

CHAPTER 14

SOR & Mifare Key

SOR

SOYAL OPEN SYSTEM RULES (SOR) is the SOYAL MIFARE APPLICATION DIRECTORY (MAD)-based developed the mechanism have multi-purpose include management access system, add value etc. SOR is advanced edition MIFARE, SOR streamlining MAD and get essential part of to help customers effectively understand the MIFARE features and benefits. MIFAREKEY and SOR TOOLS two software can help customers more efficiently study and application MIFARE the function and develop more advanced applications.

Advantages of SOR

1. The three different administrative privileges permission cards (SIM Card, UIM Card and CIM Card) can to management password and power failure AR-737 will release all information can avoid human error caused by the damage.



6-layer managing structures



User ID assignable



Expiration setup

2. The cards built-in agent code issuance though SOR Programmer. The next level also able to control their own customers, max to 6-layer managing structures.

3. Mifare Factory chip is not continuous number set by SOR, dealers can specify card number, user-friendly card management.

4. You can set up Validity in Mifare card by SOR.



Global access control



Built-in command within cards



Deposit

5. One card issuance by SOR programmer, it could be passed in other branch you specified.

6. Write the instruction to controller in Mifare card, the instruction will be set up in machine ,you don't need set up on the machine anymore.

7. SOR allows users to make electronic commerce transactions quickly and securely. SOR currently has stored value (AR-737P) and debit (SOR MIFARE) function.

SOR Application

- Value-Added Control. SOR can edit the card site code, card code, validity, rights and other functions to increase the attendance management flexibility.
- Membership-Based Approach to Management. Using SOR features: editing validity, rights or global access control through membership way manage user. For example: the community fitness facilities can set the households in permissions and statistics frequency of use to enhance community management effectiveness.
- Vending Machine and Fixed Amount of Consumption System. Using SOR fixed amount charged function to set up and management vending machines and improve the quality of life
- Hotel and Ssuites of Management Systems. Using SOR will each room the needs of is set to the card , the only present SOR card to the Door Lock (AR-323D) to complete needs of different settings.

SOR Restrictions

Using the SOR the controller can not be read MIFARE card can only be read consistent SOR set of cards. The card that use SOR can not be MIFARE controller read. MIFARE controller only the recognize on the MIFARE card original chip code. RFID industry Each developed by MIFARE application is not interoperable.

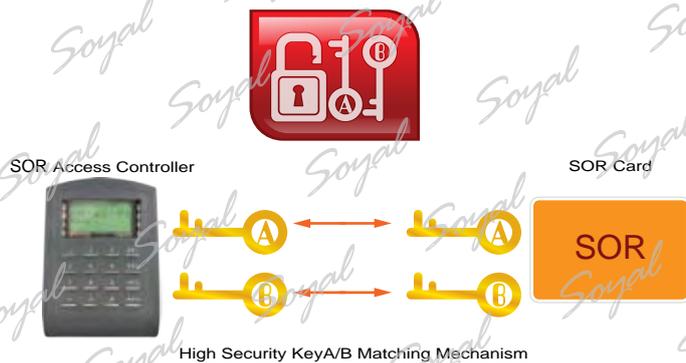
AR-737P and MIFARE Key

AR-737P has a temporary memory function, power failure release all information, high level of secrecy and high security. AR-737P mainly for the production rights card , the card format and card issuers

SOR has MIFAREKEY and SOR TOOLS two software. MIFAREKEY is the first to be developed software can help software engineers quickly develop applications, introduction MIFAREKEY is this chapter focus.

Card Configuration Steps

- A. Setting 9 permissions cards (SIM Card *3, UIM Card *3, CIM Card *3)
- B. Enable SOR controller and SOR Programmer
- C. Format MIFARE IC S50
- D. Editing formatted card
- E. Editing instruction card
- F. Setting Distribution Layer's Controller and Permissions card



A. Setting 9 Permissions Cards

Using permissions cards to save password (Key A/ Key B) and to set the permissions to strengthen the password the confidentiality. Permissions card is a very important, please keep these cards in a safe place.

Authorization Media SIM / CIM / UIM



SIM (Red) System Initiate Media:

SIM keeps the keys of each licensed distributor or his application. SIM card can format card, edit card, edit programmer and also able to control next level customers. Each AR-737P has thress SIM cards, please keep these cards in a safe place.



CIM (Blue) Card Initiate Media:

Only CIM can create new media for each application. CIM card main function is format the card and edit the card. Each AR-737P has thress CIM cards, Charge card (CIM Card) and charge controller card (UIM Card) different can be achieved decentralized management of purposes.



UIM (Green) Unit Initiate Media:

Only UIM can launch new reader unit for each application. UIM card main function is format the controller and edit the controller. Each AR-737P has thress UIM cards, Charge card (CIM Card) and charge controller card (UIM Card) different can be achieved decentralized management of purposes.

KeyA KeyB:

Key A / Key B is two 12 16 Hex value and Config Trailer composed.

- Key A=12 16 Hex value, 0-9 and A-F
- Key B=12 16 Hex value, 0-9 and A-F
- There ard two kind Config Trailer: A: Decrement, A:Increment (Default) and A: Decrement, B: Increment.

A: Decrement, A:Increment (Default): Read and write data before must be checked SOR card and the SOR controller the key A.

A: Decrement, B: Increment: Read data before must be checked SOR card and the SOR controller the key A. Write data before must be checked SOR card and the SOR controller the key B.

