MF700 Configurable Reader

User's Manual

REV.C

July 15, 2004

MF700 Configurable Reader

Overview:

MF700 is a user configurable mifare® sector data reader. It can be configured to read mifare® card with MAD1/MAD2 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.

Output interface can be configured as an RS232 output or Wiegand output. Wiegand output is selectable from 26 bits to 130 bits.

MF700 can also be set with a Reader ID number for multi-unit communication.

MF700 not only can read sector data (or/and card serial number) on mifare® card, but also it can Read/Write the card through the "MF5 Command Mode" from the Host.

MF700 Features:

1. Support MAD1/MAD2 standard, and support customer MAD-AID setting.
2. Support Non-MAD format with user-defined sector number.
3. Support Anti-Collision (Tow cards together can be read at the same time).
4. Support Multi Sectors.
5. Support Mifare® Standard 4K or Mifare® Standard 1K card.
6. Each Reader with Reader ID for multi-link application.
7. Two output interface: Wiegand (Default) and RS232.
8. Wiegand output selectable from 26 bits to 130 bits.
9. RS232 output packet can be set with Header, Reader ID and Trailer.

MF700 Application:

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

Mifare® Application Directory (MAD) Support:

MF700 support the MAD format card, the MAD (mifare® application directory) standard proposes the introduction of common data structures for card application directory entries. MF700 reader should take advantage of this feature using those sector pointers instead of physical sector number.

The MF700 will search the AID from mifare® application directory (MAD) , then got a correct sector number from MAD. If the card is not a MAD card, the MF700 will use the **Non-MAD Sector#** (Setting by MF700 Utility).

About MAD please see the web pages:

http://www.mifare.net

http://www.semiconductors.philips.com/ac
robat/other/identification/M001824.pdf
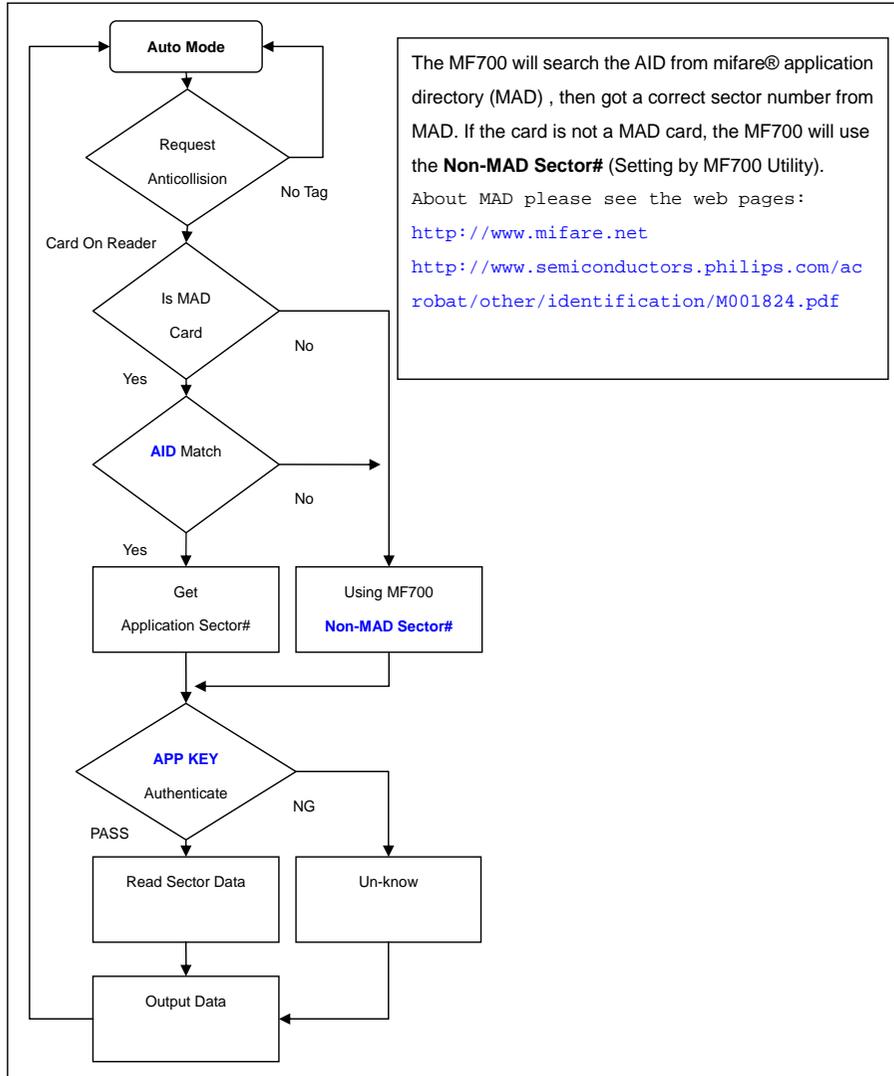
User-Data Format

MF700 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.

