# Mifare<sup>™</sup>/DESFire<sup>™</sup> Reader User's Manual



(For DF7XX Series)

REV.G May 26, 2017



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## 1. Introduction

### 1.1 General

DF7XX series are available with metal keypad and without metal keypad options for customer end applications. The communication interfaces between the reader and tags are with RS232, ABA TK2, Wiegand or RS485 to match the integration requirement.

#### Features:

- 1. Supports MAD1/MAD2/MAD3 standard, and supports customer MAD-AID setting.
- 2. Supports Non-MAD format with user-defined sector number.
- 3. Supports used card with data offset and length.
- 4. Supports multi sectors.
- 5. Reads Mifare<sup>™</sup> Classic 1K/4K, Mifare<sup>™</sup> Pro, or DESFire<sup>™</sup> 2K/4K/8K card.
- 6. Sets each reader with reader ID for multi-link application.
- 7. Output interface: Wiegand (Default), ABA-TK2 and RS232/RS485.
- 8. Wiegand output selectable from 1 bit to 128 bits.
- 9. RS232 output packet can be set with header, reader ID and trailer.
- 10. Serves as a versatile configurable reader bundled with a utility developed by Promag<sup>™</sup> engineering teams which is easy to set up for buzz or LED color indication.
- 11. Has the IP 66 certificate to secure the critical installation environment. Also passed the R&TTE, FCC approval.
- 12. Protected by mutual three passes authentication, DES & 3 DES MACing/Encipherment.
- Classic housing and various models offer customers wide coverage to select for their application demand. The inside buzzer and LED are able to be configured by the bundled utility.

#### Application:

- 1. Access Control.
- 2. Time Attendance.
- 3. Guest Registration System.
- 4. Academic Services.
- 5. Info Services.
- 6. Identity authentication.

### **1.2 Product Description**

#### 1.2.1 Reader Description

DF7XX series are available for user's end configuration by applying Mifare sector and Mifare DESFire technology. They can be configured to read Mifare or Mifare DESFire card with MAD1/MAD2 or MAD3 standard in a Mifare application open system, or can be configured to read the user-defined sector data (Non-MAD) in a user defined closed system.

#### 1.2.2 Reader Appearance

#### DF700/DF710 series



#### DF750/DF760 series



### **1.3** Mifare<sup>™</sup> Application Directory (MAD) Support

DF7XX supports the MAD format card, the MAD (Mifare application directory) standard proposes the introduction of common data structures for card application directory entries. DF7XX should take advantage of this feature using those sector pointers instead of physical sector number.



### 1.4 User-Data Format

DF7XX will send out the data following the format as below, the user data length defined by the data-info. At Wiegand output format, the data output length is fixed (defined by number of bits), so the user data would be cut if longer than number of bits, or the user data would be appended with zero "0" if shorter than number of bits.

			Ву	te 0		Byte 15
	Bloc	ck 0	Data	-Info		
Application	Bloc	ck 1				
Sector #	Bloc	ck 2				
	Bloc	ck 3				
Data-Info						
bit7 bit6		bit5			bit0	
Data Type (11				Data Length		

Data type is fixed with 11b which means "any other data" type of "Card Holder information" as MAD standard. And data length is including the data with ending zero "0", so the number of data byte sent by DF7XX is equal to data length with one less for RS232 output.

Example: If data length is 16, DF7XX only sends out 15 bytes for RS232 output.

## 2. Specification

### 2.1 Hardware Specification

	DF7XX reader			
Major Feature         Mifare <sup>™</sup> /DESFire <sup>™</sup> Application Directory Reader				
	Access Control & Security			
Card Type	ISO14443A, Mifare <sup>™</sup> Classic 1K/4K for MAD1/MAD2,			
	Mifare <sup>™</sup> Pro,			
	Mifare DESFire <sup>™</sup> 2k/4K/8K			
RF Frequency	13.56MHz			
DC Power	DC 7.5~24V /125mA@12V			
Interface	Wiegand 1~128 bits (Standard / Reverse)			
	RS232 2400~57600 (baud rate)			
	ABA-TK2 40IPS			

### 2.2 Order Information

Part Number	Include	Description
DF700-00	DF700-00	DF700 Mifare <sup>™</sup> /DESFire <sup>™</sup> Configurable Reader
MF700KIT-10	Reader-Kit	Reader-Kit
	WAS-T0029	Reader Configure Cable
	DISK5238	Install CD (Document, Driver, Software)
	Power Adaptor	DC Power Adaptor 9VDC for Reader-Kit
MFA01	MFA01	Mifare <sup>™</sup> Classic 1K Card
MFA04	MFA04	Mifare <sup>™</sup> Classic 4K Card

## 3. Preparation

### 3.1 Wires Assignment

Color	Symbol	I/O	Description			
Red	VCC	IN	Power Input : DC 7.5V~24V			
Black	GND	IN	Power Ground			
White	DATA 1	OUT	Wiegand Data 1 Signal / ABA TK2 Clock (Strobe)			
Green	DATA 0	OUT	Wiegand Data 0 Signal / ABA TK2 Data			
Yellow	TXD	OUT	RS232 TXD (To Host RXD) / RS485+ (for DF710/DF760)			
Blue	RXD	IN	RS232 RXD (To Host TXD) / RS485- (for DF710/DF760)			
Orange	СР	OUT	ABA TK2 Card Present			
Brown	LED/BUZEER	IN	External LED/BUZZER Control			

To configure DF7XX, you need to connect the reader to the reader-kit first below:

#### DF700/DF750(K)



#### DF710/DF760(K)

The following is the example of using USB485A-00 with DF710/DF760(K).

