

**INSTALLATION INSTRUCTIONS
FOR ALL
PRO SYSTEMS**

MOUNTING THE CABINET

1. Determine which of the two openings into the box (back or bottom) will be used to run wires into the cabinet. If the wires can be pulled through the wall or pedestal on which the unit is mounted, you should use the back opening into the box since it provides better protections against tampering/vandalism. If this cannot be accomplished, run the wires through the 3/4 inch conduit into the bottom opening of the cabinet. Be sure to connect the conduit to the unit securely.
2. Remove the set of circuit boards from the unit, by removing the screw and solder lug that hold the upper right corner and releasing the board from the plastic stand-off that holds the lower right corner. **Try to discharge any static that you may have built-up before handling the boards.**
3. Carefully remove the knockout plug from the opening to be used.
4. Mount the unit on the wall or pedestal securely. Mounting hardware is provided if you are using Sentex's pedestal mount post. Do not put the circuit board back in the cabinet until all connections are made as described below.

MAKING ALL CONNECTIONS

1. Connect an 18 awg, 2-conductor cable to the top two terminals (numbers 24 and 25) on the terminal block shown in Exhibit 1. If you are going to use **AC power** to run the system, connect the other end of the cable to the 12 VAC transformer provided. Do not plug the transformer into a 110 VAC outlet yet. Be sure that this outlet is solely dedicated to the PRO system. Specifically, the outlet into which you plug the transformer provided should be wired back to its own circuit breaker. This will prevent two problems: A) other equipment cannot introduce spikes, noise, surges, or dips into the power circuit, and B) the PRO system's operation will not be affected if any other equipment develops a short circuit across the power line.

If you are going to use **DC power** to run the system, connect the other end of the cable into a 12 VDC power supply. Please note that the PRO system will not trickle charge a battery, so your DC power supply must have its own charging circuit. Do not plug in the transformer for the power supply yet.

NOTE: The PRO system requires an incoming voltage of 11.5-16.5 VDC. To ensure power is within the specified range, perform the following voltage check:

1. Attach one lead of a voltmeter to either side of the large capacitor located on the upper left side of the bottom board (polarity is unimportant).
 2. Attach the other voltmeter lead to the other side of the capacitor. Check the voltage. If voltage is below 11.5 or above 16.5 VDC, the system may malfunction or become inoperable.
2. Connect the wires from the door strike (or gate operator) and the strike power supply to the terminal block using the connections shown in Exhibit 2. **Strike power may not be drawn from the same transformer** as the power for the PRO system.
 3. If you wish to connect one or more remote card readers to the PRO system, follow the section below which refers to the type of card reader you are using:

For **Weigand** readers, we recommend that you use Belden Datalene #9929 which is 24 awg and has both a foil and braid shield. This cable will allow any Weigand card readers to be mounted up to 500 feet from the system. The connections for Weigand readers are shown below:

| <u>WIRE COLOR FROM READER</u> | <u>USE OF THIS CONDUCTOR</u> | <u>TERMINAL TO USE FOR READER 1</u> | <u>TERMINAL TO USE FOR READER 2</u> |
|-----------------------------------|----------------------------------|---|---|
| GREEN | DATA 0 | 5 | 9 |
| WHITE | DATA 1 | 6 | 10 |
| BLACK & BROWN TIED TOGETHER | GROUND | 7 | 11 |
| RED | +5 VDC | 8 | 12 |

NOTE: Some Weigand readers have a sixth blue wire, which is unused in the PRO system. This wire should not be connected to the system, but should be completely insulated to prevent shorting the system.

For **Barium Ferrite** readers, you may use the same type of wire as used in the Weigand installation as long as the readers will be within 125 feet of the PRO system. Use exactly the same connections as shown above, with the exception that these readers **require +12VDC instead of +5 VDC**. Thus, you will need a special model of the Bottom Board which will emit +12 VDC from terminals 8 and 12. To determine if your Bottom board is a +12 VDC board, look for the letter "V" following the serial number in the upper right-hand corner of the board. If your system does not have the special model Bottom Board, the card reader and the system will not operate properly. If you need to make a cable run longer than 125 feet, you may use 20 awg wire for distances up to 350 feet away from the system or 18 awg wire for distances up to 500 feet away.