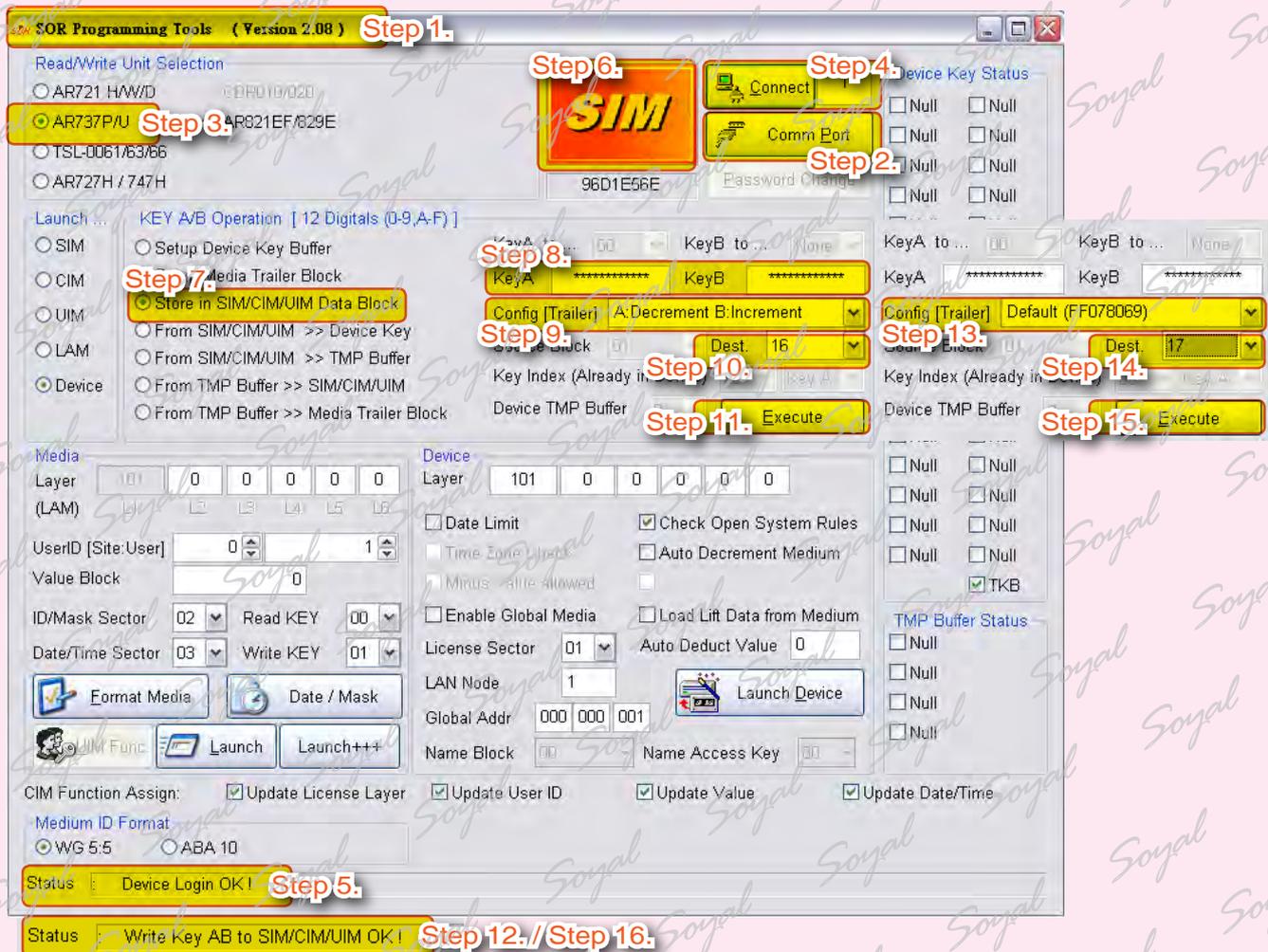
NOTE

Card and controller Data transfer required check Key A /Key B and distribution Code.

By example to get familiar with SIM Card's Key A / Key B.

Setting SIM Card Key A / Key B

- Step 1. Ending all SOYAL software and plug in AR-737P's USB to PC open MIFAREKEY software.
- Step 2. Selection COM Port.
- Step 3. Selection controller item No. For example: AR-737P.
- Step 4. Click "Connect" button to connect.
- Step 5. If status bar show "Decice Login OK! " indicates successful connection.
- Step 6. Place SIM card to the AR-737P the MIFARE software will show SIM icon.
- Step 7. Selection "Store in SIM/CIM/UIM Data Block" write data to SIM/CIM/UIM block.
- Step 8. Input the desired Key A / Key B (Key A=12 16 Hex value, Key B=12 16 Hex value).
- Step 9. Selection A: Decrement, B: Increment in "Config [Trailer]".
- Step 10. Selection 16 in "Dest" field (Save Key A/ Key B to 16th Block).
- Step 11. Press "Execute" button.
- Step 12. If status bar show "Write KeyAB to SIM/CIM/UIM OK! " indicates that the data successfully written SIM card.
- Step 13. Selection Config [Trailer] "Default(FF078069)" to set another Key A / Key B.
- Step 14. Selection 17 in "Dest" field (Save Key A/ Key B to 17th Block).
- Step 15. Press "Execute" button.
- Step 16. If status bar show "Write KeyAB to SIM/CIM/UIM OK! " indicates that the data successfully written SIM card.





Setting KeyA / KeyB and Config in MIFAREKEY software and write to SIM card block 16 and block 17

NOTE

Currently the SIM card has been stored Key A / Key B data and can active SOR setting in card and controller.
 If UIN card and CIM card has been stored Key A / Key B data also can enable card's SOR setting and controller's SOR setting.
 ※ Please keep these cards in a safe place to the rainy day.

B.Enable SOR Controller and SOR Programmer

Using permissions card to active SOR setting in card or controller. The next to introduce is how to use the SIM card to enable AR-737P's SOR setting and how to use the UIM card to set controller and enable controller's SOR setting.

