



Installation Manual - 5352-900 Rev E  
Serial ProxPro Reader - 5352A

# Serial ProxPro Reader™ Installation Manual

## System Overview

The Serial ProxPro reader is a self contained proximity reader. The two piece polycarbonate enclosure has an rubber gasket that seals the pieces together and a cable fitting that seals the cable entry. The water resistant unit is approved for outdoor use. The enclosure is designed to fit on a single gang electrical box. A Bi-color LED and audible tone enhance user feedback. A tamper switch feature is available that will alert the Host when the enclosure is opened. An internal DIP switch configures the unit for a RS232, RS422 or RS485 interface. The DIP switch is also used for enabling/disabling the audible tone. A keypad version is available.

Installation of the Serial ProxPro reader consists of mounting, verifying the DIP switch settings, setting a tuning jumper and connecting the cable to the Host.

## Operation

Access Cards may be presented to either the front or the back of the reader. Optimum read range is achieved when the access card is presented parallel to the front reader face. The LED is normally controlled by the internal reader firmware. The LED normal state is red and indicates that the reader is ready to read an access card. The LED flashes green when the access card is read and the message is transmitted to the Host system. When the reader is ready for another access card, the LED returns to red (about 250 milliseconds).

## Parts List

- |  |   |
|--|---|
| 1. Serial ProxPro Reader   | qty 1 (included)                                  |
| 2. #6-32 x 1 self tapping screws, Type T or 23   | qty 2 (included)                                  |
| 3. Installation Manual   | qty 1 (included)                                  |
| 4. Cable Fitting   | qty 1 (included)                                  |
| 5. Cable, 3,4 or 5 conductor, 22AWG<br>(Alpha 1295 C or equivalent)                    | as required (50 to 4000 feet)<br>See cable notes. |
| 6. DC Power Supply 12V/120mA or 24V/150mA  | 1 (Installer supplied)                            |
| 7. In the E.U. the recommended power supply is the Micro State Electronics Model PS-5. |   |

## Installation Procedure

1. Determine an appropriate **mounting position** for the reader. The reader drawing below is actual size and may be used as a template. Install a single or double gang electrical box or drill the appropriate mounting for #6 fasteners. If mounting to a metal surface, drill two 7/64 (.109) inch holes and use the enclosed self tapping screws for mounting.
2. **Route** the interface **cable** from the reader and/or power supply to the Host.
3. **Prepare the cable** by cutting the cable jacket back 2 (two) inches and strip the wires 1/4 inch. Tinning the wires is not required.
4. Pry off the center face plate by placing a thin blade into the groove that outlines the face of the reader. **Use care to avoid scratching the surface of the reader.** The face plate is attached to the reader by friction only. The screws that hold the enclosure pieces together will be exposed. Loosen the four screws to open the enclosure (the enclosure screws are captive in the cover).
5. **Install the cable fitting** on the rear of the reader. Feed the cable through the cable fitting, tighten the fitting nut so the cable jacket is flush with the printed circuit board. Dress the cable conductors and connect the reader to the Host according to the terminal descriptions in the dimension diagram. The descriptions are on the PCB guard in the reader. Connect the drain line of the shield to terminal 2 (Power Supply Ground). Terminal 5, Data Return, is to be connected to the ground of the Host if the power supply ground is not common with the Host. The opposite end of the drain line should be cut flush with the jacket and left disconnected.
6. If the **tamper feature** is available on the Host, connect the tamper switch using the connections recommended by the Host documentation. The switch is a single pole, double throw. When the inner reader cover is removed, the tamper switch is released. The TB1 connections to the tamper switch are pins 10 and 11. Pin 10 is the common contact of the switch and pin 11 is either the normally open or closed. Jumper P3 selects the contact of the tamper switch, either the normally closed or the normally

open contact. The default position is P3 across pins 1 and 2. This selects the normally open contact on TB1 pin 11. If the normally closed contact is required, move P3 across pins 2 and 3. (Note - "normally open and normally closed" refer to the Pin 11 status while the cover is removed.) The contacts are rated for 100mA at 35 VDC.

