

Hardware Manual

(Model:FM2000M)

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1. Direction before Using

1.1 Direction for safety usage

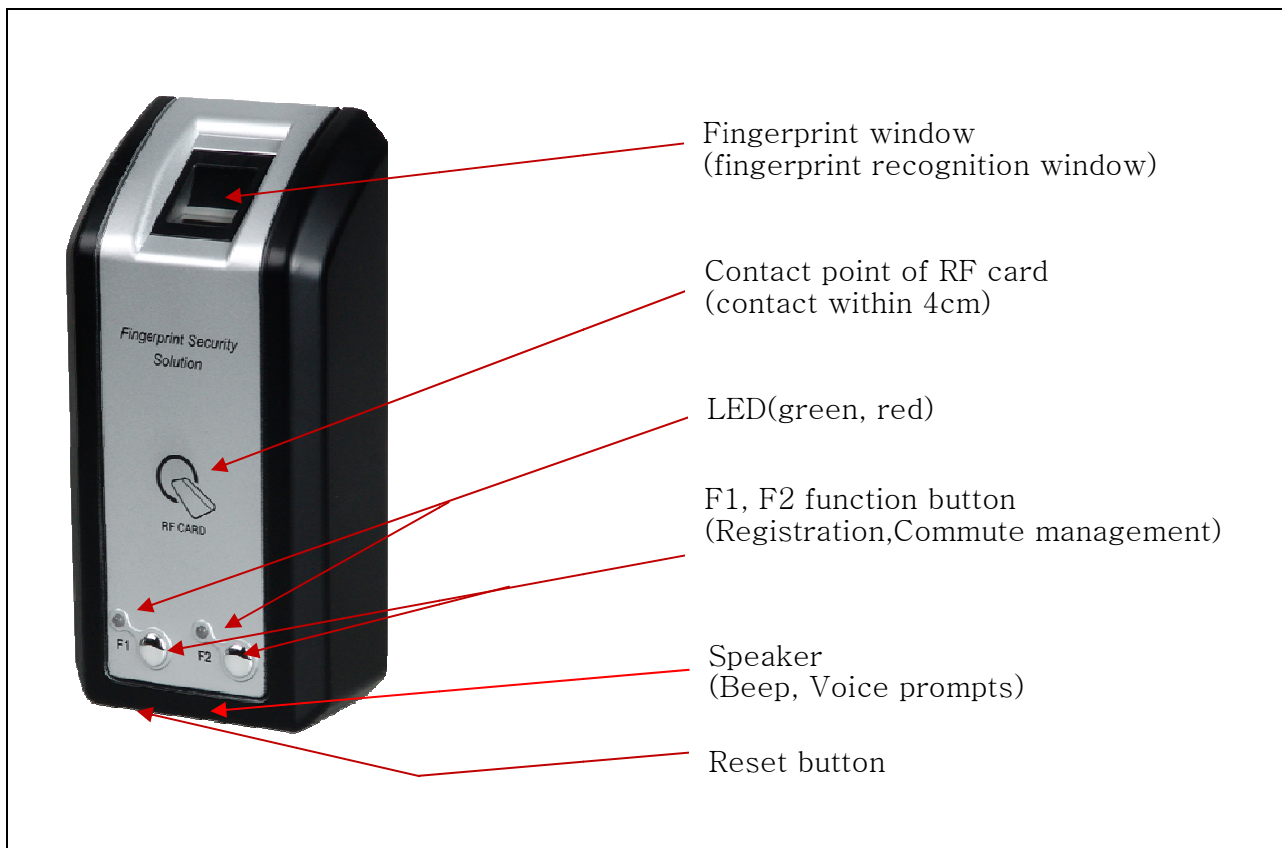
- ◆ Do not move or reinstall the system arbitrarily.
: In case of arbitrarily moving or installing the system, the system may not work or be broken down due to an electrical shock or inadequate connection. In this case, call the operator.
- ◆ Do not place the equipment around places where high voltage flows.
: The system may receive electrical effect due to high voltage.
- ◆ Do not open/close or repair the system arbitrarily.
: This system is a high-precision electronic product. So, it can be damaged if you arbitrarily open/close or repair it. Make sure to call the sales company or operator if needed.

