

MF700 Configurable MAD Reader User's Manual



REV.L
June 12, 2008

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 128 bits.

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

MF700 Features:

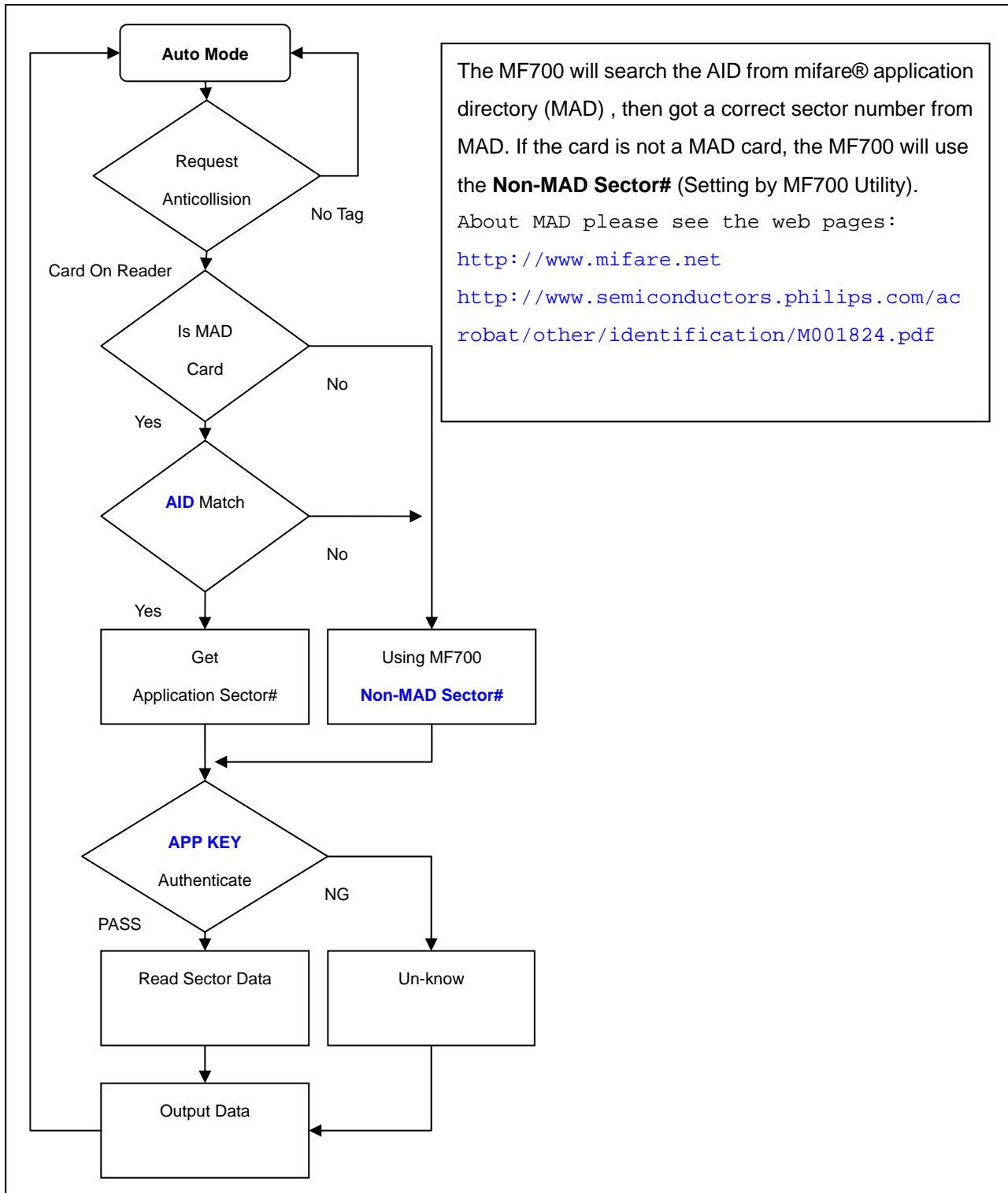
1. Support MAD1/MAD2 standard, and support customer MAD-AID setting.
2. Support Non-MAD format with user-defined sector number.
3. Support Anti-Collision (Two cards together can be read at the same time).
4. Support Multi Sectors.
5. Support Mifare[®] Standard 4K or Mifare[®] Standard 1K card.
6. Each Reader with Reader ID for multi-link application.
7. Output interface: Wiegand (Default), ABA-TK2 and RS232.
8. Wiegand output selectable from 26 bits to 128 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.



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	USER DATA (Max 47 Bytes)
	Block 1		
	Block 2		
	Block 3		



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

Data Type is fixed with 11b 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.

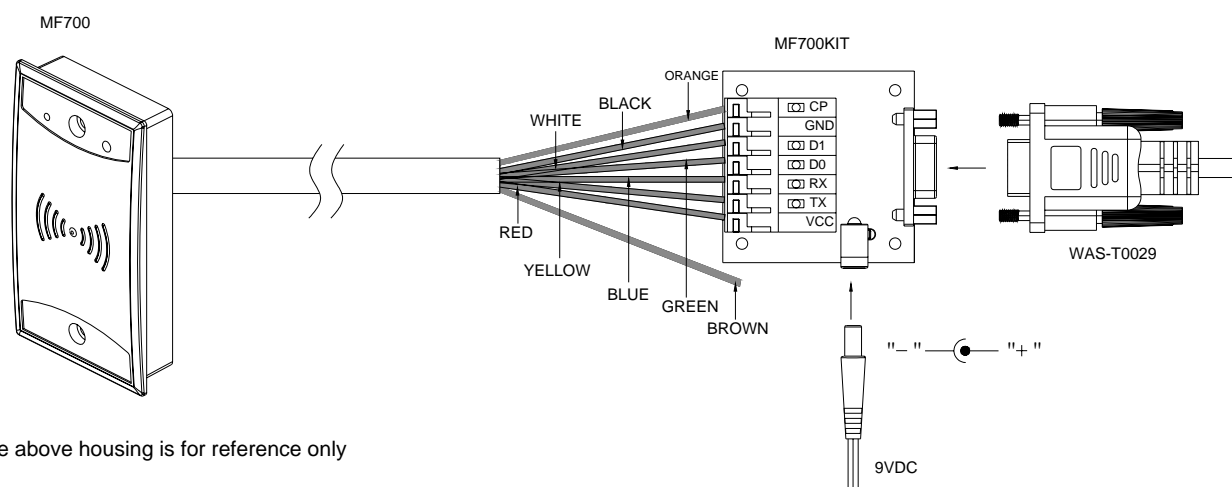
Example: Data Length is 16, MF700 only send out 15 bytes for RS232 output.