7. **Mount the base** of the reader that holds the electronics to the gang box or surface using the two holes located on the center axis of the reader. Two #6-32 x 1 inch screws are provided for mounting to a gang box or metal surface.
8. Set the DIP switches according to the table in the section, **DIP Switch Settings**.
9. Place the jumper on P1 between pins 1 and 2 when **mounting to a metallic surface** or to a junction box with a metal cover plate. Otherwise, the jumper should be between pins 2 and 3, the default position.
10. After wiring the Reader and power supply, the Reader is ready to be tested. **Power up the Reader** and the LED and Beeper will flash and beep 3 times in a sequence of two short delays and one long delay. This indicates that the micro-controller unit is working properly. Present an ID card to the Reader and the LED should momentarily turn green, indicating a read of the card.
11. **Replace the top cover** and face plate.

### Cable Notes

1. The ProxPro Serial reader internally connects **GROUND** to SIG GND. As a result, the power supply used to power the reader and Host must have a common ground (voltage reference).
2. **RS232 (DTE)** - A 5 conductor cable (Alpha 1295 C or equivalent) is required when using the RS232 interface. It is recommended that the RD line be connected for compatibility with future firmware upgrades. The DTR/DSR hardware handshake lines do not need to be connected to the host. The maximum cable length for the RS232 interface is 50 - 200 feet. Connect TB1-1 (DC+) and TB1--2 (Ground) for power supply and TB1-6 (TD output)), TB1-7 (RD input) and TB1-3 (Signal Ground) for RS232.
3. **RS422** - A 7 conductor cable (Alpha 1297 C or equivalent) is required when using the RS422 interface. It is recommended that the RX+ and RX- lines be connected for compatibility with future upgrades. The maximum cable length for the RS422 interface is 4000 feet. Connect TB1-1 (DC+) and TB1-2 (Ground) to power supply and TB1-4 (TX+), TB1-5 (TX-), TB1-6 (RX+), TB1-7 (RX-) and TB1-3 (Signal Ground) for RS422.
4. **RS485** - A 5 conductor cable (Alpha 1295c or equivalent) is required when using the RS485 interface. The maximum cable length for the RS485 interface is 4000 feet. Connect TB1-1 (DC+) and TB1-2 (Ground) to power supply and TB1-4 (485+), TB1-5 (485-) and TB1-3 (signal ground) for RS485. Multi-drop protocols are not currently supported. Contact HID Corporation customer service to inquire about specifying a particular software protocol.
5. **Tamper Switch Feature** - A 22 AWG twisted pair, shielded, stranded cable (Belden 9330 or equivalent) is often required for the tamper switch. Follow the recommendations of the manufacturer of the Host system. If the tamper input is a supervised input, the "end of line" resistors may be mounted in the enclosure. Use extreme care and shield any bare wire from the printed circuit assembly and its components.
6. **Cable fitting** - The inner diameter of the cable fitting will accommodate a cable with an outer diameter of .300 inches (nominally). If larger diameter (or two cables) must be accommodated, do not use the fitting.
7. **Shield** - Connect cable shield by connecting drain wire to TB1-2 ground. Leave foil and drain wire disconnected at host end of cable by cutting them off at the end of the cable jacket .

### RS232/RS422/RS485 Interface Considerations

1. The ProxPro Serial reader operates in a send only mode. However, it is recommended that the interface receive line(s) be connected for compatibility with future firmware upgrades.
2. The RS232 interface includes connections for DTR/DSR hardware handshake lines. However, the ProxPro Serial reader does not support hardware handshake at this time.

- The message format for RS232, RS422 and RS485 are identical. There are no provisions for node addresses in the message.

