DOCUMENTATION

IM INSTALLATION **GUIDE**

HARDWARE GUIDE

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FCC Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A 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 commercial 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. Operation of this equipment in a residential area is likely to cause harmful interference in which the user will be required to correct the interference at his expense.

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Warning

Each Intelligent Module board contains a lithium "coin cell" battery that is used to maintain the on-board data (cardholders, access levels, and so on) when there is no external power source. The battery will support RAM for two months and has a shelf life of approximately 5 years.

Lithium is a hazardous material and may present a fire or chemical burn hazard if mistreated. Do not short circuit, recharge, disassemble or incinerate. Observe all applicable regulations governing the disposal of such hazardous material when discarding the lithium battery. Replace the battery only with a 3 Volt CR2032 lithium battery. Use of any other battery may present a risk of fire or explosion.

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About This Guide

Product and version

This *Intelligent Reader Module (IRM) Installation Guide, COM-04* applies to an Intelligent Reader Module (IRM) circuit board from OLTIS Security Systems International LLC, (OSSI)..

In this guide, the term *Compass Access Control* refers to the Intelli-Site application installed at the facility.

Purpose

A hardware technician can use this guide to install, operate, and maintain the Intelligent Reader Module (IRM) hardware for a Intelli-Site Access Control application to meet custom requirements at a facility. A hardware technician should carefully read and understand this entire guide before performing any of the procedures in this guide. This guide must be available for reference throughout the life of the Intelli-Site Access Control application. To enable an IRM to operate in an application, a security system administrator must configure the IRM, as described in the *Compass RTU Guide*:

Audience

This guide is to be used only by a hardware technician who is qualified, trained, and certified by OLTIS Security Systems International LLC, (OSSI) to install an IRM.

Ordering information

To obtain more copies of this guide, contact OLTIS Security Systems International LLC, (OSSI), as follows:

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The latest version of this guide is available in .pdf format on the OSSI Web site at www.ossi-usa.com.

Revision history

The following table summarizes the technical changes reflected in each revision of this document:

Revision and Date	Summary of Changes
Original Issue: June 2004	
Revision 1: August 2005	Add RS232/RS485 Converter daughterboard (CDB-004). Add RS485/Ethernet Converter daughterboard (CDB-005).
Revision 2: September 2005	Update Digi One SP device server information.
Revision 3: January 2006	Add Compass panel for 8-door control. Add Compass 6e information. Correct information for wiring a Communications Control Daughterboard on an Intelligent Reader Module (IRM) to RS485 Daughterboards on Intelligent Output Modules (IOMs) for Reader Controlled Output (RCO) operation.
Revision 4: May 2006	Add wiring requirements to detect AC failure and low-battery conditions on a 12V 6.5A power supply in a four-module enclosure.
Revision 5: July 2006	Add resistor connections required for Integrated Engineering smart card readers. Add wiring requirements for door contacts to meet American Disabilities Act (ADA) standards. Update power-up and auto-detection procedures. Correct illustration of Control Communication Daughterboard-to-RS485 Daughterboard connections.
Revision 6: March 2011	Update to match Intelli-Site Software

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Section 1. Meeting Site Requirements

1.1 Satisfying the Limited Warranty

Please note that the limited warranty for an Intelligent Reader Module (IRM) applies to manufacturing defects only. The limited warranty does not cover the following:

- Installation problems
- Damage due to incorrect handling of the equipment
- Acts of God

1.2 Taking Safety Precautions

Always take proper safety precautions when operating, maintaining, or replacing components in a Compass panel enclosure, which can contain one or more Intelligent Modules of any type in any combination and their associated daughterboards and power supplies.

CAUTION: All circuit boards are sensitive to static electricity and have delicate components mounted on them.
Wear properly attached, grounded wrist straps when working with them.
Discharge any static electricity from your body by touching a grounded object, such as a metal screw, that is connected to earth ground.
Handle the circuit board by its edges; do not twist or flex it.
Install the Intelligent Module enclosure in a static free area.
After handling an Intelligent Module circuit board, verify that the Intelligent Module functions properly following the instructions in Section 7.

1.3 Conforming with Local Codes

The information in this guide is not intended to conflict with the local building, electrical, fire, or safety codes to which the system must conform. If conflicts do arise, the codes take precedence over OLTIS Security Systems International LLC, (OSSI) recommendations. If necessary, consult OLTIS Security Systems International LLC, (OSSI) to resolve any conflicts.

1.4 Protecting Against Voltage Spikes

When an electromagnetic device, such as a magnetic lock or electric strike, turns on or off, it can produce voltage spikes. These spikes can build to a high voltage (thousands of volts) that travels down the cable back to the IRM and may interfere with normal IRM operation.

To eliminate problems caused by voltage spikes, wire each diode as described in Section 7.

CAUTION: A diode does not provide lightning protection.

1.5 Establishing Earth Grounds

All grounding must conform to the National Electric Code (NEC) specifications and any local codes.

Each Intelligent Module circuit board must be connected to a proper earth ground. Failure to obtain a quality earth ground makes all electronic equipment susceptible to electromagnetic interference (EMI) and transient voltages that may result in erratic system operation or data and communication problems.

A proper earth ground provides a stable and equal voltage reference throughout the system and a path to ground for EMI.

1.6 Protecting Against Electrostatic Discharge

Electrostatic discharges can damage an Intelligent Module circuit board. Electrostatic charges can build up from many causes, including walking across a carpeted floor. Always wear a properly attached, grounded wrist strap before you touch an Intelligent Module circuit board. At a minimum, always touch an earth ground first to discharge any static electricity before handling the board.

1.7 Preventing Electromagnetic Interference (EMI)

Electromagnetic interference (EMI) is the electronic noise created by electrical devices such as motors, heaters, air conditioning units, and computer monitors. To ensure reliable communication to and from an Intelligent Module circuit board, locate it as far as possible from sources of EMI.

Running power and communication cables into an Intelligent Module in the same conduit can introduce EMI. Run all power cabling in conduits separate from all other system cables including existing power cabling. To reduce EMI, separate the power cables from all other cables by at least two feet (greater for higher voltage lines), and cross the cables at 90 degrees when necessary.

Separate communication, reader, and alarm cables from power and door strike cables.

Fluorescent lighting is a source of EMI. Avoid running cables next to or across fluorescent fixtures.

If you plan to connect to a remote site via a modem, beware that most modems are incompatible with Private Branch Exchange (PBX) telephone switching systems. This incompatibility can cause modem disconnections. Therefore, a dedicated analog telephone line is required for successful modem communication.

1.8 Conforming to Wiring Requirements

All wiring must conform to requirements specified by the following:

- National Electric Code (NEC) specifications, where applicable
- National Fire Protection Association (NFPA) NFPA 70: National Electrical Code
- Local building electrical codes
- Any other authorities having jurisdiction

Table 1-1 summarizes the wiring requirements for an IRM.

Table 1-1. Wiring Requirements for an IRM

Connection Type	Wiring Requirements
RS232	Four-conductor, shielded, stranded, 22 AWG or larger gauge; 50 foot maximum cable length.
RS485	Two individually twisted, shielded pair of conductors, stranded, 22 AWG or larger gauge; 4000-foot maximum cable length at speeds of up to 64Kbps. Speed and distance may vary depending on actual operating conditions.
Card Reader	Cable requirements may vary depending upon the type of card reader. Refer to the card reader manufacturer's documentation for recommendations and more information.
Input	Single, twisted pair of conductors, stranded, 22 AWG or larger gauge; 500-foot maximum cable length.
Power	Single twisted pair of conductors, stranded, 18 AWG or large gauge; 500-foot maximum cable length. All connecting wires between the power supply and Intelligent Modules should have thermoplastic or rubber insulation not less than 1/64 inches thick. Some installations may require Plenum cable; refer to a cable reference guide for the proper Plenum cable type.

Section 2. Intelligent Module Overview

2.1 Intelligent Reader Modules

An Intelligent Reader Module (IRM) is a circuit board with connectors that can be wired to security devices to enable a Intelli-Site Access Control application to control the operation of those security devices. Each connector can be wired to one input device, output device, or reader. An IRM includes firmware to locally store and process access data, user data, alarm data, and configuration data. An IRM provides rapid and reliable access control and alarm monitoring. An IRM uses state-of-the art-flash memory to perform smooth and simple upgrades or changes to IRM firmware.

2.2 Intelligent Input Modules

An Intelligent Input Module (IIM) controls inputs. An input is a sensor that can receive a signal that indicates a change in the state of a device and, when the state changes, report an alarm, short, and/or open condition. An input signal can come from a door switch, request-to-exit button, or motion detector, for example.

2.3 Intelligent Output Modules

An Intelligent Input Module (IOM) controls outputs. An output is a connection that can activate a relay signal to turn on or turn off an external device, such as an electronic door or a light switch.

2.4 Intelligent Module Operation

Each Intelligent Module requires a serial or network connection to a Intelli-Site Server host, which is a personal computer where Intelli-Site Server software resides. Intelli-Site Server acts as a database manager and manages configuration data for all Intelligent Modules in a Intelli-Site Access Control application. Intelli-Site Server automatically downloads configuration data and user data from the Intelli-Site Access Control Database to flash memory in Intelligent Modules and uploads access data and alarm data from Intelligent Modules to the Intelli-Site Database.

