

SY-760
SY-780/A
Installation Manual



Synel Industries Ltd.

**Refer to: <ftp://synel.com/docs/> for
enhanced documentation!**

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1. Technical Specifications

1.1 Technical and interface specifications

- 32 character LCD with back light display
- Eight (780)/six (760) programmable function keys
- Ten numeric keys
- Four special function keys: Escape, Return, dot and clear
- Two arrow keys
- Badge Reader: magnetic/wiegand/bar code/proximity
- 512K of protected RAM
- Protected Real Time date/time clock
- Rechargeable backup battery (one month capacity) for the memory and Real Time clock
- Rechargeable backup battery for operation with auto shut-off for use during power outages
- RS-232 and RS-485 communication
- Two relays for bell, door, etc
- Two sensors (door monitoring)
- Variable baud rate - 1200 to 19200 bps

1.1.1 Options

- Fingerprint reader verification or identification (780):

	Verification	Identification
Template size	400Bytes	2Kb
Response time	3 seconds	3 seconds
Security level	5	NONE
Template storage	4000	200
False accept/reject	0.001	0.001

- Bar-code slot reader model (Codes: 128, 2/5, 3/9, UPC-EAN)
- Magnetic (Track II, Track I)
- Proximity reader (125 KHz)
- Mifare reader (13.56 MHz)
- Wiegand 26/27/34/36/37/44/48bit (as of version 6.201)

- 2400/14400 bps internal modem
- Ethernet (10BASE-T/100BASE-T or AUI)

1.2 Physical characteristics

- Dimensions:
- Height - 17.0 cm.
- Width - 25.0 cm.
- Depth – 9.5 cm.

1.3 Power Requirements

- Voltage: 115/230 VAC
- Back-up battery - rechargeable, included

Bottom connector panel

The connector panel is located at the lower part of the casing, withholding the socket openings for all external connections as follows:

1. Power supply
2. External secondary Reader
3. I²C – I/O extension (N/A)
4. Network
5. Serial I – Serial port connection for printer
6. Host – RS-232/RS-485

Internal components

1. Battery back-up modules:
The terminal has two back-up battery modules, one for the real time clock memory and the other for operation during a power failure. The standard memory back-up module is a 30 day span lithium battery, keeping the internal clock running and the memory intact. The battery (in addition to the standard memory back-up) is self-contained, this allows operation during a power failure for 11/2 hours. A shut down timeout feature enables longer operation time. During a power failure, the user presses the battery key to activate the terminal. Data can then be entered and stored in the terminal memory. Timeout will cause the terminal to shut down automatically after the last use of the terminal, until the battery key is pressed again.

Note: You must plug the terminal into a main power source, for at least 18 hours continuously before using it for the first time.

2. Memory:
The terminal contains a 512 Kbyte user memory, providing storage for data from more than 10,000 simple operations depending on programming tables length, and the complexity of collected data.
3. Serial RS-232/485 internal Card

2. Unpacking

Note: Do not throw away the box or packing materials.

Check the box and contents for signs of damage that may have occurred during shipment. Carefully unpack and check contents:

2.1 Contents

The terminal package contains:

- Terminal
- Mounting panel
- 1 connecting/splitter box (included only when network communication is not available)
- Short RS-232/485 communication cable (included only when network communication is not available)
- Short TCP/IP communication bridge cable (included only when network communication is available)
- Four Phillips flat head 3.5x30mm anchors, for terminal mounting
- Mounting template
- Connector cover

3. Installation

3.1 Mounting the terminal on a wall

Make sure the unit is unplugged. If you have already connected the terminal to a PC, disconnect it. You can reconnect after mounting has been completed.

Caution: The terminal contains computer components. It should not be mounted where it will be exposed to extreme heat or cold, water, steam, violent vibrations, high electromagnetic radiation including high voltage power lines and electrical equipment.

Step 1: Place the terminal near an easily accessible power outlet. Select an

appropriate location for the terminal and mount it at employee shoulder-height. Do not place the communication cable near a source of electromagnetic radiation or radio interference such as power lines, large machinery, etc. If the communication cable is to be threaded into the wall, make sure that it is safe to drill a hole at the desired location. The recommended height from top edge is 140cm (4'7").