### RS232/RS422/RS485 Card Message Specification

When Access Cards (transponders) are presented to the ProxPro reader, the reader sends a message. The message is in the following format:

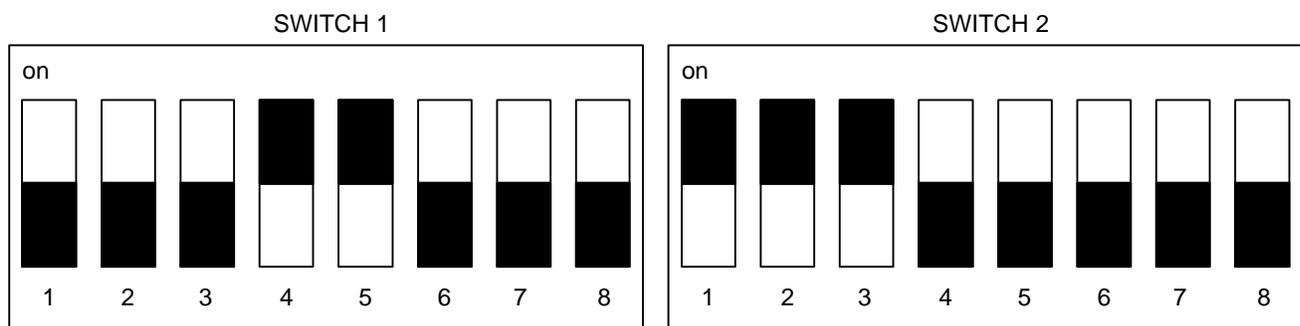
CCDDDDDDDDDDXX<CR><LF>

^ First character sent

- All characters C, D and X are ASCII encoded, hexadecimal digits. (i.e. The hex value 7 is sent as an ASCII character 7 or the hex value E is sent as an ASCII character E)
- The CC field is reserved for use by HID Corporation. The valid values are 00 through 7F.
- The DDDDDDDDDD field is the transponders (Access Card) data. The valid values are 000000000 through 1FFFFFFF (ASCII).
- The XX field is a computed checksum. The checksum is calculated by first grouping the message data into the pairs CC DD DD DD DD DD. Each pair of characters represents one byte of data. Then each pair of characters is converted from ASCII to their respective hex values. At this point, the 6 bytes are added together. The checksum is equal to the least significant 8 bits of the result.
- <CR> is the ASCII code for a carriage return. (0D hex)
- <LF> is the ASCII code for a line feed. (0A hex)
- For example, if the ProxPro reads a transponder (Access Card) that contains the value CC=00 and DDDDDDDDDD=01234ABCDE, the reader will report the ASCII message 0001234ABCDE08<CR><LF>. Note that each of the characters is ASCII encoded. The actual bytes (hex value) that are sent to the host are <30><30><30><31><32><33><34><41><42><43><44><45><30><38><0D><0A>. The checksum was computed by adding 00 + 01 + 23 + 4A + BC + DE = 208 hex. The checksum is the least significant 8 bits of this result or 08 hex.
- The communications settings are 9600 BAUD, 8 bits, 1 stop bit, no parity.

### DIP Switch Settings

There are two switches on the ProxPro Serial reader that are used to select several different modes of operation. The following is a diagram detailing the default switch settings.



## DIP Switch Settings, continued

### SW1-1, 2 and 3

**Not used.**

### SW1-4 Keypad Operation.

The keyboard data can be processed by the reader or may be connected directly to the Host. When Switch 1-4 is in the "off" position, the host is expected to process any key presses (2 of 7 or 3 x 4 formats). When Switch 1-4 is in the "on" position, the reader scans the keyboard and outputs the keyboard entries over the selected interface. The message is the ASCII representation of the key that is pressed. For example, if the "4" is pressed, the reader will output a <34 hex>

### SW1-5 Beeper Operation.

The Beeper may be enabled or disabled. If enabled, the reader will issue a beep while flashing a green LED after a card is read. Switch 1-5 in the "on" position enables the audible tone. Switch 1-5 in the "off" position disables the audible tone.

### SW1-6 Terminating Resistor.

Some RS422/RS485 connections require that the RX- line be terminated with a resistor to RX+. If SW1-6 is in the "off" position, there is no terminating resistor on RX-. If SW1-6 is in the "on", then a 120 ohm resistor is connected between RX+ and RX-.

### SW1-7 Line Setting.

SW1-7 is used to configure the reader's interface configuration. SW1-7 should be in the "off" position for RS232 and RS422 operation and "on" for RS485 operation.