1.2 Product packing and contents

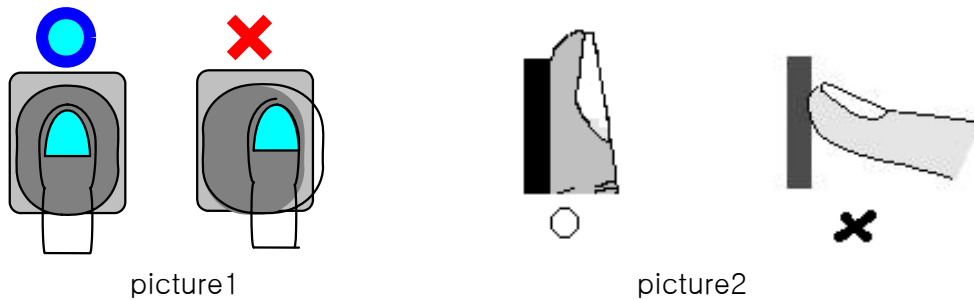
a. fm2000 Fingerprint Control Unit	1ea
b. RF Card(13.56MHz)	2ea
c. Accesaries(Connector, Screw and etc)	1ea
d. CD(hardware/software manual, pc program)	1ea

- ** Select Order : AC Power Adaptor(DC12V, 2.5~3A)

1.3 Parts name and Function



1.4 Fingerprint identification process



- ☺ Finger should be kept clean, so that a correct recognition is possible.
- ☺ If the finger is wet, recognition may be impossible.
- ☺ Make sure that there is no alien substance on the fingerprint recognizer.
- ☺ Place the finger correctly at the center of the fingerprint recognizer as shown in <Picture 1>.
- ☺ All fingerprint should be touching the fingerprint recognizer as shown in <Picture 2>.

2. Product Specifications and Function

2.1 Specification

CPU	ARM9 400MHz
RAM	32MByte
FLASH(Program & Data)	64MByte
User Registration	4Fingerprint + 1Card : 5,000Users Card : 50,000 Users Total 55,000 Users
Event Log	200,000 Events
Communication	RS422, Ethernet, Wiegand
In/Out	4 Signal Inputs, 1 Relay Output
Card Reader	13.56MHz Mifare
Audio	Speaker
System Software	Access Control and Time Attendance
Operating Environment	-20 ~ 50°C / Lower than 90% RH(Non-Condensing)
Power Consumption	DC 12 ± 3 V 300 mA
Sensor Type	Optical Sensor
1:1 Verification Time	800 ms
1: 1,000 Identification Time	< 1sec
Template Size	MAX 490Bytes

2.2 Function button and explanation on LED

** This product is designed to work using function buttons and LEDs alone without numeral buttons.

For convenient use, read carefully how to work function buttons and LEDs)

2.2.1 Function button

Press F1 2 times and F2 once	Function to have master finger print registered and Changed
Press each F1 and F2 2 times	Function to have master card registered and Changed.
Press F2 2 times and F1 once.	User registration and deletion (F1:ongoing F2:completed)
Press F1+F2+F1	Setting mode of how to access(incoming/outgoing) (F1:Menu change, F2:setting completed and closed)
Press F2+F1+F2	Setting how to recognize
Press F1 & F2 at the same time	Back to original position(initial state) or Cancellation
Press F1+fingerprint (or card)	After a voice "Attendance" is heard, save the time to work
F1 + F2 + fingerprint (or card)	After a voice "Go out" is heard, save the time to go out in the office.
F2 + F1 + fingerprint (or card)	After a voice "Return to the office" is heard, save the time to get back to the office
F2 + fingerprint (or card)	After a voice "Leave Office" is heard, save time to go home
Recognition of registered finger print (or card)	After a voice "Door opened" is heard, Fingerprint (card) ID is stored with green LED on F1 & F2 turned on.
Unregistered finger print (card) is authenticated or Unauthenticated	A sound "Beep" is heard once with red LED on F1 & F2 turned On.
Press F1 or F2 key	Whenever F1 or F2 is pressed, a voice "beep" is heard once.
Setting wrong function	A voice "Set back" is heard and back to an original position
The product is in an Abnormal condition	Red LED on F1 & F2