An Intelligent Module operates online when there is an established and active network communication connection between the Intelligent Module and a Intelli-Site Server host. When an Intelligent Module is operating online, Intelli-Site Server immediately downloads any configuration changes as they occur from the Intelli-Site Database to static Random Access Memory (RAM) in the Intelligent Module. As

each event occurs during online operation, Intelli-Site Server immediately uploads the event data from the Intelligent Module to the appropriate data files in the Intelli-Site Database.

An Intelligent Module can operate offline when there is no established and active network communication connection between the Intelligent Module and a Intelli-Site Server host. When an Intelligent Module is operating offline, Intelli-Site Server saves any configuration changes for that Intelligent Module. During offline operation, each Intelligent Module processes its events offline and stores any data regarding those events in its storage buffers.

Following a period of offline operation, when an active connection is established, Intelli-Site Server immediately downloads any changes in configuration data from the Intelli-Site Database to flash memory in the Intelligent Modules and uploads any event data from the storage buffers in the Intelligent Modules to data files in the Intelli-Site Database.

2.5 Intelligent Module Specifications

Table 2-1 lists the physical and electrical specifications for an Intelligent Module.

Table 2-1. Physical and Electrical Specifications for an Intelligent Module

Item	Specification
Enclosure	Type 1 with tamper switch Size: Single-Module 10” x 12” x 4” or Dual-Module 12” x 18” x 4” or Four-Module 22” x 18” x 4.5”
Circuit Board	Size: 4.5” x 6” x 1.5” Weight: 8 oz.
Temperature	32° to 122° F (0° to 50° C)
Humidity	0 to 85% non-condensing.
Power	650 ma peak @ +12VDC, 7.8 Watts (includes communications daughterboard). +12VDC nominal (+13.8VDC max, +10.8VDC min).
Power Supply	+12VDC 1.2A or +12VDC 2.5A or +12VDC 6.5A, regulated. The power supply and transformer must be Class 2 Devices as per NEC Section 725.
Auxiliary Power	12VDC at 100mA
Backup battery	5Ah, 7Ah, 12Ah, or 18Ah 12VDC Lead Acid, depending upon the enclosure size.
Memory retention	Replaceable Lithium Ion Battery protects on board data for two months.
Reader	Wiegand signal (up to 64 bits), individual outputs for red and green LEDs, and Sounder. Clock and Data type. Maximum reader current is 150mA.
Inputs	2-state, 3-state, and 4-state using 4.7K-ohm and 15K-ohm resistors.
Outputs	Single-pole, double-throw (SPDT) Form C dry-contacts rated at 1Amp @24VDC.
Capacities	
Intelligent Modules	Up to 32 Intelligent Modules per communication line. Up to 12 Intelligent Reader Modules in a Intelli-Site CORE application. Up to 512 Intelligent Modules per server in Intelli-Site Enterprise.
Readers	IRM: Two Wiegand or two Clock and Data type readers.

Inputs	IRM: Eight 2-state/3-state/4-state inputs using 4.7K-ohm and 15K-ohm resistors. IIM: Sixteen 2-state/3-state/4-state inputs using 4.7K-ohm and 15K-ohm resistors. IOM: Four 2-state/3-state/4-state inputs using 4.7K-ohm and 15K-ohm resistors.
Outputs	IRM: Four single-pole, double-throw (SPDT) Form C dry-contacts rated at 1Amp @24VDC. IIM: 4 single-pole, double-throw (SPDT) Form C dry-contacts rated at 1Amp @24VDC. IOM: 16 single-pole, double-throw (SPDT) Form C dry-contacts rated at 1Amp @24VDC.
Buffered alarms	13,455
Memory	IRM: 640K flash memory. IIM: 128K Flash memory. IOM: 128K Flash memory.
ID Cards:	IRM: 26,000
Communications	
Interfaces	RS232; RS485 full duplex; Transmission Control Protocol/Internet Protocol (TCP/IP); Dial-up
Baud Rate	2,400 to 115,200 bps
Diagnostics	
LEDs	Transmit LED and receive LED; Heartbeat and address LED; Output LEDs.
System	Downloadable system diagnostics.

2.6 IRM Circuit Board Layout and Connections

Figure 2-1 illustrates the IRM circuit board layout.

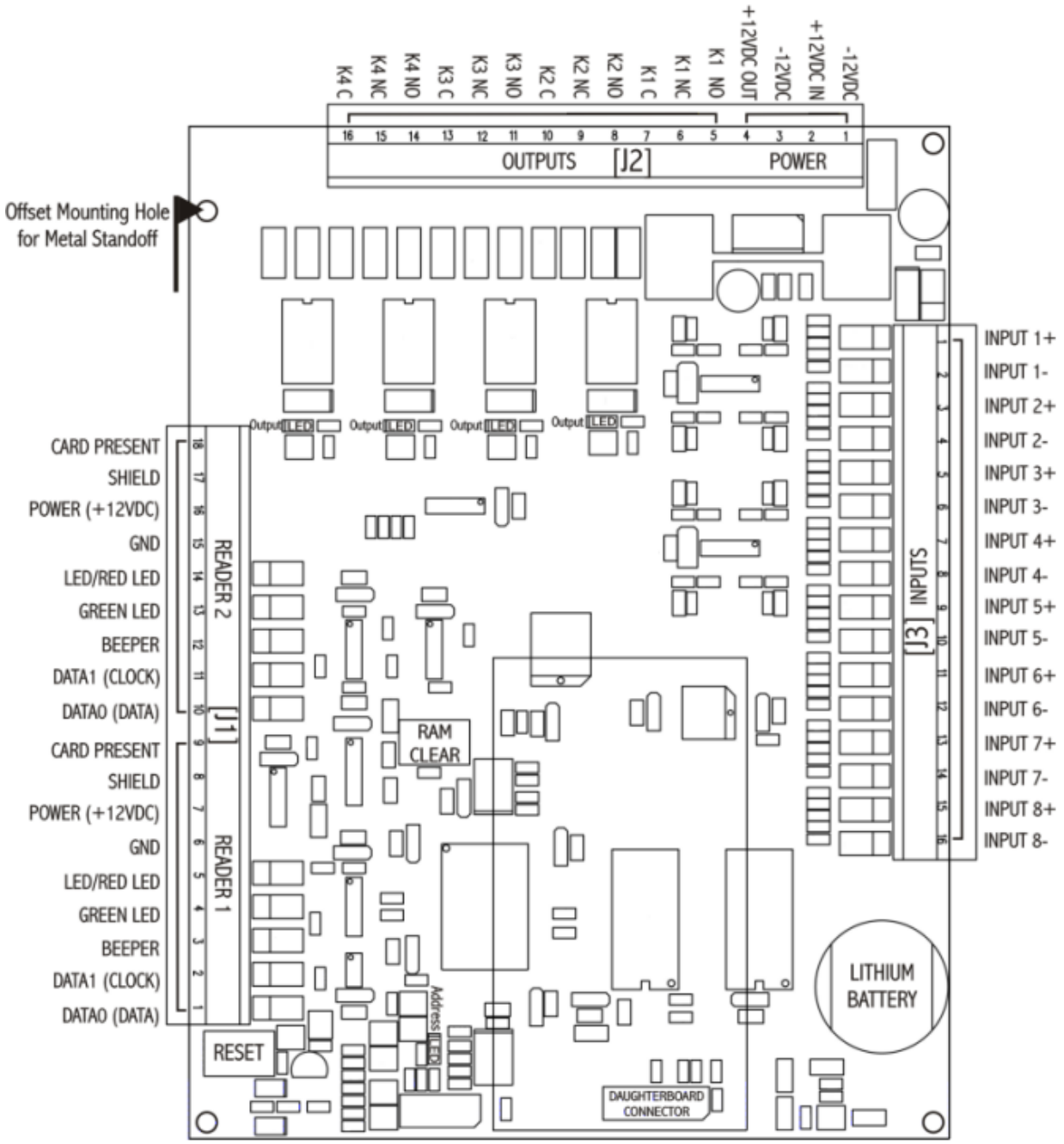

Figure 2-1. Intelligent Reader Module (IRM) Circuit Board Layout

2.7 IIM Circuit Board Layout and Connections

Figure 2-1 illustrates the IIM circuit board layout.