Connect the reader's yellow wire (T+) and blue wire (T-) to RS485 converter. Connect RS485 converter to PC. (Using Promag<sup>™</sup> USB485A-00 is recommended.)





Note: Reader-kit and USB485A-00 are connection tool kit. They are optional items for purchasing.

### 3.2 WebISP - Firmware Update Utility

DF7XX also supports the ISP (In-System Program) function to upgrade the reader's firmware. Install WebISP (included in CD-ROM) in your Windows System first and follow the steps below. (You need to connect the reader to PC and power on the reader.)



### 3.3 Setting Reader

Install Mifare/DesFire Reader Utility software (included in CD-ROM) in your PC, and connect the reader to PC. Please check the connection of PC-to-reader is correctly.

#### 1. Connection

Cou	Co IINT	NT: T	TT.: 11	1.00.0						
<u> </u>	lifare/DE	SFire R	er Utuuty (V	1.2R6)						Ľ
File	Tools	Connects								
	٧	COM1						RS2	32/485	
	Mi	COM2						LED/B	uzzer	ור
		COM5								
	ard Infori	SF650-	9F@192.16	8.100.9	6:2167					
	MA	ER750	-4E8F@192	2.168.10	0.218:2:	167				
	Non	ER750	-4A9F@192	2.168.10	0.120:2	167				
		Refres	1 Connects							
							1			
		Encry	<sup>pt</sup> None		•					
	Used C	ard (Not is	sued by PR	OMAG (	card issu	uer)				
		Offs	et	0		Le	ength		0	
				_					_	
										Р
				_	_	1		_		<u> </u>
Au	uto Scan	Upda	te Reader		Test		Reader Version		Languag	ge
L										

Method 1

Click [Auto Scan] to search all COM ports and to find the available device.

#### Method 2

Click [Connects] and choose the COM port to detect available device.

#### 2. Instruction

> Mifare Settings

🔑 Mifare/DESFire Rea	ader Utility (V1.2R6)			
File Tools Connect	ts			
Wiegand	АВА-ТК2	RS	s232/485	Configured Card
DESFire	Mifare	[ Re	ader	LED/Buzzer
Card Information —				
MAD-AID (H	IEX) 4703			
Non-MAD Se	ctor 1	-		
Арр	Key FFFFFFFFFFF	Ki Ki	ey A 🔻	
Enc	None	<b>T</b>		
Used Card (Not	issued by PROMAG	card issuer	Ð	
Of	fset 0		Length	0
				Ľ
Auto Scan Up	date Reader	Test	Reader Version	Language
DF7xx Series On COM	11			

#### MAD-AID (default=4703)

MAD Application Identifier number is authorized and assigned by Mifare.net<sup>™</sup> upon the customer's request for registered Application Identifier in a Mifare application open system (AID:0000h~FFFFh).Or it is also possible for the user to define the AID himself for the application in user defined closed system without registering into MAD group. According to the AID, DF7XX can find and read the corresponding sector on the MAD card.

#### App Key (KEY\_A) (default=FFFFFFFFFFFF)

App Key must be the same as the KEY\_A of the card issued. This means DF7XX only can read the sector data on the card with the same KEY\_A.

#### Encrypt (default=None)

Fraud prevention, Select Encrypt Mode (None, Encrypt 1, Encrypt 2, Encrypt 3, Encrypt 4, Encrypt 5) to protect your card data. (Remark: Encrypt mode must work together with the same encrypt mode of "Mifare Card Issuer" software.)

#### Used Card (Not issued by PROMAG Card Issuer)

You have to indicate the data position in the card, when the card is not issued by "Mifare Card Issuer" software. And you must set the "Offset" (Max 255, and base from zero) from the beginning of sector and set your data "Length" (Max 240).

Example: If your card data is in the grey grid of sector, you have to set the "Offset" = 17, and set the "Length"= 20.

	AID Sector (or Non-MAD Sector)															
Block 0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Block 1	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Block 2	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47

#### > DESFire Settings

🔑 Mifare/DESFire Read	ler Utility (V1.2R6)		
File Tools Connects			
Wiegand	ABA-TK2	RS232/485	Configured Card
DESFire	Mifare	Reader	LED/Buzzer
Card Settings			
MAD-AID (	HEX) F47030		
F	ile ID 0	•	
Offset(Data	File)	0	
Length(Data	i File)	5 (0 means all	data in file)
Access Ke	y No 0	<b>~</b>	
Access Key \	/alue 000000000000	000000000000000000000000000000000000000	0000
	_		
			P
		l Poods	
Auto Scan Upda	ate Reader T	est Versio	bn Language
DF7xx Series On COM1			

#### MAD-AID (default=F47030)

MAD Application Identifier number is authorized and assigned by Mifare.net<sup>™</sup> upon the customer's request for registered Application Identifier in a Mifare application open system (AID:000000h~FFFFFh).Or it is also possible for the user to define the AID himself for the

application in user defined closed system without registering into MAD group. According to the AID, DF7XX can find and read the corresponding application on the card.

#### File ID (default=0)

File ID is 0~15. There are three file types. Data file, Value file and Record file. DF7XX will auto detect the type and output the data.

#### Offset/Length (default=0 / 5)

The Data file will depend on the value to output data. The Value file will be sent the value out. The Record file will be sent the latest record data.

#### 

Key must be the same as the Read or Read/Write KEY of the card issued. This means DF7XX only can read the data on the card with the same key.

