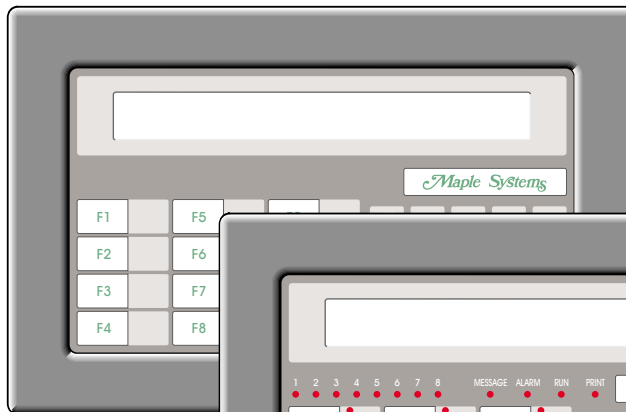
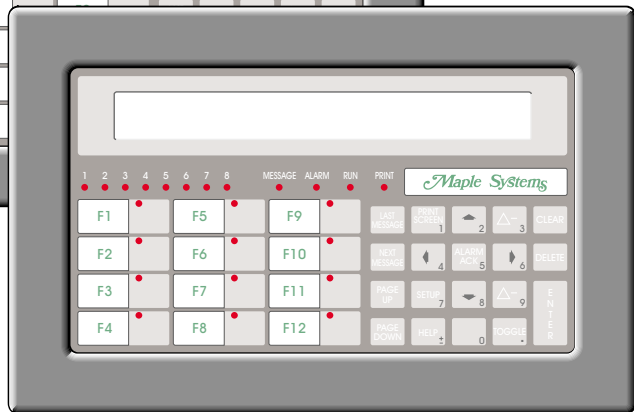


# INSTALLATION MANUAL

**CIT**  
3200



**CIT**  
3250



CE



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Package the unit in its original packaging container or, if unavailable, any suitable rigid container. If a substitute container is used, surround the unit with shock absorbing material; damage in shipment is not covered by the warranty. Include a letter with the unit describing the difficulty and designating a contact person. Send to the following address: Maple Systems, Inc., 808 134th Street SW, Suite 120, Everett, WA 98204.

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## APPLICATIONS ASSISTANCE

This manual is designed to provide the necessary information for trouble-free installation and operation of your new Operator Interface Terminal (OIT). However, if you need assistance, please call Maple Systems at 425-745-3229 or visit our web site at [www.maple-systems.com](http://www.maple-systems.com).

## Read Me First!

Your new Maple Systems OIT comes from the factory without any communications protocol or operational software installed; therefore

- The OIT will NOT operate until it has been configured using OITware-200 or STEPware-100.
- When power is first applied, the OIT's display will indicate that it needs to be configured.
- Use the OITware-200 or STEPware-100 software to create a file (or "project") that can be downloaded to the OIT.
- When the project is transferred, both communications protocol and operational software are automatically loaded and the unit is ready for operation.

To ensure that the OIT meets CE compliance, it is necessary to follow all installation procedures described in this manual.

## Introduction

Thank you for purchasing a Maple Systems OIT3200 or OIT3250. You have selected a rugged, reliable, and powerful operator interface for your application. This booklet describes the steps necessary to ensure trouble-free OIT system operation. **Please read this booklet carefully!!**

## Static Awareness



It is best NOT to remove the rear cover on the OIT except when replacing the real-time clock battery on the OIT3250 (please refer to the “Battery Replacement” section for more information). When the rear cover is removed, the circuitry inside is exposed to possible damage by electrostatic discharge during handling. Minimize the possibility of electrostatic discharge by:

- Discharging personal static by grounding yourself prior to handling the OIT.
- Handling the OIT at static-free, grounded work stations.
- Connecting the chassis of the OIT to a clean ground.
- Placing the OIT into an anti-static bag during transport.

## Unpacking the Unit

Carefully unpack the OIT. Please read any instructions or cautions that appear on the shipping container. Check all material in the container against the enclosed packing list. Maple Systems, Inc., will not accept responsibility for shortages against the packing list unless notified within 30 days. The equipment and its accessories were inspected and tested by Maple Systems before shipment; all of the equipment should be in good working order. Examine the equipment carefully; if any shipping damage is evident, notify the carrier immediately. You are responsible for claim negotiations with the carrier. Save the shipping container and packing material in case the equipment needs to be stored, returned to Maple Systems, or transported for any reason.

# TABLE OF CONTENTS

1. Control Panel Design Guidelines .....	6
1.1. Control Panel Grounding .....	6
1.2. Power Supply Selection .....	6
1.3. OIT Cable Routing .....	7
1.4. Other Steps to Improve Noise Immunity .....	7
2. OIT Installation.....	8
2.1. Set Jumper for Specific Protocol.....	8
2.2. Prepare Panel for OIT Mounting.....	8
2.3. Mount OIT to Panel.....	9
2.4. Connect OIT Chassis Ground to Control Panel .....	10
2.5. Connect OIT to Power.....	11
2.6. Connect OIT to PLC/Host.....	12
3. OIT Configuration Wiring .....	13
3.1. Connect OIT3200 to PC for Configuration .....	13
3.2. Connect OIT3250 to PC for Configuration.....	14
4. OIT3250 Special Features.....	15
4.1. Connecting to Printer .....	15
4.2. PLC/Host Programming via Bypass Mode.....	15
4.3. Wiring for External Alarm/Keypress Buzzers .....	16
4.4. Battery Replacement.....	17
5. Custom Keypad Slide-In Legends .....	18
5.1. Blank Legends for Photocopying .....	18
5.2. Creating Computer-Generated Slide-In Legends .....	20
5.3. Installing the Slide-In Legends .....	21
Appendix A: OIT Hardware Specifications.....	22
Appendix B: Building Your Own Power Cable .....	24

# 1. Control Panel Design Guidelines

Pay careful attention to the placement of system components and associated cable routing. These items can significantly enhance the performance and integrity of your control application.

