ScreenCheck BADGEMAKER 7

SC Mifare Plug-In

· ID DESIGN · MANAGE · PRINT SYSTEM ·



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Introduction to Mifare

MIFARE is based on the International Standard ISO/IEC 14443 Type A.

MIFARE is used for contactless smart card systems. MIFARE typically has a maximum read and write distance of 10cm. It is highly secure and reliable as there are no moving parts and no battery involved in the operation of MIFARE.

MIFARE 1k features

- MIFARE 1k has a storing capacity of 1 KB of information (768 Bytes).
- Unique serial number of 4 Bytes
- 2 x 48 bit keys per sector for key hierarchy.
- Data Retention is around 10 years.
- 16 sectors (or tracks), each sector contains 4 blocks,
- 3 user blocks (block 0 to 2) and one key block (block 3)
- Sector 0 block 0 cannot be used (contains manufactory data)
- Sector 0 block 1 and 2 can be used for the MAD.
- Each block contains 16 bytes.

MIFARE 4k features

- MIFARE 4k has a storing capacity of 4 KB of information (3480 Bytes).
- Unique serial number of 4 Bytes.
- 2 x 48 bit keys per sector for key hierarchy.
- Data Retention is around 10 years.
- 40 sectors (or tracks).
- The first 32 sectors contain 4 blocks,
- 3 user blocks (*block 0 to 2*) and one key block (*block 3*)
- Sector 0 block 0 cannot be used (*contains manufactory data*)
- Sector 0 block 1 and 2 can be used for the MAD for sector 1 to 15.
- In case MAD is used, sector 16 block 0 to 2 contain the MAD
- information for sector 16 to 39.
- The last 8 sectors contain 16 blocks,
- 15 user blocks (*block 0 to 14*) and one key block (*block 15*).
- Block 0 key is for block 0 to 4
- Block 1 key is for block 5 to 9
- Block 2 key is for block 10 to 14
- Block 3 key is for block 15, which is the key block.
- Each block contains 16 bytes.





Installing SC Mifare

Inventory Checklist

- Mifare Reader, stand-alone or built-in a printer.
- A Serial cable to connect the reader to your computer, (not for Zebra-Gemplus solution).
- KeyCard (chipcard), containing the Mifare Keys, or Keyfile in the mifare directory.
- If the Keys are stored on a Card select SCR331Chipcard reader for the KeyCard.
- SC Mifare Software.

This software can be used for:

- Classic Mifare 1k
- Classic Mifare 4k

Installing SC Mifare

It is recommended to close all your applications before installing new software.

Select from a CD installation menu **Encoding** click on **SC Mifare** or run **SCMifare.exe** from (*the root\fscommand of*) the CD.

The Install Shield wizard will begin which will guide you through the Installation.



Welcome to SC Mifare Setup

Click Next to proceed.

You must accept the license agreement to install the product.

tall	Shield Wizard
i ce i Ple	nse Agreement ase read the following license agreement carefully.
Pre	ss the PAGE DOWN key to see the rest of the agreement.
Th Sc ag thi: By Sc sul res inc	is document is a legal agreement between the user, who is the licensee, and reenCheck B.V By using this program, the licensee is obliged to fulfil the terms of this reement. If you, the user, do not agree with the terms of this agreement, please return s product in its original package with payment receipt, within 14 days to your retailer. paying the retail price, the buyer pays the License fee to ScreenCheck B.V reenCheck B.V. grants the licensee a non-exclusive right - without the right to b-license + 0.0 grants the licensee and non-exclusive right - without the right to b-license + 1.0 software, and retains title and ownership of the software, sluding all subsequent copies in any media.
Do	you accept all the terms of the preceding License Agreement? If you choose No, the

License Agreement

Click Yes to proceed.

Enter a **User Name** and a **Company Name**, this information is necessary to register the Mifare software.

InstallShield Wizard	
Customer Information Please enter your information.	
Please enter your name and the name of the cor	mpany for whom you work.
User Name:	
SC	
Company Name:	
sc	
InstallShield	
	< Back Next > Cancel

Customer Information





In the next wizard user you can choose between three different installation options:

- Custom (custom installation)
- **Mifare DeChip** (custom install for Cards&More)
- Standard Mifare (standard installation for Digion24,GemPlus and IE readers)

InstallShield Wizard	
Setup Type Choose the setup type that best suits your needs.	
Click the type of Setup you prefer. Custom Mifare DeChip Standard Mifare	Description Standard Mifare installation supporting Digion24 and IE readers
InstallShield < Back	Next > Cancel

Setup Type

By default Standard Mifare is selected, click Next to proceed.