Wires Assignment

Color	Symbol	I/O	Description
Red	VCC	IN	Power Input : DC 7.5V~12V
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)
Blue	RXD	IN	RS232 RXD (To Host TXD)
Orange	CP	OUT	ABA TK2 Card Present (for MF700 REV.D and later)
Brown	LED/BUZEER	IN	External LED/BUZZER Control

Connect To MF700KIT before configure the MF700 Reader.

To configure the MF700 reader you need connect the reader to the MF700KIT first as below:



The above housing is for reference only

Remark:

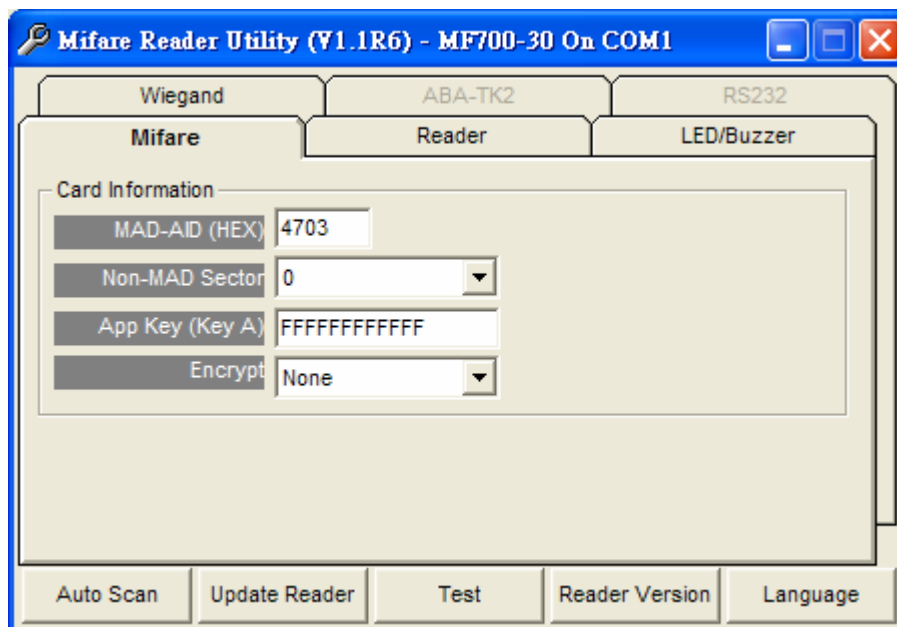
2004/10/29: New Brown wire is for External LED/Buzzer Control, and Blue wire is keep in RS232 RX signal for communication only. (MF700-00 REV.F, Firmware V1.3R0)

Note:

MF700KIT is a test connection kit for MF700 configuration use. It is an optional item for purchasing.

Mifare Reader Utility

1. Mifare Settings:



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.

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.

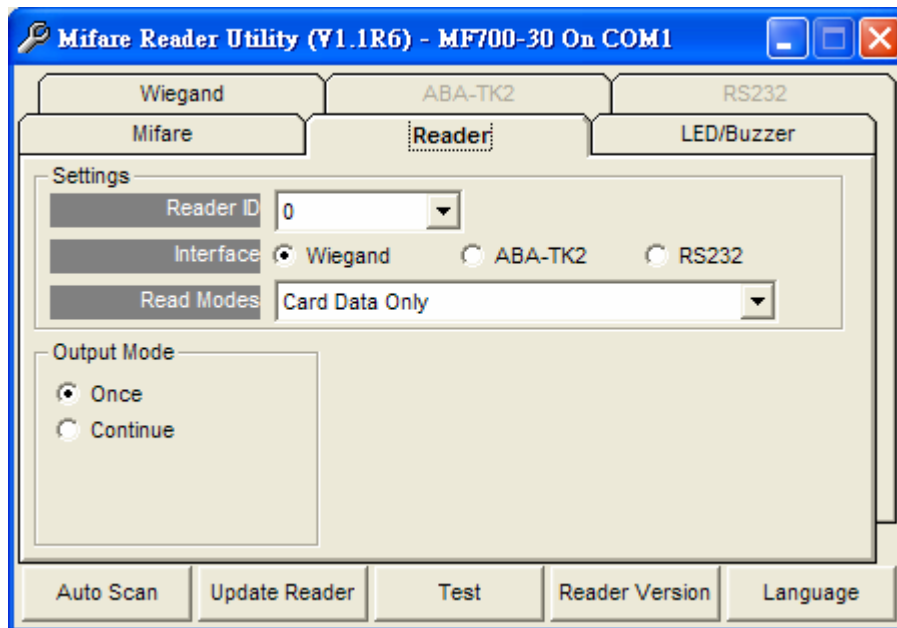
App Key (KEY_A): (Default=FFFFFFFFFFFF)

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.