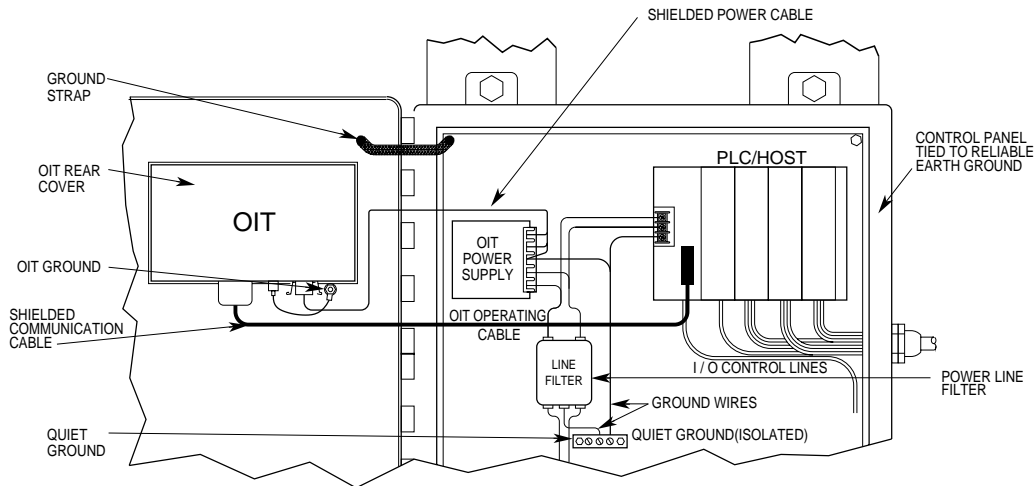


Figure 1 Control Panel Example

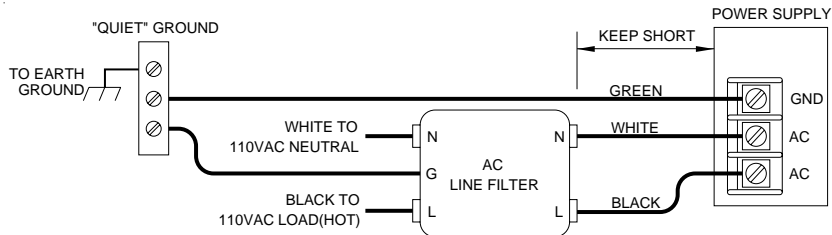
## 1.1. Control Panel Grounding

- The control panel should be connected to a good, high-integrity earth ground both for safety considerations and shielding purposes. This must be a reliable earth ground with a low-resistance path. The ideal earth ground would be a copper grounding rod located close to the OIT and the control panel.
- Hinged doors on control panels do not provide a long term electrical connection to the rest of the enclosure. Corrosion develops over time and prevents good electrical contact. For this reason, a separate wire braid should be installed from the hinged control panel to the rest of the enclosure.

## 1.2. Power Supply Selection

- The power supply used to power the OIT should have an output between +12 and +30 VDC. The voltage should measure between +12 and +30V at the OIT between Pins 1 and 2 of the power connector. A 24 VDC, 0.5 amp linear power supply dedicated to the OIT is recommended.
- The power cable for the OIT should be 18AWG 2-conductor wire with a shield wire and protective shield foil. The shield of the OIT power cable must be connected to earth ground at both ends of the cable. Please refer to the “Connect OIT to Power” section and Appendix C for more information.

- A power line filter installed at the AC input to the OIT power supply is highly recommended as a safeguard against conducted RF noise, which is often present on factory power lines. The wires connecting the output of the power line filter to the power supply should be kept as short as possible to minimize any additional noise pickup. The case of the power line filter should be connected to a quiet earth ground. The power line filter should have a current rating of at least three amps with common mode and differential mode attenuation.



**Figure 2 Power Line Filter Connection**

- The power supply that provides power to the OIT should not be used to power switching relays or solenoids unless noise filter caps are connected to each relay.

### 1.3. OIT Cable Routing

- Always route the OIT communication cable and power cable away from any AC voltage or PLC/host control wires.
- Never bundle the OIT cables together with 120 VAC power wires or with relay wiring.
- Try to keep at least 8 inches (20 cm) of separation between the OIT cables and other power wiring. If voltages greater than 120 VAC are used in the system, greater separation is required.
- If the OIT cables must come near AC wiring, make sure they cross at 90 degrees.
- Running AC power wires in a separate grounded conduit is the preferred method for electrical noise reduction.
- Keep the lengths of the OIT cables as short as possible. Do not coil excess cable and place it next to AC powered equipment.

### 1.4. Other Steps to Improve Noise Immunity

- Always install the OIT's rear cover. This provides a shield against electrical noise which can be generated in the control panel by relays, motors, power lines, and/or high frequency equipment. Ensure that all rear cover mounting screws are properly secured.
- Any equipment used in the enclosure that operates at high frequency or high current levels can be covered with a grounded metal shield.

## 2. OIT Installation

It is necessary to follow all installation procedures described in this chapter for electrical noise immunity and CE compliance.

### 2.1. Set Jumper for Specific Protocol

This step is required for a few protocols only. Consult the Protocol Guides in your documentation. If the protocol requires RS-485 half-duplex 3-wire communication, proceed as follows:

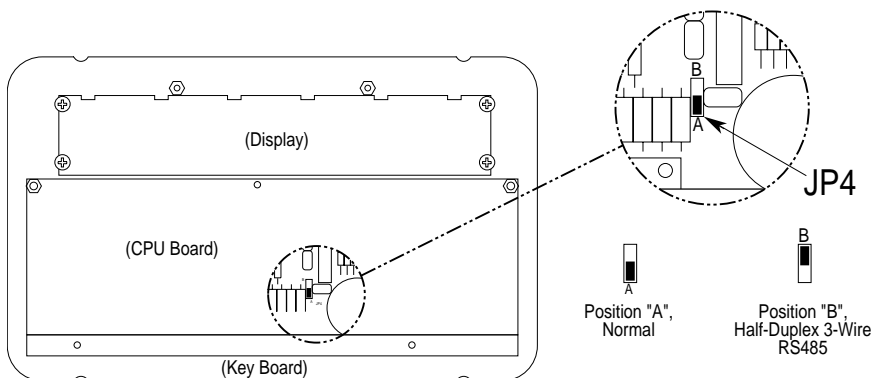


Figure 3 OIT3200/3250 Jumper Installation

#### STEPS

1. Remove the protective cover from the rear of the unit.

**CAUTION:** *When the rear cover is removed, the circuitry inside is exposed to possible damage by electrostatic discharge. Refer to Static Awareness on page 4.*

2. Locate jumper “JP4” using Figure 3 as a guide. The jumper is installed on the lower two pins of a 3-pin header. This is called Position “A”.
3. Move the jumper to the upper two pins of the 3-pin header (Position “B”). Ensure that the jumper is pressed fully into place.
4. Replace the rear cover and the six retaining screws.

### 2.2. Prepare Panel for OIT Mounting

The OIT3200 and OIT3250 are mounted to a control panel from the front. For a proper NEMA 4/12 seal, you will need a panel with a minimum thickness of 16-gauge (0.059 inches; 1.5 mm) steel or 10-gauge (0.102 inches; 2.6 mm) aluminum. Thinner panels may bow between the mounting studs requiring the use of a stiffener on the rear. Two gaskets on the inside rim of the OIT’s bezel provide an environmental seal to NEMA 4/12.



The diagram below shows the dimensions of the panel cutout required for proper panel installation. The panel cutout should be cleaned and deburred before the OIT is installed. Also the area around the lower right hand mounting hole (as viewed from the rear) should be free of paint or anodizing to provide the OIT with a good earth ground connection.