SIM Card Enable AR-737P's SOR Setting

- Step 1. Ending all SOYAL software and plug in AR-737P's USB to PC open MIFAREKEY software.
- Step 2. Selection COM Port.
- Step 3. Selection controller item No. For example: AR-737P.
- Step 4. Click "Connect" button to connect.
- Step 5. If status bar show "Decice Login OK!" indicates successful connection.
- Step 6. Place SIM card to the AR-737P the MIFAREKEY software window will show SIM icon.
- Step 7. Tick "Check open system rule".
- Step 8. Press "Launch Device" button to enable SOR setting.
- Step 9. If status bar show "Update Device Layer OK! " indicates success enable SOR setting.

Step 1. Read/Write Unit Selection

Step 3. AR737P

Step 4. Connect

Step 2. Connect Port

Step 6. SIM

Step 7. Check Open System Rules

Step 8. Launch Device

Step 9. Status: Update Device Layer OK!

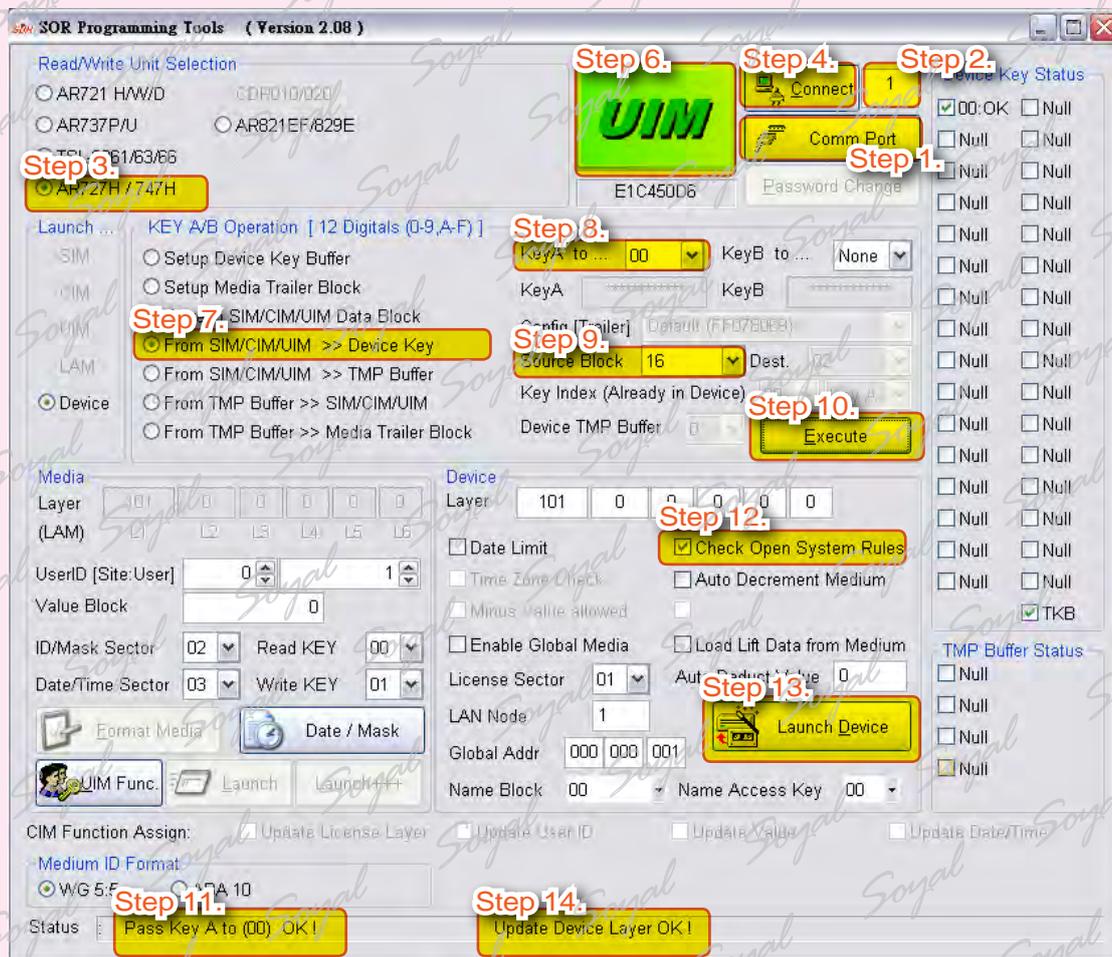
UIM Card Set and Enable AR-727H's SOR

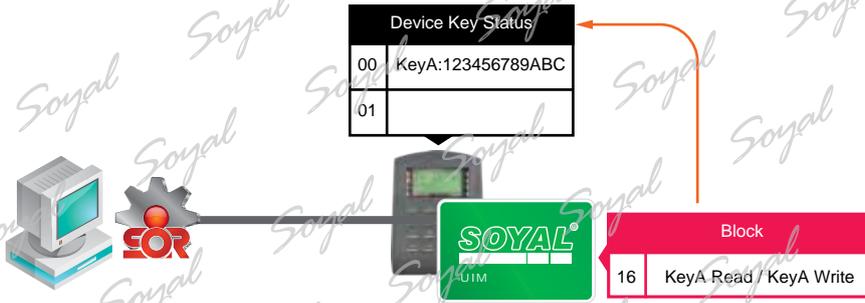
UIM Card Set AR-727H's SOR Data

- Step 1. Selection device COM Port (frequency of the device must be MIFARE).
- Step 2. Selection device's node ID. For example: AR-727H node ID is 001.
- Step 3. Selection equipment item No. For example: AR-727H.
- Step 4. Click "Connect" button to connect.
- Step 5. If status bar show "Decice Login OK!" indicates successful connect to AR-727H.
- Step 6. Place UIM card on AR-727H the MIFARE software will show UIM icon.
- Step 7. Selection "From SIM/CIM/UIM>>Device Key" to copy UIM Key A to AR-727H block 00.
- Step 8. Selection 00 in "Key A" field.
- Step 9. Selection 16 or 17 in "Source Block" field.
- Step 10. Press "Execute" button.
- Step 11. If status bar show "Pass Key A to (00) OK!" indicates that Key A has been successfully written AR-727H block 00.