### SW1-8 Line Setting.

SW1-8 is used to configure the reader's interface configuration. SW1-8 should be in the "off" position for RS232 and RS422 operation and "on" for RS485 operation.

### SW2-1 Reader Interface.

### SW2-2 Reader Interface.

### SW2-3 Reader Interface.

SW2-1, SW2-2 and SW2-3 are used to select the reader's interface configuration. Currently there are 3 options available. They are:

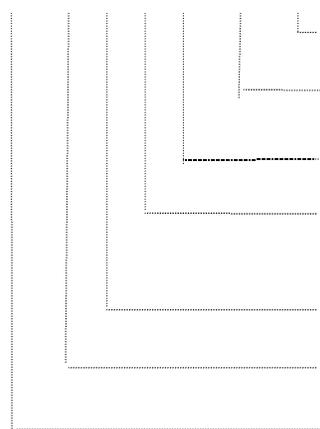
1. SW2-1 "on", SW2-2 "on" and SW2-3 "on" selects the RS232 interface.
2. SW2-1 "on", SW2-2 "on" and SW2-3 "off" selects the RS422 interface.
3. SW2-1 "on", SW2-2 "off" and SW2-3 "off" selects the RS485 interface.

### SW2-4, 5, 6, 7 and 8

**Not used.**

## Product Configuration/Ordering Options

5352 A G N 00 -XXXX Y