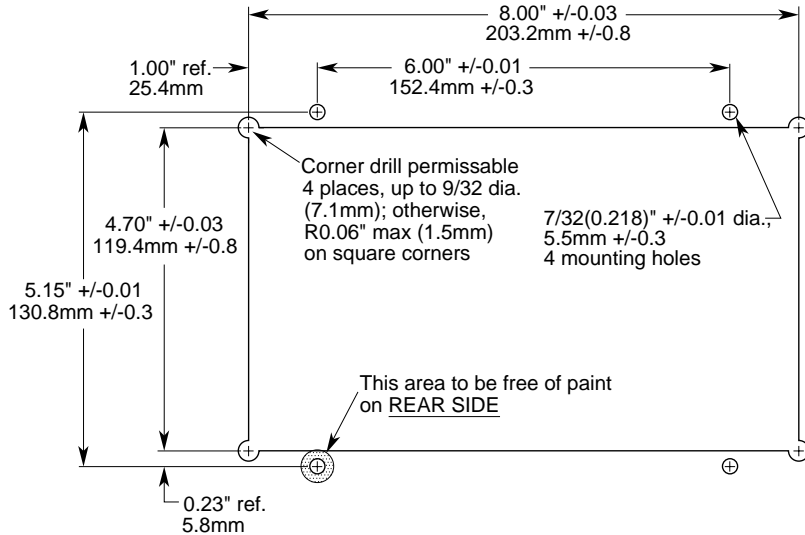


Figure 4 OIT3200/3250 Panel Cutout Dimensions-Front View

### 2.3. Mount OIT to Panel

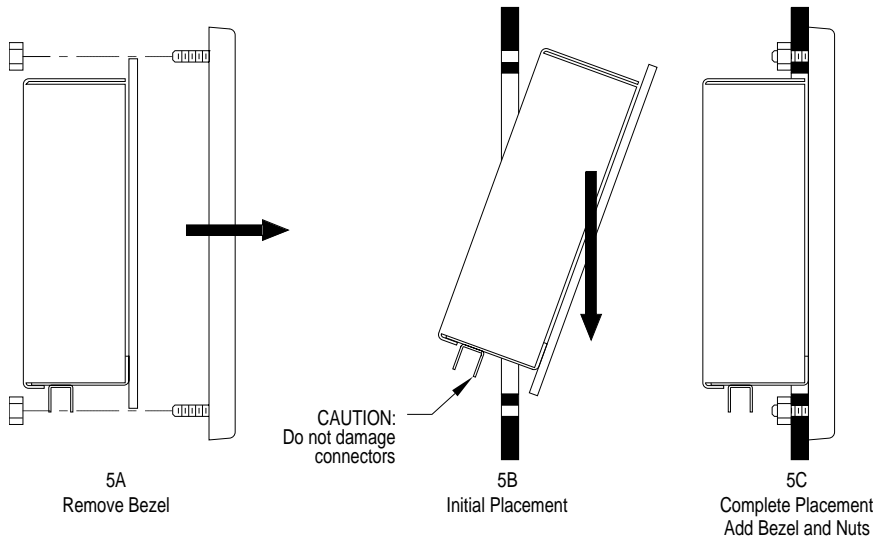


Figure 5 OIT3200/3250 Panel Mounting

## STEPS

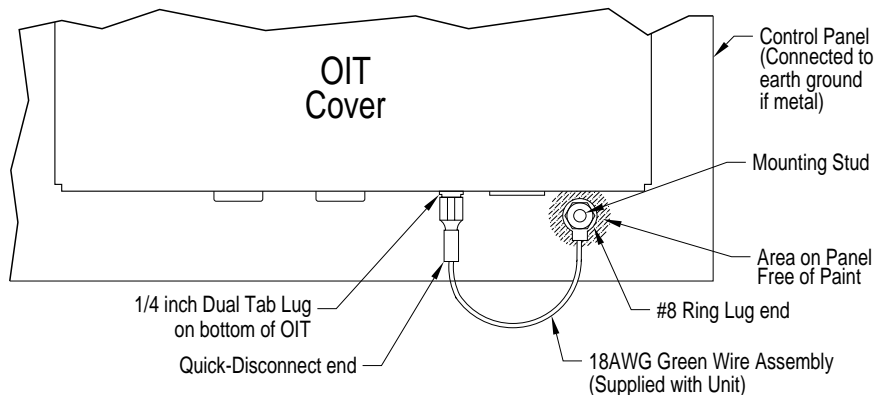
1. Remove the four #8-32UNC mounting nuts from the rear of the OIT using an 11/32 inch socket wrench or nut driver.
2. Remove the bezel (frame) as shown in Figure 5A.
3. Tilt the top of the OIT towards you, approximately 15-20°, and gently place it against the panel cutout as shown in Figure 5B.
4. Gently slide the OIT downward until it is resting against the cutout.
5. Replace the bezel (frame).
6. Secure the OIT by re-installing the four #8-32UNC mounting nuts on the rear of the OIT using an 11/32 inch socket wrench or nut driver.

**CAUTION:** Do not torque the 4 mounting nuts to over 30 pound-inches. Over torquing can strip the threads. The unit is properly installed when the bezel first touches the control panel. Additional tightening will not improve the seal.

## 2.4. Connect OIT Chassis Ground to Control Panel

The green ground wire assembly, supplied with the OIT, must be installed as shown. This provides a good earth ground connection to the OIT's bezel and rear cover.

If your control panel is metal, be sure it is grounded. If it is a non-conductive material such as plastic, run an additional ground from either the dual-tab lug on the OIT or the mounting stud (shown) to a good ground point. Use a braided grounding strap that is as short as practical.



**Figure 6 OIT3200/3250 Chassis Ground**

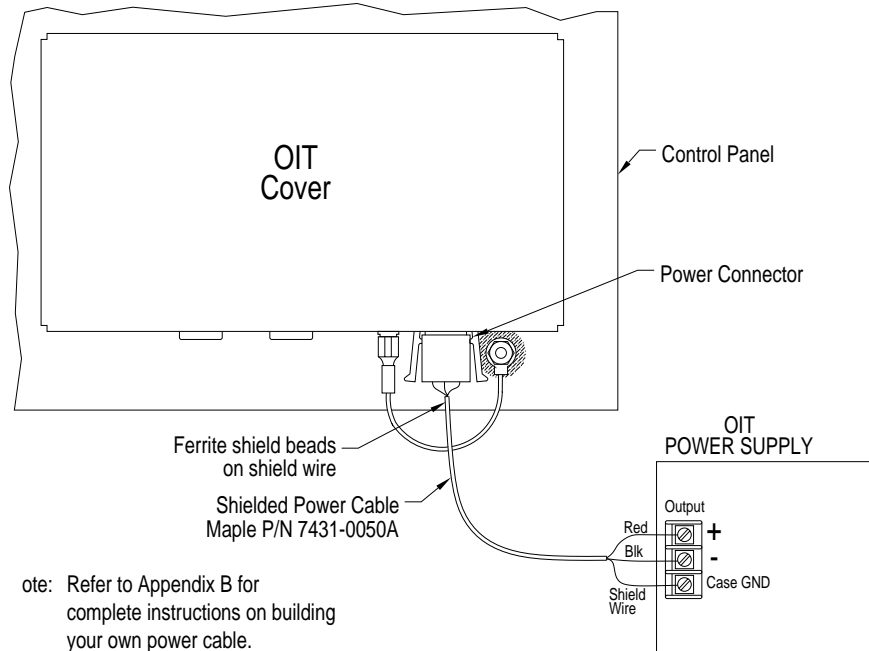
## STEPS

1. Remove the mounting nut from the lower right hand stud, as viewed from the rear.
2. To install the green ground wire assembly, slip the #8 ring lug over the stud.
3. Re-install the mounting nut. Gently tighten using an 11/32 inch socket wrench or nut driver.