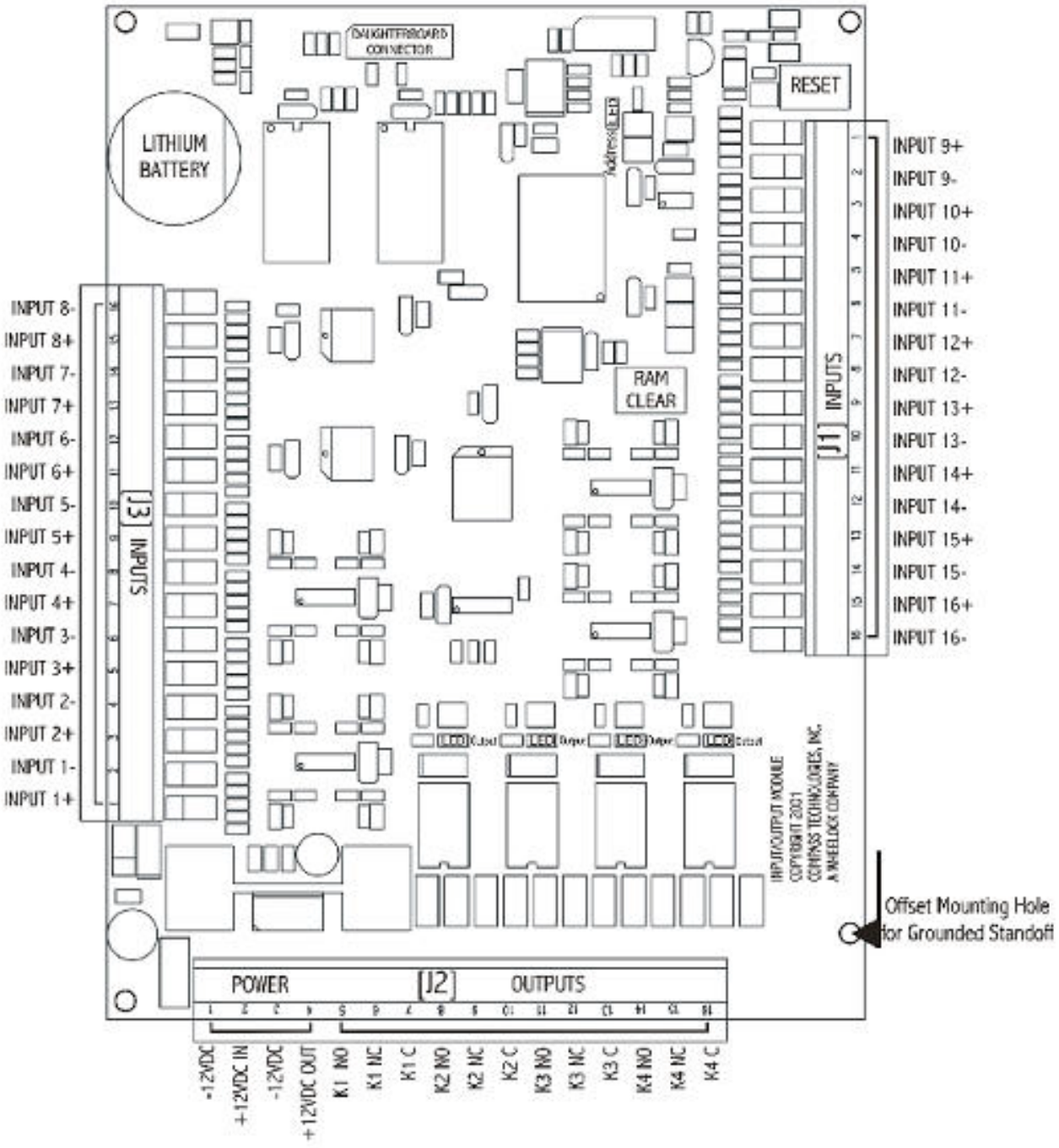

Figure 2-1. Intelligent Input Module (IIM) Circuit Board Layout

2.8 IOM Circuit Board Layout and Connections

Figure 2-3 illustrates the IOM circuit board layout.

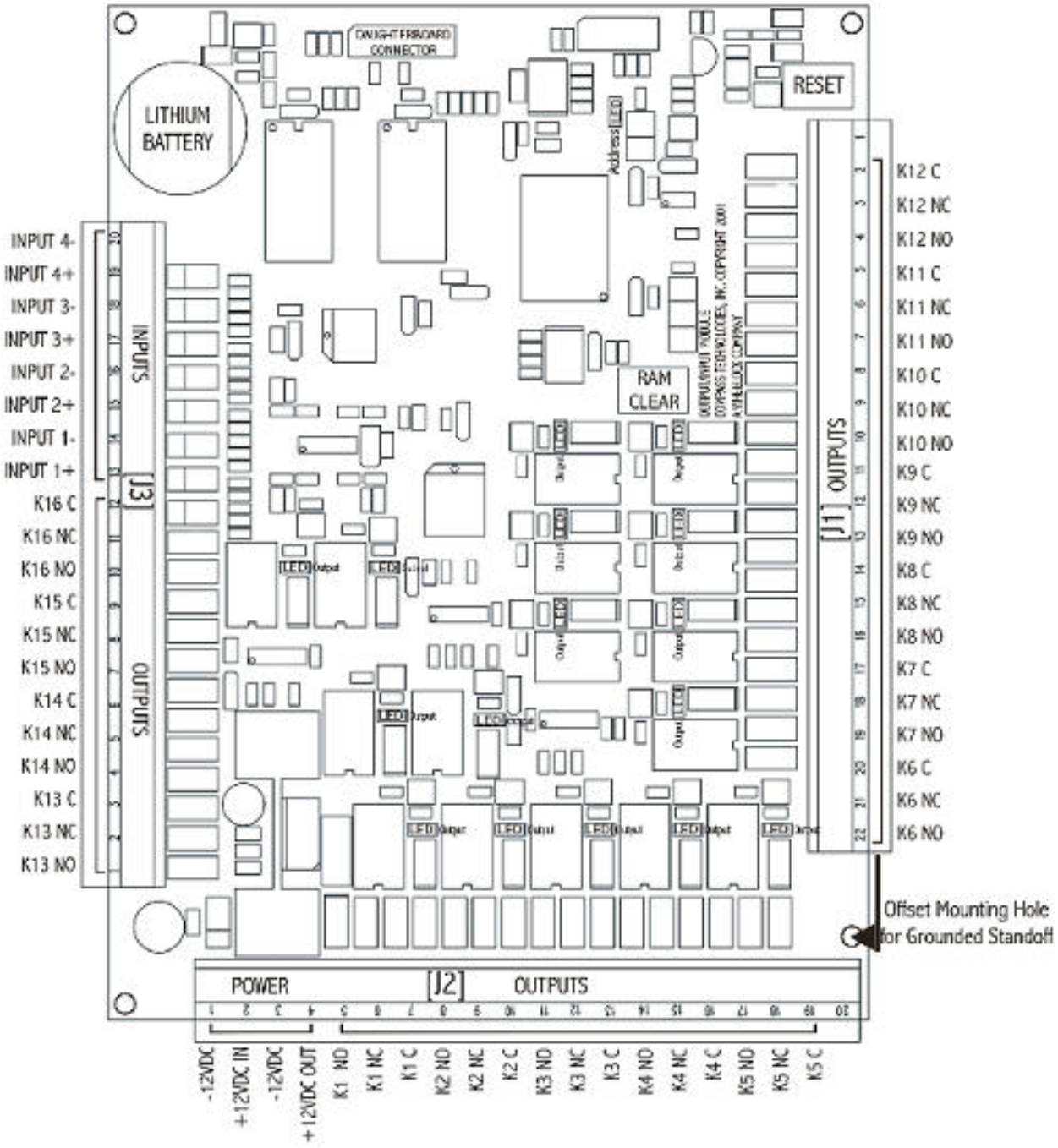

Figure 2-3. Intelligent Output Module (IOM) Circuit Board Layout

2.9 Separately-Purchased Components

The following components can be purchased separately:

Component Type	Specifications
Card Readers	Wiegand or Clock and Data type card readers. There are individual outputs for Red and Green LEDs, and a sounder. The maximum reader current available for an IRM is 150mA at 12 VDC. An external power supply is required for any current over this value.
Door Locks	The IRM outputs provide a Form C relay output with a normally-open and normally-closed state. When the output is triggered, the relay changes state, activating or deactivating the door mechanism. The relay is rated at 24VDC at 1.0 Amps. Power for all door locks should come from an external and independent supply.

2.10 Field Wiring an IRM for a Device Configuration

The Intelli-Site software provides a default device configuration for an IRM to support the devices and connections listed in Table 2-2.

Table 2-2. IRM Default Device Configuration

Device	Alarm Contact	Request to Exit	Door Relay
Reader 1	Input 1	Input 2	Output 1
Reader 2	Input 3	Input 4	Output 2
Tamper switch	Input 8		

If an IRM is to use the default device configuration, a hardware technician can field-wire an IRM to match the default device configuration and a security system administrator can apply the default device configuration for an IRM that is provided with the software.

If an IRM does not use the default device configuration, a hardware technician must field-wire the IRM to match a custom device configuration and a security system administrator must completely configure each device as it is connected to the IRM.

For more information about configuring devices for an IRM, see the *Compass RTU Guide*:

2.11 Intelligent Module Installation Practices

A hardware technician must adhere to the following practices when installing an Intelligent Module:

Do NOT:	Do:
• Do not power up an Intelligent Module until it is completely wired. • Do not service an Intelligent Module while it is powered up, except to perform voltage checks or current checks. • Do not run output cables in the same conduit as the reader and input cables. • Do not run accessory cables in the same conduit as the power cables. • Do not run cables near sources of electromagnetic interference (EMI).	• Install a diode (IN4001) across each electromagnetic device connected to an Intelligent Module. • Run communication, reader, and alarm cables in conduit separate from power and door strike cables. • Wear a properly grounded static strap before touching the Intelligent Module circuit board.

2.12 Preparing a Wiring Diagram for the Application

Before installing any Intelligent Modules, a hardware technician must use this guide to create a wiring diagram of all hardware in the application. This wiring diagram should illustrate the wiring from all Intelligent Modules to their associated input devices, output devices, and readers, all cable types, and all device connections. Store the wiring diagram with this guide for reference throughout the life of the application.