Encrypt: (Default=None):

Fraud prevention, Select Encrypt Mode (None, Encrypt 1, Encrypt 2, Encrypt 3, Encrypt 4, Encrypt 5) to protected your card data. (Remark: Encrypt mode must to work together with the same encrypt mode of MF700-30 Card Issuer.)

2. Reader Common Settings:



Reader ID : (Default=0):

MF700 Reader ID for multi link application. (ID: 0~255).

Interface: (Default=Wiegand):

MF700 can be set as Wiegand, RS232 or ABA-TK2 output.

Read Modes: (Default=Card Data Only):

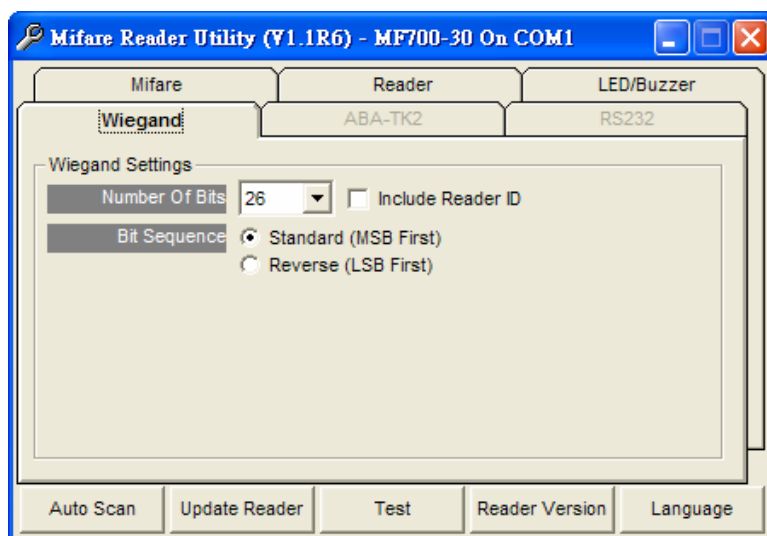
Card Data or CSN (Card Serial Number): MF700 will send out the card serial number when MF700 fail to authenticate App Key with the card to be read.

Output Mode: (Default=Once)

Once: Send data (or CSN) to host once.

Continue: Keeping sending data (or CSN) to host till card remove.

3. Wiegand Setting:

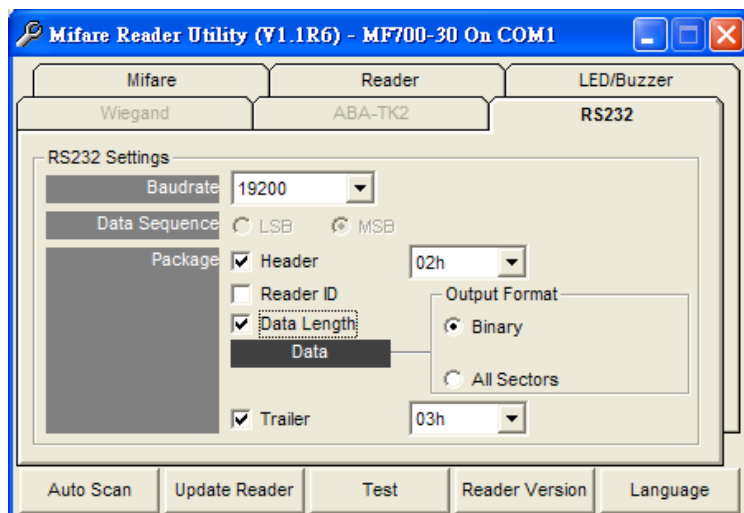


Number of Bits is to set the Wiegand output type you want to meet your Host (or Terminal). It can be 26 to 128 (Default=26).

Include Reader ID¹ 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).

4. RS232 Setting:

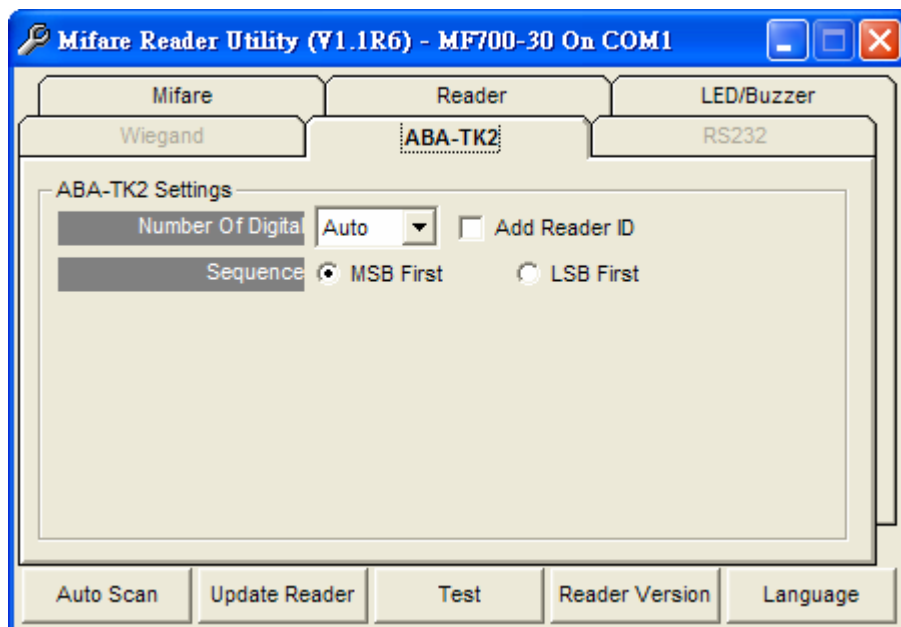


Baudrate can be set 2400bps~57600bps (Default=19200bps)

Mode is to set the output data mode (Binary or All Sectors). User data is the user defined format (See User-Data Format of Mifare® Card Issuer Manual) . All Sectors is just to send out all the data in the sectors. (Default= Binary)