**CAUTION:** Do not torque the mounting nut to over 30 pound-inches. Over torquing can strip the threads. The unit is properly installed when the bezel first touches the control panel. Additional tightening will not improve the seal.

4. Install the other end of the green ground wire assembly onto the dual-tab lug on the rear cover of the OIT.

## 2.5. Connect OIT to Power



**Figure 7 OIT3200/3250 Power Supply Connection**

### STEPS

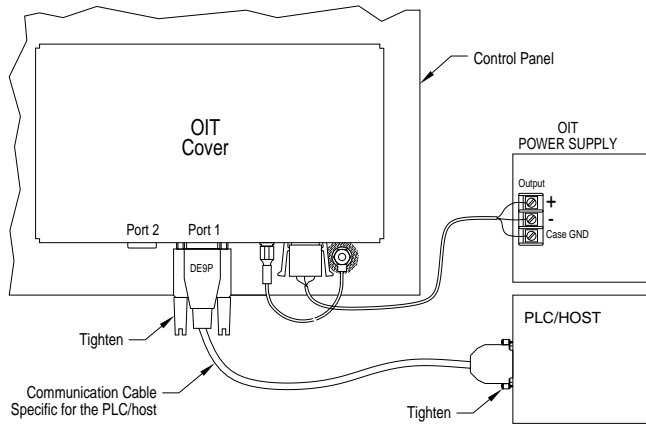
1. Plug the orange connector on Maple Systems Cable 7431-0050A into the power connector on the OIT.
2. Route the power cable to the OIT power supply.
3. The power cable should not be any longer than necessary. If needed:
  - a) cut the power supply cable to the appropriate length.
  - b) strip the cable shield back on the power cable.
  - c) strip the insulation from the red and black wires.
4. Install the wires into the power supply as follows:
 

RED	+ output
BLACK	- output
SHIELD	case ground

## 2.6. Connect OIT to PLC/Host

Each PLC/host supported by Maple Systems has its own wiring requirements. Maple Systems offers pre-constructed OIT-to-PLC communication cables for most PLCs. Most cables are available for same day shipment from Maple Systems. They are built and tested for high reliability and are strongly recommended. Maple Systems also builds custom cables—contact the factory for information. Components and instructions necessary to construct your own OIT-to-PLC communication cables are also available. Refer to Maple Systems' Price List or web site ([www.maple-systems.com](http://www.maple-systems.com)).

**NOTE:** Refer to the *ASCII Slave Protocol Guide* or the *STEP1 Protocol Operation Manual* for information on constructing OIT-to-ASCII host communication cables.



**Figure 8 OIT3200/3250 PLC Connection**

### STEPS

1. Connect the DE9P plug end of the communication cable to Port 1 on the OIT, which is the port nearest the power connector.
2. Tighten the cable screws to ensure that the cable remains attached to the OIT.
3. Route the communication cable to the PLC/host. Refer to the “OIT Cable Routing” section for more information.
4. Connect the other end of the cable to the PLC/host and tighten the cable screws.

PIN#	FUNCTION
1	RXD-
2	RXD
3	TXD
4	RXD+
5	RETURN
6	TXD-
7	RTS
8	CTS
9	TXD+

**Figure 9 Port 1 Pin Outs**

### 3. OIT Configuration Wiring

The OIT3200 and OIT3250 must be configured for a particular protocol before use. The OITware-200 or STEPware-100 software (used on a computer with Windows 3.1 or later) is used for OIT configuration. For detailed instructions on installing and using the software, please consult your software documentation.

#### 3.1. Connect OIT3200 to PC for Configuration

To configure the OIT3200 using Maple Systems' configuration software, remove the PLC/host cable from Port 1 and connect the OIT to the computer using an RS-232 serial communications cable (P/N 7431-0049, purchased separately from Maple Systems). The configuration cable should be connected to the proper COM port on your computer, then attached to Port 1 on the OIT3200. See Figure 10 below for Port 1 pin assignments.

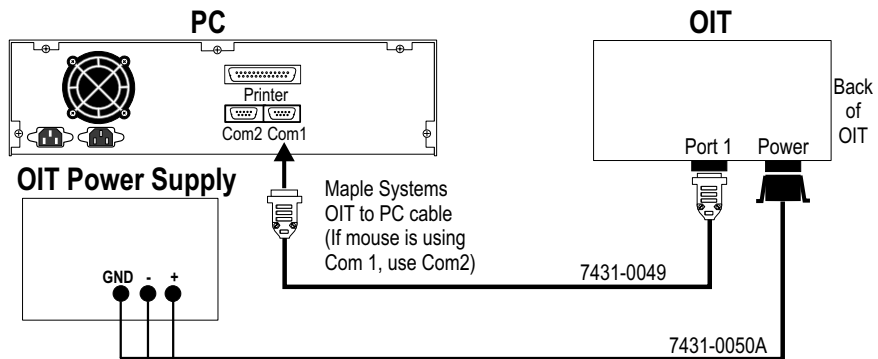
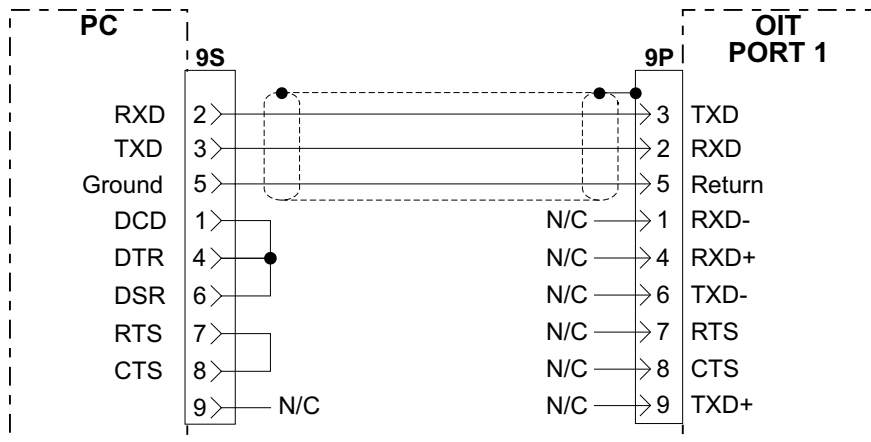


Figure 10 Port 2 OIT3250 to PC RS-232 Communication

### 3.2. Connect OIT3250 to PC for Configuration

To configure the OIT3250 using Maple Systems' configuration software, a second serial port (Port 2) is provided which allows you to connect a computer while using the first port (Port 1) to connect to the PLC/host. Connect the OIT to the computer using an RS-232 serial communications cable (P/N 7431-0049, purchased separately from Maple Systems). The configuration cable should be connected to the proper COM port on your computer, then attached to Port 2 (the serial port farthest away from the power connector) on the OIT3250. See Figure 10 below for Port 2 pin assignments.