Section 3. Installing Compass Panel Enclosures

3.1 Compass Panel Enclosures

A Compass panel enclosure can house one or more Intelligent Modules of any type in any combination along with their associated daughterboards, power supplies, and backup batteries.

The following types of Intelligent Modules enclosures are available from OLTIS Security Systems International LLC, (OSSI):

- A Single-Module Enclosure (10" x 12" x 4") that can house one Intelligent Module, a 12V 1.2A power supply, and the backup battery (see Figure 3-1)
- A Dual-Module Enclosure (12" x 18" x 4") that can house two Intelligent Modules, a 12V 2.5A power supply, and the backup battery (see Figure 3-2)
- Four-Module Enclosure (18" x 22.25" x 4.5") that can house four Intelligent Modules, a 12V 6.5A power supply, and the backup battery (see Figure 3-3)

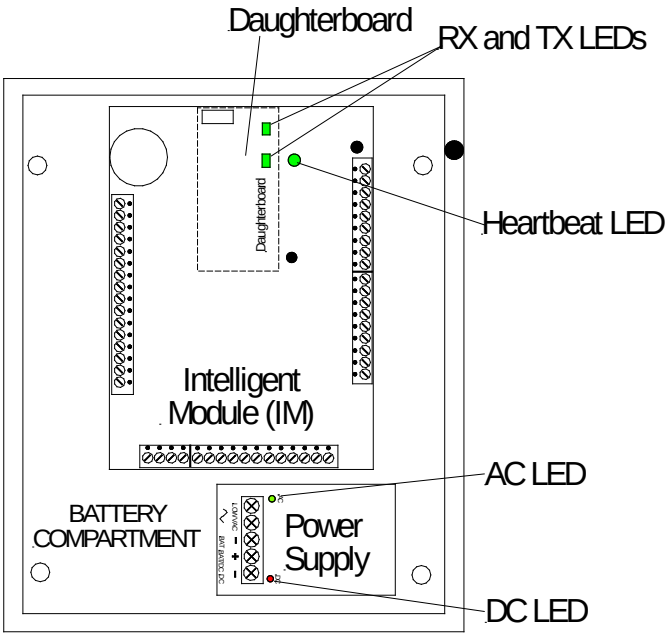

Figure 3-1. Contents of a Single-Module Enclosure

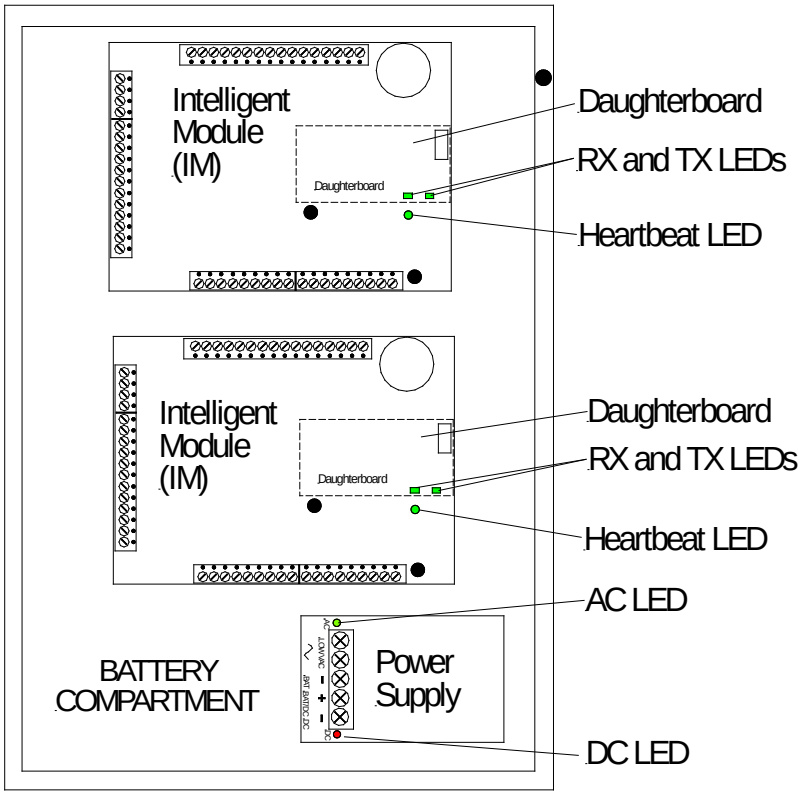

Figure 3-2. Contents of a Dual-Module Enclosure

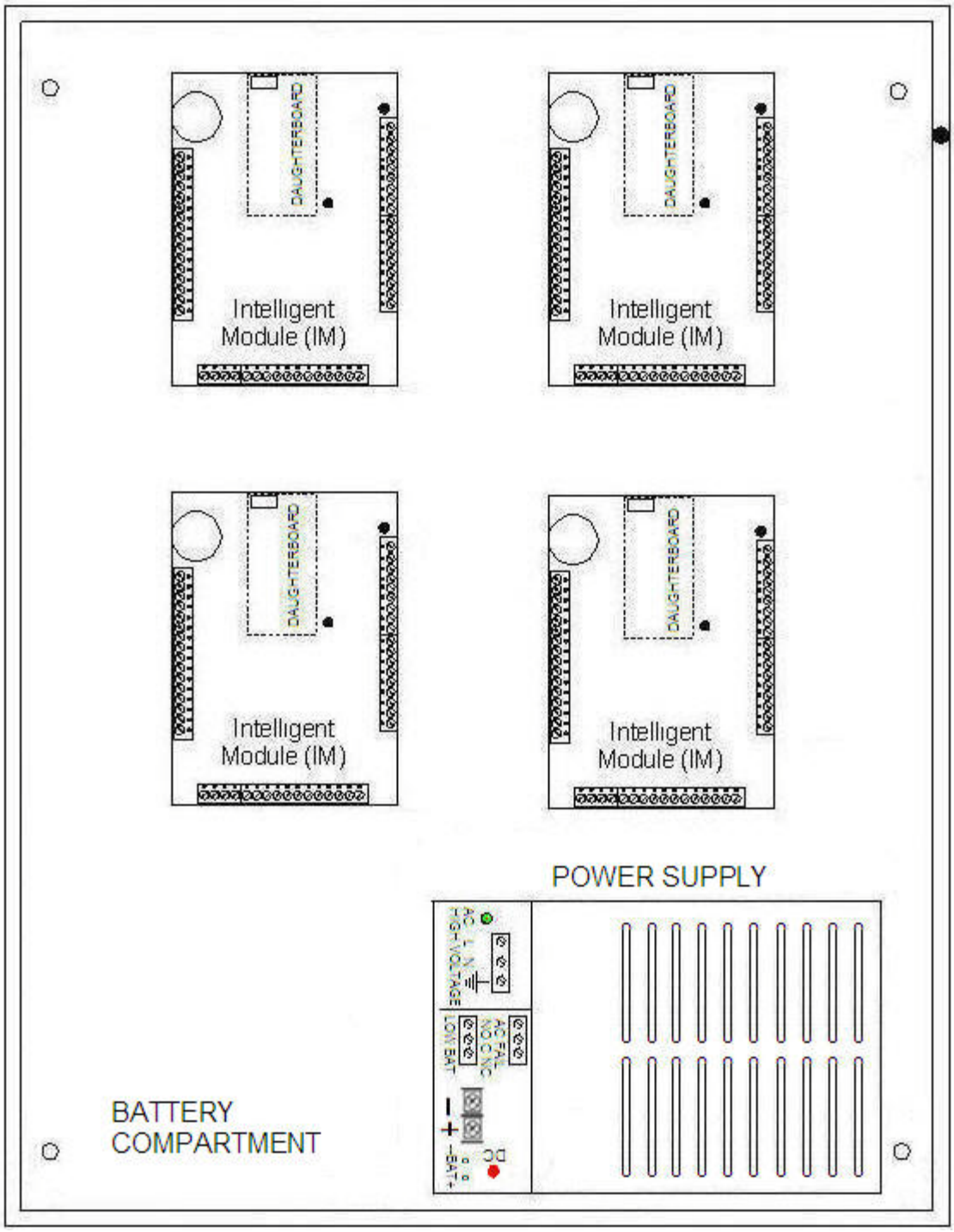

Figure 3-3. Contents of a Four-Module Enclosure

3.2 Intelligent Module Installation Requirements

NOTE: To install an Intelligent Control Module (ICM) for Reader Controlled Output (RCO) operation, see Section 11 for information.

An Intelligent Module can be purchased as a bundled product or as an unbundled product with separate components.

For an Intelligent Module that is purchased as a bundled product, the factory does the following prior to shipping the Intelligent Module:

- Mounts the Intelligent Module circuit board on four standoffs. The metal standoff in the offset mounting hole (see Figure 2-1) grounds the Intelligent Module circuit board to the enclosure.
- Mounts the power supply inside the enclosure and wires it to the Intelligent Module circuit board.
- Wires the tamper switch to Input 8 on the [J3] Connector on the Intelligent Module circuit board.
- Provides the End-of-Line (EOL) resistors for each available input.
- Provides a key for the Compass panel enclosure door lock.
- Provides quick-disconnect terminal blocks mounted on the Intelligent Module circuit board.

