1. DESCRIPTION OF SCHEMETICS

(1) Operation description of FINGER007SR

Essentially the MIFARE RF interface follows the transformer principle, although both the Proximity Reader and Proximity Card antenna of course are resonance circuitries as antennas usually are. The Card is passive with no onboard battery. Thus, an energy transmission from the Reader to the Card is required in addition to the communication (data transmission) in both directions between the Reader and the Card.

To transfer data between the Reader and the Card a half-duplex communication structure is used. The Reader always starts the communication ("reader talks first"). The data transmission from the Reader to the Card uses a 100% ASK modulation(13.56MHz) according to the ISO14443 Type A.

The Exiting Antenna generates high power 13.56MHz frequency and Micore(RC500)&MCU of Proximity Reader detects encrypted data from the proximity card and decodes received data and generates 34 bit Wiegand signal if the received data matches its encryption code. 34 bit Wiegand signal enters into the interrupt routine of the Main MCU so that the read data from the Proximity Reader can be stored into the buffer of Main MCU at any time. The Main MCU receives the 34 bit Wiegand signal (Card ID number) from the proximity reader and confirms whether the ID number is registered, within the valid Time Schedule, Holiday Schedule and right sequence of Anti-pass Back. When the all flags are confirmed, the Main MCU sends the ID to the Fingerprint Module and turns on the fingerprint scanner to received the User's fingerprint and verify User's fingerprint. If the scanned fingerprint matches correctly against the stored fingerprint data, then the Main MCU releases the door relay for the Door Open Time set for this user and saves this event to the event buffer. The keypad can be used for entering the PIN or Password. When an input signal is detected, for example, when a motion detect sensor is activated or an exit button is pressed, the controller generates and logs an appropriate response for the input signal. All event transaction data is stored into the data memory and sent to the host computer when the communication is established. The RS232/RS485 communication port is connected to the Serial Interrupt of the Main MCU and continuously checks whether the host PC tries hand-shake with the device. When the host PC sends a command to the device, the command is received from the RXD port of the Main MCU, which then interprets the command and takes a corresponding action and sends a relative resulting command and event transaction data to the host PC through the TXD port of the Main MCU. For TCP/IP communication with the host PC, an optional TCP/IP module (IIM7100A) has to be mounted onto the device. The FINGER007SR has 16-key keypad (10 Numeric

keys, 2 Control keys and 4 Function keys) and scans all signals from the Keypad every millisecond and generates corresponding outputs according to the configuration stored in the Data Memory and internal RTC (Real Time Clock) keeps the exact time set by user. The integrated keypad and LCD display can be used for the entire programming process, even without connection to a host PC. The internal Buzzer makes beep sounds when the keypad is pressed or a proximity card is read. The Red LED is a power indicator, and it is always on when the device is powered on. The Green LED is turned on while the door relay is activated. The Yellow LED is turned on while the alarm relay is activated. The 5V voltage regulators distribute necessary power to the Proximity Reader, Main MCU and other electronic circuitry.

(2) Product Overview

Functions

Standalone Operation

The FINGER007SR is capable of having two readers (*i.e.* One built-in reader inside the unit and an External Reader connectable using the External Reader port). The unit receives card data signals from the RF Readers and determines whether or not to unlock the door. When an input signal is sent, for example from and activated sensor or if the Exit Button pressed, the controller generates and logs an appropriate response. All events are kept in its memory and sent to the PC. The access controller is a true standalone device that in the event of a malfunction, will not affect other units, even if used in conjunction with one another.

Operation with PC

All event transactions can be managed via the PC. The data transmitted from the controller can be processed, displayed (In the form of cardholder status, alarm status, etc.) and stored on the PC.

Data Retention

All user information and event/alarm data are retained even in the event of Power Failure unless the memory or the device itself is damaged.

Keypad

The built-in Keypad and LCD let you perform manual programming without connection to the PC.

Dual Finger Mode

Dual Finger Mode is a function that lets a user register two fingers for one ID so that the user can receive authentication with either of the two registered fingers. This is useful when a user's finger is injured.

Anti-Pass Back

Anti-Pass Back is a function that is used to prevent a user entering an area by using their card and passing that card back to another person to use. If the Anti-Pass Back is applied, cardholders cannot gain entry or exit twice in a row, and even if someone tailgates someone into the controlled area without going through the proper authentication procedure, he or she will not be able to gain access when exiting the area. If this is the case, the FINGER007SR generates an error message without granting access and then stores an Anti-Pass Back error record in the memory. You can also program the FINGER007SR to generate certain output signals in the event of an Anti-Pass Back error.