Choose a destination.

	na se a companya da se a 🛀
Choose Desitnation	
Setup will install ScreenCheck	k Mifare in the following folder.
another folder.	ion, To instanto a different folder, click browse and select
Destination Folder	

Choose destination path

The default path is C:\SC\Mifare, click Browse to select another destination.

Click Next to proceed.

InstallShield Wizard	×
Select Program Folder Please select a program folder.	
Setup will add program icons to the Prog name, or select one from the existing fold Program Folders:	gram Folder listed below. You may type a new folder ders list. Click Next to continue.
SC Mifare	
Existing Folders: Adobe	×
Adobe Design Premium CS3 Adobe RoboHelp 7 BadgeMaker 5400 BadgeMaker 6400	
Bureau-accessoires Dell Webcam Dell Wireless intelliTWAIN Canon	✓
InstallShield	
	< Back Next > Cancel
Sele	ect Program Folder

Select a program folder. We advise to leave this default. Click **Next** to proceed. If any changes are to be made before installing click **Back**, if satisfied with the settings click **Next** to begin installing files.

	M2414	—
Start Copying Review settir	J Files Igs before copying files.	
Setup has er change any : copying files.	ough information to start copying the program files. If you w ettings, click Back. If you are satisfied with the settings, cli	vant to review or ck Next to begin
Current Settir	igs:	
User informa	tion:	<u>N</u>
Name: Company:	SC SC	
Destination:	C:\SC\MiFare	
		~

Review setup

Click **Next** to begin installing files onto the computer.

To be able to print and encode cards user need to select a reader and a printer type you will be using.

In the next dialog you must select which reader will be used in conjunction with the SC Mifare plug-in.

Choose from the following:

- IEMifare
- Omnikey
- SCR31DI
- DigiOn24

REED	
InstallShield Wizard	
Setup Type Choose the setup type that best suits your needs.	
IEMifare , Gemplus, Omnikey, SCR331DI or DigiOn24 MiFare reader	
O IEMifare	
- C Comples-	
C Omnikey	
C SCR331DI	
DigiOn24	
InstallShield	
< Back Next >	Cancel

Select type of reader

For example if you are using an Omnikey reader you must select Omnikey as shown below.

C IEMifare
-C Complas
Omnikey
C SCR331DI
O DigiOn24
_

In the next dialog you must select which reader will be used in conjunction with the SC Mifare plug-in.

nstallShield Wizard		
Setup Type Choose the setup type that be:	st suits your needs.	
Are you using a CX320, CX120	0, CX330, P330i, P430i, Zebra Ethernet Printer or (other printer
C DNP CX320	<u>C 21.11.51</u>	-
C DNP CX120	Other	
C DNP CX330		
- S Zoba Pooli wiin Uob da	nFias milare	
- Zebian 430r With OSD Gen	m ius minare	

Choose from the following:

DNP CX320
DNP CX120
DNP CX330
Other

Select a printer from the list or choose $\ensuremath{\textbf{Other}}$ and click $\ensuremath{\textbf{Next}}$ to proceed.

InstallShield Wizard			X
Setup Type Choose the setup type that best suits your need	ds.		
Mifare keys from File or Cardreader			
C File			
 Cardreader 			
InstallShield			
	< Back	Next >	Cancel





Select if you are obtaining Mifare keys from a file or card. Click **Next** to proceed.

If you have an installation of BadgeMaker version 6.1 or earlier then you must follow the next step to convert existing **CHP** files (*encoding information files*).



After clicking **Finish** the screen below will appear.

😫 SC convert CHP files	
** Click Analyze to see which files have to be converted ** ** Click Convert to convert the .CHP files **	
Analyze Convert Close	

Click analyze to check if there are CHP files on user computer that need to be converted.

When there are files to convert click on **Convert**.

When there are no files to convert click on analyze to check again or close to close the screen.







Select **Check the Mifare reader and KeyCard now** will test connection to the reader and keys to be used let the box checked and then click on **Finish**.

If there are no errors the following dialog will be presented.

🛃 SC Mifare Sy	/stem Test	×
S	C Mifare system is Oł	<
	Retry	
	System test success	



SC Mifare GUI

Selecting Mifare 1k or 4k

When creating a Mifare layout, the choice can be made between a **Mifare 1k** or **4k** type. This only is applicable to the standalone Mifare application.