2.2.2 LED explanation

Alternately flashing F1 & F2	Indicates normal standby condition
Green light on F1	Indicates Menu change, or Go ahead when F1 is pressed
Green light on F2	Function setting completed and finished when F2 is pressed.
Green light on F1 and F2 at The same time	Indicates normal working condition
Red light on F1 and F2 at The same time	Indicates abnormal working condition

2.3 Operating prompts by voice

한글음성(Korean speech)	English voice(영어음성)
관리자에게 문의하세요	Please contact security manager
다시 설정하세요	Reset please
닫힘모드입니다	Closed mode

등록되었습니다	Registered
등록완료합니다	Registration completed
마스터지문 등록하세요	Register master fingerprint
마스터카드 등록하세요	Register master card
변경 마스터지문 등록하세요	Change master fingerprint
변경 마스터카드 등록하세요	Change master card
변경되었습니다	Changed
복귀합니다	Return to office
사용자 등록입니다	User registration!
사용자 삭제입니다	User deletion!
사용자 전체 삭제입니다	All users deleted
삭제합니까?	Delete?
삭제되었습니다	Deleted
삭제완료합니다	Deletion completed
열림모드입니다	Open mode
외출합니다	Go out
인증되었습니다	Authenticated
인식방법 설정합니다	Please set how to recognize
일반모드입니다	General mode
지문 혹은 카드로 출입합니다	Access via fingerprint or card
지문등록하세요	Register fingerprint
지문으로 출입합니다	Access via fingerprint
지문과 카드로 출입합니다	Access via fingerprint and card
출근합니다	Attendance
출입모드 설정합니다	Set access mode
출입문이 열렸습니다.	Door opened
초기화되었습니다.	Initialized
카드등록하세요	Register card
카드로 출입합니다	Access via card
퇴근합니다	Leave office

3.Administrator registration and change

** After opening the product package and applying electrical power on the terminal for the first time, register administrator's master fingerprint and card.

Administrator is required to have 4 fingerprints and 1 card registered at the same time.

If either only fingerprint or card is registered, an outsider may register for unauthorized use, Thus causing very dangerous situation.

3.1 Master fingerprint registration

Press F1 button twice and F2 button once	A voice "Register Master fingerprint!" ⇒ Master fingerprint registration ⇒ A voice "Registered" ⇒ 2nd fingerprint registration ⇒ A voice "Registered"(4 registrations) ⇒ A voice "Registration completed" ⇒ Normal standby state(Green LEDs on F1 and F2 button flicker alternately)
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- ** If one made mistake in operation or wants to start again while registration(master or user) is under way, press F1 & F2 button at the same time, thus putting the terminal in normal standby state(Green LEDs on button and F2 button flicker alternately)
- ** When registering fingerprint(Maste, User), have 1~2 digits registered for 4 fingerprints, Therby reducing error in fingerprint registration.

3.2 Master card registration

Press F1 twice + F2 once	A voice "Register master fingerprint" ⇒ Card registration ⇒ A voice "Registered"(1 card registered) ⇒ A voice "Registration completed"
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3.3 Master fingerprint change

Press F1 twice + F2 once	A voice "Register master fingerprint" ⇒ Registered Master Fingerprint(card) authenticated ⇒ A voice "Authenticated", "Register change in Master fingerprint" ⇒ Registration of change in Master fingerprint ⇒ A voice "Registered" ⇒ Registration of 2 nd change in Master fingerprint ⇒ A voice "Registered"(4 fingerprints registered) ⇒ A voice "Registration completed"
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3.4 Mastercard Change

Press F1 twice + F2 twice	A voice "Register Mastercard" ⇒ Registered Mastercard (fingerprint) authenticated ⇒ "Authenticated" and a voice "Register change in Mastercard" ⇒ Change in Mastercard registered ⇒ A voice "Registered" and "Registration completed".
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4. User(finger print or card) registration and deletion

- ** A total of 55,000 users can have fingerprints or cards registered : the first 5,000 users can have both 4 fingerprints and 1 card registered while remaining 50,000 users can have only cards registered.