Step 2: Remove the back panel by sliding it to the side and pulling it out.

Warning: *Live wires in the vicinity may be 115V or 220V. Make sure not to drill into any live electric wires. Overlooking this warning may result in harmful contact with an electrical current.*

Step 3: Place the panel on the wall as a template and mark the place for drilling the holes.

Step 4: Drill holes using a 6 mm. (1/4") drill bit. If the communication cable is to be wired through the wall, wire one end.

Step 5: Screw the panel to the wall.

Step 6: Slide the terminal over the panel hinges.

Step 7: Connect the communication cable:
Plug one end of the communication cable into the communication socket of the terminal.

Step 8: Plug the terminal into the power socket.

Step 9: Re-place the connector cover at the bottom.

3.2 Communication connections

Step 1: Select a location for the connection box.
The box must be positioned where both the communication line and the terminal can be connected to it.

Step 2: Plug the terminal communication cable into the connection box.

Step 3: Wire an additional connection for Ethernet.

Step 4: If an internal modem has been added and the modem is used, plug the RJ-45 connector of a standard telephone cable into the telephone line. Do not use the terminal communication cable.

4. Technician Mode (Setup)

Enter into Technician Mode by swiping an authorized badge or by clicking both the line up/down keys six times simultaneously (if the terminal is not programmed key-in 6 times 0 + **Enter**). Use the  **Enter** key to scroll between screens, and the line up/down keys for moving between options within the selected screen. To return to the previous screen use the  key. To exit technician mode double-click the **Enter** key. Technician mode enables setting up:

- Real Time Clock (RTC) Calibration
- Baud rate
- Fingerprint unit Baud rate
- Printer Baud rate
- Station ID settings
- Modem rings
- Network connection
- User Field - A field in which the user can fill-in 4 digits that will characterize that terminal.

Enter into Technician Mode:

The display screen flashes for a five seconds interval and displays the version then flips to display the TECHNICIAN MODE and time and date alternately, (time&date are adjusted from the PC). For further information you can refer to the extended user manual.

5. Terminal-Host Interfacing

The terminal data collection terminal can be connected to the host computer using either an RS-232 or an RS-485 connection with an asynchronous serial port. RS-232 is used for a single device with a point to point connection, for distances of up to 50 meters (160 ft). RS-232 is the communication standard used by nearly all PCs and modems. Cabling distance is limited to 50 meters (160 ft) and only one terminal may be connected to the same COM port. The RS-485 standard extends the potential cabling distance to 1,000 meters (3,280 feet). Using 9600 baud enables multi-COM port connections. It uses only two communication wires. The SY-65 communication adapter converts RS-232 to RS-485.

Note: Most PCs use DTE type connectors on their RS-232 ports. The terminal is equipped with an RJ45 (telephone jack) connector. Thus, you will need a connection box intermediating the terminal and the host.

5.1 Installing communication cables

1. The cable should not be installed near EMI sources, such as:
 - Motors, generators, alternators, and transformers
 - Air conditioners, elevators
 - Radio/television transmitters, signal generators and internal communication networks
2. Cables should not be within:
 - 30 cm. (1 foot) range from less than 5 KVA power lines.
 - 60 cm. (2 feet) range from 5-10 KVA power lines.
 - 1.5 meters (5 feet) range of power lines of exceeding 10 KVA.
3. Cables should not run parallel to power lines for more than 15 meters (49 feet).
4. Use a single continuous cable for the communication line. If this is not possible, the cable should have only one indoor connection as follows:
 - a. Using two connectors with appropriate shielding and cover.
 - b. Using a connection box.
5. For aerial installation, use NYY shielded cables.

5.2 Connecting your PC to the SY-65

SY-65 must be set to one of the RS-485 modes: 4,5,6 and 7 dip-switches. For more information, refer to the manual for the SY-65 communication adapter. The diagrams below describe the pin outs for the cable connecting PC - SY-65 communication adapter. For 9-pin connector PC refer to first diagram, for a 25-pin connector refer to the second diagram.