Include² is to set the output data packet to include Header, Reader ID, Data Length and Trailer. (Header:00h~FFh, Trailer : 00h~FFh). (Default = None included)

5. ABA-TK2 Settings



Number Of Digital: Set number of digital codes for TK2 output. (Default=10)

Add Reader ID: Enable/Disable include Reader ID into TK2 data. (Default=None included)

Sequence: Set the TK2 data sequence. (Default=MSB First)

Note:

(1).Wiegand output data packet with Reader ID:

Standard	Parity(Even)	Reader ID	(MSB)	Data Bits	(LSB)	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
--------	-----------	-------	------------	-------	---------

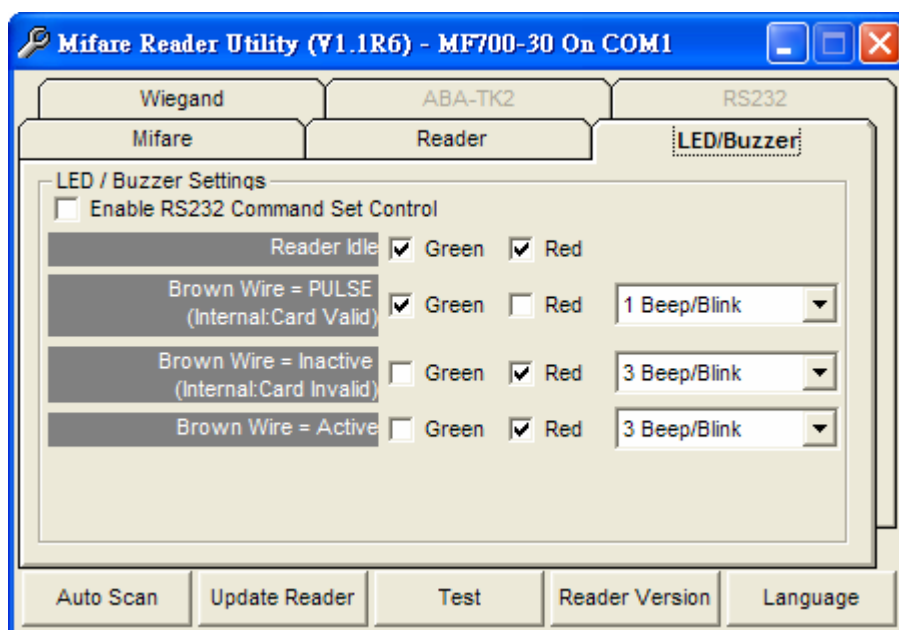
(3).ABA-TK2 with Reader ID:

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

Remark:

*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.*

6. LED / Buzzer Settings



New MF700 support the LED/Alarm Configuration. Setting the LED/Buzzer to indicate the system status for end-user.

Enable RS232 Command Set Control: (For 19200,n,8,1 Only)

RS232 LED/Buzzer command set frame as below:

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 1 Time
6 (36h)	Buzzer Beep 3 Time
7 (37h)	Green LED ON with Beep 1 Time
8 (38h)	Red LED ON with Beep 3 Time
9 (39h)	All LED ON (Orange)

Remark: If Enable the RS232 Command Set Control (for LED/Buzzer), the external LED/Buzzer control with high/low level control will be disable.

Normal: Show LED color after power on or idle state.

Card is valid: Show LED color and beeps to indicate the end-user that card was passed by MF700

reader (or by Host/Access Control).

Card Is invalid: Show LED color and beeps to indicate the end-user that card was failed by MF700 reader.

External invalid: Show LED color and beeps to indicate the end-user that card was failed by Host (Access Control)

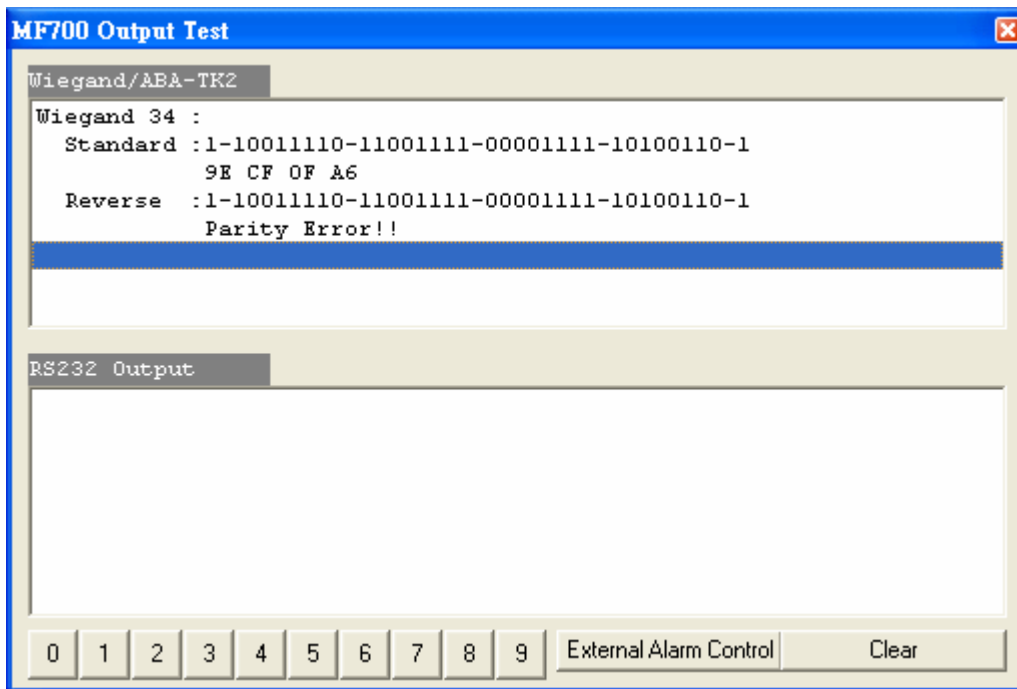
Note: See Annex E, the LED/Buzzer also can be controlled externally with High/Low level control.