⇒ DF App Admin Key (KeyNo=0)

#### > Reader Settings

🔑 Mifare/DESFire Read	er Utility (V1.2R6)			_ 🗆 ×
File Tools Connects				
Wiegand	ABA-TK2	RS232/485	5 Cor	nfigured Card
DESFire	Mifare	Reader	LEI	D/Buzzer
Settings	-	- 		
Reader ID	0	•		
Interface	Viegand	C ABA-TK2	🔿 RS232	2/485
Read Modes	Card Data Only			▼
Buffering	Card Data Only			
	Card Data or CSI	V (When card error	)	d in
	RS232/485' settir	a )		re
	1032327403 Setti	<u>19.</u> )		
Card Type	🖲 Both 🔿 D	ESFire Only 🔿	Mifare Only	′
Output Mode				
<ul> <li>Once</li> </ul>				
Continue (Mifare				
Only)				
				μ
Auto Scan Upda	te Reader	rest Re Ve	ader rsion	Language
DF7xx Series On COM1				

#### Reader ID (default=0)

DF7XX ID for multi link application. (ID: 0~63)

#### Interface (default=Wiegand)

DF7XX can be set as Wiegand, RS232 or ABA-TK2 output.

#### Read Modes (default=Card Data Only)

- Card Data Only Read card sector data only. If any error occurs (ex: App. key incorrect.), the reader will represent "Card Invalid" status.
- Card Data or CSN Read card sector data. When any error occurs (ex: App. key incorrect.), the reader will output "CSN".
- CSN Only Read card CSN (card ID) only.

#### **Output Modes (default=Once)**

- Once Read card sector data only. If any error occurs (ex: App. key incorrect.), the reader will represent "Card Invalid" status.
- Continue Keeping sending data (or CSN) to host till card remove. Only for Mifare card.

#### > Input Settings - Input Mode and Key Pad Settings

Input Settings allows you to choose using (1) Card, (2) PIN or (3) Card then PIN to present your ID.

🄑 Mifare/DESFire Reader Utility ¥1.3R28							
File Tools Connects							
ABA-TK2	RS232/485	Configured Card	)				
Mifare	Reader	LED/Buzzer	- Vviegand				
Settings Reader ID Interface Read Modes Buffering Card Type	0 VViegand CSN Only Enabled (Remark : If 'Buff the reader's buffe RS232/465' settin C Both C DI	ABA-TK2 C ering' is enabled, data v er and it won't allow yo ig.) ESFire Only C Mife	RS232/485 vill be stored in u to configure are Only				
Output Mode	Only)	ings ode: Default d Settings t Hex Code / Code / Code ways read card with p	▼ ▼ asscode				
Auto Scan Update	Reader Te	st Reader Version	Language				
DF750K/DF760K Reader	On COM6						

#### Input Mode

Select how user will present his/her ID.

- Default User can use Card, Enter PIN number or both to present his/her ID.
- **PIN Only** User can only Enter PIN number to present his/her ID.
- Card with passcode User can only use Card which must register passcode to present his/her
   ID. If the presented card that doesn't contain the passcode, then the reader will refuse to access it and will sound an error beep.
- **Card without passcode** User can only use Card which must not register passcode to present his/her ID. If the presented card that contain the passcode, and then the reader will refuse to access it and will sound an error beep.

#### **Key Pad Settings**

Output (default=Wiegand 8Bits)

Wiegand 4, 6, 8 Send Wiegand signal pre key pressing.

ASCII Hex Code Send ASCII code pre key pressing.

**Buffering (Decimal)** Press 0~65535 numbers and press "#" to send decimal numbers. ("\*" to cancel.)

**Buffering (BCD)** Press 0~ 99999999 numbers and press "#" to send BCD numbers. ("\*" to cancel.)

	Wiegand	Wiegand	Wiegand	ASCII	Buffering	Buffering	
	4 bits	6 bits	8 bits	Hex Code	(Decimal)	(BCD)	
1	0001	000010	11100001	31 00 00			
2	0010	000100	11010010	32 00 00			
3	0011	000111	11000011	33 00 00			
4	0100	101001	10110100	34 00 00		00000000~ 99999999	
5	0101	101010	10100101	35 00 00	0~65535		
6	0110	101100	10010110	36 00 00			
7	0111	101111	10000111	37 00 00			
8	1000	110001	01111000	38 00 00			
9	1001	110010	01101001	39 00 00			
0	0000	000001	11110000	30 00 00			
*	1010	110100	01011010	2A 00 00	Cancel	Cancel	
#	1011	110111	01001011	23 00 00	Send	Send	

Remark: Please refer to ANNEX J. for simply output examples.

#### Facility Code

Facility Code is placed in the first two bytes of output PIN data. Following is an example (without

any package settings, such as header, trailer etc.) that the Facility Code is set to 12 (0x0C). Once the Facility is set, the output length of PIN data will fixed to 10.

	Distant/Distant Resder Unity V1.5820
	For the Count
	ADL THO RS232/485 Configured Card
leader Test	ar LEO(Buzzer Pringens
*** REMARK: Only for Reference, Simu	late Signal May be Missing ***
	and C ABA-TK2 (F RS232/485
fiegand/ADA-TRI (Fin)	v 🔹
	ed
	<ul> <li>If Suffering is anabled, data will be stored in whis buffer and it won't allow you to configure (Id) satisfies ()</li> </ul>
	C DESPire Only 🕫 Minare Only
\$132 Output	input Settings
30 43 30 30 30 30 31 32-33 34	0000001234 Input Mode: Detault +
	Key Pad Settings
	Sherring
	Buttering (BCD)
	Table Code
ED; 0 1 2 1 4 T 4 T 4	Clear 12 ·
elay On On Bulleren Data	CDM6 • C
Connect to COM6 19200, N.B.1	
	Auto Scars Ledals Hesder Test Prester Language
	DF750K/DF750K Reader On COM5

#### Always read card with passcode selection box

When you select the **Input Mode** to **Default**, you can choose to access the card with passcode registered or not. If you select this setting, then only the card with passcode registered can be read. Once reader read the card and then will require user to enter the PIN number, if match the passcode, the reader will output the card data (or CSN). If you don't select this setting, then present the card without passcode registered, reader will output the card data (or CSN) without requiring user to enter PIN.