Customer Custom Artwork or Firmware Number  
1 through 9, A through Z

Customer Custom Number

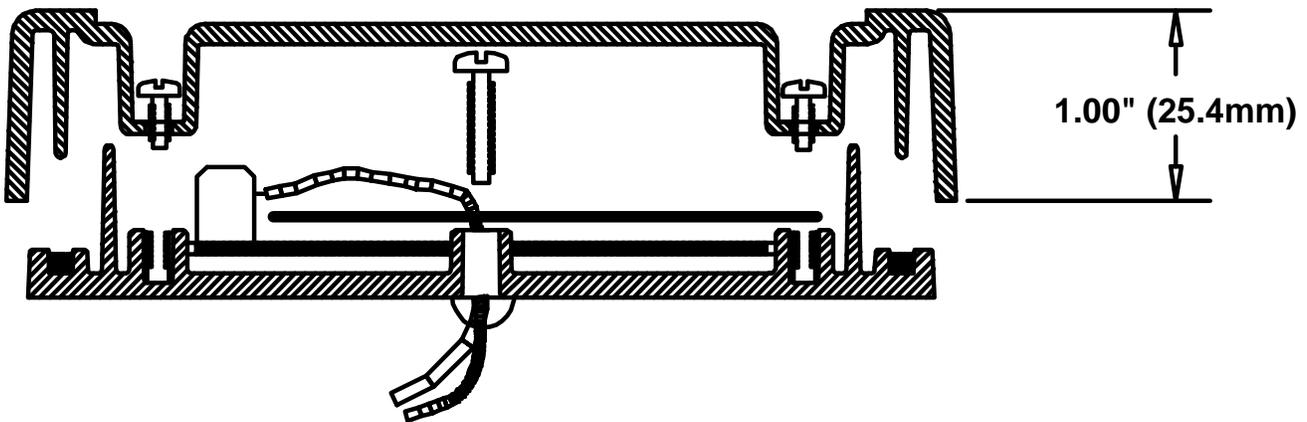
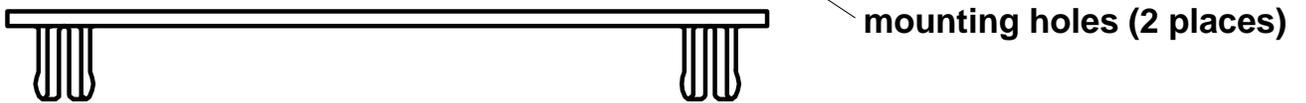
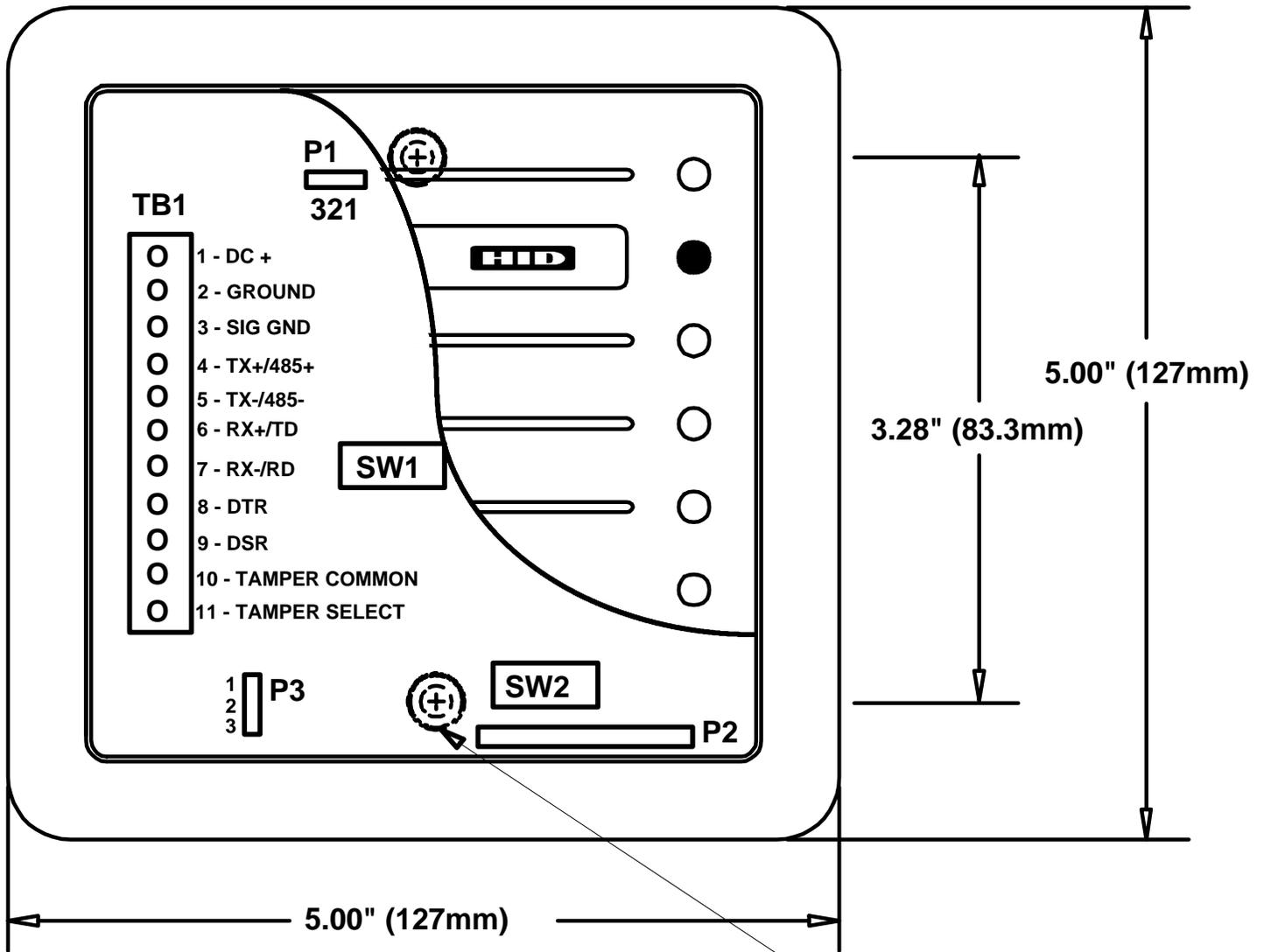
Configuration Options - (00 standard)

Standard Hardware Options - N = None, K = Standard Keypad (internal or 2 of 7), S = Direct Connect Keypad (3 x 4 type)

Color - G = Gray, B = Beige

Current Revision Letter - may change without notice

Model Number 5352 = Serial ProxPro



**Dimension Drawing (Actual Size)**

## Keypad Option Notes:

This section of this document describes the keypad interface. The keypad has twelve keys, four rows by three columns. The characters 0 to 9, # and \* are arranged the same as a standard telephone keypad. There are two methods for interfacing to the Keypad.