For an Intelligent Module that is purchased as a bundled product, a hardware technician must do the following:

1. Mount the Compass panel enclosure.
2. Wire the power supply, inputs, outputs, and readers to the quick-disconnect terminal blocks.

For an IRM that is purchased as an unbundled product, the factory does the following:

- Provides the End-of-Line (EOL) resistors for each available input.
- Provides quick-disconnect terminal blocks mounted on the Intelligent Module circuit board.

For an Intelligent Module that is purchased as an unbundled product, a hardware technician must do all of the following:

1. Purchase an appropriate enclosure.
2. Mount the enclosure.
3. Mount the Intelligent Module circuit board properly in the enclosure to ensure proper grounding.

4. Wire the power supply, inputs, outputs, and readers to the quick-disconnect terminal blocks.
5. Wire the power supply.
6. Wire the backup battery.
7. Wire the tamper switch.

3.3 Unpacking an Intelligent Module

An Intelligent Module circuit board is an electronic component that requires careful handling. Therefore, an Intelligent Module incorporates extensive transient protection to greatly reduce the chance of damage.

Before opening the shipping carton for an Intelligent Module, examine it for shipping damage. Carefully remove the Intelligent Module from the shipping carton and examine the Intelligent Module for any physical damage. Report any damage to the shipper immediately.

3.4 Mounting a Compass Panel Enclosure

To mount a Compass panel enclosure, do the following:

1. Determine where you want to mount the Compass panel enclosure. Mount the enclosure so that its door opens to the left. Make sure that there is ample room to open the enclosure door completely. Confirm that there is adequate space around the enclosure for a cabling conduit.
2. Remove the appropriate enclosure knockouts to enable you to route cables using the most direct path. If you are going to install a backup battery in the enclosure, do not remove the knockouts on the bottom of the enclosure.
3. Choose mounting hardware appropriate to the composition of the mounting surface and ensure that it has sufficient strength to support the enclosure and its contents.
4. Four mounting keyholes are located at each corner of the enclosure. Using the enclosure as a template, mark the four mounting holes on the mounting surface.
5. Drill pilot holes to the required depth and size for the mounting screws.
6. Insert the screws into the mounting holes.
7. Place the enclosure over the screws.
8. Tighten the screws to secure the enclosure to the mounting surface.

3.5 Wiring Quick-Disconnect Terminal Blocks

A hardware technician must wire the power supply, inputs, and outputs to the terminal blocks on an Intelligent Module.

It may be easier to wire devices to an Intelligent Module by removing the quick-disconnect terminal blocks, connecting the wires, and then re-attaching the terminal blocks, as follows:

1. Remove a quick-disconnect terminal block from the Intelligent Module board by grasping the terminal block by its sides and carefully pulling it away from the board. See Figure 3-4.
2. Strip approximately 1/4" of insulation from each wire.
3. For stranded wire, solder the individual strands together to ensure proper connection to the quick-disconnect terminal blocks.
4. Insert the wire into the appropriate terminal slot, and then firmly tighten the corresponding screw on the top of the terminal block to secure the wire.
5. To replace the terminal block, position it over the connector pins on the Intelligent Module circuit board and push it down over the pins being careful not to bend the pins.

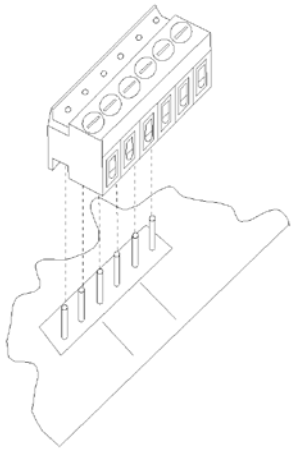

Figure 3-4. Quick-Disconnect Terminal Block and Connector Pins

3.6 Installing Power Supplies

3.6.1 Installing an Internal Power Supply

The Intelligent Module requires +12VDC for its internal power supply.

The internal power supply must be a Class 2 device that conforms to National Electric Code (NEC) Section 725.

For an Intelligent Module that is purchased as a bundled product, the factory installs the power supply inside the enclosure and wires the power supply to the appropriate pins on the [J2] Connector (Power Connection).

A customer who purchases an Intelligent Module as separate components must purchase the power supply separately, mount the power supply in the enclosure, and wire the power supply.

For the power supply connections, see Table 3-1 and Figure 2-1.

Table 3-1. Power Supply Connections

Power Connections [J2]	Function	Power Supply Terminals
1	Ground	- DC / - BAT
2	+12VDC	+ DC

Before connecting devices to the power supply, measure and verify the output voltage for the power supply to ensure that the voltage to the Intelligent Module falls within the recommended range +12VDC nominal (+10.8VDC minimum, +13.8VDC maximum) if there is a backup battery.

A power supply in a single-module enclosure is capable of charging a 12VDC 5Ah backup battery.

A power supply in a dual-module enclosure is capable of properly charging a 12VDC 7Ah or 12Ah backup battery.

A power supply in a four-module enclosure is capable of properly charging a 12VDC 12Ah or 18Ah backup battery.

3.6.2 Connecting an Internal Power Supply to a Power Source

In a single-module or dual module enclosure, an Intelligent Module is powered by an internal power supply driven by an external transformer. The transformer must be a Class 2 device that conforms to National Electric Code (NEC) Section 725.

To prevent interference from other equipment, use a dedicated, unswitched power outlet as the source of the 120VAC power for the power supply transformer.

A single-module enclosure requires a 16.5VAC transformer rated at 20VA that is included with the power supply.

A dual-module enclosure requires a 16.5VAC transformer rated at 40VA that is included with the power supply.

WARNING: Do not power up the transformer or connect the backup battery until the IRM is mounted and completely wired and configured.

Connect the transformer wires to the two AC terminals on the power supply (as shown in Figure 2-2).

A four-module enclosure does not use a transformer. For a four-module enclosure, provide a proper 110VAC to 120VAC Line, Neutral, and Ground (LNG) connection from the power supply to a power source with proper grounding.

3.6.3 Connecting a Backup Battery to a Power Supply

WARNING: Be sure to observe the correct polarity when connecting an Intelligent Module or a backup battery to the power supply.

CAUTION: Do not connect the backup battery or apply AC power to the IRM until the Intelligent Module is mounted and completely wired and configured.

During power interruptions, the backup battery provides power to operate the Intelligent Module.

Table 3-2 lists the battery size and approximate backup times based upon typical usage for each type of enclosure.

Table 3-2. Battery Sizes and Backup Times

Battery Size	Single-Module Enclosure	Dual-Module Enclosure	Four-Module Enclosure
5 AH	Backup Time: 8 hours		
7 Ah		Backup Time: 7 hours	
12 Ah		Backup Time: 12 hours	Backup Time: 6 hours
18 Ah			Backup Time: 9 hours

Battery leads are included with power supplies supplied by OLTIS Security Systems International LLC, (OSSI)

Mount the backup battery inside the enclosure. To connect the backup battery, do the following:

1. Wire the Neg (–) post on the battery to the [–BAT] terminal on the power supply.
2. Wire the Pos (+) post on the battery to the [+ BAT] terminal on the power supply.

To connect a backup battery to a 12V6.5A power supply in a four-module enclosure, use the plug-in battery cable (harness) supplied with the power supply to observe proper polarity, as follows:

1. Connect the plug end of the battery cable to the –BAT+ connector on the power supply, such that the black wire connects to the Neg (–) post and the red wire connects to Pos (+) post. Snap the plug securely in place.

2. Connect the separate black wire connector to the Neg (–) terminal on the backup battery.

3. Connect the separate red wire connector to the Pos (+) terminal on the backup battery.

3.6.4 Wiring Power Connections for Auxiliary Devices

CAUTION: If total power consumption for all auxiliary devices connected to an Intelligent Module will exceed 100ma, use a separate power supply for the auxiliary devices.

An Intelligent Module provides up to 100ma for auxiliary devices, such as motion sensors and sounders.

For auxiliary power connections, see Table 3-3 and Figure 2-2.

Table 3-3. Auxiliary Power Connection

Auxiliary Power Connections [J2]	Function
3	Ground
4	+ 12VDC OUT

3.6.5 Installing a Lithium Battery

WARNING: Lithium is a hazardous material and presents a fire or chemical burn hazard if mistreated.
Do not short-circuit, recharge, disassemble, or incinerate the battery.
Observe all applicable regulations governing the disposal of such hazardous material when discarding the battery.
Replace the battery only with a three-volt CR2032 lithium battery. Use of any other battery creates a risk of fire or explosion.

An Intelligent Module board contains a lithium coin cell battery to maintain data stored in memory on the IRM for up to two months when there is no external power source. The lithium coin cell battery has a shelf life of approximately five years.

To replace the lithium battery, remove power from the Intelligent Module board and then insert the battery, with the positive (+) side facing out, into the battery holder located next to the [J3] Connector on the Intelligent Module board.

If you stop using or store the Intelligent Module circuit board, remove the lithium battery.

3.6.6 Mounting and Grounding an Intelligent Module Board

To ensure proper operation, each Intelligent Module must be connected to a proper earth ground.