SY65 9Pin D-Type	Computer	
	9Pin	25Pin
2	3	2
3	2	3
5	5	7

5.2.1 If communication problems occur

1. Lower the baud rate.
2. Use cables with a heavier gauge conducting wire.

3. Connect 120 ohm resistors between the MRxD and PRxD, and also between MTxD and PTxD that are at the ends of the wire of the following two connectors:
 - a. The connector on the computer.
 - b. The connector on the last terminal of the multi-drop line.
4. EMI protection is integrated into the terminal, but it is best to use an external protector for lightning problems.

5.3 Making a multi-drop connection

Note: Terminal IDs are set using the technician mode. There is no procedure for hardwiring the terminal ID as in the SY-1XX and SY-4X terminals.

All terminals and their connection boxes are connected in exactly the same way, regardless of their terminal IDs. The multi-drop line may be created in one of two ways: creating a chain of connection boxes, using a junction box.

Method 1

The SY-65 is connected to a connection box which cascading another connection box.

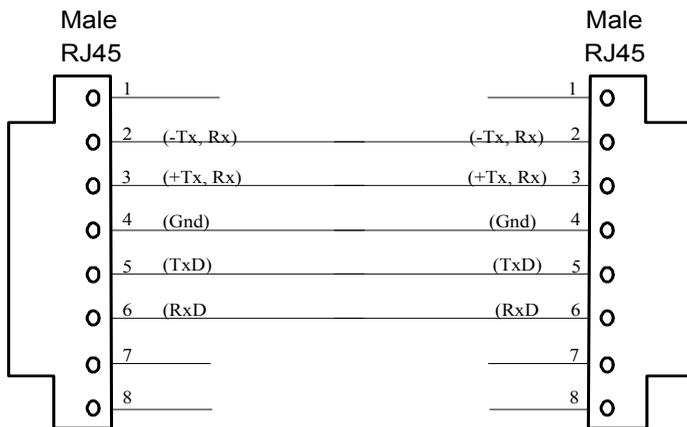
Method 2

The SY-65 is connected to a junction box. A separate cable is connected from each connection box to the junction box.

5.3.1 Cable from the terminal to the connection box

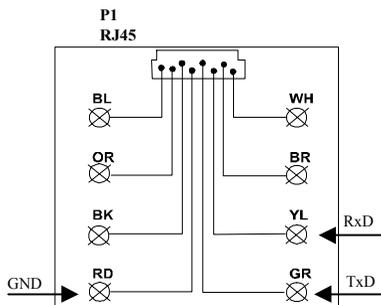
This is a standard 6 wire telephone cable with an RJ45 connector cable which is supplied with the terminal. The pin locations are illustrated below. Cable length should not exceed 30 meters (98feet).

The RJ45 connector on the terminal's side must be a short (12.35mm) RJ45 connector to enable the terminal connector case to close.



5.4 Terminal to the RS-232 PC port direct connection

- Step 1: Open the connection box.
- Step 2: Connect the TXD wire to the connection marked GR.
- Step 3: Connect the RXD wire to the connection marked YL. Connect the ground wire to the connection marked RD.
- Step 4: Close the connection box.



6. Maintenance

6.1 How to cause the memory to crash

Warning: *Must be performed by qualified personnel only! It requires working with an open unit. Make sure to unplug the unit wherever the instructions call for it. Take extreme care during the stages where the terminal is plugged into a power source.*

6.1.1 Location of jumpers

Step 1: Unplug the terminal and make sure that it is off.

The back-up battery automatically supplies power for approx. 15 seconds.

Step 2: Unscrew and remove the front panel.

Step 3: Remove the JP4 jumper from the 1-2 position to 2-3 position.

Step 4: Reposition JP4 to (1-2).

Step 5: Plug the terminal back into a power source and make sure that *MEM CRASH* reappears in the terminal display.

6.2 Formatting the memory if a crash occurs

If the memory crashes a *CRASH* message will appear. You will need to clear the terminal's memory and return the terminal to the *NO PROGRAMMING* state according to the procedure below.

Step 1: Press 6 times on the 0 key.

Step 2: Press on the Enter key once. Press 3 times on the arrow (up) key.

Step 3: Press twice on the arrow (down) key. Press 3 times on the arrow (up) key.

The message **CLEAR MEMORY?** will appear on the display.

Step 4: Press twice on the arrow (down) key.

Step 5: The message **MEMORY CLEARED** will appear on the display.

Step 6: You receive a **NO PROG** display.