**NOTE:** *Be particularly careful during wiring that Pins 8 and 9 on Port 2 are left open. Otherwise, damage to the OIT's circuitry could occur (see Figure 11 below).*

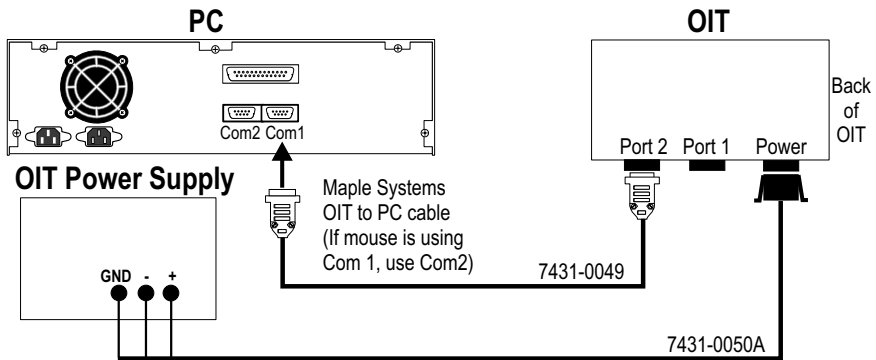
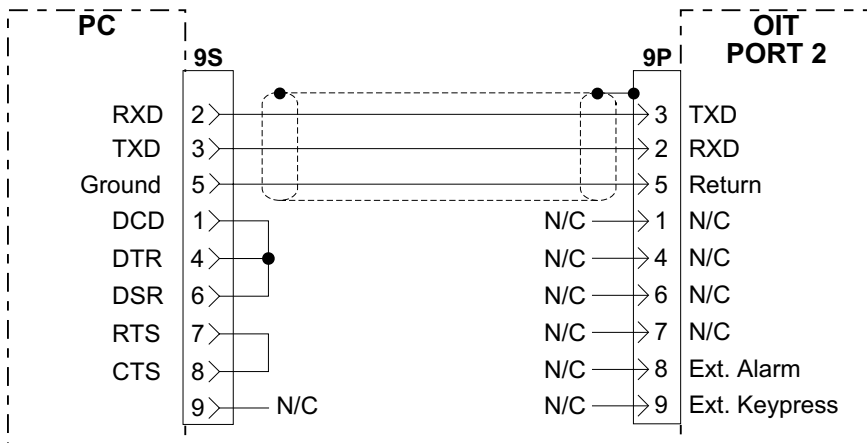


Figure 11 Port 1 OIT3200 to PC RS-232 Communication

## 4. OIT3250 Special Features

### 4.1. Connecting to Printer

The second serial port of the OIT3250 is also used to connect to a serial printer. This feature enables the OIT to print messages. The OIT 3250 uses XON/XOFF software handshaking to communicate to the printer. The communications parameters (ex. baud rate, parity, etc.) used are determined when the OIT is configured. Consult the OITware-200 manual for more information. Connection to the printer varies depending upon the pinout of the printer. See Figure 11 for the OIT Port 2 pin assignments.

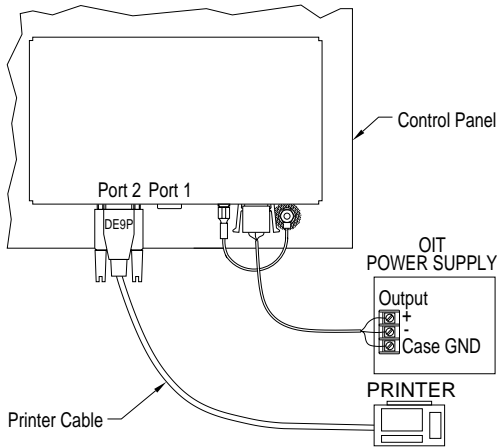


Figure 12 OIT3250 Printer Connection

### 4.2. PLC/Host Programming via Bypass Mode

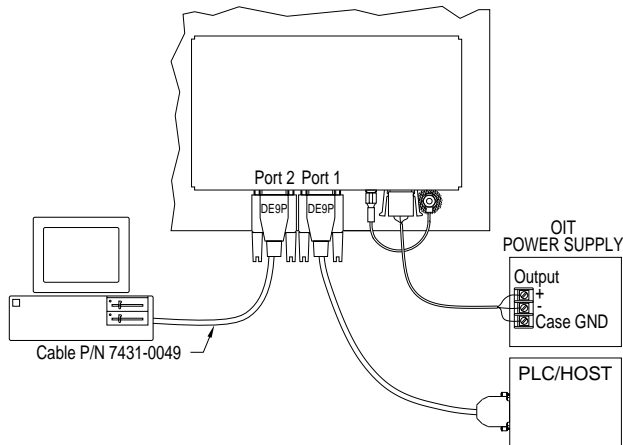


Figure 13 OIT3250 Bypass Mode Connection

The OIT3250 features a bypass mode which allows most PLC/host programming software to communicate through the OIT to the PLC/host without having to disconnect the cables from the OIT. Bypass mode does not work with PLC programming software that uses hardware handshaking or 3-wire RS-485 connections.

To use bypass mode:

1. Plug the PC into Port 2 of the OIT.
2. Leave Port 1 connected to the PLC/host.
3. Press the Setup key on the OIT to enter the local setup mode.
4. Advance to the bypass mode setting to select the bypass operation.
5. Run the PLC/host program on the PC to communicate with the PLC/host.
6. When finished using bypass mode, the OIT must have power cycled in order to operate in normal mode again.

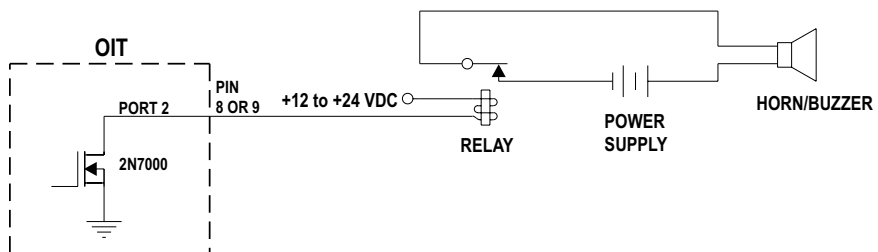
**NOTE:** *While the OIT operates in bypass mode, it cannot communicate with the PLC/host. It is off-line.*

### 4.3. Wiring for External Alarm/Keypress Buzzers

Outputs provided on Port 2 of the OIT3250 allow connections for external keypress and alarm buzzers.

- The alarm buzzer output (Pin 8) can be used to turn on an external buzzer whenever an alarm occurs on the OIT.
- The keypress buzzer output (Pin 9) can be used to turn on an external buzzer whenever keys are pressed on the OIT. The external keypress buzzer mimics the internal buzzer of the OIT. Therefore, when the internal buzzer is on, the external keypress buzzer (if connected) will be on.

The outputs are open drain outputs which can sink DC current up to 200 mA. The outputs can directly drive any buzzer with a maximum current draw of 200 mA. If more current is required, a normally open relay is recommended as shown below.