For **Proximity** readers, we recommend that you use 5-conductor, 18 to 24 awg shielded wire (such as Belden Dataleme #9929) if the readers will be within 10 feet of the system. Use exactly the same connections as shown for the Weigand readers, with the exception that the Proximity readers **require +12 VDC instead of +5 VDC**. Thus, you will need a special model of the Bottom Board which will emit +12 VDC from terminals 8 and 12. To determine if your Bottom Board is a +12 VDC board, look for the letter "V" following the serial number in the upper right-hand corner of the board. If your system does not have the special model Bottom Board, the card reader and the system will not operate properly.

For **Clikcard** readers, we recommend that you use an 18 to 24 awg, 5-conductor shielded cable (such as Belden Datalene #9929). This cable will allow any Clikcard receiver to be mounted up to 500 feet from the system. The connections for the Clikcard receivers are as follows:

| <u>WIRE COLOR FROM READER</u> | <u>USE OF THIS CONDUCTOR</u> | <u>TERMINAL USED FOR READER 1</u> | <u>TERMINAL USED FOR READER 2</u> |
|-----------------------------------|----------------------------------|---------------------------------------|---------------------------------------|
| GREEN | DATA 0 | 5 | 9 |
| WHITE | DATA 1 | 6 | 10 |
| BROWN & BLACK TIED TOGETHER | GROUND | 7 | 11 |
| RED | POWER | 8 | 12 |

4. After making all of these connections, put the set of boards back into the cabinet.
5. Ground the enclosure thoroughly. The PRO systems contain a number of static sensitive components which can be damaged or destroyed by static discharge. This type of damage is not covered under Sentex's warranty. A proper earth ground connected to the system's chassis will significantly reduce the chances of damage or improper operation. The lug connected to the upper right stanchion is the point where connection to ground should be made. The shields in the cables specified for all remote card readers should be connected to the earth ground at this same point.

To be effective, the connection should be made by running 12 awg copper wire to be a good ground point within 12 feet of the system. This ground point must be at an electrical panel, at a metallic cold-water pipe that runs into the earth, or at a grounding rod at least 10 feet in length that is driven into the earth. If you cannot meet these requirements, a ground will be of little value.

6. Plug the 12 VAC transformer or the 12 VDC power supply transformer into a 110 VAC outlet. **Any other type of outlet will cause damage to the system.**

INSTALLING OPTIONAL FEATURES

Each PRO system comes with several important capabilities built-in. These features can be utilized as follows:

1. **Alarm Shunt Relay:** A relay is provided to allow you to bypass an alarm contact that is monitoring a door controlled by the PRO system. This relay is activated by the system whenever either of the control relays are activated and remain activated for 60 seconds after the control relay deactivates (to allow time for the door to close). Connections should be made to terminals 13 and 15 if you need a normally open circuit and terminals 14 and 15 if you need a normally closed circuit. This relay has a rating of 0.6 amps at 125 VAC.
2. **Auxiliary Opening Device Contacts:** Any auxiliary opening device (such as a key switch, PIR, or exit button) that provides contact closure can be hooked up to terminals 1 and 2. When a contact closure is sensed across these terminals, relay 1 will activate for the amount of time programmed. The alarm shunt relay will activate as described above.
3. **Door Open Sensing Contacts:** These contacts are provided to allow you to deactivate the control relay instantly when the door is opened rather than waiting for the normal time out (set by the user) to be completed. This helps prevent "tailgating". Install a double pole, single throw switch in the door frame and connect a shielded pair to the contacts that will be open when the door is closed. When the door is opened, the contact closure from the switch tells the PRO system to deactivate the control relay.
4. **Printer:** See next page.