The terminal then will be in the Technician mode. The message on the display will alternate between *TECHNICIAN MODE* and the date and time in the following format: DD/DW hh:mm:ss where DW represents the day of the week.

If you make an error on steps 3 through 6, the terminal will revert to the mode prior to step 3. If you are unable to complete this operation, exit technician mode by pressing the **Enter** key twice. Then begin again.

Appendix - A

External Connectors

HOST RJ-45 (8 pin) Communication with Host computer

Pin	Signal	Value	Remarks
1	NC		
2	RS-485 (-TRX)	0-5 Volt	
3	RS-485 (+TRX)	0-5 Volt	
4	GND		
5	RS - 232 (TXD)	-12:+12Vdc	
6	RS - 232 (RXD)	-12:+12Vdc	
7	NC		
8	NC		

Ser I - RJ- 11 (6 Pin) Secondary serial channel for printer, scales or external PPrintX

Pin	Signal	Value	Remarks
1	RS-232 TxD Transmit data	TX	Finger print
2	GND	0	
3	RS-232 RxDRceive data	RX	Finger print/Printer busy
4	RS - 232 TXD		Printer
5	RS - 232 RXD		Printer
6	VCC	5Volt	

Warning: *When connecting an external PPrintX avoid connecting an internal PPrintX!*

NET RJ-45 (Ethernet/Modem)
Ethernet (Set JP1, JP2 and JP3 for Ethernet)

Pin	Signal	Value	Remarks
1	Transmit data	TX +	
2	Transmit data	TX-	
3	Receive data	RX +	
4	NC/Vin/Shield		10Base-T/Power over LAN/100Base-T
5	NC/Vin/Shield		
6	Receive data	RX -	
7	NC/GND/Shield		10Base-T/Power over LAN/100Base-T
8	NC/GND/Shield		10Base-T/Power over LAN/100Base-T

Modem (Set JP2 and JP3)

Pin	Signal	Value	Remarks
1	NC		
2	NC		
3	NC		
4	Ring	OP -	
5	TIP	OP +	
6/7/8	NC		

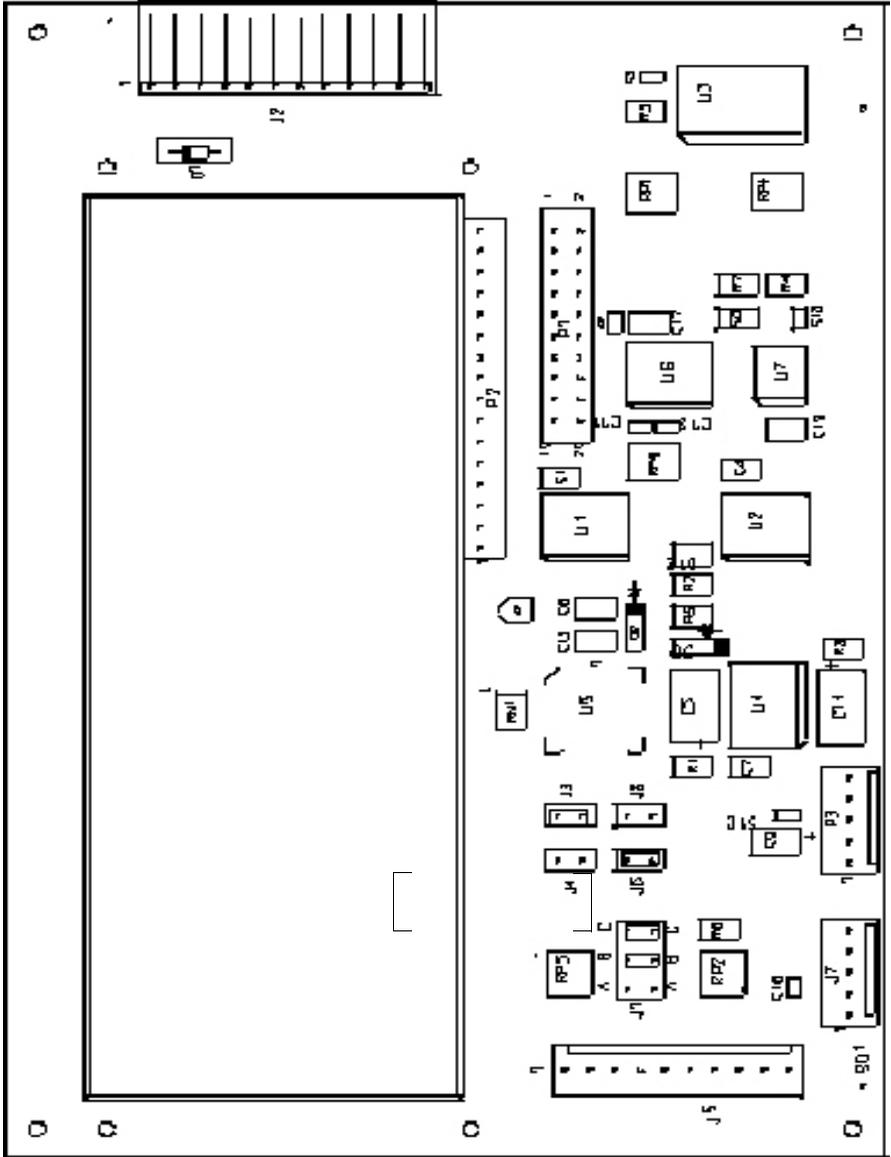
P10- External Reader 1(Magnetic/BarCode) RJ-45 (10 pin)
(Optional)

