

µFR Card Formatter Version 1.0



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About

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µFR Card Formatter is used for programming MIFARE® Classik 1K cards. You can read and write card data, change authentication keys and access bits and save data to file. Also, burst programming option is included where you can write data to multiple cards one after another.

Application has an option to write keys into the µFR reader for AKM1 (Automatic Key Mode 1) and AKM2 (Automatic Key Mode 2) mode.



Reading card

D-Logic uF Card	Formatter - vers	on 1.7.2 [[011:3.4.3 (0) 1	UNKN	WN REAL	DER TYP	PE SN:	UF1011	71 FW	v5.0.3	63									1 <u>444</u>		X
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1	4 - 7	FFFF	FFFFFFFF	00000	ÿ FFFF	FFFFF	FFF	0000	vv 6	9					Ō	1	1	0				
2	8 - 11	FFFF	FFFFFFFF	00000	V FFFF	FFFFF	FFF	VVVV	ÿÿ 6	9					0	2	2	0				
3	12 - 15	FFFF	FFFFFFFF	<u>ŸŸŸŸ</u> S	ÿ FFFF	FFFFF	FFF	ÿÿÿÿ	ÿÿ 6	9					0	3	3	1				-
4	16 - 19	FFFF	FFFFFFFF	<u>ÿÿÿÿÿ</u>	ÿ FFFF	FFFFF	FFF	ÿÿÿÿ	ÿÿ 6	9					1	0	4	0				
5	20 - 23	FFFF	FFFFFFFF	ÿÿÿÿÿ	ÿ FFFF	FFFFF	FFF	ÿÿÿÿ	ÿÿ 6	9					1	1	5	0				
6	24 - 27	FFFF	FFFFFFFF	ÿÿÿÿÿ	ÿ FFFF	FFFFF	FFF	ÿÿÿÿ	ÿÿ 6	9					1	2	6	0				
7	28 - 31	FFFF	FFFFFFFF	<u> </u>	ÿ FFFF	FFFFF	FFF	уууу	ÿÿ 6	9					1	3	7	1				
8	32 - 35	FFFF	FFFFFFFF	<u> </u>	ÿ FFFF	FFFFF	FFF	уууу	ÿÿ 6	9					2	0	8	0				
9	36 - 39	FFFF	FFFFFFFF	<u> </u>	ÿ FFFF	FFFFF	FFF	<u> </u>	ÿÿ 6	9					2	1	9	0				_
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For reading card data, put card on the reader and click the '**Read Card**' button. After successfull reading, card data will be displayed in hexadecimal and ASCII format. Displayed card data includes:

- Value of bytes stored in data blocks
- Card keys
- Card access bits
- Card UID in message box after reading



Writing card

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For writing content into card, simply fill in the data and click the '**Write Card**' button. You can write every single byte of data blocks, card keys and change the card access bits as shown on the picture above.

After successful writing you will be able to see a message box with content: "Card was successfully written. Card SN: 0x???????"



Burst programming

For burst programming, click the '**Start**' button. You will see a message "Connecting to the reader...", wait unitl it changes to "No card!". When you see the "No card!" message, you can put card on the reader and start programming.

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* Keys (Sector 0 1 2 3 4 5 6 7 8 9 9 10 11 11 12 13 14		18 trailers	00 definiti tomatii 0 4 4 8 12 16 20 16 20 24 28 32 36 40 40 44 48 52 56	00 ion - 1s c key m ocks - 3 - 7 - 11 - 19 - 22 - 22 - 33 - 39 - 42 - 55 - 55 - 55	00 	00 uthentid F F F F F F F F F F F F F F F F F F F	00 cation k FFFF FFFF FFFF FFFF FFFF FFFF FFFF F	00 (HE: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF	00 c in resc x] FFF FFF FFF FFF FFF FFF FFF F	00 Her) Key VVVVV VVVV VVVV VVVVV VVVVV VVVVV VVVVV VVVVV VVVVV VVVVV VVVVV VVVVVV	00 A K yy F yy F Y yy F yy F y yY F yY F Y YY F YY F Y YY F YY	00 ey B FFFFI FFFFI FFFFI FFFFI FFFFI FFFFI FFFFI FFFFI FFFFI FFFFI	00 CAKW [HE2] FFFF1 FFFF1 FFFF1 FFFF1 FFFF1 FFFF1 FFFF1 FFFF1 FFFF1 FFFF1 FFFF1	00 00 x x FFFF FFF FFF FFF FFF FFF FFF F	00 Define Xey YYYY YYYY YYYY YYYY YYYY YYYY YYYY	00 keys fr B B Byy 6 yy 6	00 99 99 99 99 99 99 99 99 99 99 99 99 9	00 Intication Value	v	20:		A S S 0 0 0 0 0 1 1 1 1 2 2 2 2 3 3 3 3		0 0 0 0 8 Bits BinS 0 1 2 3 0 1 2 3 0 1 2 3 0 1 2 3 0 1 2 2 3 0 1 2 2 3 0 1 2 2 3 0 1 2 2 3 3 0 1 2 2 3 3 0 1 2 2 3 3 0 1 2 2 3 3 0 1 2 2 3 3 0 1 2 2 3 3 0 1 2 2 3 3 0 1 2 2 3 3 0 1 2 2 3 3 0 1 2 2 3 3 0 1 1 2 2 3 3 0 1 1 2 2 3 3 0 1 2 2 3 3 0 1 1 2 2 3 3 0 1 2 2 2 3 3 0 1 2 2 3 3 0 1 2 2 2 3 3 0 1 2 2 2 3 3 0 1 2 2 2 3 3 0 1 2 2 2 3 3 0 1 2 2 2 3 3 0 1 2 2 2 3 3 0 1 2 2 2 3 1 2 2 2 3 3 0 1 2 2 2 3 3 0 1 2 2 2 2 2 2 3 1 2 2 2 2 2 2 3 1 2 2 2 2 2 2 2 2 2 2 2 2 2	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 or traile ock: ock 0		ss.	bits	<u>C</u> leara dpart):	