When an Intelligent Module is purchased as a bundled product, the factory mounts the Intelligent Module on four standoffs, one metal and three plastic, inside the metal enclosure. The board is

grounded to the enclosure using a metal standoff inserted into the Offset Mounting Hole (see Figure 2-1).

When an Intelligent Module is purchased as an unbundled product, a hardware technician must mount the Intelligent Module board properly on standoffs, three plastic and one metal, inside the metal enclosure to ensure proper grounding.

When mounting an Intelligent Module, be sure to do the following:

- Insert the metal standoff into the Offset Mounting Hole (see Figure 2-1).
- Connect the earth ground to the metal standoff.

A Federal Communications Commission (FCC) compliance label is shipped with each unbundled IRM board. To ensure FCC compliance, place the label in a conspicuous place inside the enclosure lid.

Connect the earth ground to the grounding post located inside the Intelligent Module enclosure.

When using shielded cable for inputs or outputs, connect the drain to the grounding post located inside the Intelligent Module enclosure. To ensure reliable performance, keep all drain wires as short as possible. Do not ground drain wires to any other point in the system.

3.6.7 Connecting Intelligent Modules to a Power Supply

After mounting and grounding all Intelligent Module boards within a Compass panel enclosure, wire a connection from the power supply to the power connectors (see Figure 2-1) on each Intelligent Module board, observing proper polarity.

A four-module enclosure from OLTIS Security Systems International LLC, (OSSI) has mounting holes near the Intelligent Modules to be used to attach plastic guides for wires that connect the Intelligent Modules to the power supply. The use of plastic guides is recommended. Plastic guides are not included with the enclosure.

3.6.8 Installing a Door Lock Power Supply

CAUTION: OLTIS Security Systems International LLC, (OSSI) requires the use of a separate power supply for all electrical locking devices.
Do not use the Intelligent Module power supply to power the electrical locking devices.

An Intelligent Module provides single-pole, double-throw (SPDT) Form C relays rated at 1Amp @ 24VDC for output relays. If an Intelligent Module is to control output relays for electrical locking devices, such as door locks, a hardware technician must install a separate power supply for all electrical output devices.

3.6.9 Wiring an Input to Detect an AC Failure Condition

In a four-module enclosure, the AC FAIL connectors on a 12V 6.5A power supply can be wired to any input point on any Intelligent Module board with in the enclosure to detect an AC failure condition, as follows:

12V 6.5A Power Supply Connector	Input Connector on an Intelligent Module Board
AC FAIL NC (not closed)	Positive (+) Input
AC FAIL C (closed)	Negative (-) Input

For example, Figure 3-5 illustrates the wiring required to use Input 5 on an Intelligent Module to detect an AC failure condition. See Section 5 for more information about wiring input connections.

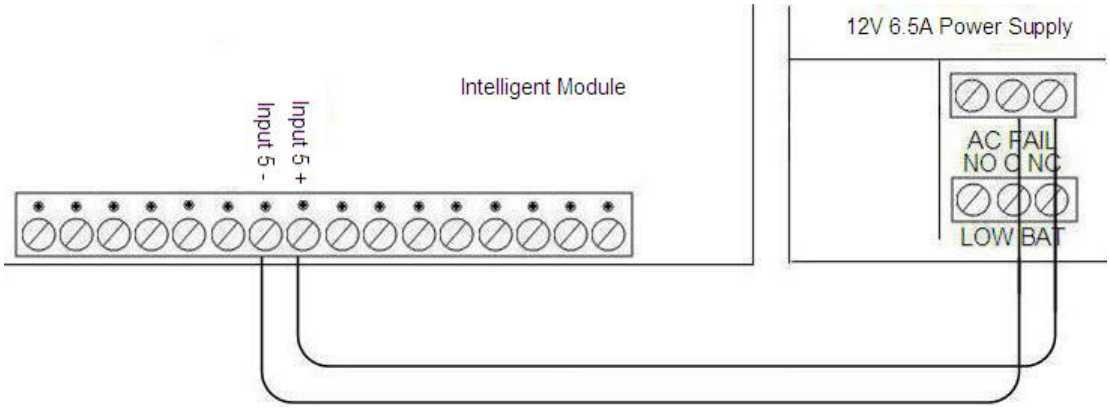

Figure 3-5. Example Connections to Monitor for an AC Failure Condition

3.6.10 Wiring an Input to Detect a Low Battery Condition

In a four-module enclosure, the LOW BAT connectors on a 12V 6.5A power supply can be wired to any input point on any Intelligent Module board within the enclosure to detect a low battery condition, as follows:

12V 6.5A Power Supply Connector	Input Connector on an Intelligent Module Board
LOW BAT NC (not closed)	Positive (+) Input
LOW BAT C (closed)	Negative (-) Input

For example, Figure 3-6 illustrates the wiring required to use Input 6 on an Intelligent Module to detect a low battery condition.

See Section 5 for more information about wiring input connections.

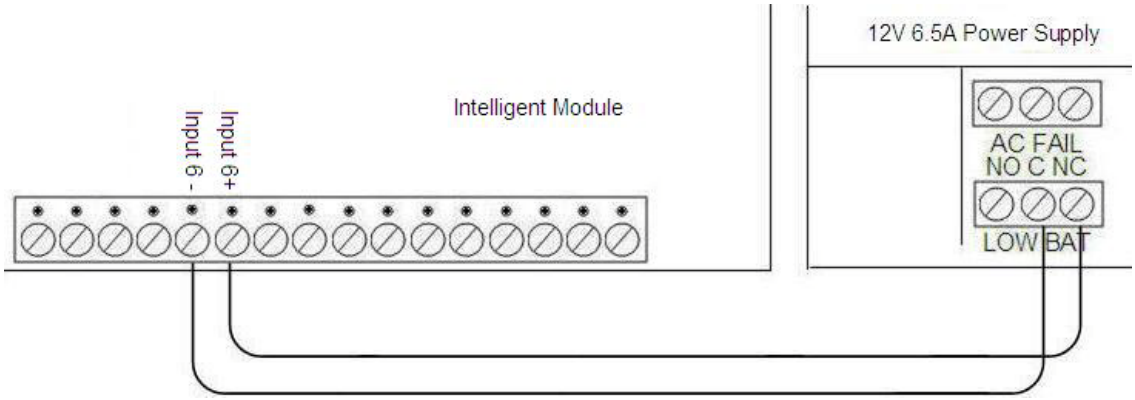

Figure 3-6. Example Connections to Monitor for a Low Battery Condition

3.7 Wiring a Tamper Switch

An Intelligent Module enclosure provided by OLTIS Security Systems International LLC, (OSSI) has a built-in tamper switch located on the top right side of the enclosure. The hardware installer must wire the tamper switch to any available input point on the Input Connector [J3]. See Section 5 for more information on wiring inputs.

Section 4. Setting up Communication

4.1 Communication Options for Intelligent Modules

An Intelligent Module must communicate with Intelli-Site Server software on a personal computer used as a Intelli-Site Server host. Therefore, a communication connection must be established between each Intelligent Module and a Intelli-Site Server host.

Intelligent Module communication is managed by a pluggable, replaceable daughterboard mounted on the Intelligent Module circuit board. OLTIS Security Systems International LLC, (OSSI) provides various types of daughterboards to satisfy particular communication requirements.

Intelligent Modules can support either of the following communication protocols:

- Electronic Industries Alliance (EIA) Standard RS485 full-duplex communication, which is a multi-drop communication method
- Electronic Industries Alliance (EIA) Standard RS232 serial point-to-point communication protocol

Intelligent Module communication can take place over the following types of connections:

- Cable
- Dial-up modems
- Transmission Control Protocol/Internet Protocol (TCP/IP) network

A network administrator should use the information in this section to implement the appropriate type of communication connection for each Intelligent Module based upon the following factors:

- Distance between a Intelli-Site Server host and the Intelligent Modules
- Number of Intelligent Modules
- TCP/IP network availability

4.2 Using RS485 Full-duplex Communication

4.2.1 RS485 Full Duplex Communication Capability

Electronic Industries Alliance (EIA) Standard RS485 defines full-duplex communication, which is a multi-drop communication method.

RS485 connections must be multi-dropped. Star configurations are not supported. T-taps of less than eight feet are acceptable.

RS485 protocol communication can take place over the following types of connections from a Intelli-Site Server host to Intelligent Modules:

- Cable connection to up to 32 Intelligent Modules to a maximum distance of 4000 feet from a Intelli-Site Server host to the last Intelligent Module
- Dial-up modem connection to up to 32 Intelligent Modules
- TCP/IP network connection to up to 32 Intelligent Modules
- RS232/RS485 converter connection to up to 32 Intelligent Modules
- RS485/Ethernet converter connection to up to 32 Intelligent Modules

4.2.2 RS485 Daughterboard (CDB-001)

OLTIS Security Systems International LLC, (OSSI) provides an RS485 Daughterboard (part number CDB-001) (see Figure 4-1) to support full-duplex communication over the following types of connections from a Intelli-Site server host:

- Cable connection to up to 32 Intelligent Modules to a maximum distance of 4000 feet from a Intelli-Site Server Host to the last Intelligent Module
- Dial-up modem connection to up to 32 Intelligent Modules
- TCP/IP network connection to up to 32 Intelligent Modules

An RS485 Daughterboard has a terminal block with six terminals.

An RS485 Daughterboard has two termination pins.