		Byte 0	Byte 15
Application Sector #	Block 0	**Data-Info**	
	Block 1		**USER DATA (Max 47 Bytes)**
	Block 2		
	Block 3		

Data-Info		
bit7 bit6	bit5	bit0
Data Type (11h)	Data Length	

Data Type is fixed with 11h which meets "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 MF700 is equal to data length with one less for RS232 output.

Example: Data Length is 16, MF700 only send out 15 bytes for RS232 output.

**Pin Assignment**

Cable Color	Symbol	I/O	Description
Red	VCC	IN	Power Input : DC 5.5V~12V
Black	GND	IN	Power Ground
White	DATA 1	OUT	Wiegand Data 1 Signal
Green	DATA 0	OUT	Wiegand Data 0 Signal
Yellow	TXD	OUT	RS232 TXD (To Host RXD)
Blue	RXD	IN	RS232 RXD (To Host TXD)

Connect To MF700KIT before configure the MF700 Reader.

To configure the MF700 reader you need connect the reader to the MF700KIT first as below:
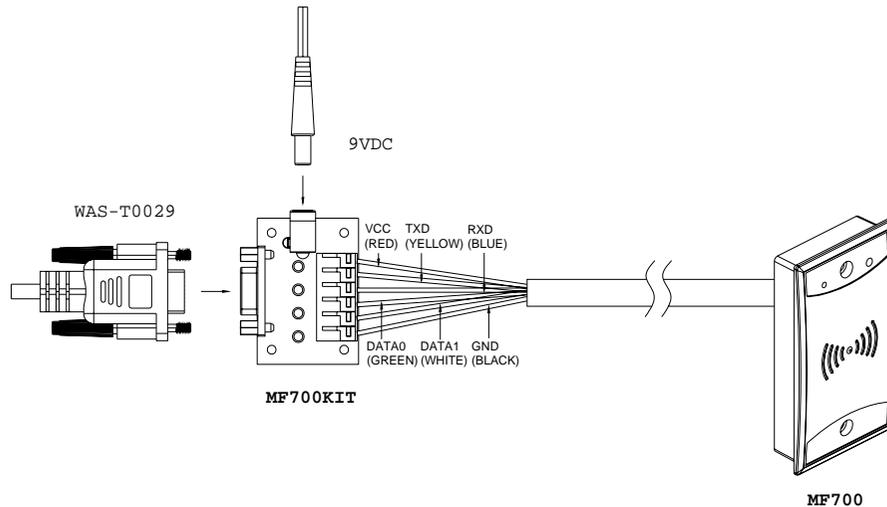
Note: MF700KIT is a test connection kit for MF700 configuration use. It is an optional item for purchasing.

MF700 Software Utility
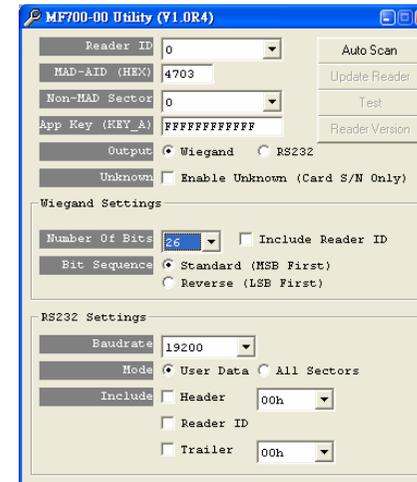
1. **Reader ID : (Default=0)**
   MF700 Reader ID for multi link application. (ID: 0~255).

2. **MAD-AID: (Default=4703)**
   MAD Application Identifier number is authorized and assigned by Mifare.net 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, MF700 can find and read the corresponding sector on the MAD card.