After successfull programming you will see a green area with the message "Card SN: ??????? Done". After that you can put another card on the reader for programming. To stop burst programming, simply click the '**Stop**' button.

If you check the '**Create LOG file**' option, 'logs' folder will be created with txt file inside. In txt file all programmed cards will be written.



Authentication

Г	Automatic key mode (a	uthentication keys are in re	ader) 🕫	АКМ1 С АКМ2	Define key	s for authentication
Sector:	Blocks:	Key A [HEX]	Key A	Key B [HEX]	Key B	Byte9 value
0	0 - 3	FFFFFFFFFFF	ÿÿÿÿÿÿÿ	FFFFFFFFFFFF	<u>ÿÿÿÿÿÿ</u>	69
1	4 - 7	FFFFFFFFFFFF	ÿÿÿÿÿÿÿ	FFFFFFFFFFFF	ÿÿÿÿÿÿÿ	69
2	8 - 11	FFFFFFFFFFFF	ÿÿÿÿÿÿ	FFFFFFFFFFFF	<u>ÿÿÿÿÿÿ</u>	69
3	12 - 15	FFFFFFFFFFFF	ÿÿÿÿÿÿ	FFFFFFFFFFFF	ÿÿÿÿÿÿÿ	69
4	16 - 19	FFFFFFFFFFFF	ÿÿÿÿÿÿ	FFFFFFFFFFFF	<u>ÿÿÿÿÿÿ</u>	69
5	20 - 23	FFFFFFFFFFFFF	ÿÿÿÿÿÿ	FFFFFFFFFFFF	<u>ÿÿÿÿÿÿ</u>	69
6	24 - 27	FFFFFFFFFFFF	ÿÿÿÿÿÿ	FFFFFFFFFFFF	ÿÿÿÿÿÿ	69
7	28 - 31	FFFFFFFFFFFF	ÿÿÿÿÿÿÿ	FFFFFFFFFFFF	ÿÿÿÿÿÿ	69
8	32 - 35	FFFFFFFFFFFF	ÿÿÿÿÿÿÿ	FFFFFFFFFFFF	ÿÿÿÿÿÿ	69
9	36 - 39	FFFFFFFFFFFFF	ÿÿÿÿÿÿ	FFFFFFFFFFFF	ÿÿÿÿÿÿÿ	69
10	40 - 43	FFFFFFFFFFFF	<u> </u>	FFFFFFFFFFF	ÿÿÿÿÿÿ	69
11	44 - 47	FFFFFFFFFFFF	<u> </u>	FFFFFFFFFFFF	ÿÿÿÿÿÿÿ	69
12	48 - 51	FFFFFFFFFFFF	<u> </u>	FFFFFFFFFFFF	ÿÿÿÿÿÿÿ	69
13	52 - 55	FFFFFFFFFFFF	<u> </u>	FFFFFFFFFFFF	ÿÿÿÿÿÿÿ	69
14	56 - 59	FFFFFFFFFFFF	<u> </u>	FFFFFFFFFFFF	ÿÿÿÿÿÿÿ	69
15	60 - 63	FFFFFFFFFFFF	VVVVVV	FFFFFFFFFFFF	VVVVVV	69

For authentication to card, you can choose between:

- Automatic key mode (authentication keys are in reader)
- Define keys for authentication (Provided key)

For Automatic key mode you can choose between AKM1 and AKM2.