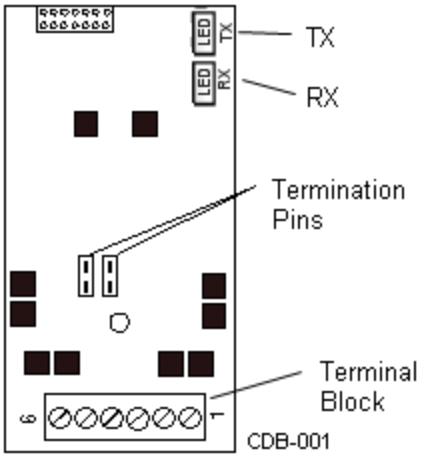

Figure 4-1. RS485 Daughterboard (CDB-001)

4.3 Using RS232 Direct Communication

4.3.1 RS232 Direct Communication Capability

Electronic Industries Alliance (EIA) Standard RS232 defines a standard serial point-to-point communication protocol.

RS232 communication connections for Intelligent Modules are configured as Data Terminal Equipment (DTE) devices. EIA Standard RS232 pin definitions of DTE and Data Control Equipment (DCE) are observed.

With RS232 protocol, only one Intelligent Module can connect to a single serial communication port on a Intelli-Site Server Host.

RS232 protocol communication can take place over the following types of connections from a Intelli-Site Server Host:

- Cable connection to an RS232 Daughterboard to one Intelligent Module
- Dial-up modem connection to an RS232 Daughterboard to one Intelligent Module
- TCP/IP network connection to an RS232 Daughterboard to one Intelligent Module
- RS232/RS485 converter connection to up to 32 Intelligent Modules

4.3.2 RS232 Daughterboard (CDB-002)

OLTIS Security Systems International LLC, (OSSI) provides an RS232 Daughterboard (part number CDB-002) (see Figure 4-2) to support RS232 direct communication over the following types of connections from a Intelli-Site Server Host:

- Cable connection to one Intelligent Module
- Dial-up modem connection to one Intelligent Module
- TCP/IP network connection to one Intelligent Module

The RS232 Daughterboard has a standard DB9 male serial cable connector.

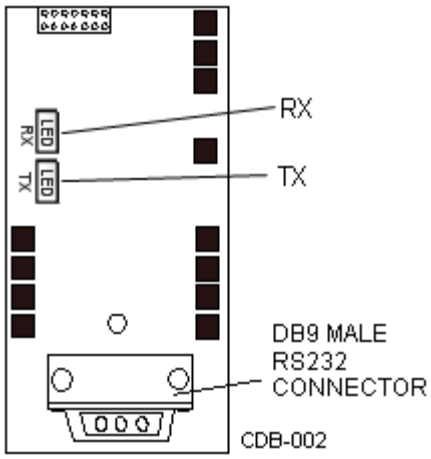

Figure 4-2. RS232 Daughterboard (CDB-002)

4.4 Installing an RS485 Cable Connection

Use these instructions to connect a Intelli-Site Server host to an RS501a converter (part number 422LP9TB) available from OSSI and then connect the RS501a converter to a series of up to 32 Intelligent Modules, each with an RS485 Daughterboard. Because the RS232 interface powers the RS501a converter, the converter does not need AC power or batteries for operation. The maximum distance from the RS501a converter to the last RS485 Daughterboard is 4000 feet.

The RS501a converter has a DB9 connector at one end and an RS485 terminal block at the other end.

Connect the DB9 connector on the RS501a converter directly to the DB9 RS232 interface (COM port) on a Intelli-Site Server host.

Attach one RS485 Daughterboard to each Intelligent Module. Connect the Daughterboard Connector on an Intelligent Module (see Figure 2-1) to the connector on the back of the RS485 Daughterboard.

Use a Belden 9482 cable or equivalent to connect the RS485 terminal block on the RS501a converter to the terminal block on each RS485 Daughterboard in a series. See to Table 4-1 and Figure 4-3 for connections.

Table 4-1. RS485 Communication Connections from an RS501a Converter

2nd Intelligent Module RS485 Daughterboard	1st Intelligent Module RS485 Daughterboard	RS501a Converter Terminals
RX+ (5)	RX+ (5)	TDA
RX- (6)	RX- (6)	TDB
TX+ (2)	TX+ (2)	RDA
TX- (3)	TX- (3)	RDB
—	—	G

Connect the shield(s) around the twisted-pair cable to the **G** (ground) terminal on the terminal block on the converter. To avoid ground loops, connect the shield to ground screw only in the first Intelligent Module enclosure nearest the RS501a converter. Cut the shield at the end of the run.

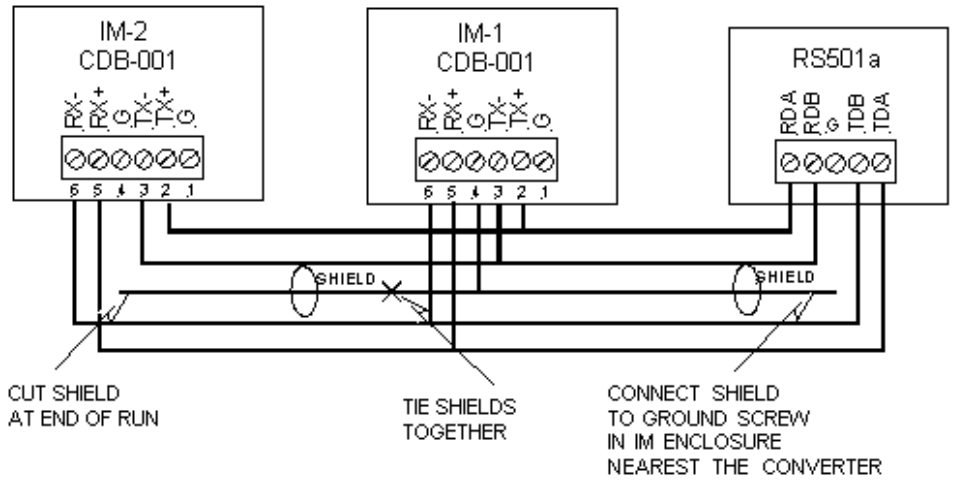

Figure 4-3. RS485 Communication Wiring from an RS501a Converter

In some cases, the RS485 wiring may require termination into 120 ohms to eliminate data reflections and the resultant communication errors. If needed, apply this termination only to the extreme ends of the wiring. The Compass hardware includes jumpers for this termination. When the jumpers are in place, they apply 120-ohm resistors to the circuit.

Begin wiring an Intelligent Module by removing all jumpers to eliminate any termination. If this results in data communication problems, try installing the jumpers on the Intelligent Module at one end of the circuit. In rare cases, you may have to terminate both ends.

4.5 Installing an RS232 Cable Connection

Use these instructions to use a cable to connect directly from a Intelli-Site Server host to one Intelligent Module so that they can communicate using RS232 communication protocol.

Connect the Daughterboard Connector on the Intelligent Module (see Figure 2-1) to the connector on the back of the RS232 Daughterboard.

To connect a Intelli-Site Server host to an Intelligent Module, do the following:

1. Get a DB9F-to-DB9F RS232 Data Transfer (Null Modem) cable. Use a standard cable or create a cable using the connection requirements in Table 4-2 and Figure 4-4.
2. Plug one end of the cable into the RS232 male connector on the RS232 Daughterboard. Tighten the connector screws.
3. Plug the other end of the cable directly into the serial communication port on the personal computer used as the Intelli-Site Server host. Tighten the connector screws.

Table 4-2. DB 9 Pin Outs for RS232 Communications

Function	1st DB9	2nd DB9
RX	2	3
TX	3	2
GND	5	5

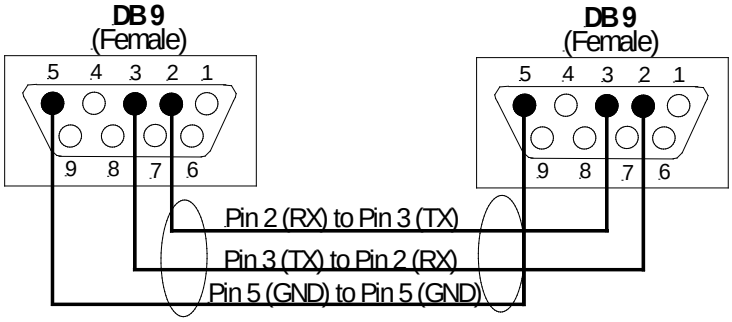

Figure 4-4. DB9F to DB9F Cable Wiring

4.6 Installing a Dial-up Modem Connection

A dial-up modem can transmit data between a Intelli-Site Server host and an Intelligent Module through a telephone line. A dial-up modem connection requires two modems, one at the Intelli-Site

Server host and the other at the Intelligent Module. During operation, the Intelli-Site Server host or the Intelligent Module can initiate the connection.

Intelligent Modules must link through a Intelli-Site Server. Do not link input devices, output devices, and readers when using dial-up or disconnected mode.

A dial-up modem can use RS232 protocol or RS485 protocol for communication.

Intelligent Modules can communicate through either of the following types of modems:

- U.S. Robotics 56K Fax modem with part number RS502 provided by OLTIS Security Systems International LLC, (OSSI) and pre-programmed at the factory to communicate with Intelligent Modules
- Hayes-compatible modem

See the modem manufacturer's documentation for more information about a particular modem.