For the standalone program the setting can be made in the program: From the top menu select **Mifare type** and click **1K** or **4K**.



This is done with a setting in the **ScMifareEnc.ini** file located in the **C:\SC\Mifare** directory this entry is: "**MifareType= 0**" for a Classic 1k card or "**Keys = Card**" (under the header [**Mifare**]).

EEV	
SCMifareEnc.ini - Kladblok	
Bestand Bewerken Opmaak Beeld Help	a Tanada 22 a Tanada 40
ReaderPort=1	; Irack 32 -> Irack 40
· · ·	Supported Mifare Readers: 0 - Iolan (using ISI-SmartEncoder software) 1 - Triple-Eye PR22 ; Digion24 ; I.E. 2 - Cards & More DECHIP
ReaderType=1 ; ;	supported reader dll's: Digion24.dll IEDLLMFC.dll Gemplus.dll SCR331DI.dll Omnikey.dll
; ReaderDll=Omnikey.dll	
, , MifareType=0	MifareType 0 = Classic 1k 1 = Classic 4k
, ,	MifareKeys File or Card
; keys=Card	
	Printers with special Mifare treatment DNP 330 DNP 320 DNP 120
<	

4

The chosen selection will be stored in the **ScMifareEnc.ini** file. When the program is restarted, this will be collected, so the last made selection is valid again.

Selecting Keys from card or file

This is done with a setting in the ScMifareEnc.ini file located in the C:\SC\Mifare directory this entry is: "Keys= File" or "Keys = Card" (under the header [Mifare]).

🖡 SCMifareEnc.ini - Kladblok		X
Bestand Bewerken Opmaak Beeld Help		
peaderTyne_1	0 - Iolan (using ISI-SmartEncoder softwa 1 - Triple-Eye PR22 ; Digion24 ; I.E. 2 - Cards & More DECHIP	ır 🔼
, , , , , , , , , , , , , , , , , , ,	supported reader dll's: Digion24.dll IEDLLMFC.dll Gemplus.dll SCR331DI.dll Omnikey.dll	
ReaderDll=Omnikey.dll		
, , ,	MifareType 0 = Classic 1k 1 = Classic 4k	
MifareType=0		
	MifareKeys File or Card	
keys=File		
	Printers with special Mifare treatment DNP 330 DNP 320 DNP 120 Zebra P330i Zebra P430i Zebra Performance Line Ethernet Nisca-PR5200	~
< [>
	ScMifareEnc.ini	

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Working with KeyFiles

A KeyFile containing **Public-key 2** is installed in the SCMifare directory, so you can start encoding.

If you want to create your own keys, you can start the program **ScKeyFileMifare.exe** (*Key-File generator*). The default logon password **1A1B1C1D1E1F**. To change your password, click **Change Password** and follow the on screen instructions.

Public keys 1 and 2 can be generated by selecting the Public key 1 or 2 button.

By double clicking a track row, you are presented with a dialog to fill in your own keys and access conditions for the track. If you do not have specific keys required you can also choose **Init Random**.

If the keys displayed are correct you can write them to the keyfile with the **Write keyfile** button, then you have to type an **8** character key which is used to encrypt your keyfile. There is also a possibility to read the current keyfile, to be able to do this you must provide the **8 character encryption key** which was provided when the key file was written.

The generated keyfile is located in the C:\SC\Mifare directory and is called mifare.yek.



If you want to use a second keyfile you can rename the existing mifare.yek and then generate a new one.

Working with Keycard

Connect a card reader to the PC and use the keycards supplied by ScreenCheck.

Using the **KeyCardTest.exe** verify that both Mifare and Card reader are properly connected and are functioning.

SC Mifare Settings

Use the SC Mifare plug-in application to setup the Mifare reader; Identify the Reader placement using **Reader>Settings**.

SCREEN CHECK		_	
	Settings		
	Reader placement: St In: St	tand Alone 💽 side Printer and Alone	
	Auto Read on New Card Use Transport Keys OK	Cancel	

Select either Stand Alone or Inside Printer.

Setup Key Usage

Track Init KeySet: These are the keys shipped with your Mifare cards which the operator must specify in order to initially gain access. These are stored in the 3rd block of a track.

Read/Write KeySet: These are the keys you will specify to replace the default stored keys (*specified in Track Init Keyset*) in the card.

Example

User Keys will replace Public Keys 2 as shown below.



If both **Track Init KeySet** and **Read/Write KeySet** are configured as the same same than no initialization will occur.