UIM Card Enable AR-727H's SOR Setting

- Step 12. Tick "Check open system rule".
- Step 13. Press "Launch Device" to enable AR-727H's SOR setting.
- Step 14. If status bar show "Update Device Layer OK!" indicates successful enable.





Reading Key A from UIM card block 16 and write to AR-727H 00 block

NOTE

AR-727H is saved Key A and can with have a Key A card transmission data.

※ AR-727H is an access controller and can only be read, when you use UIM Card to Set AR-727H's SOR Data only select Key A (refer to Step 8).

C.Format MIFARE IC S50

New MIFARE IC S50 card default Key A and Key B are FFFFFFFFFFFFFFFF, the Config Trailer are Default (A:Decrement A:Increment). MIFARE IC S50 card has 16 sectors, each sectors has four blocks, the 4th block usually to save KeyA / Key B and Config Trailer and can't save others data. sector 00 can't save data because it has kept the original chip code. Sector 01 is default permission level, sector 02 and sector 03 save new card code, validity and other data, sector 14 and sector 15 is used to store the last 5 records, therefore, it is recommended data not store to these blocks. Card block and sector use planning are as follows:

Sector 00		Sector 08	
Block 00 (00)	Manufacturer Block	Block 32 (20)	
Block 01 (01)		Block 33 (21)	
Block 02 (02)		Block 34 (22)	
Block 03 (03)	FFFFFFFFFFFFFFF078069FFFFFFFFFFFF	Block 35 (23)	FFFFFFFFFFFFFFF078069FFFFFFFFFFFF
Sector 01		Sector 09	
Block 04 (04)		Block 36 (24)	
Block 05 (05)		Block 37 (25)	
Block 06 (06)		Block 38 (26)	
Block 07 (07)	FFFFFFFFFFFFFFF078069FFFFFFFFFFFF	Block 39 (27)	FFFFFFFFFFFFFFF078069FFFFFFFFFFFF
Sector 02		Sector 10	
Block 08 (08)		Block 40 (28)	
Block 09 (09)		Block 41 (29)	
Block 10 (0A)		Block 42 (2A)	
Block 11 (0B)	FFFFFFFFFFFFFFF078069FFFFFFFFFFFF	Block 43 (2B)	FFFFFFFFFFFFFFF078069FFFFFFFFFFFF
Sector 03		Sector 11	
Block 12 (0C)		Block 44 (2C)	
Block 13 (0D)		Block 45 (2D)	
Block 14 (0E)		Block 46 (2E)	
Block 15 (0F)	FFFFFFFFFFFFFFF078069FFFFFFFFFFFF	Block 47 (2F)	FFFFFFFFFFFFFFF078069FFFFFFFFFFFF
Sector 04		Sector 12	
Block 16 (10)		Block 48 (30)	
Block 17 (11)		Block 49 (31)	
Block 18 (12)		Block 50 (32)	
Block 19 (13)	FFFFFFFFFFFFFFF078069FFFFFFFFFFFF	Block 51 (33)	FFFFFFFFFFFFFFF078069FFFFFFFFFFFF
Sector 05		Sector 13	
Block 20 (14)		Block 52 (34)	
Block 21 (15)		Block 53 (35)	
Block 22 (16)		Block 54 (36)	
Block 23 (17)	FFFFFFFFFFFFFFF078069FFFFFFFFFFFF	Block 55 (37)	FFFFFFFFFFFFFFF078069FFFFFFFFFFFF
Sector 06		Sector 14	
Block 24 (18)		Block 56 (38)	
Block 25 (19)		Block 57 (39)	
Block 26 (1A)		Block 58 (3A)	
Block 27 (1B)	FFFFFFFFFFFFFFF078069FFFFFFFFFFFF	Block 59 (3B)	FFFFFFFFFFFFFFF078069FFFFFFFFFFFF
Sector 08		Sector 15	
Block 28 (1C)		Block 60 (3C)	
Block 29 (1D)		Block 61 (3D)	
Block 30 (1E)		Block 62 (3E)	
Block 31 (1F)	FFFFFFFFFFFFFFF078069FFFFFFFFFFFF	Block 63 (3F)	FFFFFFFFFFFFFFF078069FFFFFFFFFFFF