4.1 User registration

4.1.1. User registration(4 fingerprints & 1 card)

Press F2 twice + F1 once	A voice "User registration!" ⇒ Touch master fingerprint(card) on Terminal ⇒ A voice "Register fingerprint" ⇒ User fingerprint registered ⇒ A voice "Registered" ⇒ User fingerprint (2 nd) registration ⇒ A voice "registered"(4 fingerprints registered) ⇒ A voice "Register card ⇒ Card registered ⇒ A voice "Registered" ⇒ F2 ⇒ A voice "User registration completed"
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- ** When one has only fingerprint registered, press F2 button without card registration and one wants to register card alone, after a voice "Register fingerprint" is heard, press F1 button to hear a voice "Register card"
- ** Each user is given one ID of his own which includes 4 fingerprints and 1 card registered.
- ** A total of 55,000 users can have fingerprints or cards registered : the first

5,000 users can have both both fingerprints and card, and remaining 50,000 can have only card registered.

4.1.2. User registration(4 fingerprint only)

Press F2 twice + F1 once	<p>A voice "User registration" ⇒ Master fingerprint(or card) ⇒ A Voices "Authenticated""Register fingerprint" ⇒ User A has his Fingerprint registered ⇒ A voice "Registered" ⇒ User A's fingerprint(2nd) registered ⇒ A voice "Registered"(4 fingerprints registered) ⇒ A voice "Register card" ⇒ Press F2 ⇒ A voice "Registration completed"</p> <p>## A voice "Registered"(4 fingerprints registered) ⇒ A "Register card" is heard, press F1, then registration of 2nd user B's fingerprint is under way ⇒ A voice "Registered" ⇒ User B's fingerprint(2nd) registered ⇒ A voice "Registered"(4 fingerprints registered) ⇒ A voice "Register Card" is heard, press again F1 to go ahead with 3rd users registration and if F2 is pressed, user's registration is completed.</p>
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** When one wants to have fingerprint alone registered, after 4 fingerprints are registered and a voice "Register card" is heard, without having card recognized, press F1 key to go ahead with registration of 2nd user's fingerprint. Whenever F1 key is pressed, other user's registrations continue and then, press F2 to complete registration.

4.1.3. User registration(one card only)

Press F2 twice + F1 once	<p>A voice "User registration!" ⇒ Master fingerprint(or card) ⇒ A voices "Authenticated""Register fingerprint" ⇒ Press F1 ⇒ A voice "Register card" ⇒ A card registered ⇒ A voice "Registered" ⇒ Press F2 ⇒ A voice "Registration completed"</p> <p>## After A card is registered and a voice "Registered" is heard, press F1 key to go ahead with registration of 2nd user and a voice "Register fingerprint" ⇒ F1 ⇒ A voice "Register card" ⇒ B card registered ⇒ A voice "Registered" is heard and user registrations continue and press F2 to complete registration.</p>
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4.2 User deletion

Press F2 twice + F1 once	<p>A voice "User deletion!" ⇒ master fingerprint(card) authenticated ⇒ A voice "Authenticated" ⇒ registered user fingerprint(or card) ⇒ A voice "Deleted" ⇒ Press F2 ⇒ A voice "deletion completed"</p> <p>## (When repeting deletion) After a voice "Deleted" is heard, Continue registered card(fingerprint) wanting to be deleted and when a voice "Deleted" is heard, it is deleted and when deletion is completed, press F2.</p>
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** When a particular user deletes one of his fingerprints(or 1 card), all of his fingerprints(4) and card registered are deleted.