Note: The **passcode** can be registered to card by using Card Issuer program with PCR310/320 reader (see the following **PIN Code** field).

Quality, E	Delivery & Service	for MF	/DF Series Re	ader V1.528
Card SN Constitute	Wegand / T	K2	Uner	Data
RAD AID map (14 02 ) 4705 0000 000	9777.4m (i)	26994	BrSce	16 💌
	10000	06 D6	B#Size	8 -
	Inital Rest	13330	Bit Sae	16 💌
	Card Holder Information 1	Optional	T Without Card H	Kolder Information
	Gaven Bane Sea	[None] •	* ONLY FOR Rea	ader with Keypad
			101000000000000000000000000000000000000	Terste



#### > LED / Buzzer Settings

Difare/DESFire Reader Utility (V1.2R6)							
File Tools Connec	ts						
Wiegand	ABA-TK2	RS232/4/	85 Configured Card				
DESFire	Mifare	Reader	LED/Buzzer				
LED / Buzzer Settin Enable RS232 C	ngs Command Set Control es Control LED						
	Reader Idle 🔲 G	reen 🔽 Red					
Brown (Inter	Wire = PULSE nal:Card Valid) ☑ G	reen 🥅 Red	1 Beep/Blink				
Brown V (Intern	Brown Wire = Inactive (Internal:Card Invalid)						
Brown	n Wire = Active 🔲 G	reen 🔽 Red	3 Beep/Blink				
Brown Wit	re Active Level 💿 D	isable 🛛 🔿 Hij	gh 🔿 Low				
Contr	rol Brown Wire 🔿 🖉	fter Data Output	O Any Time				
Auto Scan Up	date Reader	Test F	Reader Language				
DF7xx Series On COM	41						

DF7XX supports LED/Alarm configure. Set the LED/Buzzer to indicate the system status for end-user.

#### Enable RS232 Command Set Control

Enable this setting if you need to control LED/Buzzer by software command set.

Note: This function is only available for the RS232 communication settings are (19200, N, 8, 1).