SOR
Event Log

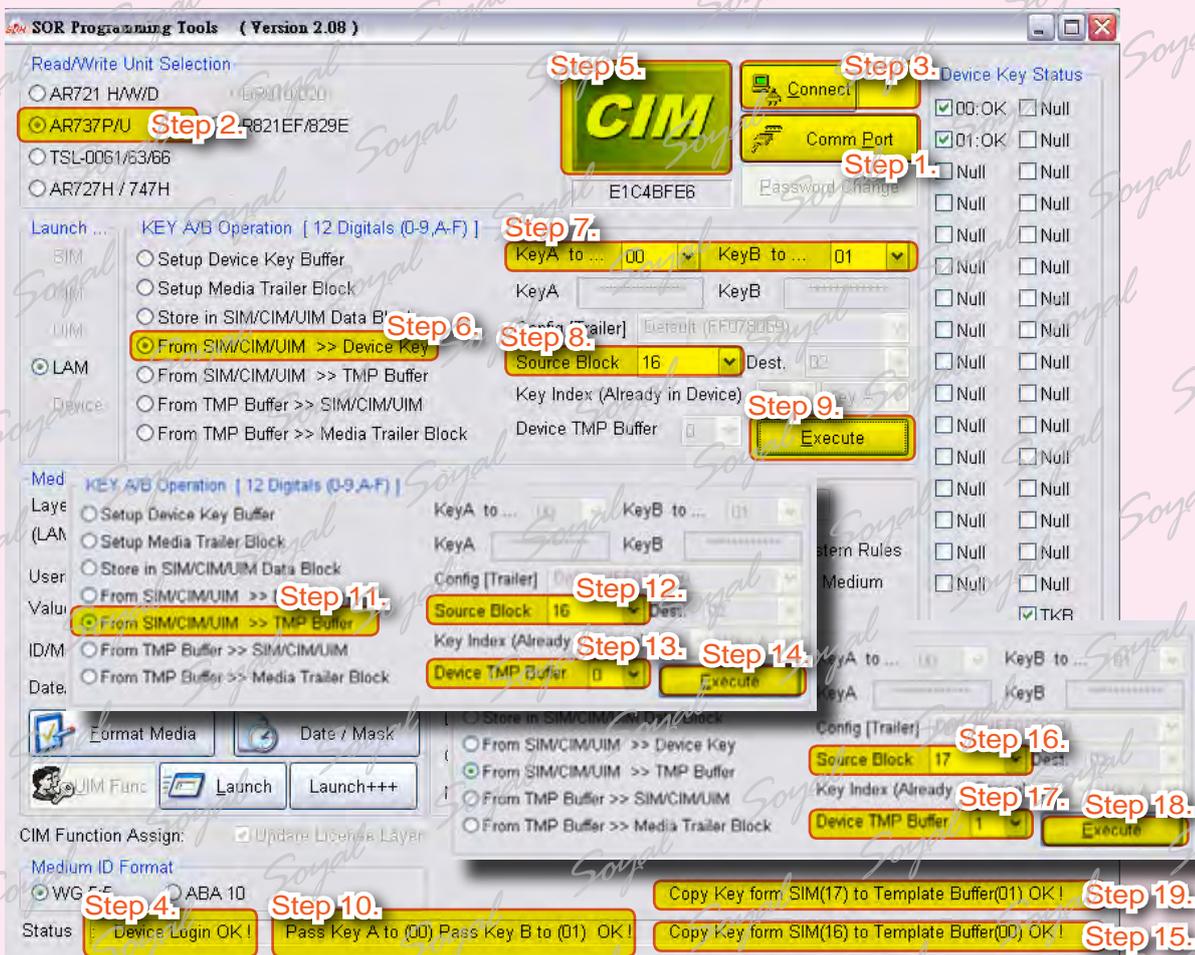
CIM Card Key A / Key B Save Into AR-737P and the Buffer

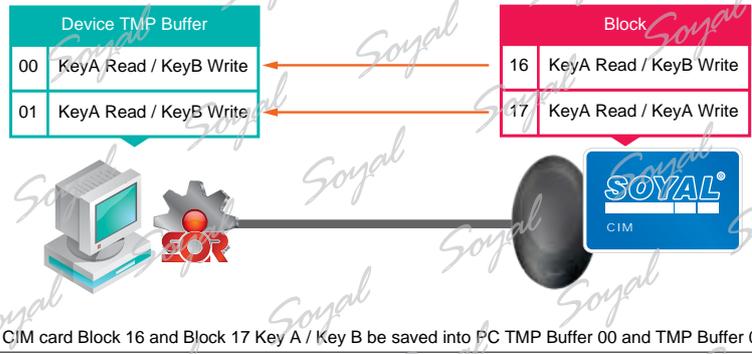
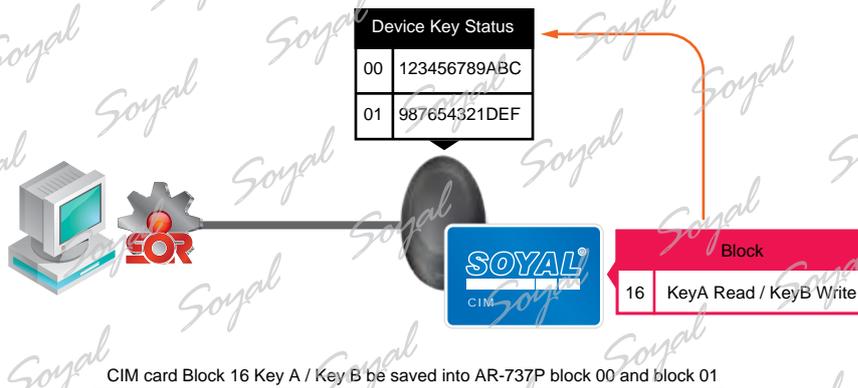
CIM Card Key A / Key B Save Into AR-737P

- Step 1. Selection AR-737P COM Port.
- Step 2. Selection controller item No. For example: AR-737P.
- Step 3. Click "Connect" button to connect.
- Step 4. If status bar show "Decice Login OK!" indicates successful connection.
- Step 5. Place CIM card on AR-737P the MIFARE software will show CIM icon.
- Step 6. Selection "From SIM/CIM/UID>>Device Key" to read CIM card data and write into AR-737P.
- Step 7. To Select 00 in "Key A" field and select 01 in "Key B" field that is mean CIM card Key A be saved into AR-737P block 00 and CIM card Key B be saved into AR-737P block 01.
- Step 8. Selection 16 or 17 in "Source Block" field.
- Step 9. Press "Execute" button.
- Step 10. If status bar show "Pass Key A to (00) Pass Key B to (01)OK!" indicates Key A / Key B has been successfully copied to AR-737P block 00 and block 01.