External Input / Output

The FINGER007SR has 4built-in inputs and 4outputs (2Relay Outputs and 2TTL Outputs) which can be used for a wide variety of purposes and applications. For example, the input ports can be used for interface with external devices such as Request-To-Exit Button, Fire Detection Sensor, etc. while the relay output ports can be connected to a Door Lock and/or an Alarm System. When you use Weigand output function, 26/34BIT Weigand will be generated from dual TTL output.

Time Schedule

You can program 10 Time Schedules and apply one Time Schedule to each user. Each Time Schedule has 8 different time zones from Monday to Sunday (7 Time Zones) and one holiday. Each time zone has 5 different time codes so you can program 5 different time codes to each day. Also you can program Time Schedule for individual inputs and outputs. Note that the Time Schedule for input is activated time code for input device so that the input is activated during the time code on this Time Schedule. Each Time Schedule is linked to one of holiday schedule and this linked holiday only validates to holiday time code of the Time Schedule.

Access Time Limitation for Cardholders – You can assign a time schedule code to each Cardholder during the card registration process. Cardholders are granted access only during the time defined in the assigned time schedules. If a Cardholder attempts to gain access out of the set time, access will be denied with a time schedule error.

Operating Time Limit for Output Ports – If you assign a time schedule code to an output code, the Output Port generates constant output signals during the set time. (This feature can be used, for example, to keep a door open during a certain period of time.)

Operating Time for Authentication Modes – Using this feature, you can have the FINGER007SR change. It's Authentication Mode during a set time period. For example, if you set the FINGER007SR to the RF + FP (P/W) mode and apply a time schedule code for the Authentication Mode, the FINGER007SR will operate in the RF-Only mode (Using RF Card verification alone) during the set time and shift into the RF + FP (P/W) mode (Using both RF Card and fingerprint verification) out of the set time.

Holiday Schedule Setup

Excepting Sunday, you can program 32 holidays to one Holiday Schedule. Each Holiday Schedule is linked to one time schedule which has time code for holidays. So you can program all holidays to Holiday Schedule and the time code for holidays is programmed to holiday time zone of time schedule.

Example: A: Holiday Schedule 01 linked to Time Schedule 01,
Holiday Schedule 02 linked to Time Schedule 02.
B: Holiday Schedule 02 linked to Time Schedule 01,
Holiday Schedule 01 linked to Time Schedule 02.

Door Open Alarm & Forced Door Open Alarm

The FINGER007SR can report the open status of the door if the door is not closed within a certain length of time (default: 3 sec) after the door is opened following a normal access procedure. (If this is the case, an alarm signal can be sent to the output port and the alarm event will be saved in the event buffer so that it can be uploaded to the PC when communication is established.) If the door contact sensor detects forced opening of the door, the Forced Door Open Alarm can be generated.

Duress Alarm

In the event of duress, you can enter the 2Digit Duress Password and press <ENT> and open the door using general process. If your access is granted, the door will be opened as usual but duress output will be generated and an alarm event will be sent to the PC.

1: N Authentication (Identification Mode)

You can gain access using the fingerprint authentication alone without using the RF Card or PIN. This feature can be enabled in 9.Identification of "SETUP MODE F4". In the Identification Mode, the security level gets higher automatically, FRR (False Rejection Ratio) as well, but FAR (False Accept Ratio) gets lower, which may result in a lower recognition rate. With an optional Auto Touch Sensor, the FINGER007SR can automatically detect the approach of the finger, but if your FINGER007SR does not have an Auto Touch Sensor, you will be required to press <ENT> prior to placing your finger on the sensor.

Adaptive Mode

If the Adaptive Mode is enabled, the fingerprint image is automatically adapted for better recognition results. This mode can be enabled in 11.Adaptive of “SETUP MENU F1”. While this feature improves the recognition success rate, the authentication process may take longer.

Weigand Output Function

You can use a Weigand Output Function in the "SETUP MODE F2".

Product Description

Front View

① LCD Display

It shows setting status.

② 3 LED Indicators

It shows system status.
The red LED turns on with power supply.
The green LED turns on with Relay #1 operation.
The yellow LED turns on with Relay #2 operation.

③ 16 Numeric Keypad

Register/Delete card data and set functions through keypad input.