The first configuration (K version, internal keypad) processes the keypad entries in the reader and then transmits the data to the host system via the RS232/422 data lines. The reader outputs each key as an ASCII encoded hexadecimal digit. The decoding of the message sent through the RS232/422 interface is the only processing required of the host system. The user interface has been implemented in the most generic fashion to give the integrator the most flexibility.

The Second configuration (S version, direct connect keypad), the Host must scan the keypad directly using a separate cable.

## K Version - Internal keypad processing

### Length (Buffer keys) Option

The length option chooses the number of key entries that will be buffered before the message is sent to the host. The maximum number of entries is 11. When the option is set for multiple entries the reader has a five (5) second timer that will clear all entries after five seconds has expired between entries. The length option requires the user to enter the programmed number of key entries. Upon completion of the last key entry, the message is assembled and sent. This requires the system integrator to configure the reader for the number of key entries before installation.

### User Interface

The user is able to press keys at any time. Card reads and key entries are independent of each other, the user is not required to follow any sequence, unless specified by the system integrator. The reader is equipped to beep, flash the LED and give tactile feedback when a key is pressed. The amount of time is 5 (five) seconds between key entries when the multiple key entry option is used. If the time expires between key entries, all keys entered are cleared and the user must start the sequence from the beginning.

### Keypad Messages

The keypad message follows a basic format. The reader outputs each key as an ASCII encoded hexadecimal digit. For an example, if the user presses the:

five key, the host receives ASCII 5 <35 hex>  
eight key, the host receives ASCII 8 <38 hex>  
star key "\*", the host receives ASCII A <2A hex>  
number key "#", the host receives ASCII B <23 hex>

If the ProxPro has been factory configured for buffering, the reader will buffer the correct number of keys before transmitting the serial ASCII message.

For an example, if the buffer length equals 3 keys, and the user presses keys 4, 5 and 6, The host will receive (ASCII) 4,5,6, CR,LF, or <34H 35H 36H 0DH 0AH>.

The communications settings are 9600 BAUD, 8 bits, 1 stop bit, no parity. The internal keypad processing mode is available on the Serial ProxPro 5352XXKXX versions.

### Keypad Scanning 2 of 7 (K version)

This mode requires a separate cable to be supplied that connects to the Keypad board, inside the ProxPro, to the Host via P2. P2 is a 7 position terminal strip. Switch 1-4 (SW1-4) should be switched to the "off" position. The reader will then NOT process the keypad data, and it will be decoded by the host in 2 of 7 format..

The keypad has a matrix of contacts corresponding with the matrix of keys. The contact outputs are wired to the seven terminals of P2. The seven terminals are called P2-1 thru P2-7 and provide the 2 of 7 decode of the buttons. When a key is pressed, the button closes two contacts that pull 2 lines to ground. This results of the key entries are in the table below. The reader and the host that is scanning the keypad will require a common signal ground. The connection is to be made on either pin 2 (power supply ground) or 5 (Data Return) of TB1 of the Serial ProxPro.

This method of interfacing the keypad requires additional processing by the host. These include the de-bouncing of the keys, decoding of the keypad, timing between key entries, as well as others depending on the Host. The 2 of 7 format is available on the Serial ProxPro 5352XXKXX versions.

**Key Pad Data Table - 2 of 7**

Key #	Terminal Number						
	P2-1	P2-2	P2-3	P2-4	P2-5	P2-6	P2-7
1	LO	HI	HI	HI	HI	HI	LO
2	LO	HI	HI	HI	HI	LO	HI
3	LO	HI	HI	HI	LO	HI	HI
4	HI	LO	HI	HI	HI	HI	LO
5	HI	LO	HI	HI	HI	LO	HI
6	HI	LO	HI	HI	LO	HI	HI
7	HI	HI	LO	HI	HI	HI	LO
8	HI	HI	LO	HI	HI	LO	HI
9	HI	HI	LO	HI	LO	HI	HI
*	HI	HI	HI	LO	HI	HI	LO
0	HI	HI	HI	LO	HI	LO	HI
#	HI	HI	HI	LO	LO	HI	HI

HI represents a voltage of +5 volts in reference to the Serial ProxPro ground.  
 LO represents the Serial ProxPro ground.