CIM Card Key A / Key B Save Into PC Buffer (TMP Buffer)

- Step 11. Selection "From SIM/CIM/UID>> TMP Buffer"
- Step 12. Selection 16 in "Source Block" field.
- Step 13. Selection 00 in "Device TMP Buffer" field.
- Step 14. Press "Execute" button.
- Step 15. If status bar show "Copy Key from SIM(16) to Template Buffer(00) OK !" indicates UMI card block 16 has been successfully copied to Template Buffer 00.
- Step 16. Selection 17 in "Source Block" field.
- Step 17. Selection 01 in "Device TMP Buffer" field.
- Step 18. Press "Execute" button.
- Step 19. If status bar show "Copy Key from SIM(16) to Template Buffer(00) OK !" indicates UMI card block 17



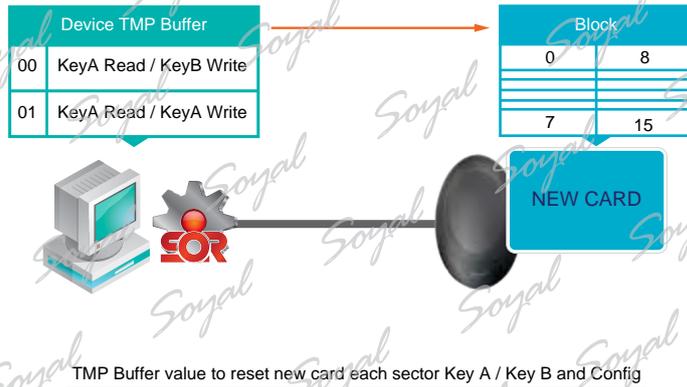


NOTE

Now AR-737P and PC TMP buffer have CIM card's Key A and Key B, so the CIM card have to remove the AR-737P.

CIM Card Format MIFARE IC S50

- Step 1. Place MIFARE IC S50 on AR-737P the MIFARE software will show NEW icon.
- Step 2. Press "Format Media" will open "Format new medium to LAM" window.
- Step 3. Tick all option in "User Sector" field because we will format all 16 sectors.
- Step 4. Source TMP xx : saving TMP buffer status (TMP buffer 00 and TMP buffer 01) to MIFARE IC S50 sector. We will save TMP Buffer status 00 data into sector 00~13 and save TMP Buffer status 01 data into sector 14~15 (TMP Buffer status 00: A: Decrement, B:Increment, TMP Buffer status 01:A: Decrement, A:Increment).
- Step 5. A new media (new MIFARE card) default value use Key A as master code to read and write data into media. Because MIFARE IC S50 is a new card, so "Use KeyAB Type" field select Key A (default).
- Step 6. In order to easy programming the new media, SOYAL put this default vale at the 32nd key (initial key) of device for user. Because MIFARE IC S50 is a new card, so "User Key at" field select 32 (default).
- Step 7. Press "RUN" to Format, all sector shows OK.
- Step 8. Press "EXIT" to quit.



D.Editing Formatted Card

The following is MIFAREKEY software provides can be edited the content:

1. Distribution Level
2. Programming USER ID
3. Card Value (0~32767)
4. Validity Period
5. Global Access Conditions and Global Access Address
6. User Name
7. Command
8. Change the Default Address

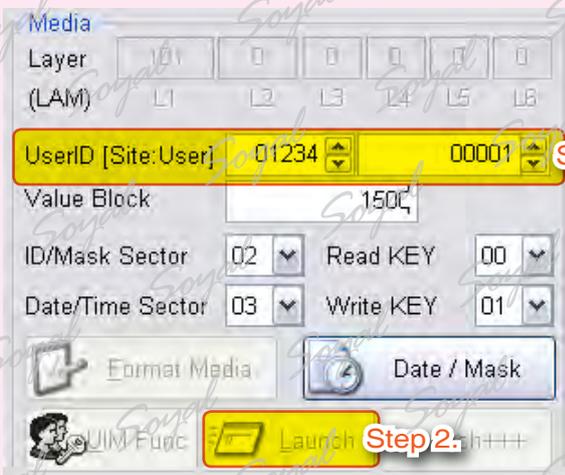
※ Data set is complete remember to press the ooo button and generate ok messages to ensure that the settings have been saved.

2. Programming USER ID

SOR controller will read SOR card UserID as shown on, for example: 01234 00001. General, card code use WG code:5 digits card site code and 5 digits card code and must be less than 65535.

Step 1. Input 5 digits card site code and card code.

Step 2. Press "LAUNCH MIDIA" and the status would change to "LAM".

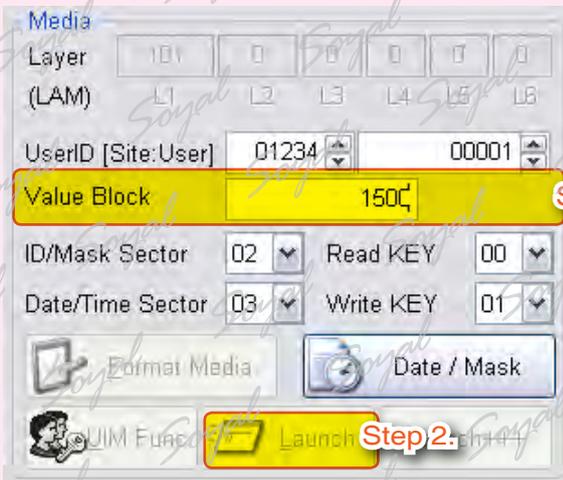


3. Card Value

Card value must be an integer and should be less than 32,767.

Step 1. Input value.

Step 2. Press "Launch" button.