**Figure 14** Wiring for External Keypress/Alarm Buzzer

**NOTE:** *Ensure that the relay contacts are properly rated for the current required to drive the selected alarm horn.*



## 4.4. Battery Replacement

The OIT3250 is shipped with a 3V lithium coin cell battery installed for backing up the real-time clock. During periods of power loss, the coin cell will allow the internal clock to continue to run and keep accurate time. As long as power is applied to the OIT, the battery will not be drained. The battery will experience no loss of power until the OIT has been configured. Following OIT configuration, the battery will last for approximately 4-6 months if the OIT is in a continually powered down state. Replacement batteries can be Ray-O-Vac or Panasonic BR1225 or equivalent 3V coin cell batteries.

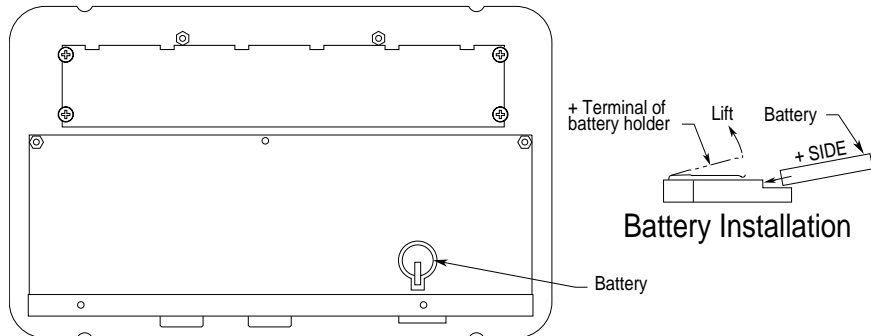


Figure 15 Location and Installation/Removal of Battery

### STEPS

1. Remove the protective cover from the rear of the unit.

**CAUTION:** *When the rear cover is removed, the circuitry inside is exposed to possible damage by electrostatic discharge. Refer to Static Awareness on page 4.*

2. Find the coin cell on the PCB. It looks like a 1/2-inch (12.7 mm) silver disk.
3. Insert a small screwdriver into the top of the socket near the positive terminal and carefully twist the screwdriver to pop the cell loose.
4. Remove the cell from the socket and discard it.
5. Place the new coin cell into the socket at an angle, noting the polarity. The positive side is indicated by a "+" on the cell (the widest side of the battery).
6. Press the coin cell into the socket from the rounded side of the socket. This will allow the cell to slide into the socket. The coin cell will pop into the socket when it has been pressed far enough in.
7. Replace the rear cover and the six retaining screws.

## 5. Custom Keypad Slide-In Legends

The OIT3200 and OIT3250 have a graphic overlay covering the keypad. This overlay contains clear windows that allow you to insert your own legends to customize the text, color, and graphics of the twelve function keys and add your own logo or model identification. Function keys F1, F2, F3, and F4 are on the left legend; F5, F6, F7, and F8 are on the middle legend; and F9, F10, F11, and F12 are on the right legend. The logo is on the logo legend. These legends can be inexpensively made and are environmentally sealed when installed.

These slide-in legends can be made on any non-glossy stock between 0.004 inches (0.1 mm) and 0.008 inches (0.2 mm) thick by either of the following methods:

- Photocopy the blank legends and hand illustrate.
- Use the dimensions to create computer generated legends.

### 5.1. Blank Legends for Photocopying

The blank legends in Figure 16 can be photocopied and hand illustrated.

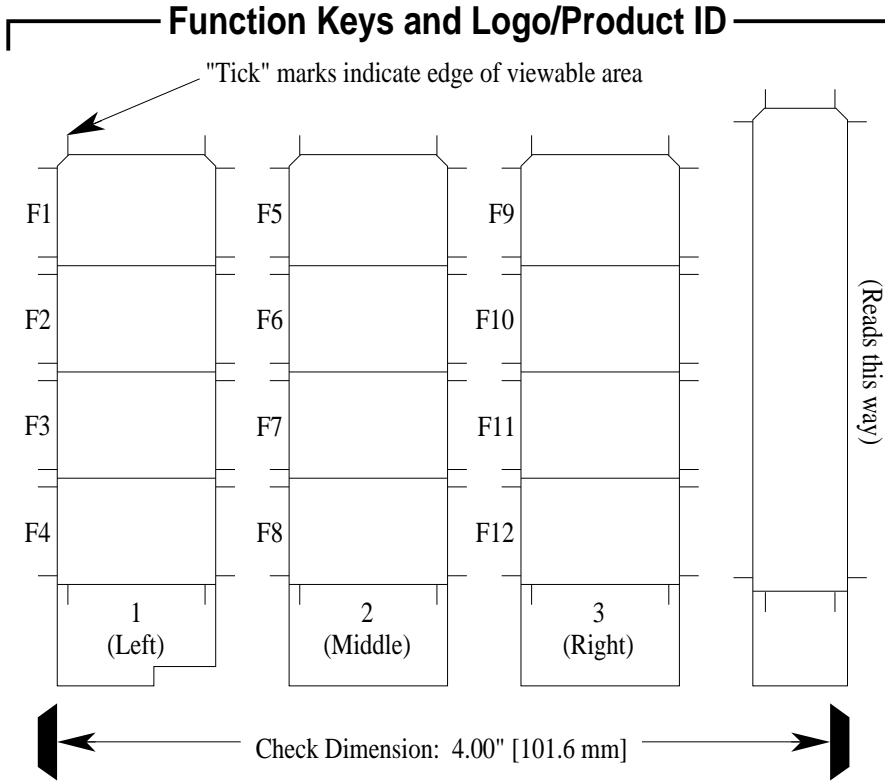
When photocopying:

- Use only non-glossy stock which is 0.004 - 0.008 inches (0.1 - 0.2 mm) thick
- Check photocopy accuracy with the printed check dimension.

When illustrating:

- Use the tick marks to locate the window boundaries.
- Background colors should extend to the solid lines.
- All text and graphics should be 0.07 inches [1.78 mm] within the solid lines.

**NOTE:** *Do not affix anything to the legend using glue, tape, stickers, etc.*



**Figure 16 Photocopy Legend Masters**

## 5.2. Creating Computer-Generated Slide-In Legends

The dimensions in Figure 17 can be used to create computer generated legends.

When creating:

- Dimensions are in inches [mm].
- Background colors should extend to the solid lines.
- All text and graphics should be within the dashed rectangles.

When printing

- Use only non-glossy stock which is 0.004 - 0.008 inches (0.1 - 0.2 mm) thick
- Check printing accuracy with a printed check dimension.