7. 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 34 bits output data with standard bit sequence, example as below: (If "Bit Sequence" is standard, Reverse will detect a wrong with parity error.)



ANNEX A. Hardware Specification

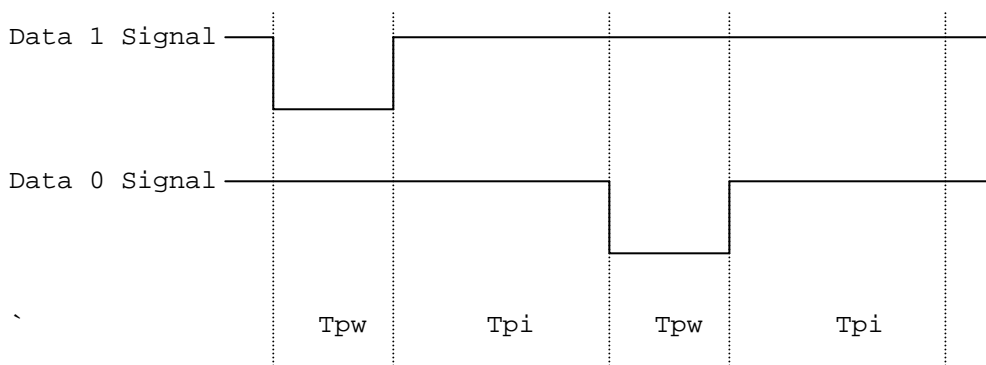
	MF700
Major Feature	Mifare® Application Directory Reader Access Control & Security
Card Type	ISO14443A, Mifare Class ¹ (Mifare® 1K, Mifare® 4K for MAD1/MAD2)
RF Frequency	13.56MHz
RF Distance ²	50mm (Using the MFA01 Mifare® card of GIGA-TMS INC.)
DC Power	7.5VDC~12VDC (Min 250mA@7.5V, 150mA@12V)
Interface	Wiegand 26~128 bits (Standard / Reverse) RS232 2400bps~57600bps ABA-TK2 40IPS
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 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 MF700 reader.



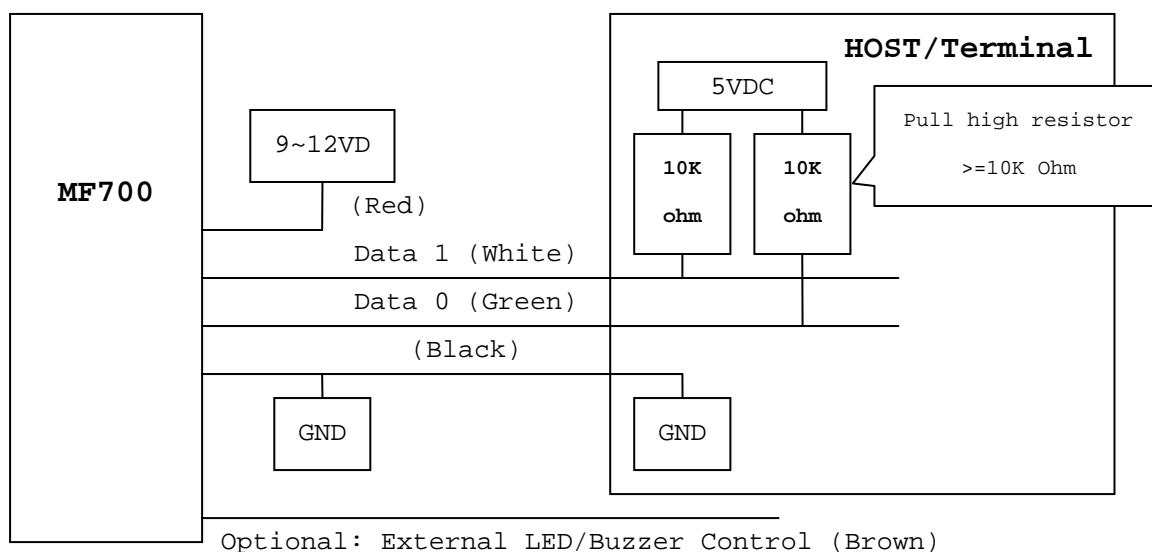
Pulse Times

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

Wiegand Packet (Without Reader ID)

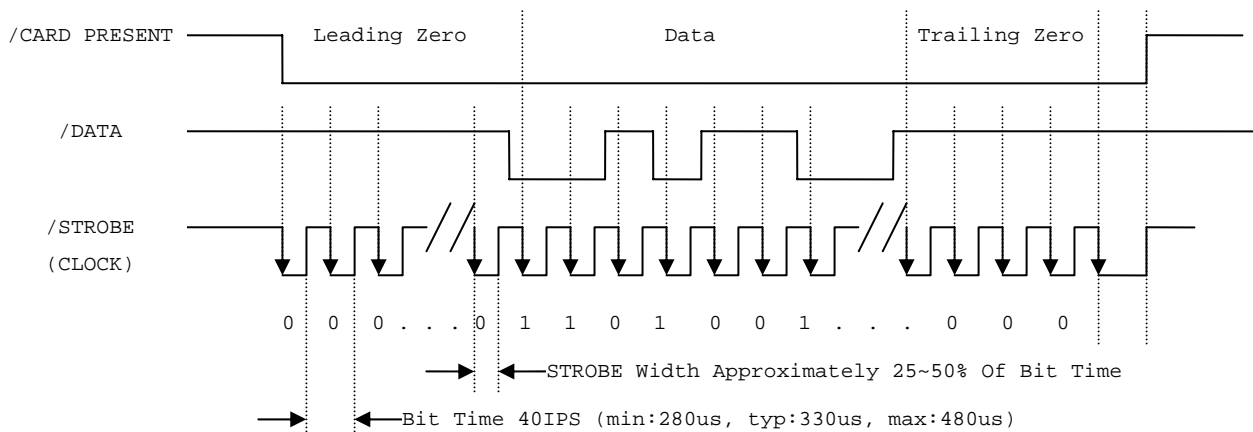
Standard (Default)	Parity(Even)	(MSB)	Data Bits	(LSB)	Parity(Odd)
Reverse (Option)	Parity(Odd)	(LSB)	Data Bits	(MSB)	Parity(Even)