P11- External Reader 2(Magnetic /Bar code) RJ-45 (10 pin)
Magnetic/Bar code/Wiegand readers

Pin	Signal	Value	Remarks
1	Data / (6-Wiegand) -		For RS-422 signal only
2	Led 1		
3	Led 2		
4	VCC		
5	GND		
6	Led 3		
7	Clock (magnetic)/DATA 1 (Wiegand)		Clock +, For RS-422
8	DATA (0+Wiegand)		Data +, For RS-422
9	VS	9v	
10	Clock- (magnetic)/Data- (Wiegand)		For RS-422 signal only

Note: Change JP18/19 accordingly.

Display Card



Ethernet - Modem

No.	Jumper	Description	Value	Default/Note
1	JP1	TU	2-3 Ethernet 1-2 Modem	2-3 Ethernet
2	JP2	RU	Open Ethernet Close Modem	Open - Ethernet
3	JP3	RU	Open Ethernet Close Modem	Open - Ethernet
4	JP22/23/32	(1)NC/NC/NC--> modem/Ethernet 10Base-T (2)[(1-2),(2-3)]/[(1-2),(2-3)]/[(1-2)] Ethernet 10Base-T with Power over LAN (3)[(1-2),(2-3)]/[(1-2),(2-3)]/[(1-3)] Ethernet 100Base-T		default (1) Modem & Ethernet connected via JP1/2/3

PSD Programming

No.	Jumper	Description	Value	Default/Note
5	JP6	Jtag programming	Open - Normal work Closed - Programming	Open

Miscellaneous

No.	Jumper	Description	Value	Default/Note
6	JP12	Watch Dog in	Open WDI Disable Closed - Normal WORK	Closed
7	JP13	RTC	1-2 Normal work 2-3 Calibration	Normal work
8	JP7	Battery	Open Battery OFF Closed Battery ON	Closed
9	JP18	Reader 1 type	Wiegand - closed Other readers - Open	JP30 must be in (1-2) & JP31 must be closed
10	JP19	Reader 2 type	Wiegand - closed Other readers - Open	JP30 must be in (1-2) & JP31 must be closed

No.	Jumper	Description	Value	Default/Note
11	JP30/ JP31	Reader selection	JP30 [1-2] JP31 [Closed]	Do not change!!
12	JP5	Tamper switch	[1-2] - Enabled [2-3] - Disabled	Disabled - NA
13	JP21	Connect (R2 Input) to the printer busy or to the external FPU	[1-2] - External FPU [2-3] - Printer busy	
14	JP11	VCC	Closed - VCC ON Open - VCC OFF	
15	JP10	Testing current charging	Closed - Normal work Open - Test current	
16	JP14/15/ 16/17	UART selection	(1) (1-2)/(1-2)/(2-3)/(2-3) u.CPU--> Host u.URT --> Printer (2) (2-3)/(2-3)/(1-2)/(1-2) u.CPU--> Printer u.URT --> Host	Default = value 1

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