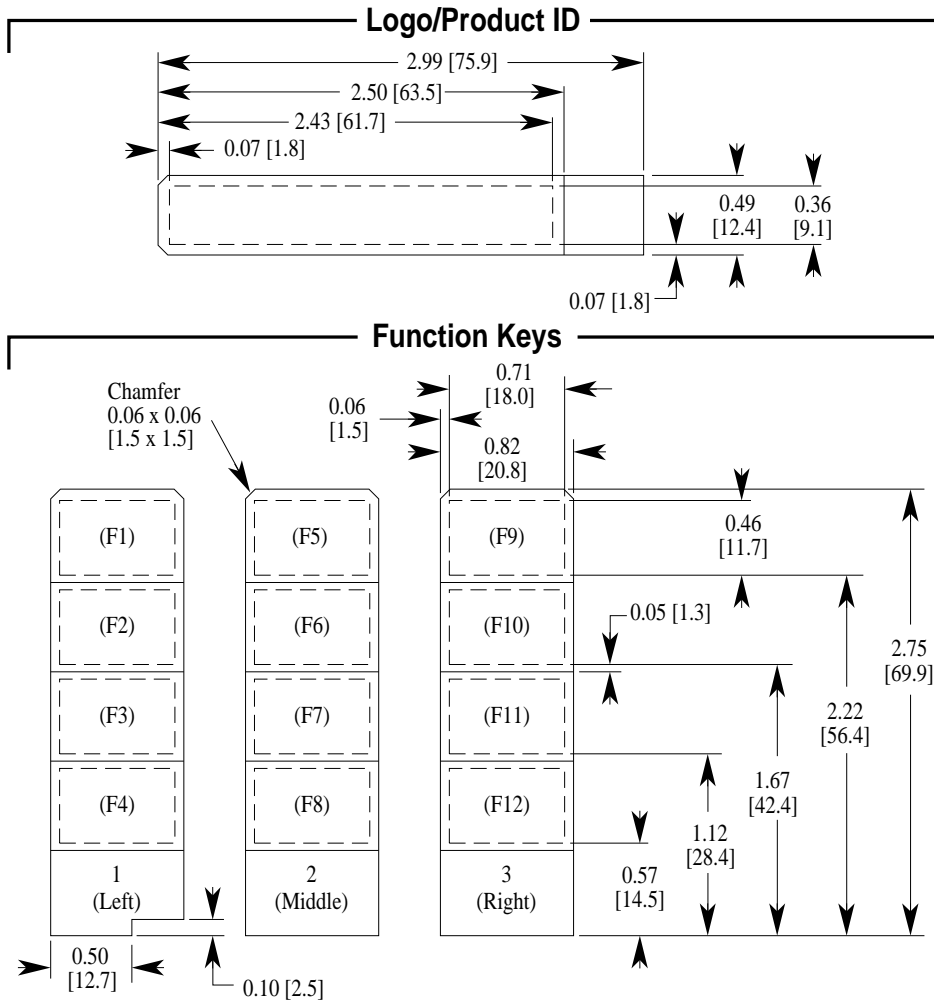


Figure 17 Computer-Generated Legend Dimensions

### 5.3. Installing the Slide-In Legends

To replace the factory installed legends with your own:

1. Ensure all paints, ink and fixative are thoroughly dry and will not transfer.
2. Place the unit face down on a clean protective surface.
3. Remove the four mounting nuts, which hold the bezel (frame) to the main assembly, from the back of the unit.
4. Lift the main assembly out of the bezel and place it face up on the clean protective surface.
5. Locate the four legend pockets, refer to Figure 18.
6. Carefully remove the factory installed legends.
7. Slide in the new legends:
  - be gentle
  - avoid wrinkling, which makes it hard to push the legend in
  - if the legend moves around too much, put a curl in the paper

**NOTE:** *The legends are made long to facilitate removal.*

8. Be sure not to tape over the ends of the inserts, as this could cause a leak where the bezel gasket seals.

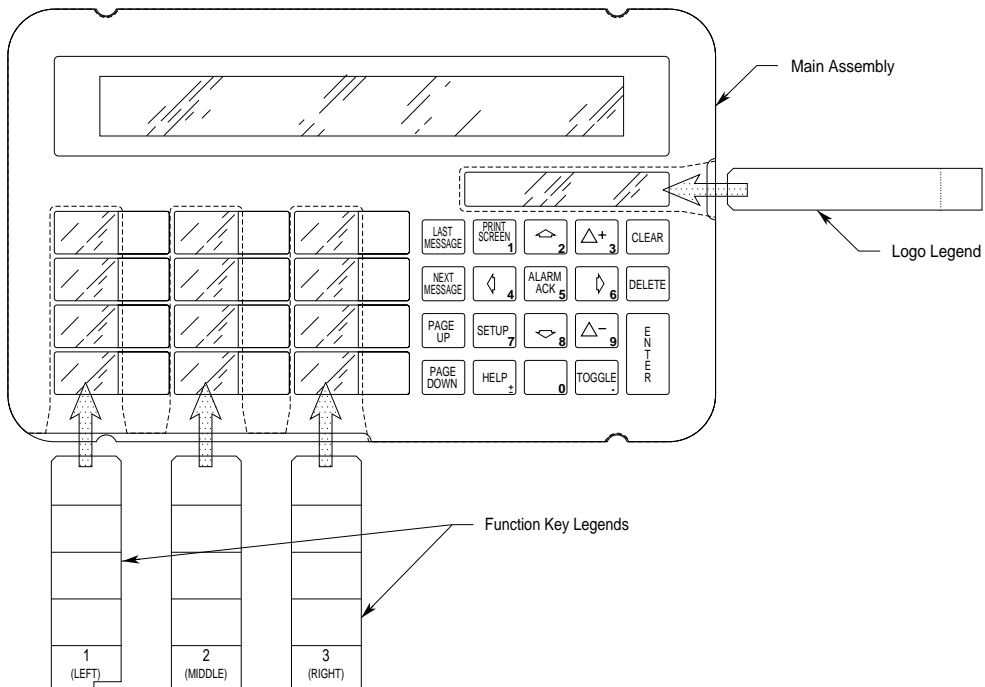


Figure 18 Custom Legend Installation

# Appendix A

## OIT Hardware Specifications

### Mechanical

Material: Cast aluminum bezel sealed to NEMA 4/12 when panel mounted

Mounting: Panel

Wiring: Unit is field-wired by user to external power plug and D-style communications connectors

Weight: 2 pounds (0.90 kg)

### Environmental

Operating Temp: +32 to +122°F (0 to +50°C)

Storage Temp: -4 to +158°F (-20 to +70°C)

### Electric Noise Immunity

Emissions: EN55011 (Group 1, Class B) — Generic commercial, light, and heavy industrial environments  
EN50081-1 — Generic domestic and light industrial environments  
EN50081-2 — Generic heavy industrial environment

Immunity: EN50082-1 — Generic domestic and light industrial environments  
EN50082-2 — Generic heavy industrial environment

### Power Requirements

Input Voltage: 12 to 30 VDC

Power Usage: 2.5 watts typical

### Display

Display Type: Backlit Liquid Crystal Display (LCD)—5 x 7 dot matrix with cursor

Display Character Size: 2 lines by 40 characters, 0.2 inches (5 mm) high

Display Viewing Angle: Approximately 120 degrees

LEDs: 24 for keypress and status on OIT3250 only

### Keypad

Key Type: Membrane switch

Feedback: Internal buzzer (OIT3200/3250), open drain outputs for external keypress and alarm buzzers (OIT3250 only), function key LEDs (OIT3250 only)