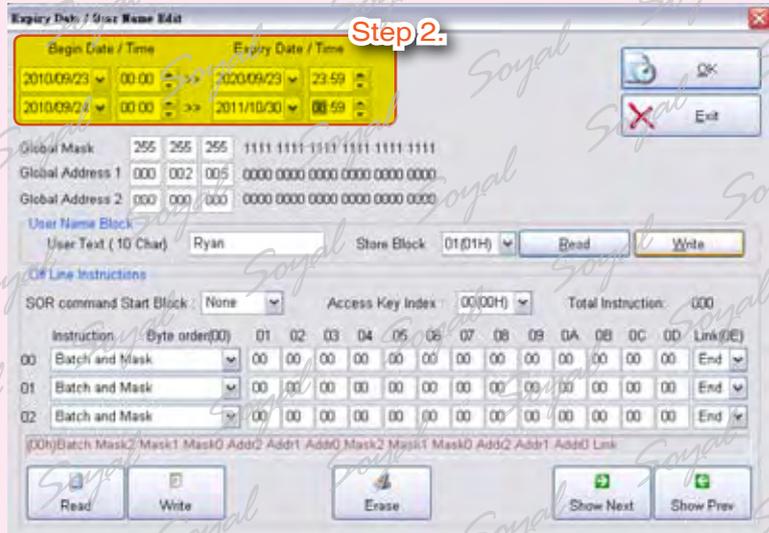
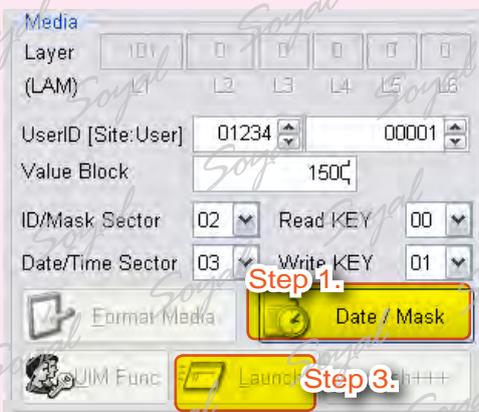
4. Validity Period

Here are 2 groups validity of to the user and the flexibility in the use.

Step 1. Press "Date / Mask" will open "Expiry Date / User Name Edit" window.

Step 2. Input starting date and ending date.

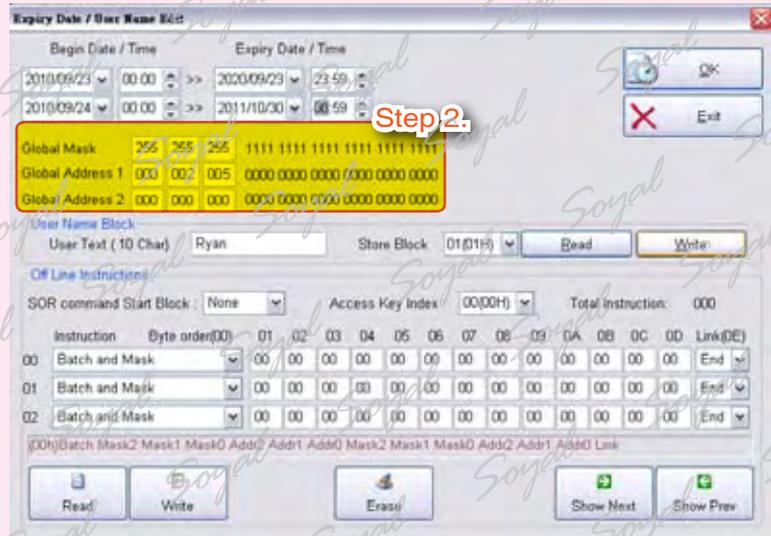
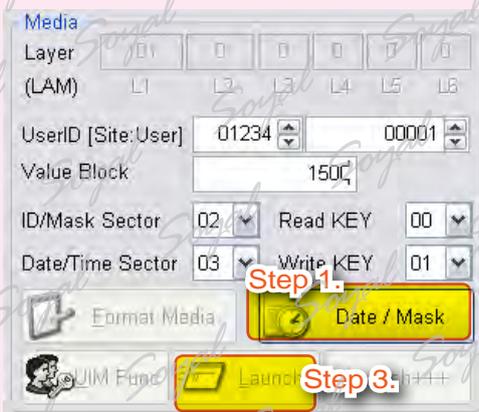
Step 3. Press "Launch" button.



5. Global Access Conditions and Global Access Address

Setting the number to be checked when SOR be used in global access control through 2 Hex 0 and 1 determine the need for reconciliation, 0 means do not check the data, 0 represents the need to verify the data. A total of 3 bytes, If you enter the data base 10 , please remember to convert to 2 decimal. If you input 255.255.255 that is mean for each byte need to be checked, each card and controller's byte are the same can access. Each field the maximum value is 255.

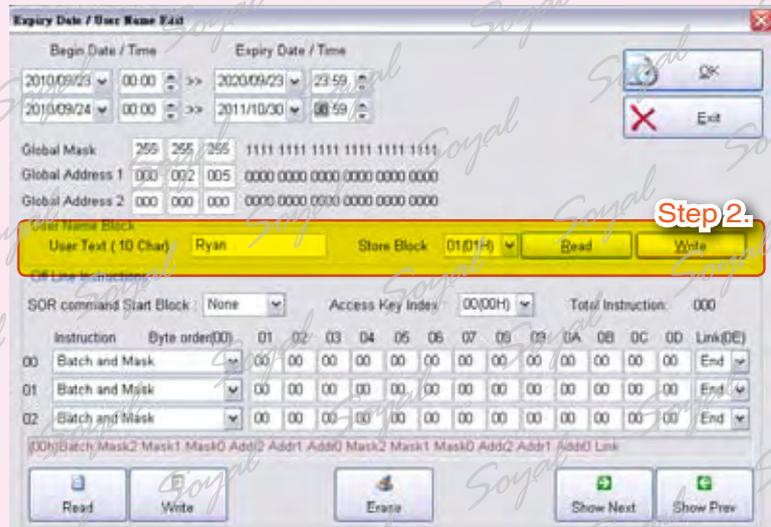
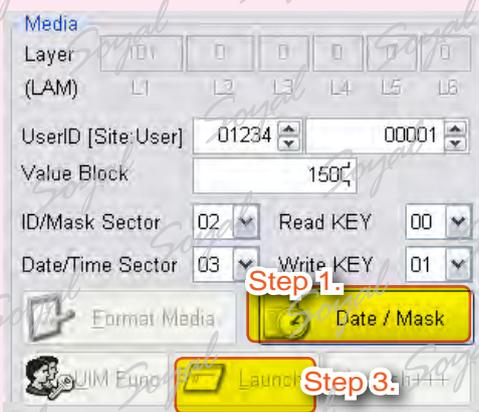
- Step 1. Press "Date / Mask" button will open "Expiry Date / User Name Edit" window.
- Step 2. Enter to be checked the value.
- Step 3. Press "Launch" button.