INSTALLING OPTIONAL PRINTER

If you have purchased a printer with your system, it includes the RS-422 serial interface required to operate with the PRO system. The following steps are involved in installing this printer:

1. Unpack and test the printer as described in the Printer Handbook.
2. After testing the printer, disconnect the power.
3. Make sure the power to the PRO system is disconnected and remove the circuit boards from the housing.
4. Run a twisted 3-wire cable (24 awg or thicker and color-coded) into the PRO system housing and to the spot where the printer will be located. The printer can be up to 1,500 feet away from the PRO system.
5. Remove the flat, 5-hole conductor with the 3-wire color-coded pigtail (part number 8100335) from the bag of accessories packed with your printer.
6. Splice each of the wires in your 3-conductor cable to a corresponding wire on the connector. Note which color wire on the cable is connected to which color wire on the connector.
7. Reinstall the circuit boards in the PRO system housing after all connections have been made as described in the Installation Instructions for all PRO systems.

WARNING

In the following step, the 5-pin connector **MUST** be installed properly, or the piggyback circuit board will be damaged, rendering the printer and possibly the Pro System inoperative.

8. The 5-pin printer connector is located on the upper right-hand corner of the top circuit board. **Install the flat printer connector with the wires toward the top of the unit and the empty holes in the connector below the wires.** Failure to orient the connector correctly will result in damage to the unit.
9. Remove the larger (DB 25) connector with the 3-wire color-coded pigtail (part number 8100426) from the accessories bag.
10. Splice each of the wires in the twisted cable to each of the wires on the DB 37 connector such that the same color wire on the DB 37 is connected to the same color wire on the PRO system connector.
11. Plug this connector into the top receptacle location on the back left-hand side of the printer and tighten the screws securely.
12. Reconnect the power to the printer and the PRO system.
13. Finish reading Chapter 1 in the Printer Handbook.
14. Insert the paper in the printer. The printer uses plain, 80-column, sprocket feed paper that is available at any computer or stationary store.

If properly installed, the printer will now print out a record of every system activity, including programming.

EXAMPLE

POWER ON
 PROG ON
 AUX OK

 PROG OFF

RECORD MEANING

The Pro System and Printer are ON
 The correct password has been entered
 The Auxilliary opening device has been enabled by shorting terminals 1 and 2 of the bottom board terminal block.
 The Program Mode has ended

ADDITIONAL TESTING

If you have a problem with your printer, check the settings of the DIP switches inside the printer. These settings should be as shown below:

| | | | | | | | | |
|------------------------------|-----|---|---|---|---|---|---|-----|
| Main Board Switch | ON | X | | | | X | | X |
| | OFF | | X | X | | | X | X |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 8 |
| Serial Board Switch 1 | ON | X | X | X | X | X | X | X |
| | OFF | | | | | | | X |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 8 |
| Serial Board Switch 2 | ON | | | X | | X | X | X |
| | OFF | X | X | | X | | | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 8 |

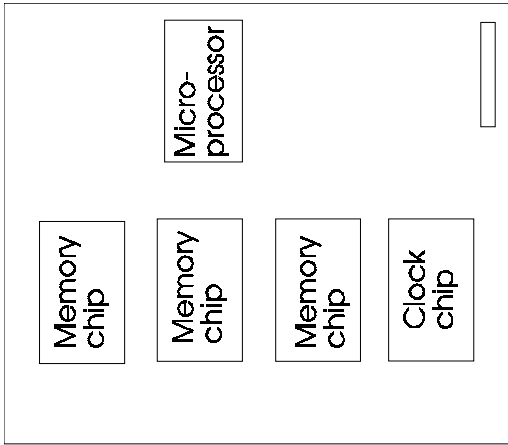
PRINTING MEMORY CONTENTS

To print the memory contents of the Pro System, from the Programming Mode:
 Enter "01★" to print memory contents.
 Enter "##" to stop printing.