Connect the Wiegand wires, example as below: (The pull high resistor must $\geq 10K$ Ohm)



ANNEX C. ABA TK2 Interface

The timing for Card Present, Clock (Strobe) and Data , example as below:



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.

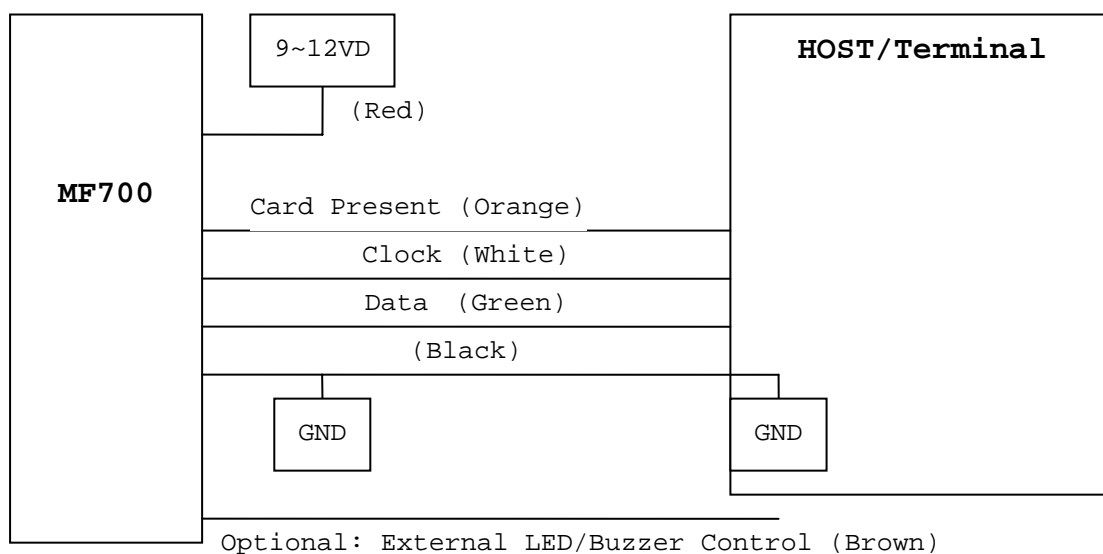
CLOCK (STROBE)

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

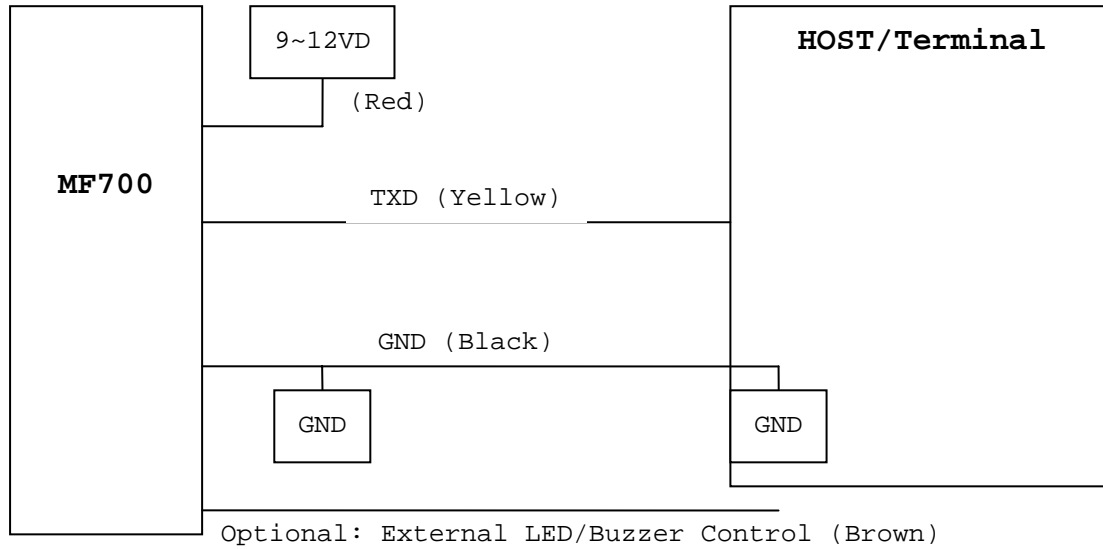
Card Present will go low after flux reversals from the Reader. Card Present will return high after the last flux reversal.