4.3 Deletion of all users

Press F2 twice + F1 twice	A voice "User deletion!" ⇒ Master fingerprint(or card) ⇒ A Voice "Authenticated" ⇒ F1 ⇒ A voices "All users deleted", "Delete?" ⇒ F1 ⇒ A voice "Deletion completed"
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** If all fingerprints(or card) of users are deleted, master fingerprint(card) remains and be careful that once they are deleted, they cannot be reinstated.

5. Setting how to access

5.1 Access mode setting

General mode (registered user's access)	Press F1+F2+F1 ⇒ A voice "Set access mode" ⇒ Master fingerprint(or card) ⇒ A voice "Authenticated" ⇒ F1 ⇒ A voice "General mode" ⇒ F2 ⇒ A voice "Registration completed, and into normal stanby (greenLED on F1 and F2 flicker alternately)
Open mode (Access door remaining open)	Press F1+F2+F1 ⇒ A voice "Set access mode" ⇒ Master fingerprint(or card) ⇒ A voice "Authenticated" ⇒ F1 ⇒ A voice "General mode" ⇒ F1 ⇒ A voice "Open mode" ⇒ F2 ⇒ A voice "Registration completed" ## At open mode, green LEDs on F1 and F2 flicker alternately, fingerprint light is extished and fingerprint/card except function key are not recognized..
Closed mode (no access allowed except for adminis-trator)	Press F1+F2+F1 ⇒ A voice "Set access mode" ⇒ Master fingerprint(or card) ⇒ A voice "Authenticated" ⇒ F1 ⇒ A voice "General mode" ⇒ F1 ⇒ A voice "Open mode" ⇒ F1 ⇒ A voice "Closed mode" ⇒ F2 ⇒ A voice "Registration completed" ## At closed mode, green LEDs on F1 and F2 flicker alternately, fingerprint light is extished and fingerprint/card except function key are not recognized

** When the product left factory, access mode was set at general mode.

5.2 Set how to recognize

Access via fingerprint of card	Press F2+F1+F2 ⇒ A voice "Please set how to recognize" ⇒ Master fingerprint(or card) ⇒ A voice "Authenticated" ⇒ F1 ⇒ "Access via card" ⇒ F1 ⇒ A voice "Access via fingerprint" ⇒ F1 ⇒ A voice "Access via fingerprint and card" ⇒ F1 ⇒ A voice "Access via fingerprint or card" ⇒ F2 ⇒ A voice "Registration completed" and into normal standby state(Green LEDs on F1 and F2 flicker alternately)
Access via fingerprint only	Press F2+F1+F2 ⇒ A voice "Please set how to recognize" ⇒ Master fingerprint(or card) ⇒ A voice "Authenticated" ⇒ F1 ⇒ "Access via card" ⇒ F1 ⇒ A voice "Access via fingerprint" ⇒ F2 ⇒ A voice "Registration completed" and into normal standby state(Green LEDs on F1 and F2 flicker alternately) and registered card is not recognized.

Access via card only	Press F2+F1+F2 ⇒ A voice “Please set how to recognize” ⇒ Master fingerprint(or card) ⇒ A voice “Authenticated” ⇒ F1 ⇒ “Access via card” ⇒ F2 ⇒ A voice “Registration completed” and into normal standby state(Green LEDs on F1 and F2 flicker alternately) and fingerprint light is extinguished.
Dual recognition via card and fingerprint	Press F2+F1+F2 ⇒ A voice “Please set how to recognize” ⇒ Master fingerprint(or card) ⇒ A voice “Authenticated” ⇒ F1 ⇒ “Access via card” ⇒ F1 ⇒ A voice “Access via fingerprint” ⇒ F1 ⇒ A voice “Access via fingerprint and card” ⇒ F2 ⇒ A voice “Registration completed” and into normal standby state (Green LEDs on F1 and F2 flicker alternately) ## For access via card and fingerprint, have card first recognized and then, have fingerprint recognized.