Layout: 31 keys, including 12 function keys arranged in 4 rows

Operational Life: Five million operations, minimum

Customizing: Custom keyboard graphics through use of user-installed inserts

### Communications

Serial (PLC) Port 1: RS-232, RS-422, or RS-485

Serial (PC) Port 2: RS-232

Baud Rates: 300, 600, 1200, 2400, 4800, 9600, or 19.2k

### Internal Features

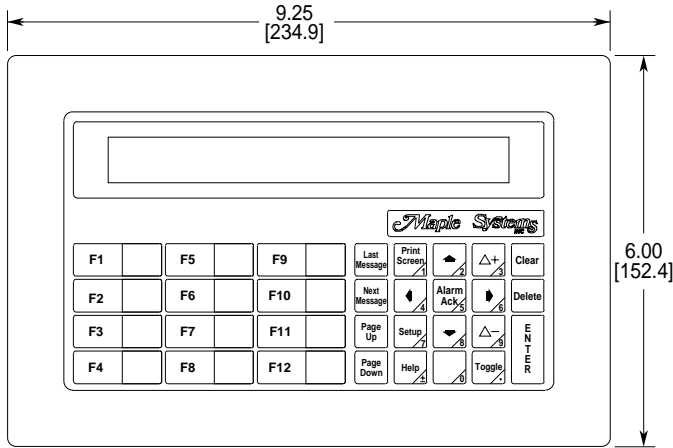
Memory: 128K x 8 Flash PROM for firmware protocol and configuration data—no battery required

Clock: Internal displayable real-time clock (OIT3250 only)

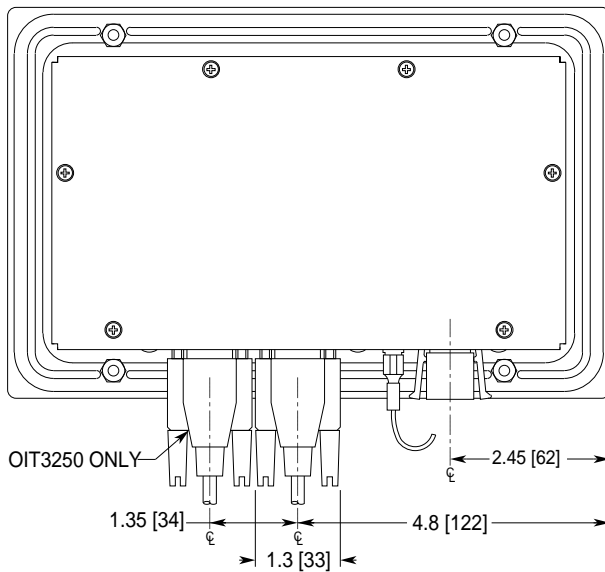
Battery: 3V Lithium coin cell, 12 mm diameter (Ray-O-Vac BR1225 or equivalent)

# Appendix A (con't)

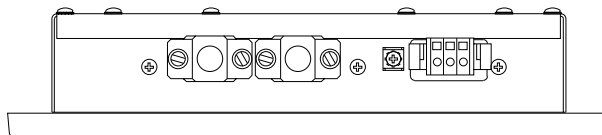
## Dimensional Outline



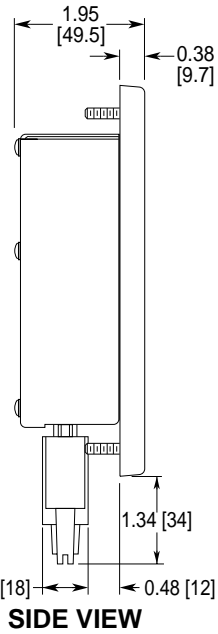
**FRONT VIEW**



**REAR VIEW**



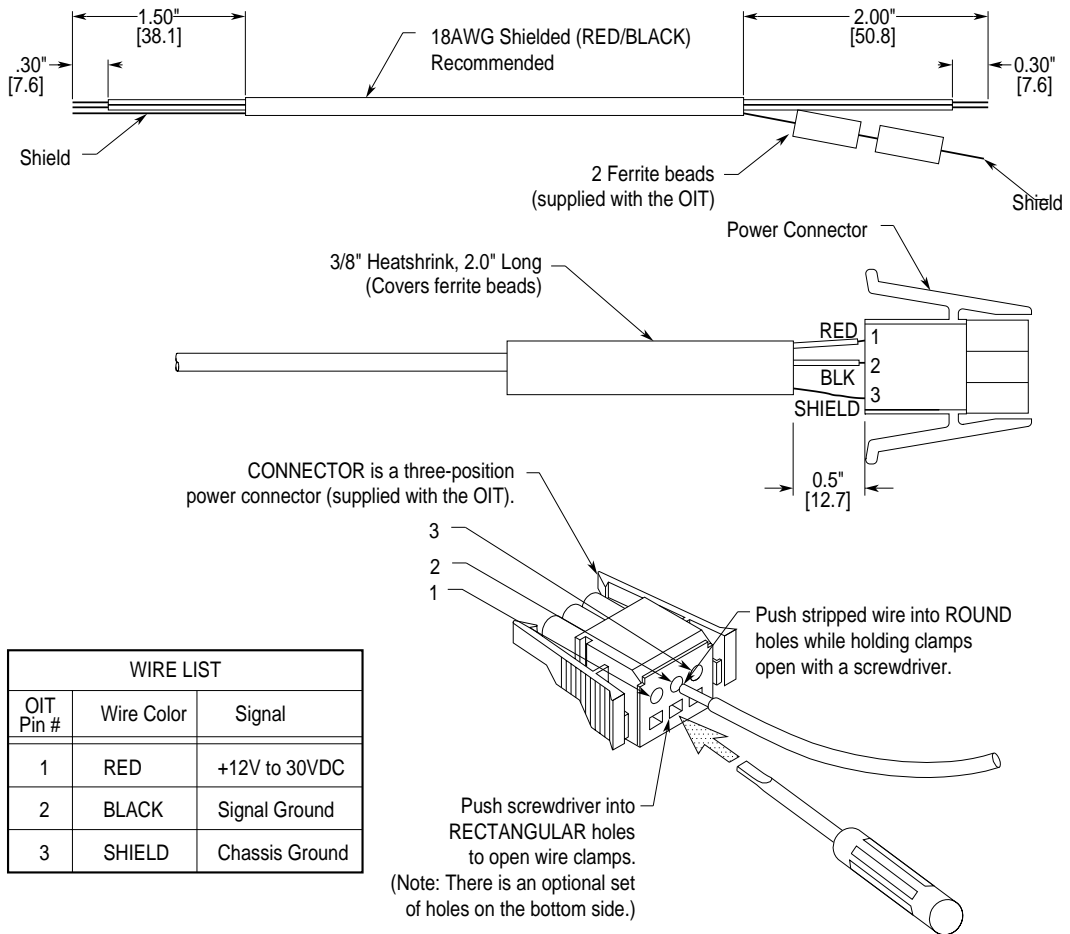
**BOTTOM VIEW**



# Appendix B

## Building Your Own Power Cable

When building your own power cable, slide the two ferrite shield beads that were included in the connector kit from Maple Systems onto the cable shield wire before inserting the wire into Pin 3 of the power connector. These ferrite shield beads are required for CE compliance and noise immunity.



**Figure 19 Power Connector Pin-Out**