④ Function Keypad

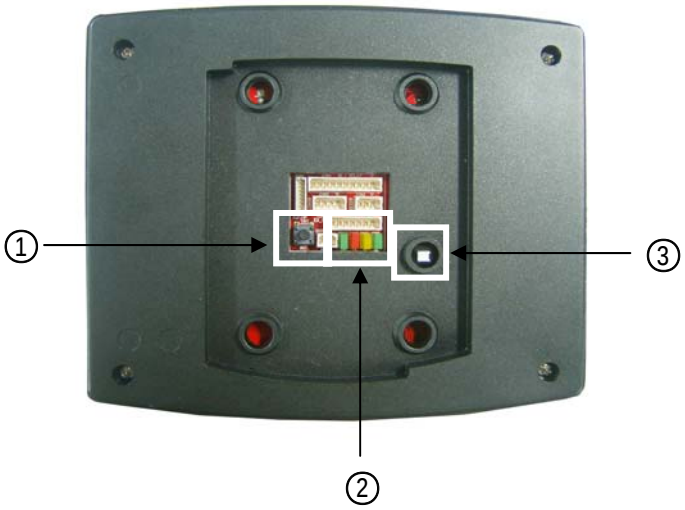
There are four function keys, F1, F2, F3 and F4

⑤ Finger Print Scanner

When users put their finger on the scanner, *white light will turn on.

In case of FIM2030, red light will turn on.

Rear View



① Initialization Switch

This switch is used to initialize FINGER007SR. For initialization, press down this switch and then keep it more than 2 seconds. Refer to '8.2 System Initialization' for more details.

② Communication Display LED

#3, #4(yellow, green) LED will twinkle during RS232, RS422 and TCP/IP communication.

If the LAN is connected normally during TCP/IP communication, #1, green LED will turn on. But in the collision status, #2, red LED turns on.

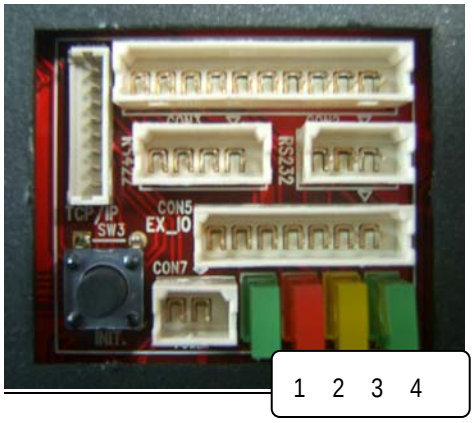
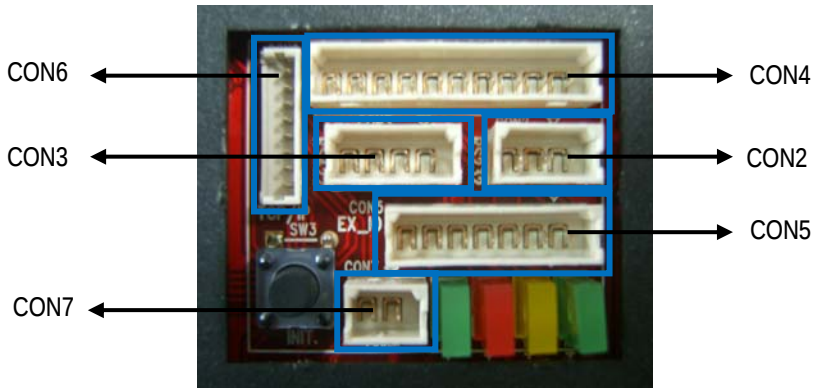


Figure: Magnification of the Communication Display LED in the Rear Panel

③ Tamper Switch

If someone takes off FINGER007SR installed on the wall by force, the tamper switch is activated then buzzer makes sound to inform of theft.

Color Coded & Wiring Table



I/O PORT NAME	SIGNAL NAME	COLOR CODED
POWER	CON7	
Main Power(+12V)	DC +12V	Red
Power Ground	GND	Black
OUTPUT	CON4	
Door Relay(COM)	COM(1)	Gray with Red Stripe
Door Relay(NC)	NC(1)	Blue with White Stripe
Door Relay(NO)	NO(1)	White with Red Stripe
Alarm Relay(COM)	COM(2)	White
Alarm Relay(NC)	NC(2)	Purple with White Stripe

Alarm Relay(NO)	NO(2)	Purple
INPUT	CON4	
Exit Button	EXIT	Orange
Door Sensor	CONTACT	Yellow with Red Stripe
Aux Input 1	IN1(OK input-Reader Mode)	Green
Aux Input 2	IN2(Error input-Reader Mode)	Green with White Stripe
EXTERNAL READER PORT	CON5	
Wiegand Data0	DATA0	Pink
Wiegand Data1	DATA1	Cyan
OUTPUT	CON5	
TTL Output1	TTL1/D0	Orange with White
TTL Output2	TTL2/D1	Brown with White Stripe
OK Signal Out	OK Out (Not Use)	Green with Red Stripe
Error Signal Out	Error Out (Not Use)	Blue with Red Stripe
Tamper Switch Out	Tamper Switch Out (Not Use)	Yellow with White Stripe
RS232 INTERFACE	CON2	
RS232-TX	TXD	Black with White Stripe
RS232-RX	RXD	Red with White Stripe
Ground	GND	Black
RS422 INTERFACE	CON3	
RS422-TX(-)	TX(-)	Yellow
RS422-TX(+)	TX(+)	Gray
RS422-RX(-)	RX(-)	Blue
RS422-RX(+)	RX(+)	Brown
TCP/IP Communication	CON6	
	TCP/IP Communication	8PIN Connector Module