Note: The Keypad/Reader is to be used on a single point ground system.

**S Version - Direct connect keypad Scanning - 3 X 4 Matrix format**

The Serial ProxPro reader is available with a 3 x 4 matrix keypad. The keypad is independent of the Serial ProxPro reader and only provides the connections to the keypad. This mode requires a separate cable to be supplied that connects to the Keypad board, inside the ProxPro, to the Host via P2. P2 is a 7 position terminal strip. The following is the table for the contact closures.

This table indicates the connection between the connector pins when a key is pressed. For example, if key 3 is pressed P2-5 is connected (shorted) to P2-1. This is available on the Serial ProxPro 5352XXSXX versions.

Rows	Columns		
	P2-5	P2-6	P2-7
P2-1	3	2	1
P2-2	6	5	4
P2-3	9	8	7
P2-4	#	0	*

## Serial ProxPro Reader™ Specifications

### Read Distance - using ProxCard II

➤ Over all Operating Limits, minimum (@12VDC)	5.0 inches (12.5 cm)
➤ Non-Metallic Mounting, typical (@12VDC)	7.0 inches (17.6 cm)
➤ Mounted on Metal, typical (@12VDC)	5.0 inches (12.5 cm)
➤ Overall Operating Limits, minimum (@24VDC)	5.0 inches (12.5 cm)
➤ Non-Metallic Mounting, typical (@24VDC)	7.5 inches (19 cm)
➤ Mounted on Metal, typical (@24VDC)	5.5 inches (15.2 cm)

### Regulatory Approvals and Certifications

- Underwriters Laboratories listing under UL 294, Access Control Unit Accessory, Indoor and Outdoor
- UK Type Approvals
- German General License Type Approval per RTP letter, Vfg 70/1998, dated 30 June 1998
- CE Mark - See letter of Conformance
- FCC Certification
- EMC Certificate

### Environmental Characteristics

➤ Designed for listing under UL 294 "Standard for Access Control System Units"	
➤ Operating Temperature Range	-30°C to 65°C (-22°F to 150°F)
➤ Storage Temperature Range	-40°C to 85°C (-40°F to 185°F)
➤ Operating Humidity Range	5% to 95% non-condensing
➤ Operating Vibration Limit	.04 g <sup>2</sup> /Hz 20-2000Hz
➤ Operating Shock Limit	30g, 11mS, Half Sine
➤ Enclosure Material	UL Recognized Lexan Polycarbonate
➤ Weight	11.3oz (310gms)

### Power Requirements

➤ Power supply	Linear type recommended
➤ Operating Voltage Range (+DC)	10VDC -28.5VDC
➤ Absolute Maximum (+DC non-operating)	31.4VDC
➤ Maximum Average Current 12V/24V	120mA/150mA
➤ Transient Protection (all terminals)	8,000 volts
➤ Reverse Voltage Protection	YES
➤ Input Voltage (maximum data-0/1 lines)	28.5VDC
➤ Input Voltage (maximum interface lines)	28.5VDC

### Operating Parameters

➤ Excitation Frequency	125KHz
➤ Duty Cycle (alternate power level rate)	20% @ 60mS period
➤ Read and Report Speed (26 bit Card)	100mS
➤ RS232 - Maximum Cable Distance to Host	50 - 200 feet (61 meters)
➤ RS422 - Maximum Cable Distance to Host	4000 feet (1230 meters)
➤ RS485 - Maximum Cable Distance to Host	4000 feet (1230 meters)
➤ LED Type	Bi-colored Red/Green
➤ LED Control (default)	internal control enabled
➤ Beeper Control (default)	internal control enabled
➤ Anti-Pass Back Delay (default)	1 second

NOTES: THE ABOVE ARE RECOMMENDED INSTALLATION PROCEDURES. ALL LOCAL, STATE AND NATIONAL ELECTRICAL CODES TAKE PRECEDENCE.