- LED / Buzzer Settings	
Enable RS232 Command Set Control	
Reader Idle 🗖 Green 🗖 Red	
Brown Wire = PULSE (Internal:Card Valid) 🗹 Green 🔲 Red 🛛 1 Beep/Blink 🔽	
Brown Wire = Inactive (Internat:Card Invalid)	
Brown Wire = Active 🗖 Green 🔽 Red 3 Beep/Blink 🔽	
Brown Wire Active Level 🕥 Disable 🔿 High 🔿 Low 👡	
Control Brown Wire O After Data Output O Any Time	
	Remark:
	If "Enable RS232 Command
	Set Control (for LED/Buzzer)"
	is checked, the external
	LED/Buzzer with high/low
	level control will be disabled
i,	iever control will be disabled.
	```````````````````````````````````````

#### RS232 LED/Buzzer command set frame

STX	J	NUMBER (0~9)	CR
02h	4Ah	30h~39h	0Dh

#### **Command Table**

NUMBER	Descriptions
0 (30h)	All LED Off, Buzzer Off
1 (31h)	Green LED ON
2 (32h)	Green LED OFF
3 (33h)	Red LED ON
4 (34h)	Red LED OFF
5 (35h)	Buzzer Beep once
6 (36h)	Buzzer Beep 3 Times
7 (37h)	Green LED ON with Beep once
8 (38h)	Red LED ON with Beep 3 Times
9 (39h)	All LED ON (Orange)

### Enable Two Wires Control LED (Only for Promag<sup>™</sup> reader of baud rate=19200, n, 8, 1)

Set up the "Brown Wire Active Level", and Brown wire and Orange wire will follow the setting. Example: "Brown Wire Active Level"=High; Green light on when brown wire level was high. The red LED light on when orange wire level high. When both wire change level high at the same time, it will both light on without beep.

LED / Buzzer Settings     Enable RS232 Command Set Control     Enable Two Wires Control LED	
Reader Idle 🔽 Green 🔲 Red 🔽 Blue	
Brown Wire = PULSE (Internal: Card Valid)	1
Brown Wire = Inactive (Internal:Card Invalid)	3
Brown Wire = Active 🔽 Green 🔽 Red 3 Beep/Blink 💌	
Brown Wire Active Level 🔿 Disable 💿 High 🔿 Low	
Control Brown Wire 🔿 After Data Output 💿 Any Time -	
	Remark:
	If "Enable Two Wires
	Control LED" checkbox
	Control LED" checkbox is checked, the
	Control LED" checkbox is checked, the external LED/Buzzer
	Control LED" checkbox is checked, the external LED/Buzzer control with high/low
	Control LED" checkbox is checked, the external LED/Buzzer control with high/low level control will be
	Control LED" checkbox is checked, the external LED/Buzzer control with high/low level control will be disabled.

#### Read Idle

Show LED color after power on or idle state.

#### Brown Wire = PULSE (Internal: Card is Valid)

Show LED color and beeps to indicate the end-user when brown wire inputted pulse signal, or card was passed by reader.

Remark: This setting is enabled when "Brown Wire Active Level" is "Disable".

#### Brown Wire = Inactive (Internal: Card is Invalid)

Show LED color and beeps to indicate the end-user when brown wire inputted GND signal, or card was failed by reader.

#### Brown Wire = Active

Show LED color and beeps to indicate the end-user that brown wire inputted the active level signal from host.

Remark: This setting is enabled when "Brown Wire Active Level" is not "Disable".

#### Brown Wire Active Level (default=Disable)

Set brown wire active level condition with host status.

- **Disable** Disable the brown wire. The LED/buzzer is controlled by settings.
- High Brown wire active state is in high logic, normal state is in low logic (normal open).
- Low Brown wire active state is in low logic, normal state is in high logic (normal closed).

Remark: If setting Active Low, you may have to connect the brown wire to a pull-up resistor (1K~10K) with 5VDC.

#### **Control Brown wire**

- After Data Output The brown wire will be enabling after finished output the card data or CSN.
- **Any Time** The brown wire enabled in any time.

Note:LED/Buzzer can be controlled by the externally high/low level controller also. (See Annex E.)

#### Brightness

Change value to brighten or darken LED. More high and more brighten.

#### Wiegand Settings

🔑 Mifare/DESFire Reader Utility (V1.2R6)								
File Tools Connects								
DESFire	Mifare		Reader	LED/Buzzer				
Wiegand	ABA-TK2	T RS2	32/485	Configured Card				
Wiegand Output Settings								
Add Reader II	🔲 Include Rea	der ID						
	Custom:							
Number Of Bit:	26 💌	□ √Vith Pa	rity					
Bit Sequence ③ Standard (MSB First) ④ Reverse (LSB First)								
Byte Orde	Byte Order O High Byte First							
Alive Event Disabled								
μ μ								
Auto Scan Upda	ite Reader	Test	Reader Version	Language				
DF7xx Series On COM1								

#### Add Reader ID (default=Disable)

Set Wiegand output data to include the Reader ID when it is checked.

#### Custom Premable (default=Disable)

Set the Wiegand output data to include premable code when it is enabled. This code only combines with CSN output.

#### Number of Bits (default=26)

Set the Wiegand output type you want to meet your host (or terminal). It can be 1 to 128.

#### With parity (default=Enable)

Set data with or without parity bit. If this is enabled, it will automatically add parity bit when sending output data.

#### Bit Sequence (default=Standard)

Set the Wiegand output data sequence, and it can be a standard data sequence (MSB first) or a reverse data sequence (LSB first).



#### Byte Order (default=High Byte First)

Set the Wiegand output data byte order, and it can be high byte first or low byte first.

Alive Event is reserved.

#### > ABA-TK2 Settings

🔑 Mifare/DESFire Reader Utility (V1.2R6)							
File Tools Connect	2						
DESFire	Mifare	Reader	LED/Buzzer				
Wiegand	ABA-TK2	RS232/485	Configured Card				
ABA-TK2 Output Settings							
Number Of	Digital 10 💌	Add Reader ID					
Output Data	<sup>Order</sup> 💿 MSB First	🔿 LSB First					
Source Data	Order 💿 MSB First	🔿 LSB First					