3. **Non-MAD Sector: (Default =0)**
   When the card is Non-MAD format, MF700 will only read the "Non-MAD Sector".
   (1K Card Sector: 0~15, 4K Card Sector:0~39). For the Non-MAD application, user can freely define the Sector.

4. **App Key (KEY_A): (Default=FFFFFFFFFFFF)**
   App Key must be the same as the KEY_A of the card issued. This means MF700 only can read the sector data on the card with the same KEY_A.

5. **Output : (Default=Wiegand)**
   MF700 can be set as Wiegand or RS232 output.

6. **Unknow: (Default=Disable)**
   When unknown is enabled, MF700 will send out the card serial number when MF700 fail to authenticate App Key with the card to be read.

7. **Wiegand Setting:**
   Number of Bits is to set the Wiegand output type you want to meet your Host (or Terminal). It can be 26 to 130 (Default=26).
   Include Reader ID[1] is to set the Wiegand output data to include Reader ID when it is enabled. (Default=Disable).
   Bit Sequence is to set the Wiegand output data sequence, it can be standard data sequence (MSB first) or Reverse data sequence (LSB first). (Default=Standard).

8. **RS232 Setting:**
   Baudrate can be set 2400bps~57600bps (Default=19200bps)
   Mode is to set the output data mode (User-Data or All Sectors). User data is the user defined format (See

MF700 User-Data Format) . All Sectors is just to send out all the data in the sectors.

Include[2] is to set the output data packet to include Header, Reader ID and Trailer. (Header:00h~FFh, Trailer : 00h~FFh).

Note:

1.　Wiegand output data packet with Reader ID:

Standard	Parity(**Even**)	(MSB)　Data Bits　(LSB)	Reader ID	Parity(**Odd**)
Reverse	Parity(**Odd**)	Reader ID	(LSB)　Data Bits　(MSB)	Parity(**Even**)

2. RS232 output data packet with Header, Reader ID and Trailer:

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

Remark:

*MF700 all configuration items are write only, so any users can not read the configuration items from MF700 to get the **App Key**, that is very important to protect your **App Key** and all configuration items.*

Test MF700 Reader after configuration

After MF700 configuration is completed you may use MF700 Utility "Test" function to test the MF700 to see if the configuration is done correctly.

1.　After the configuration on the MF700 Utility software is made, you should click [Update Reader] to download the current configuration to the MF700 Reader.
2.　After MF700 configuration is completed, you may click [Test] to test MF700 Reader.
3.　Get an issued mifare® card to put on MF700 reader to be read and see the output data on the window of "MF700 Output Test".

Wiegand 42 bits output data with <u>standard</u> bit sequence, example as below: (If "Bit Sequence" is standard, Reverse will detect a wrong with parity error.)

```
MF700 Output Test                                    ☒
Wiegand Output
Wiegand 42 :
   Standard :1-00111000-00100000-01000100-01001001-01000001-1
             38 20 44 49 41
   Reverse  :1-00111000-00100000-01000100-01001001-01000001-1
             Parity Error!!

RS232 Output

```
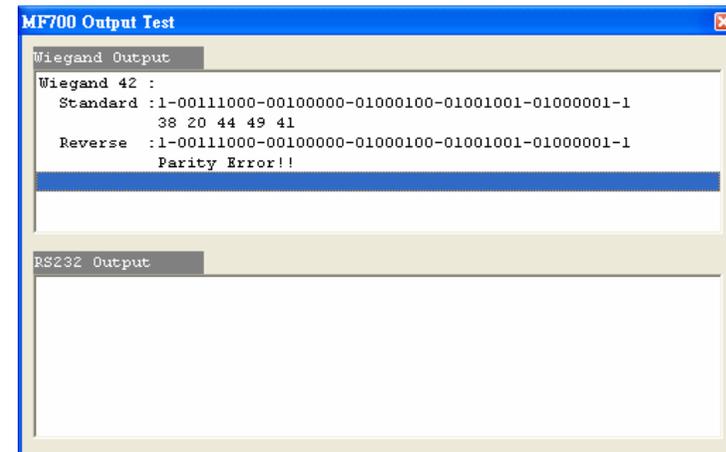
ANNEX A. Hardware Specification

| MF700	
Major Feature	Mifare® Application Directory Reader
	Access Control & Security
Card Type	ISO14443A, Mifare Class[1]
	(Mifare® 1K, Mifare® 4K for MAD1/MAD2)
RF Frequence	13.56MHz
RF Distance[2]	50mm (Using the MFA01 Mifare® card of GIGA-TMS INC.)
DC Power	5.5VDC~15VDC (Max150mA)
Interface	Wiegand 26~130 bits (Standard / Reverse)
	RS232 2400bps~57600bps
Dimension	H82.5mm x W46.5mm x D15.0mm
Weight	120g