AKM1 stands for AUTOMATIC KEY MODE 1.

AKM2 stands for AUTOMATIC KEY MODE 2.

For more info about AKM1 and AKM2, please refer to:

µFR Series NFC Reader API

https://git.d-logic.net/nfc-rfid-reader-sdk/ufr-doc/blob/master/uFR%20Series%20NFC%20reader%20API.p df



If you click on '**Define keys for authentication**' button, this window will be open:

Sector:	Blocks:					<u>C</u> opy from main windo
		Key A [HEX]	Key A [ASCII]	Key B [HEX]	Key B [ASCII]	Load from file
)	0 - 3	FFFFFFFFFFF	ÿÿÿÿÿÿ	FFFFFFFFFFFF	ÿÿÿÿÿÿÿ	
2	4 - 7	FFFFFFFFFFFF	ÿÿÿÿÿÿ	FFFFFFFFFFFF	ÿÿÿÿÿÿÿ	Set <u>T</u> ransport Config.
2	8 - 11	FFFFFFFFFFFF	<u> </u>	FFFFFFFFFFFF	<u> </u>	
3	12 - 15	FFFFFFFFFFFF	<u> </u>	FFFFFFFFFFFF	<u>ŸŸŸŸŸŸ</u>	
1	16 - 19	FFFFFFFFFFFF	<u> </u>	FFFFFFFFFFFF	<u> </u>	
5	20 - 23	FFFFFFFFFFFF	<u>ÿÿÿÿÿÿÿ</u>	FFFFFFFFFFFF	<u>ÿÿÿÿÿÿÿ</u>	Write keys in reader
5	24 - 27	FFFFFFFFFFFF	<u>ÿÿÿÿÿÿÿ</u>	FFFFFFFFFFFF	ÿÿÿÿÿÿÿ	· · · · · · · · · · · · · · · · · · ·
7	28 - 31	FFFFFFFFFFFF	<u>yyyyyy</u>	FFFFFFFFFFFF	<u>yyyyyy</u>	Lock reader keys
3	32 - 35	FFFFFFFFFFFF	ÿÿÿÿÿÿÿ	FFFFFFFFFFFF	ÿÿÿÿÿÿÿ	Halest condextons
)	36 - 39	FFFFFFFFFFFFF	ÿÿÿÿÿÿÿ	FFFFFFFFFFFF	ÿÿÿÿÿÿÿ	Unlock reader keys
LO	40 - 43	FFFFFFFFFFFF	<u> </u>	FFFFFFFFFFFF	ÿÿÿÿÿÿÿ	
11	44 - 47	FFFFFFFFFFFF	<u> </u>	FFFFFFFFFFFF	<u> </u>	
12	48 - 51	FFFFFFFFFFFF	ÿÿÿÿÿÿÿ	FFFFFFFFFFFF	<u> </u>	
13	52 - 55	FFFFFFFFFFFF	<u>yyyyyy</u>	FFFFFFFFFFF	<u>ÿÿÿÿÿÿ</u>	
4	56 - 59	FFFFFFFFFFFF	<u>ÿÿÿÿÿÿÿ</u>	FFFFFFFFFFFF	ÿÿÿÿÿÿ	
15	60 - 63	FFFFFFFFFFFFF		FFFFFFFFFFFF	000000	

Here you can define provided keys for all sectors in the card in different ways.

- You can copy keys from the main window if you click the 'Copy from main window' button.
- You can load keys from file
- Set transport configuration will set all keys to **FFFFFFFFFFFFFFFF** (hexadecimal)
- You can also write keys into reader from this table and choose write method between AKM1 and AKM2
- Also, you can lock or unlock writing keys into the reader providing 8 characters long password.



Input files

Input files example:

```
test_input_sector2.hex 321 Bytes
                         B
 1
    [card]
 2
    type=08
 4
    [trailers_byte9]
 5
    02: 32
 6
 7
    [access bits]
 8
    08: 0
 9
    09: 0
 10
    0A: 0
 11
    0B: 1
 12
    [data]
 14
    08: 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46
 15
    16
    17
    [keys]
 19
    02.A: FF FF FF FF FF FF
    02.B: FF FF FF FF FF FF
20
 21
```

On the picture above you can see an example how to create an input file with defined keys, data blocks, access bits and sector trailer byte9 which can be loaded from software.



Revision history

Date	Version	Comment
2020-03-09	1.0	Base document

Digital Logic Ltd.

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