Data Conve	BIN to DEC (D	)efault)					
Bin to DEC (Default)         Bin to DEC (Default)         Decimal String         BCD (Standard)         Direct (Memory Map)         Bytes to DEC							
Auto Scan Update Reader Test Reader Language							

#### Number of Digital (default=10)

Set the number of digital codes for TK2 output.

#### Add Reader ID (default=Disable)

Add Reader ID into TK2 data.

#### Output Data Order (default=MSB First)

Set the TK2 data sequence order.

#### Data Conversion (default=BIN to DEC)

Select card data format to convert.

- BIN to DEC (the card is issued by Mifare Card Issuer.)
- Decimal String (ex. "123456")
- BCD
- Direct (Memory Map)
- Byte to DEC

#### RS232/485 Output Settings

🔑 Mifare/DESFire Reader Utility ¥1.3R7 🛛 📃 🗖 🔀					
File Tools Connects					
DESFire	Reader LED/Buzzer Wiegand				
ABA-TK2	RS232/485 Configured Card				
RS232/485 Output Se	attings				
Baudrate	19200 💌 Heart beat Smin				
Data Sequence	CLSB © MSB				
Package	Header O0h				
	🔽 Reader ID				
	🖵 Data Length				
	Output Format				
	Data C Binary				
	Trailer 00h 💌				
	L				
Auto Scan Upda	te Reader Test Version Language				
DF700-20/D750-20 On (	COM1				

#### Baud rate (default=9600)

The working range can be set from 2400 to 57600 (depends on the device).

#### Heart beat (default=disabled)

Click to select the interval time of periodically sending the heart beat data to host via RS232/485 interface. The heart beat data format is: (E' + (H' + Device Serial Number.

#### Example

Header Device Serial Number									
45h	48h	43h	42h	34h	45h	35h	42h	24h	32h
'E'	'H'	ʻC'	'B'	'4'	'E'	'5'	'B'	'4'	'2'

If you want an end character in the end of the heart beat data, for example CR, then you can select

**CR** box in **Package** group then update to reader.

The interval of sending heart beat data can be:

l	RS232/485	Configu
Hear	t beat on a	
	Disable	-
•	Prefi: 30 S 1 min 2 min	
	Postf 5 min	

#### Data Sequence (default=MSB first)

The output data sequence order can be set to "LSB" first or "MSB" first.

#### Package (default=Header (02h) + CR + LF + Trailer (03h))

To set a packet which includes the "Header", "Reader ID", "Data Length", "CR", "LF" and "Trailer". (Header: 00h~FFh, Trailer: 00h~FFh).

#### **Output Format (default=Hex String)**

The output format can be "Binary" or "Hex String".

Note

(1) Wiegand output data packet with Reader ID

Standard	Parity ( <b>Even</b> )	Reader ID	(MSB) Data Bits (LSB)	Parity ( <b>Odd</b> )
Reverse	Parity ( <b>Odd</b> )	Reader ID	(LSB) Data Bits (MSB)	Parity ( <b>Even</b> )

(2) RS232/RS485 output data packet with Header, Reader ID and Trailer

	Header	Reader ID	(LSB)	Data Bytes	(MSB)	Trailer
--	--------	-----------	-------	------------	-------	---------

#### (3) ABA-TK2 with Reader ID

MSB First	SS	Reader ID	(MSB)	Digital Code	(LSB)	ES	LRC
LSB First	SS	Reader ID	(LSB)	Digital Code	(MSB)	ES	LRC

Remark: The reader's all configuration items are write only, so any user cannot read the configuration items from the reader to get the App Key, this is very important to protect your App Key and all configuration items.

#### Configured Card

Nifare/DESFire Reader Utility (V1.2R6)							
File Tools Connec	ts						
DESFire	Mifare	R	eader		)/Buzzer		
Wiegand	ABA-TK2	RS23	2/485	Configu	red Card		
Configured Car	d Enabled						
Key 123	FFFFFF123						
*Remark: The key v Current A	alue have to different APP Key = FFFFFFFFF	from AppH FF2	(ey!				
Auto Scan Up	date Reader	ſest	Reader Versior	·	Language		
DF7xx Series On COM	41						

#### Configured Card Enabled (default=Enable)

Can allow your reader change configuration by Mifare Card.

#### Key (default=00000000000)

Is the Mifare Key A for allowed the configured card.

### 3.4 Make a Configured Card

DF7XX supports updating the reader by reading Configured Card. This function is specially using when stand alone system. The following steps guide you how to make a configured card.

Step 1:	Mifare/DESFire Reader Utility (V1.2R6)
Configure the reader.	DESFire Mifare Reader LED/Buzzer
	Wiegand ABA-TK2 RS232/485 Configured Card
Enable the "Configured Card Enabled" item, and then press [Update Reader].	Configured Card Enabled         Key       123FFFFF123         *Remark: The key value have to different from AppKey! Current APP Key = FFFFFFFF2         Auto Scan       Update Reader         Test       Reader Version         Language
Sten 2.	Mifare/DESFire Reader Utility (V1 2R6)
O(C) = 2.	File Tools Connects
	Mi COM1 RS232/485
Select the series corresponding, or load the configuration file.	COM3           SF650-TIME@192.168.100.159.2167           M4         SF650SD-QA TEST0@192.168.100.149.2167           Non         SF650ASD-WIFI-9F@192.168.100.140.2167           SF650ASD-WIFI-3F@192.168.100.217.2167         ER750-WIFI05@192.168.100.59.2167           Refresh Connects         Used Card (Not issued by PROMAG card issuer)
Ļ	Offset 0 Length 0
Select the reader's model	L
name.	Auto Scan Update Reader Test Reader Language
↓ ↓	
Click "OK".	



Remark: The corresponding series are "DF700/DF750 Series" and "DF750K Series".	Found a PCR310       Image: Configured Card for OK         • MF700 Series       OK         • MF700-VT       Cancel         • LBR700       From File         • SF600 Series       From File         • DF700/DF750 Series       DF750K Series
Step 3: Configure all settings as	Mifare/DESFire Reader Utility (V1.2R6)
normal.	Wegand         ABA-TK2         RS232/485         Configured Card           DESFire         Mifare         Reader         LED/Buzzer
Ļ	MAD-AID (HEX) 4703 Non-MAD Sector 0