Note:

1. Mifare Class: Mifare Standard 1K/4K/Pro (without Mifare Ultra-Light).

2. MF700 RF distance can reach up to 50mm with MFA01(Mifare® Standard 1K Card) of
   GIGA-TMS INC.

ANNEX B. Wiegand Data Signal & External Alarm Control

● Wiegand Data Signal:

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
MF700 reader.
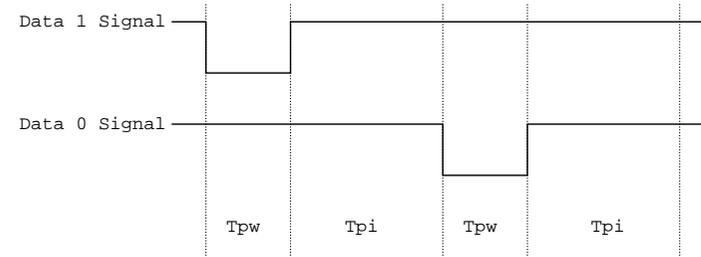
Pulse Times

Symbol	Description	Typical Time
Tpw	Pulse Width Time	100us
Tpi	Pulse Interval Time	1.9ms

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)

● External Alarm Control

MF700 supports the external alarm control for Terminal (or Host) to prompt end-user the card data is invalid.
Use RX signal to control the alarm of MF700, and set RX to High Level (>=5Vdc) within 3 seconds after
MF700 sends data to Terminal (or Host) .
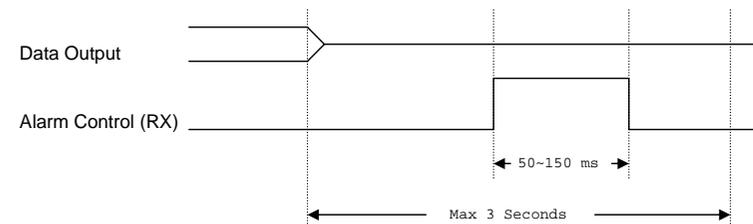
ANNEX C. Order Information

| Part Number	Include	Description
MF700SK-00	MF700-00	MF700 Configurable Reader
	MF700KIT	MF700 Configure Kit
	WAS-T0029	MF700 Configure Cable
	PCR310U	Card Issue Programmer
	DISK5219	Card Issue and Utility Software
	Power Adaptor	DC Power Adaptor 9VDC for MF700KIT
	MFA01 (3PCS)	Mifare Standard 1K Card
MF700-00	MF700-00	MF700 Configurable Reader
MF700KIT-00	MF700KIT	MF700 Configure Kit
	WAS-T0029	MF700 Configure Cable
	DISK5219	Card Issue and Utility Software
	Power Adaptor	DC Power Adaptor 9VDC for MF700KIT
PCR310U-20	PCR310U	Card Issue Programmer
	DISK5219	Card Issue and Utility Software
MFA01	MFA01	Mifare® Standard 1K Card
MFA04	MFA04	Mifare® Standard 4K Card

ANNEX D. WebISP - Firmware Upgrade Utility

MF700 also supports the ISP (In-System Program) function to upgrade the reader's firmware.

Install the WebISP (include in CD-ROM) in your Windows System first (It may need to reboot your system) and follow the steps as below: (First of all, you need to connect the reader or programmer to PC, and make sure they were power-on)