Connect the ABA TK2 wires, example as below:



ANNEX D. RS232 Interface

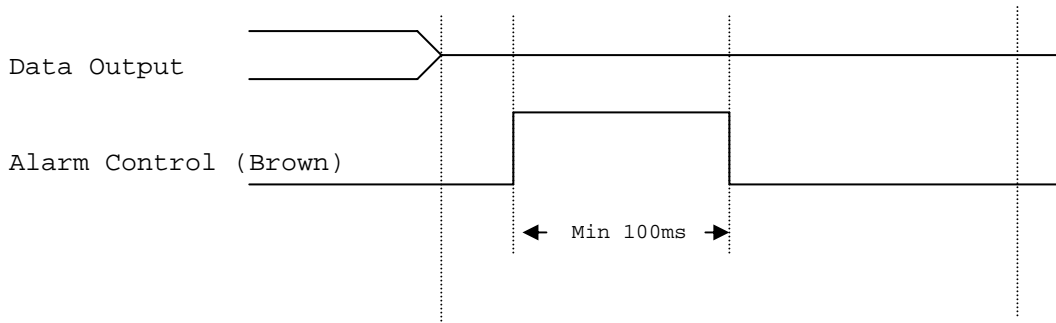
Connect the RS232 wires, example as below:



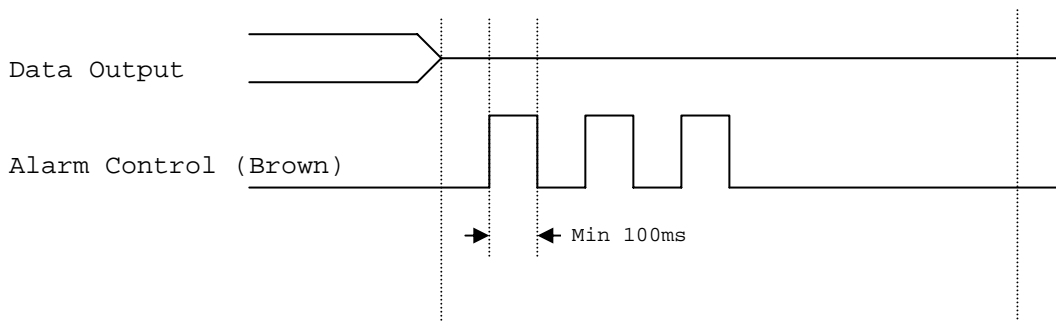
ANNEX E. External LED/Buzzer Control

MF700 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 MF700, and set Brown wire to High Level (2.5V~12V) . Examples as below:

(1) Show External Invalid Status



(2) Show Card Valid 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 MF700 utility.

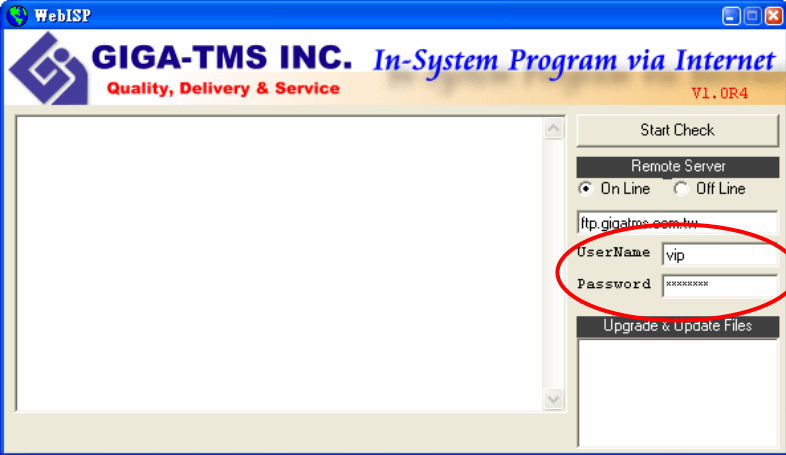
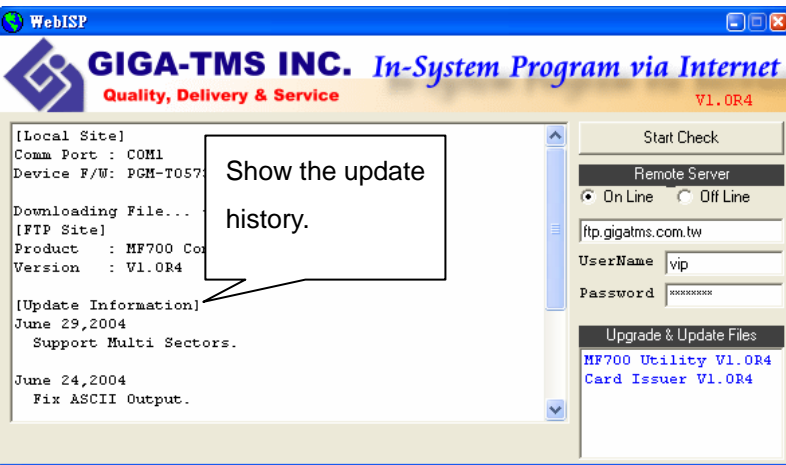
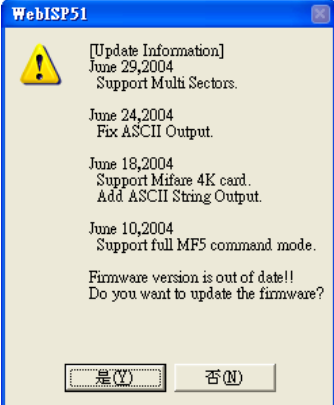
ANNEX F. Order Information

Part Number	Include	Description
MF700SK-30	MF700-30 MF700KIT WAS-T0029 PCR310U DISK5257 Power Adaptor MFA01 (3PCS)	MF700 Configurable Reader (Encrypt Version) MF700 Configure Kit MF700 Configure Cable Card Issue Programmer Card Issue and Utility Software DC Power Adaptor 9VDC for MF700KIT Mifare Standard 1K Card
MF700-30	MF700-30	MF700 Configurable Reader (Encrypt Version)
MF700KIT-30	MF700KIT WAS-T0029 DISK5257 Power Adaptor	MF700 Configure Kit MF700 Configure Cable Card Issue and Utility Software DC Power Adaptor 9VDC for MF700KIT
PCR310U-30	PCR310U DISK5257	Card Issue Programmer Card Issue and Utility Software
MFA01	MFA01	Mifare® Standard 1K Card
MFA04	MFA04	Mifare® Standard 4K Card