Click [Configure Card].	App Key FFFFFFFF2 Key A  Encrypt None
	Used Card (Not issued by PROMAG card issuer) Offset Offset Offset
	Auto Sc in     Configured Card     est     Reader Version     Language       CFG for DF     CFG for DF     CFG     CFG





### 4. Data Output

### 4.1 Reader Test

After reader's configurations have been updated success, you can use [Test] function to check reader's configurations have been correctly stored.

Reader Test			×	
*** REMARK: Only for Reference	e, Simulate Signa	al May b	e Missing ***	
Wiegand/ABA-TK2 (Sim) Wiegand 26 : Without Pty :0101-0100-0101-110 Preamble(0) - 54 5D 3	01-0011-0000-11- 30 3	C Dec	ode with Parity	Use to "decode with parity" when Wiegand interface not with parity.
RS232 Output				
				Click to clear the output data, or double click the output area.
LED:         0         1         2         3         4         5         6         7           Relay:         Off         On         Buffering Data	89	СОМ2		
	Available COM ports.		Click to re-connect COM port.	

#### LED [0]~[9] (default=Disable)

Manually to control LED/buzzer by commands [0]~[9]. Enable this by "Enable RS232 Command Set Control".

#### Buffering (default=Disable)

Manually to control data output timing by the command [Buffering Data]. Enable this by "Buffering" Enabled.

#### Relay (default=Disable)

Not available for DF7XX.

### 4.2 Test Read Card After Updating

The following steps guide you how to test read card.

- 1. After set configurations in the Reader Utility software, you can click [Update Reader] to update the currently configurations to the reader.
- 2. Or, click [Test] to update configurations and verify output data.
- 3. Take an issued Mifare card and approach it to the reader, You can see the output data on "Reader Test" window.

Aifare/DESFire Reader Utility (V1.2R6)	
File Tools Connects	
DESFire Mifare Reader LED/Buzzer	
Wiegand ABA-TK2 RS232/485 Contigured Card	
Wiegand Output Settings	
Adu Reader ID	
Number Of Pite	
Number of Bits 34 Vith Parity	
Bit Sequence () Standard (MSB First) C Reverse (LSB First)	
Byte Order O High Byte First	
Event	
P	
Lude Sees Undete Bander Local Reader	
Auto Scan Opulate Reader Test Version Language	
DF750K/DF760K Reader On COM1	
Reader Test	×
*** REMARK: Only for Reference, Simulate Signal May be Missing	ininini i
Wiegand 34 :	_
Standard Pty=OK :0-1011-1010-0001-1111-1110-0110-0111-0000-1	-1
D\$232 Dutnut	
Belay Off On Buffering Data	<u>2</u> 5

Example: Wiegand 34 bits output data with Standard bit sequence

Remark: (1) When using reader-kit to test Wiegand (or TK2) signal, this test may be failed if the processor of computer is too slow. (2) When using reader-kit to test Wiegand (or TK2) signal, you need to connect to the physical COM port.

### 4.3 Test Key Pad After Updating

#### 4.3.1 Simply Output "1234" – RS232 Interface

#### RS232 interface – Settings

🔑 Mifare/DESFire Read	er Utility (V1.2R6) 👘		_ 🗆 🗙	🔑 Mifare/DESFire Rea	der Utility (V1.2R6) 👘		_ 🗆 🗵
File Tools Connects				File Tools Connects	:		
Wiegand	ABA-TK2	RS232/485	Configured Card	DESFire	Mifare	Reader	LED/Buzzer
DESFire	Mifare	Reader	LED/Buzzer	Wiegand	ABA-TK2	RS232/485	Configured Card
Settings		n		RS232/485 Output S	ettings		
Reader IL			P\$333/495	Baudrat	e 9600 💌		
Read Modes	Card Data Only	O ADA-INZ	132327403	Data Sequenc	e–OISB OMS	8	
Buffering	Enabled			Packag			
	Remark : IT Buffer	ring' is enabled, data v	vill be stored in		Header 02h	•	
	the reader's buffer IRS232/485' setting	and it won't allow you ા )	uto configure		Reader ID		
Card Type	Both O DES	SEire Oply C Mife	re Oply		🔲 Data Length		
	- Kou Bod So	#ipgo				Output Form	nat
Output Mode     Once	Output	unus			Data	C Binarry Visible H	lex Code
	Buffering	(BCD)				NO VISING I	
C Continue (Mifare	Only)	ic					
	None		•		Trailer 03	n 💌	
	🗖 Alway:	s read card with pass	code 🛛 🖓				P
	1	1 Decider				L Deader	
Auto Scan Upda	te Reader Te	st Reader Version	Language	Auto Scan Upd	ate Reader Te	st Reader Version	Language
DF750K/DF760K Reader	On COM2			DF750K/DF760K Reade	er On COM2		

#### RS232 interface - Output: Press "1234" + "#"

Reader Test	×
*** REMARK: Only for Refe	rence, Simulate Signal May be Missing ***
Wiegand/ABA-TK2 (Sim)	Decode with Parity
RS232 Output	
30 30 30 30 31 32 33 34-	00001234
LED: 0 1 2 3 4 5	6 7 8 9 Clear
Relay: Off On Buffering Data	СОМ2 🔽 🔃

Result=1234

### 4.3.2 Simply Output "1234" – ABA-TK2 Interface

#### ABA-TK2 interface – Settings

🔑 Mifare/DESFire Reader Utility (V1.2R6)	🔑 Mifare/DESFire Reader Utility (V1.2R6)
File Tools Connects	File Tools Connects
Wiegand ABA-TK2 RS232/485 Configured Card	DESFire Mifare Reader LED/Buzzer
DESFire Mifare Reader LED/Buzzer	Wiegand ABA-TK2 RS232/485 Configured Card
Settings       0         Interface       Vilegand         Read Modes       Card Data Only         Buffering       Enabled         Remark: If 'Buffering' is enabled, data will be stored in the reader's buffer and it won't allow you to configure (RS232/485' setting.)         Card Type       Both         Output Mode       Output         Output Mode       Output         Output       Mifare Only         Output       Mifare Only         Auto Scan       Update Reader       Test         Reader       Version       Language	ABA-TK2 Output Settings         Number Of Digital         Output Data Order         Output Data Order         MSB First         Source Data Order         MSB First         Data Conversion         BIN to DEC (Default)             Auto Scan             Auto Scan
DF750K/DF760K Reader On COM2	DF750K/DF760K Reader On COM2