** When the product left the factory, access mode is set via fingerprint or card.

6. Product initialization and Reset

6.1. Product initialization(Factory mode)

When it is necessary to delete registered master fingerprint(card) and all of user registrations to operation problem or reinstallation and the terminal is handled as if it is for the first time, have the product initialized.

How to initialize : With DIP No. 8 switch at OFF and power switched ON, a voice “Initialized” is heard repeatedly and when DIP No. 8 which is put at ON, the terminal will be in a normal standby state.

After the terminal is initialized, be sure that DIP Switch is always to be put at ON position.

Registration and status of events stored at fingerprint terminal are deleted by Product initialization.

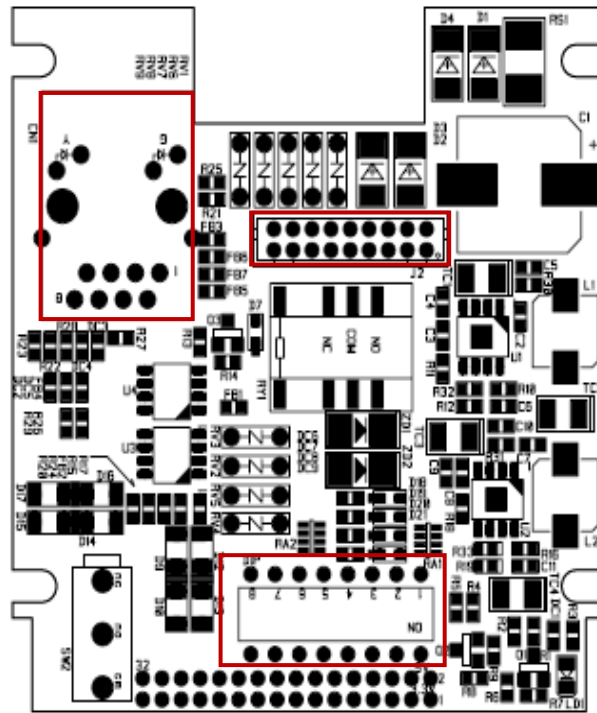
Be careful.

6.2. Product resetting(reactivation)

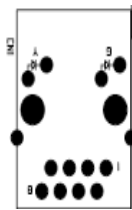
If something goes wrong with the product while in operation, press reset switch to Restore it back to normal.

Registrations and events stored remain undeleted.

7. Product installation

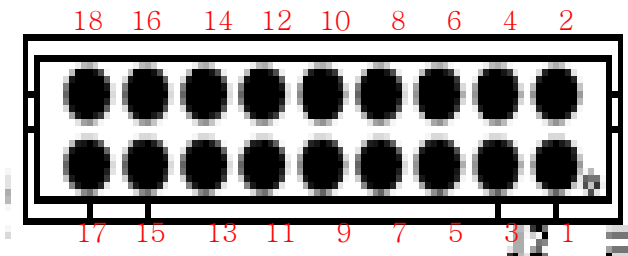


7.1. Connection to CN1 Ethernet



connect Ethernet line to CN1

7.2. J2 Connection to J2 power and I/O



- Power connection : Connect +12V, 0V to No.2pin and No.4 pin irrespective of their respective Polarity.
- Connection to Wiegand : Connect No.6 pin to Wiegand D0 and connect No.8 pin to Wiegand D1.
- RS422 connection : TX+(No.12pin), TX-(No.14pin). Rx+(No.16pin), RX-(No.18pin)
- Connection to Relay output : Normal Open(No.1pin), Common(No.3pin), Normal Close(No.5pin)
- Connection to Sensor : Sensor 0(No.9pin, Exit), sensor1(No.11pin, Door Status), sensor2(No. 13pin), Sensor4(No.15pin)
- Signal ground : No.7pin, No.10pin, No.17pin

7.3. FM2000 local Address setting

- Use SW1No. 1 ~ 5 to set Local Address
- If SW1No. 1 ~ 5 were set at OFF when leaving factory, local address is No.1
- To set address, set SW1 pin No. 1 ~ 5 as shown in below table..