6. User Name

For the store name the default address is 01H, you can according to the demand change the user name, but remember to set controller's user name address, mainly in order to make cards and controller consistent with the data. The maximum value is 10 letters and five Chinese characters.

- Step 1. Press "Date / Mask" button will open "Expiry Date / User Name Edit" window.
- Step 2. Input name and press "Write" button.
- Step 3. Press "Launch" button.

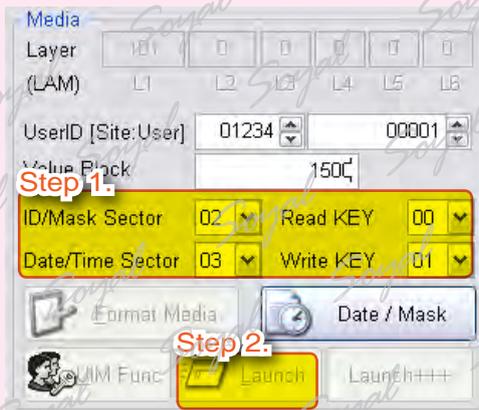


8. Change the Default Address

Default card code, value be saved in sector 02 and validity period be saved in sector 03, as shown below. Responsible for writing feature Is KeyB and responsible for writing feature Is KeyA, so the AR-737P buffer be used for read is 00 and the AR-737P buffer be written for read is 01.

Step 1. Select the "Read KEY" and "Write KEY" value.

Step 2. Press "Launch" button.



NOTE

If SIM card used to load Key A and Key B to the device, software will show "LAN" indicates that the card was formatted.

E.Editing Instruction Card

AR-737P is to edit instruction card an important medium, to make use of the card user can quickly understand and use SOR provided by the functions, SOYAL software MIFAREKEY opening many instructions and operation of to the user their own edit and modify. These open instructions include:

1. Setting the controller basic data, for example: controller Time correction, node ID, SOR parameters etc.
2. Adding card
3. Deleting card
4. Reading standalone controller messages.

Press "Date/Mask" button to open Expiry Date / User Name Edit window. Instruction starting address is 16H, the first instruction must be Batch and Mask and connect next instruction through "Next". Batch and Mask be used to determine the number of instruction. If controller have a consistent Key A / Key B and Distribution Code then can implementation of the instruction.

Setting Controller Data

For example: Setting function card to modify the controller function, data can be modified as follows:

1. Node ID = 002
2. Door Number=002
3. Lock Relay Time=003 sec
4. Read user name.

- Lock Relay Time is 3 sec =3000 ms=012C, base on 10ms.
- GID2/1/0 be used in Door Lock to set Global node ID.

※ Instruction format is 16 hex.

- Step 1. Instruction starting address is 16 (10H).
- Step 2. Batch and Mask last field value selection "Next" to connect next instruction.
- Step 3. Selection "Node Parameter".
- Step 4. Instruction address 01~03 save global node ID data: 00 00 02.
- Step 5. Instruction address 04 save node ID: 02 (002 (10 hex) conversion to 16 hex is 02).
- Step 6. Instruction address 05~06 save Lock Relay Time: 01 2C=3000ms (3000 (10 hex) conversion to 16 hex is 01 2C)
- Step 7. Instruction address 07~08 save door number: 00 02 (2 (10 hex) conversion to 16 hex is 00 02).
- Step 8. Instruction address 09 save user name: 01, because user name be saved in card block 01.
- Step 9. Instruction address 0A save Name-Key: 00, because Key be saved in controller buffer 00.
- Step 10. Press "Write" button.



F. Setting Distribution Layer's Controller and Permissions card

A total of 6 layers distribution layer, SOYAL sales of products is the first distribution layer, first distribution layer sales of products must to set the second distribution layer code. Card and the controller layer must be the same can communicate with each other. The following is a the distribution Code description:

The first distribution code (SOYAL sales of products is the first distribution layer): 1-60,000.

The second distribution code: 1-60,000.

The third to 6th distribution code: 1-250.

For example: distribution (distribution No. 101) will sales AR-737P to his customer (customer No. 111)

Setting the Second Distribution

- Step 1. AR-737P connect to PC.
- Step 2. Place SIM card (distribution No. 101's SIM card) on AR-737P.
- Step 3. "Device Layer" field: Input 111.
- Step 4. Press "Launch Device" button.



Setting the Second Distribution Permission Cards

- Step 1. The first layer AR-737P connect to PC.
- Step 2. Place the first layer SIM card on AR-737P and from AR-737P remove the SIM card.
- Step 3. Place the second layer SIM card on AR-737P.
- Step 4. Selection SIM in "Launch" field.
- Step 5. Input 111 in "Media Layer" field.
- Step 6. Press "Launch" button.



Step 2.



Present the first layer SIM card to AR-737P to enable next layer card

Step 3.



From AR-737P remove the SIM card.