Setting Track Init KeySet to Automatic is recommended as shown below.

SCREEN		
	Key Usage	
	Track Init KeySet:	
	Read/Write KeySet: User Keys 💌	
	Track Init Read Write ⊙ Key A ⊙ Key A ○ Key B ○ Key B ○ Key B ○ Key B	
	BadgeMaker settings	
	Read from	
	Write to	
	OK Cancel	

Key Usage

Set **Track Init KeySet** to keys that are shipped with the <u>empty</u> cards. Select from the following **Keysets**:

- Public Keys 1 (A0...A6)
- Public Keys 2 (FF...FF)
- User Keys
- Automatic

Set Track Init to Key A (this should work in most cases).



Set **Read/Write KeySet** to **User Keys** if you have customized your own keys or **Public Keys 1** or **2** (a copy of the KeyCard).

Read/Write KeySet:	User Keys	-
-		_

Configure Read and Write to Key A or Key B as required by the User Keys.





Read	Write
💿 Key A	🔿 Key A
🔿 Key B	Key B
	Verify

Enable/Check Verify if you want to verify each write action (recommended).

Write	
🔘 Key A	
Key B	
🔽 Verify	

When all settings are correct, click **Write to** (*test*) ensuring BadgeMaker will use these settings.



Testing with a Stand Alone reader

Select Mifare Card from the toolbar, or from the SC Mifare menu select Mifare Card and click New Card.

Place a Mifare Card on the reader.



The Card Serial Number will be displayed on the screen.





🗐 SC Mifare	(Card Serial N	umber: 3663279437	/ = 0xDA59354D) 🔀
File Reader	Mifare Card Mifa	re type Page (4k) Help	-
🖻 🖬 🍼	× 🕹 🎸 😵		Reversed
Current Card:	4D3559DA SF	now Hexadecimal 🔲	Use MAD 🔲
Track R	Block 0	Block 1	Block 2
0 ~	Y5M G ⊥n [Mifare serial number	

Click Select All from the toolbar, or from the Mifare Card menu click Select All.

🚍 SC Mifare (Card Serial Nu	mber: 36632794	37 = 0xDA59354D) 🔀
File Reader Mifare Card Mifare	etype Page(4k) He	lp
Current Card: 4D3559DA Sho	ow Hexadecimal 🔲	Use MAD 🗖
Track R Block 0	Block 1	Block 2 N
0	sa	-1
2		
3		
5	1987 	3
6		
7	83 <u></u> 83	
9 <u> </u>	868	
10		
12		
13		
15		
<		

Select All tracks

Select Select Initialize from the toolbar, or from the Mifare Card menu. A counter will show the progress while the tracks are initialized.

Use Initialize only if needed or required to change the keys in the mifare card. If the keys stored in the card are the same as the selected/configured read/write keys, this action is not necessary.

Card Encoding
Initializing Track 7
Please Wait
Cancel

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Select Read from the toolbar, or from the Mifare Card menu. A counter will show the progress while the tracks are read.

The read information is displayed on the screen.

🔜 SC Mifare (Card Serial Number: 3663279437 = 0xDA59354D) 🛛 🛛 🔀					
File Reader Mifare Card Mifare type Page (4k) Help					
🛎 🖬 💆 🚿 🕭 😽 .					
Current Card: 4D3559DA Show	Hexadecimal 🗖	Use MAD 🔲			
Track R Block 0	Block 1	Block 2	MAD		
0 » _Y5MG_+u 1 » 100001					
2 » Johnson David					
4 » Software Develop	z				
5 »					
7 »					
8 » 9 »					
10 »					
12 »					
13 »	3				
15 »					
Track Information					

To view the data in Hexadecimal format, check **Show Hexadecimal**.



The read information is displayed on the screen in hexadecimal format.

2 R	11 🍼		
Current	Card:	4D3559DA Show Hexadecimal 🔽 Use	e MAD 🔲
Track	R	Block 0	Block 1
0	*	DA 59 35 4D FB 88 04 00 47 C1 2B 75 D1 00 08 07	00 00 00 00 00 00 01
1	»	31 30 30 30 30 31 00 00 00 00 00 00 00 00 00 00 01	00 01 02 03 00 0
2	>	4A 6F 68 6E 73 6F 6E 20 44 61 76 69 64 00 00 00	00 00 00 00 00 00
3	»	31 30 30 30 30 31 00 00 00 00 00 00 00 00 00 00 00	
4	»		7A UU UU UU UU UU U
с с	»		
7	» ~		
8	~		
9	»		
10	>	00 00 00 00 00 00 00 00 00 00 00 00 00	00 00 00 00 00 00 0
11	»	00 00 00 00 00 00 00 00 00 00 00 00 00	00 00 00 00 00 00 01
12	»	00 00 00 00 00 00 00 00 00 00 00 00 00	00 00 00 00 00 00 01
13	»	00 00 00 00 00 00 00 00 00 00 00 00 00	00 00 00 00 00 00 01
14	>	00 00 00 00 00 00 00 00 00 00 00 00 00	
15	»	00 00 00 00 00 00 00 00 00 00 00 00 00	00 00 00 00 00 00 01