Address	No.1	No.2	No.3	No.4	No.5	Address	No.1	No.2	No.3	No.4	No.5
1	OFF	OFF	OFF	OFF	OFF	17	OFF	OFF	OFF	OFF	ON
2	ON	OFF	OFF	OFF	OFF	18	ON	OFF	OFF	OFF	ON
3	OFF	ON	OFF	OFF	OFF	19	OFF	ON	OFF	OFF	ON
4	ON	ON	OFF	OFF	OFF	20	ON	ON	OFF	OFF	ON
5	OFF	OFF	ON	OFF	OFF	21	OFF	OFF	ON	OFF	ON
6	ON	OFF	ON	OFF	OFF	22	ON	OFF	ON	OFF	ON
7	OFF	ON	ON	OFF	OFF	23	OFF	ON	ON	OFF	ON
8	ON	ON	ON	OFF	OFF	24	ON	ON	ON	OFF	ON
9	OFF	OFF	OFF	ON	OFF	25	OFF	OFF	OFF	ON	ON
10	ON	OFF	OFF	ON	OFF	26	ON	OFF	OFF	ON	ON
11	OFF	ON	OFF	ON	OFF	27	OFF	ON	OFF	ON	ON
12	ON	ON	OFF	ON	OFF	28	ON	ON	OFF	ON	ON
13	OFF	OFF	ON	ON	OFF	29	OFF	OFF	ON	ON	ON
14	ON	OFF	ON	ON	OFF	30	ON	OFF	ON	ON	ON
15	OFF	ON	ON	ON	OFF	31	OFF	ON	ON	ON	ON
16	ON	ON	ON	ON	OFF	32	ON	ON	ON	ON	ON

7.4. Enable to output Wiegand

- Set pin No.6 of SW11 at ON, enabling the terminal to output Wiegand.
- Where user card is registered, if user is authenticated irrespective of access mode, registered card ID is output.
- Where fingerprint alone is registered, if user is authenticated, user ID is output. Where fingerprint is registered in FM2000 terminal, user ID is automatically set sequentially starting with 1.

7.5. Selecting type of signal input as required

- SW1 No.7 pin is set at OFF when leaving the factory. Signal is input by normal open.
- Where signal is input by normal close, change SW1 No.7 pin to ON position.

8. Others

8.1. Checking matters before request for A/S

- α Input does not act well or response speed is slow
 - Check whether there is moisture in finger
 - Check whether Alien substance is on the surface of fingerprint reader
 - Check whether fingerprint was input exactly
- α Fingerprint registration does not act
 - Confirm fingerprint registration availability
 - Confirm fingerprint registration method
 - Confirm state of fingerprint reader

8.2. Terminology explanation

- α LAN (Local Area Network) :

LAN is linked with communication line fewer than 300m, and it means linkage of PC, main frame, workstation. LAN is distance that electric current or radio signal can be passed correctly between computer and LAN is linked high speed communication network established in building of a certain organization so that employees can use computer equipments most effectively
- α IP address :

It is Internet Protocol Address of 32 bits that provided as the concept agreeing with physical network address, on the Internet, to make Routing efficiently
- α Gateway(GW) :

It is a network point that act as entrance which enter other network
- α Subnet Mask(SM) :

Subnet is abbreviated word of "sub-network", it is network that is belonged to certain organization but it means network that can be realized to a part detached apart



CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK
DO NOT REMOVE COVER (OR BACK)
NO USER-SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



This lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated dangerous voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

FCC WARNING: This equipment may generate or use radio frequency energy. Changes or modifications to this equipment may cause harmful interference unless the modifications are expressly approved in the instruction manual. The user could lose the authority to operate this equipment if an unauthorized change or modification is made.

REGULATORY INFORMATION: FCC Part 15

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.