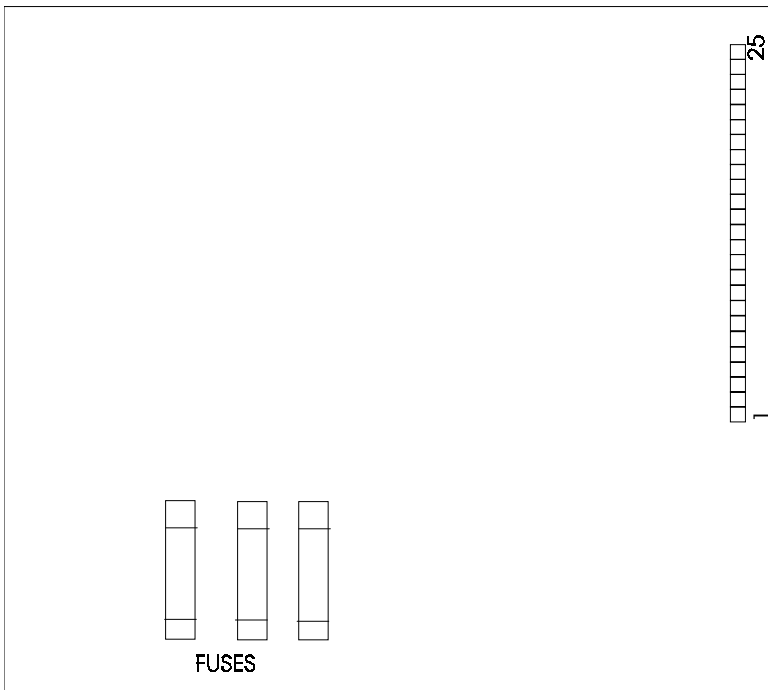
NOTES:

1. In the printed record, * (asterisks) are represented by a colon (:), and # (pound signs) are represented by semi-colons (;).
2. If printing is stopped before the entire memory contents is printed, the following message will be printed: ABRT (meaning printing has been aborted).

CIRCUIT BOARD LAYOUT



TOP BOARD



USE OF TERMINALS

- 24-25 MAIN POWER
- 20-23 RELAY 2 (+ POWER)
- 16-19 RELAY 1 (+ POWER)
- 13-15 ALARM SHUNT RELAY
- 9 - 12 READER 2
- 5 - 8 READER 1
- 3 - 4 DOOR OPEN SENSE
- 1 - 2 AUXILIARY OPENING DEVICE

BOTTOM BOARD

HOOK-UPS FOR CONTROL RELAYS

| | <u>TERMINALS USED FOR MAIN RELAY HOOK-UP</u> | <u>TERMINALS USED FOR OPTIONAL 2ND RELAY HOOK-UP</u> |
|--|--|--|
| FOR NORMALLY LOCKED STRIKES | | |
| Strike | 16 + 18 | 20 + 22 |
| Strike Power | 18 + 19 | 22 + 23 |
| FOR MAGNETIC LOCKS OR NORMALLY UNLOCKED STRIKES | | |
| Lock/strike | 17 + 18 | 21 + 22 |
| Power | 18 + 19 | 22 + 23 |
| FOR DRY CONTACT CLOSURE | 16 + 19 | 20 + 23 |

EXHIBIT 3

HOOK-UPS FOR REMOTE CARD READER HEADS

| | TERMINALS USED FOR WIRES OF THE FOLLOWING COLOR: | | | | |
|--|---|--------------|--------------|------------|--------------|
| | <u>GREEN</u> | <u>WHITE</u> | <u>BLACK</u> | <u>RED</u> | <u>BROWN</u> |
| ONE REMOTE READER HEAD | | | | | |
| If no other reader | 5 | 6 | 7 | 8 | Not used* |
| If another reader is attached to cabinet that contains electronics | 9 | 10 | 11 | 12 | Not used* |
| TWO REMOTE READER HEADS | | | | | |
| Reader 1 | 5 | 6 | 7 | 8 | Not used* |
| Reader 2 | 9 | 10 | 11 | 12 | Not used* |

FCC REQUIREMENTS

RADIO FREQUENCY

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 when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, 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.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the FCC helpful: "How to Identify and Resolve Radio-Television Interface Problems". This booklet is available from the United States Government Printing Office. Washington, D.C., 20402. Stock No. 004-000-00345-4.