10 3

Show Hexadecimal

To view data configured in conjunction with MAD, Mifare Application Directory, check Use MAD.

🗐 s	C Mifar	e (Card Ser	ial Number	: 366327	9437	= 0xDA59354	D) 📔	×
File	Reader	Mifare Card	Mifare type	Page (4k)	Help			
Current Card: 4D3559DA Show Hexadecimal Use MAD								
Tra	ack R	Block 0	Blo	ock 1		Block 2	MAD	
	n ~	V5M G	111	Use MAD				

Testing Mifare with a Stand Alone Reader

Select New Card from the toolbar 2, or from the Mifare Card menu click New Card.

Place a Mifare Card on the reader.

The Card Serial Number will be displayed on the screen.

🚍 SC Mifare (Card Serial Number: 3663279437 = 0xDA59354D) 🛛 🛛 🔀

Click Select all from the toolbar , or from the Mifare Card menu click Select All.





Select Initialize from the toolbar solution or from the Mifare Card menu click Initialize. A counter will show the progress while the tracks are being initialized.

Use Initialize only if needed or required to change the keys in the mifare card. If the keys stored in the card are the same as the selected/configured read/write keys, this action is not necessary.

Select **Read** from the toolbar , or the from **Mifare Card menu** click **Read**. A counter will show the progress while the tracks are read.

The read information from the card is displayed on the screen. To view the data in Hexadecimal format, check **Show Hexadecimal**, and enlarge the window.

🚍 SC Mifare (Card Seri	al Number: 3663279437 = 0xDA5935 🔀			
File Reader Mifare Card	Mifare type Page (4k) Help			
Current Card: 4D3559DA	Show Hexadecimal 🔲 Use MAD 🕅			
Track R Block 0 0 > _Y5MG 1 > 100001 2 > Johnson Davi 3 > 100001 4 > Software Devi 5 > 6 > 7 > 8 > 9 > 10 > 11 > 12 > 13 > 14 > 15 >	Block 1 Block 2 +u			

Results

Testing Mifare with a Reader inside a Printer

Place a Mifare Card into the Card Hopper.

Select New Card from the toolbar 2, or from the Mifare Card menu click New Card.

The card is then fed into the reader.

The Card Serial Number will be displayed on the screen.

SC Mifare (Card Serial Number: 3663279437 = 0xDA59354D)

Click Select all from the toolbar , or from the Mifare Card menu click Select All.

Select **New Card** from the toolbar *Select*, or from the **Mifare Card menu** click **New Card**. The card is moved to the encode position inside the printer which then can be read by the onboard reader.





Select Initialize from the toolbar so r from the Mifare Card menu click Initialize. A counter will show the progress while the tracks are being initialized. Initializing the card will replace old keys with newer keys, this occurs in the 3rd block of a track.

Data can now be written onto the track of choice. Select **Write** from the toolbar to write data to a track

Select **Read** from the toolbar , or the from **Mifare Card menu** click **Read**. A counter will show the progress while the tracks are read.

The read information from the card is displayed on the screen. To view the data in Hexadecimal format, check **Show Hexadecimal**, and enlarge the window.

🚍 SC Mifare (Card Serial N	umber: 3663279	437 = 0xDA5935 🔀		
File Reader Mifare Card Mifar	e type 🛛 Page (4k)	Help		
2 A A A A A A A A A A A A A A A A A A A				
Current Card: 4D3559DA Show Hexadecimal Use MAD				
Track R Block 0	Block 1	Block 2		
0 » _Y5MG_+u				
1 » 100001				
2 » Johnson David				
4 » Software Develop	z			
5 »				
6 »				
7 »	<u> </u>			
8 »				
9 »	· · · · · · · · · · · · · · · · · · ·			
11 >				
12 »				
13 »				
14 »				
15 »	<u> </u>			
1				

Results