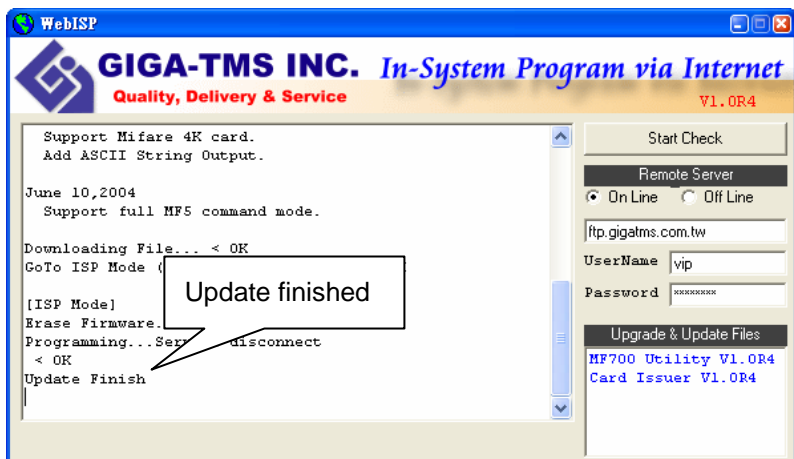
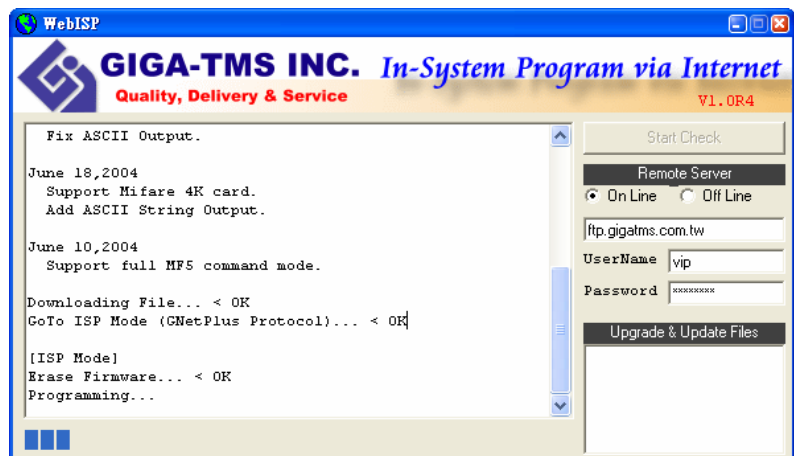
ANNEX G. WebISP - Firmware Upgrade Utility

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)

<p>Step 1: Input your account (UserName and Password)</p> <p>Note: Contact us to get your account when needed.</p>	
<p>Step 2: Click [Start Check] to automatically check the firmware version from our FTP server.</p> <p>Note:</p> <ol style="list-style-type: none"> 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. 	
<p>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.</p>	

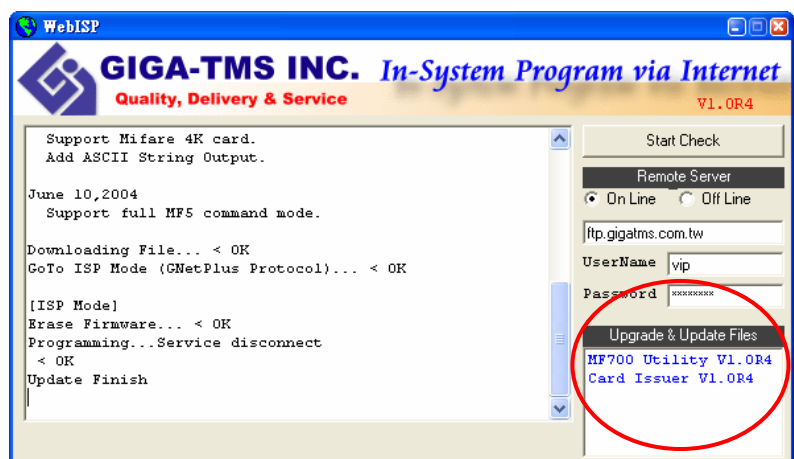
Step 4: Wait for the updating to finish. And repeat step 2 to update other readers or programmers.



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 H. 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 E).

REV C: July 15, 2004

Add external alarm control (ANNEX B).
(MF700 firmware version upgrade to V1.0R5)

REV D: August 6, 2004

Add LED/Alarm Settings (ANNEX C).
(MF700 firmware version upgrade to V1.1R0)
(MF700 utility version upgrade to V1.1R0)

REV E: September 1, 2004

Add ABA-TK2 output
Add RS232 LED/Buzzer communication command set.
Add TK2 Card Present wire for MF700 Hardware Version REV.D
Add Extern LED/Buzzer Control for Card Valid status. (ANNEX E).
(MF700 firmware version upgrade to V1.2R0)
(MF700 utility version upgrade to V1.2R0)

REV F: September 23, 2004

Fix Wiegand number of bits from 26 bits to 128 bits.
(MF700 Utility version update to V1.2R1)
Fix LED/Buzzer status when Enable RS232 LED/Buzzer Control.
(MF700-00 Firmware version update to V1.2R2)

REV G: October 29, 2004

Add Brown wire for external LED/Buzzer Control. (MF700-00 REV.F)
Add "Data length" for RS232 output. (Firmware V1.3R0, Utility V1.3R0)

REG H: January 12, 2005

Revise the b7~b6 from "11h" to "11b" in User-Data Format. (Page 4)

REV I: June 7, 2005

Add encrypt mode for fraud prevention. (Firmware PGM-T0633 V1.0R4)

REV J: November 15, 2005

Revise MF700 power specification from DC6.5V to DC7.5V

REV L: June 12, 2008

Use "Mifare Reader Utility" for setting

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