(3) System Features

- 13.56MHz(Mifare, ISO14443 Type A) Proximity PIN and Fingerprint Recognition
- Dual Function for Access Control and Time & Attendance
- 1:1 Verification and 1: N Identification
- Stores 2 Fingerprint Templates per user
- Auto Touch Sensor for Fingerprint-Only Access

- Supports up to 1,000 / 2,000 / 4,000 Fingerprint Users
- Stores up to 10,000 – 50,000 Users and up to 10,000 – 50,000 Events (Selectable)
- Network Communication via RS232 or RS422 or Ethernet through a Built-in TCP/IP Module (Optional)
- 4 Supervised Input Ports for Cut-Off Check
- 2 FORM-C Relays and 2 TTL Output Ports
- Duress Alarm Function
- Reader Mode Allows Connection to a Control Panel.
- 34Bit Wiegand Output for Reader Mode
- 2 Tamper Switches
- Compatible Software: STARWATCH DUAL PRO I, STARWATCH DUAL PRO II, STARWATCH STANDARD

● Specifications

Model			FINGER007SR
CPU			32Bit ARM9 and Dual 8Bit Microprocessor
Memory	Fingerprint Module	Program Memory	1MByte flash memory
		Data Memory	1MByte / 2MByte / 4MByte flash memory
	Controller	Program Memory	128KByte flash memory
		Data Memory	1MByte flash memory
Users (Fingerprint Users)			10,000 – 50,000 users (including 1,000 / 2,000 / 4,000 fingerprint users, depending on the model)
Event Buffer			26,000 Event Buffers
Fingerprint Templates Size			800 Bytes for 2 fingerprint templates
Read Range			Passive Type IHC80 :Up to 2 inches (5cm) ISC80 :Up to 4 inches (10cm)
Reading Time (Card)			30ms
Verification / Identification Time			Less than 1sec. / Less than 2sec.
Power / Current			DC 12V / Max.300mA
External Reader Port			1ea (34bitWiegand, 4 / 8bit Burst for PIN) for Anti-Pass-Back
Communication			RS232 / RS422 / RS485 (Max.32ch)
			TCP/IP (External LAN Converter Required)

Baud Rate		9,600bps (Default) / 4,800bps, 19,200bps and 38,400bps (Selectable)
Input Port		4ea (Exit Button, Door Sensor, Aux# 1, Aux#2)
Output Port		2ea (FORM-C Relay Output (COM, NO, NC) / DC12V~18V, Rating Max.2A)
		2ea (TTL Output / DC5V, Rating Max.20mA)
LCD		Character LCD (2 Lines x 16 Char) / 65.6mm x 13.8mm (2.62" x 0.55") Screen
Keypad		16 Key Numeric Keypad with Back Lighting
LED Indicator		3 Array LED Indicators (Red, Green and Yellow)
Beeper		Piezo Buzzer
Operating Temperature	Fingerprint Module	-15° to +40°C (+5° to +104°F)
	LCD	0° to +50°C (+32° to +122°F)
	Controller	-15° to +70°C (+5° to +158°F)
	RF Reader	-35° to + 65°C (-31° to +149°F)
Operating Humidity		10% to 90% relative humidity non-condensing
Color / Material		Dark Pearl Gray / Polycarbonate
Dimension (W x H x T)		6.36" x 5.28" x 1.9" (161.5mm x 134mm x 48.5mm)
Weight		547g (1.21lbs)
Certification		UL, CE, MIC

* Fingerprint Module Specifications

Resolution	500dpi
Captured Image Size	260 X 300 Pixels
Sensing Area	FIM2260 : 15.0mm X 18.5mm FIM2030 : 13mm X 15.2mm
Scanner	High Quality Optical Sensor
FAR(False Acceptance Ratio)	0.001%
FRR(False Reject Ratio)	0.1%
ESD(Electro Static Discharge)	± 6KV (Contact)
Verification Time	Less than 1 Sec.
Identification Time	Less than 2 Sec.
Color of Scanning LED	FIM2260: White / FIM2030: Red