#### ABA-TK2 interface – Output: Press "1234" + "#"

Reader Test		×
*** REMA	RK: Only for Reference, S	Simulate Signal May be Missing 🚥
	-	
Wiegand/ABA	-TK2 (Sim)	Decode with Parity
ABA-TK2:	;1234? Digits= 4	
	0000000000011010100000100	
<u> </u>		
RS232 Outpu	t	
LED: 0 1	2 3 4 5 6 7	8 9 Clear
Relay: Off On	Buffering Data	СОМ2 🔽 🚺

Result=1234

#### 4.3.2 Simply Output "1234" –Wiegand Interface

#### Wiegand interface – Settings

🔑 Mifare/DESFire Reader Utility (V1.2R6)	Mifare/DESFire Reader Utility (V1.2R6)	_ 🗆 🗙
File Tools Connects	File Tools Connects	
Wiegand ABA-TK2 RS232/485 Configured Card	DESFire Mifare Reader LED/Bur	zzer
DESFire Mifare Reader LED/Buzzer	Wiegand ABA-TK2 RS232/485 Configured	Card
Settings       Reader ID       O         Interface       V Wegand       ABA-TK2       RS232/485         Read Modes       Card Data Only       Image: Card Data Only       Image: Card Data Only         Buffering       Enabled       (Remark: If 'Buffering' is enabled, data will be stored in the reader's buffer and it wont allow you to configure RS232/485' setting.)       Card Type       Both       DESFire Only       Mifare Only         Output Mode       Output       DesFire Only       Mifare Only       Facility Code       Image: Card With passcode         Output Scan       Update Reader       Test       Reader       Language	Wiegand Output Settings         Add Reader D         Include Reader ID         Custom:         Number Of Bits         26         Standard (MSB First)         Bit Sequence         © Standard (MSB First)         Byte Order         O High Byte First         Cuve Byte First         Alive Event         Disabled         Auto Scan         Update Reader         Test         Yenging	guage
DF750K/DF760K Reader On COM2	DF750K/DF760K Reader On COM2	

#### Wiegand interface - Output: Press "1234" + "#"

Reader Test	×
*** REMARK: Only for Reference, Simulate Signa	al May be Missing ***
Wiegand/ABA-TK2 (Sim)	
Wiegand 26 :	
Standard Pty=0K :1-0000-0000-0001-0010-0011-010 Preamble(0) - 00 12 34	JU-1
RS232 Output	
	Class
LED: 0 1 2 3 4 5 6 7 8 3	
Relay: Off On Buffering Data	COM2 🔽 🖸

Result=1234

## Appendix

### **ANNEX A. Wiegand Interface**

The Data 1 and Data 0 signals are held at a logic high level unit, the reader is ready to send a data stream. The reader places data as asynchronous low-going pulses on the Data 1 or Data 0 lines to transmit the data stream to Host. The Data 1 and Data 0 pulses will allowable pulse width times and pulse interval times for the reader.



#### **Pulse Times**

Symbol	Description	Typical Time	
Трw	Pulse Width Time	100us +/- 3%	
Трі	Pulse Interval Time	1.9ms +/- 3%	

#### Wiegand Packet (Without Reader ID)

Standard (Default)	Parity(Even)	(MSB)	Data Bits	(LSB)	Parity(Odd)
Reverse (Option)	Parity(Odd)	(LSB)	Data Bits	(MSB)	Parity(Even)



#### Example of connecting Wiegand wires (the pull high resister must >= 10K Ohm)



Optional: External LED/Buzzer Control (Brown)

### ANNEX B. ABA-TK2 Interface

#### Example of the timing for card present, clock (strobe) and data



#### DATA

The data signal is valid while the clock is low. If the Data signal is high, the bit is a zero. If the Data signal is low, the bit is a one.

#### **CLOCK (STROBE)**

The Clock signal indicates when Data is valid. It is recommended that Data be loaded by the user with the leading edge (negative) of the Strobe.

#### CARD PRESENT

Card Present will go low after flux reversals from the Reader. Card Present will return high after the last flux reversal.



#### Example of connecting ABA TK2 wires



Optional: External LED/Buzzer Control (Brown)



### ANNEX C. RS232 Interface

#### Example of connecting RS232 wires



Optional: External LED/Buzzer Control (Brown)

### **ANNEX D. External LED/Buzzer Control**

DF7XX supports the external LED/Buzzer control for Terminal (or Host) to prompt end-user the card data is invalid or valid. Use Brown wire to control the LED/Buzzer of DF7XX.

#### Examples (Active High)

(1) Show External Invalid Status



#### Note

- 1. Send one pulse to show the "Extern Invalid" LED/buzzer status.
- 2. Send three or more pulse to show the "Card Valid" LED/buzzer status.
- 3. You can configure the LED/buzzer status by reader utility software.

### **ANNEX E. History**

Rev G:	June 24, 2017 Added note for [Enable RS232 Command Set Control].
Rev G:	May 26, 2017 Added <u>Heart beat data format</u>
Rev F:	January 18, 2017 Added <u>input mode selection for DF750K reader</u>
Rev E:	May 26, 2016 Added <u>Heart beat setting</u>
Rev C:	November 30, 2011 (Kylie) Update Mifare Reader Utility Pics. Modify Reader ID to 0~63. Add "Source Data Order". (P.14) Modify "Sequence Order" to "Output Data Order". (P.14) Modify "Remark". (P.11) January 12, 2012 (Kylie) Modify "DataLength" limit to 64 bytes. (p.8) Add how to "Read the Configure Card". (p.29) August 15, 2012 (Kylie) Add examples for keypad output. (p.31~33) September 13, 2013 (Kylie) Delete e. (P. 29) Modify remark. (P.28) September 16, 2013 (Kylie) Update utility S/W & Web ISP S/W pictures. November 20, 2013 (Kylie) Add "Hardware Compare table" and "Software requirement table" (p.9)(p.11) September 12, 2014 (Kylie) Add a note about DF710/DF760 wire assignment by using USB485A. (p. 12) September 26, 2014 (Kylie) Fix "Two Wire Control" descriptions. (p. 22)
Rev D:	August 12, 2015 (Kylie) Add notice for Access key, the utility DESfire configure. (P. 17)
Rev B:	October 29, 2009 Fix power supply 7.5V~24VDC
Rev A:	February 12, 2009 Issue DF7XX



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