Step 1: Input your account (UserName and Password) Note: Contact us to get your account when needed.	
Step 2: Click [Start Check] to automatically check the firmware version from our FTP server. Note: 1. The WebISP will auto scan all Comm ports to search the reader or programmer. 2. The WebISP will show the [Update Information] and list the update history.	
Step 3: If your reader's or programmer's firmware out of date, then WebISP will prompt you to update the firmware. Click [Yes] to begin Updating the firmware.	
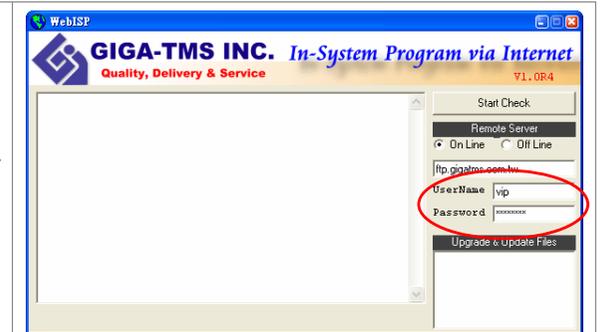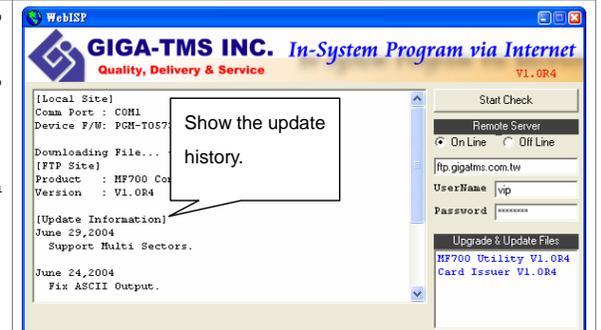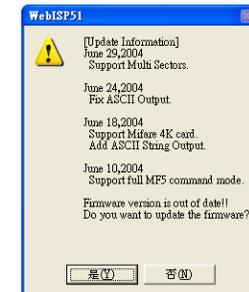
Step 4: Wait for the updating to finish. And repeat step 2 to update other readers or programmers.

Update finished
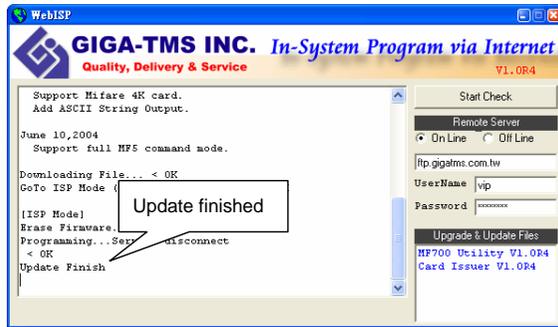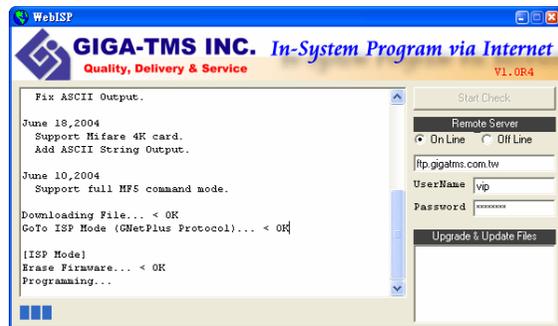
Step 5: Check "Upgrade & Update Files" list to download the new and related software or utility to meet the updated firmware.

Note:
Click the new software or utility at "Upgrade & Update Files" to start downloading.
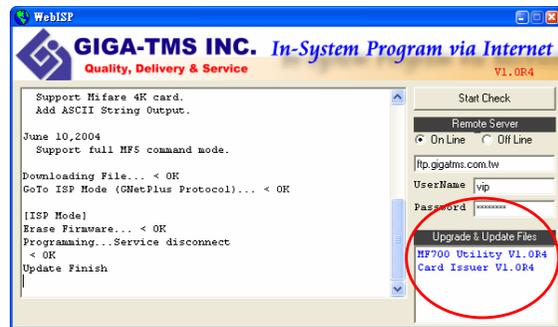
ANNEX E. History

Rev A: June 4, 2004
      Initial MF700 Configurable Reader.

REV B: June 29, 2004
      1. Support multi sectors and Mifare® standard 4K.
      (MF700 firmware version upgrade to V1.0R4)
      2. WebISP Instruction (ANNEX D).

REV C: July 15, 2004
      Add external alarm control (ANNEX B).
      (MF700 firmware version upgrade to V1.0R5)

PROMAG®

GIGA-TMS INC.

http://www.gigatms.com.tw

mailto:promag@gigatms.com.tw

TEL：+886-2-26954214

FAX：+886-2-26954213

Office: 8F, No. 31,Lane 169, Kang-Ning St.,Hsi-Chih, Taipei, Taiwan