For more information about dial-up configurations, see the *Compass RTU Guide*.

4.6.1 Programming a Dial-up Modem

To use the Windows® HyperTerminal program to program a modem, do the following:

1. Ensure that the modem is properly connected to a Intelli-Site Server host and powered up.

   Most modems echo the commands received to allow the modem programmer to see the accepted command in the HyperTerminal program. To see the accepted command of the RS502 modem, set DIP switch 4 to ON.

2. For Windows® 2000 and XP programs, click **Start**, point to **Programs**, point to **Accessories**, point to **Communications**, and then click **HyperTerminal**. The **Connection Description** dialog box opens.

3. In the **Name** box, type the name of the connection and then click **OK**. The **Connect To** dialog box opens.

4. In the **Connect using** box, select the correct COM port and then click **OK**. The **COM1 Properties** dialog box opens.

5. Do the following:

   a. In the **Bits per second** box, select **9600**.

   b. In the **Data bits** box, select **8**.

   c. In the **Parity** box, select **None**.

d. In the **Stop bits** box, select **1**.

e. In the **Flow Control** box, select **None**.

f. Click **OK**. The **HyperTerminal** dialog box opens.

6. See *US Robotics Modem Command Set* or *Hayes-compatible Modem Command Set* in this section for the commands associated with the U.S. Robotics and Hayes-compatible modems, respectively.

   In the **HyperTerminal** dialog box, type each command required for the particular modem. Press **Enter** after you type each command.

7. When you finish entering commands, exit the program.

4.6.1.1 US Robotics Modem Command Set

OLTIS Security Systems International LLC, (OSSI) provides a U.S. Robotics 56K modem 56K Fax modem with part number RS502 that is pre-programmed at the factory to communicate with Intelligent Modules in a Intelli-Site Access Control application. Occasionally, an error prevents proper operation and you need to reprogram the modem.

To reprogram a RS502 modem, enter the command string in Table 4-3 during the procedure in *Programming a Dial-up Modem* in this section.

Set all DIP switches to the up position except for the following:

- DIP switches 5 and 8 are down on the modem at a Intelli-Site Server Host.
- DIP switch 8 is down on the modem at the Intelligent Module.

Table 4-3. U.S. Robotics Modem Command Set

Command	Meaning
ATX1	Connect
&A1	ARQ results code enabled
&B0	Serial Port Rate - variable follows connection rate
&H0	Flow control disabled
&R1	Ignore RTS
&N6	Sets ceiling connect speed – baud rate 9600
&U6	Sets floor connect speed – baud rate 9600
&W	Store settings

Note: The last character in each modem command is numerical.

Table 4-4. U.S. Robotics Modem DIP Switch Settings

Dip Switch Settings	Meaning
Switch 1 - DOWN	Data Terminal Ready Override
Switch 8 - DOWN	Smart Mode
All Other Switches UP	UP – OFF

4.6.1.2 Hayes-compatible Modem Command Set

To program a Hayes-compatible modem to communicate with Intelligent Modules, enter the command string in Table 4-5 during the procedure in *Programming a Dial-up Modem* in this section.

Table 4-5. Hayes-compatible Modem Command Set

Command	Meaning
ATS0=1	Auto answer on first ring
N0	Connect at last DTR speed
&K0	Disable flow control
Q1	Disable results
&W	Store settings

4.6.2 Connecting Modems for RS232 Communication

Use these instructions to use modems to enable a Intelli-Site Server host and one Intelligent Module to communicate using RS232 communication protocol.

To connect the Intelli-Site Server host to a modem, do the following:

1. Get a standard DB9F-to-DB25M Data Transfer Modem cable.
2. Plug the DB9F end of the cable directly into the serial communication port on the Intelli-Site Server host. Tighten the connector screws.
3. Plug the DB925M end of the cable directly into a modem. Tighten the connector screws.

To connect the Intelligent Module to a modem, do the following:

1. Get a standard DB9F-to-DB25M Data Transfer Modem cable.
2. Plug the DB9F end of the cable into the RS232 male connector on the RS232 Daughterboard. Tighten the connector screws.
3. Plug the DB925M end of the cable directly into a modem. Tighten the connector screws.

To create your own RS232 DB9-to-DB25 Transfer Modem Cable, see Table 4-6 and Figure 4-5.

Table 4-6. DB9-to-DB25 Pin Out for RS232 Modem Communication

Function	DB9 Pin	DB25 Pin
DCD	1	8
RD	2	3
TD	3	2
DTR	4	20
SG	5	7
DSR	6	6
RTS	7	4
CTS	8	5
Ring Indicator	9	22

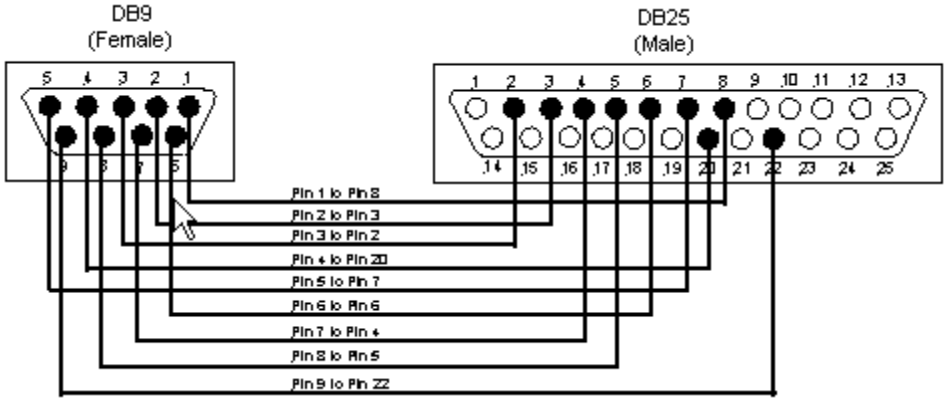

Figure 4-5. DB9F-to-DB25M Cable Wiring

4.6.3 Connecting Modems for RS485 Full-duplex Communication

Use these instructions to use modems to connect a Intelli-Site Server host to up to 32 Intelligent Modules that are to communicate using RS485 full-duplex protocol.

The RS501b converter (Model 422LPCON) and Pin 2 and Pin 3 REVERSER (RS1003), available from OLTIS Security Systems International LLC, (OSSI) connects directly to the DB25 port of the modem. Because the RS501b converter is powered from the modem's data and control signals, the RS501b converter requires no AC power or batteries for operation.

To connect the RS501b converter terminals to a series of RS485 Daughterboards for RS485 communication, see Table 4-7 and Figure 4-6 for connections.

Table 4-7. RS485 Communication Connections from an RS501b Converter

2nd Intelligent Module RS485 Daughterboard	1st Intelligent Module RS485 Daughterboard	RS501b Converter Terminals
RX+ (5)	RX+ (5)	TDA
RX- (6)	RX- (6)	TDB
TX+ (2)	TX+ (2)	RDA
TX- (3)	TX- (3)	RDB
—	—	G

Connect the shield(s) around the twisted-pair cable to the **G** (ground) terminal on the terminal block on the converter. To avoid ground loops, connect the shield to a ground terminal in only one enclosure. Cut the ground at the end of the run.

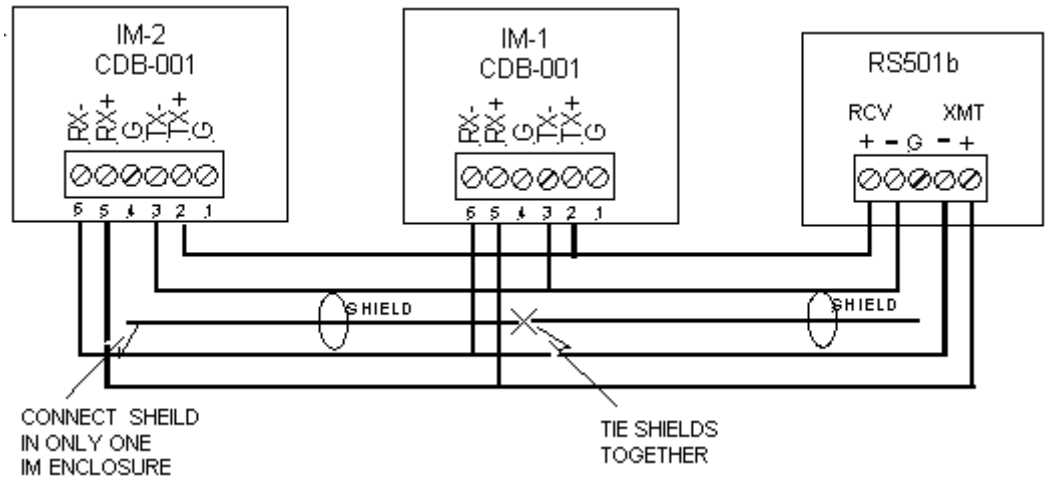

Figure 4-6. RS485 Communication Wiring from an RS501b Converter

In some cases, the RS485 wiring may require termination into 120 ohms to eliminate data reflections and the resultant communication errors. If needed, apply this termination only to the extreme ends of the wiring. The Compass hardware comes with jumpers for this termination. When the jumpers are in place, they apply 120-ohm resistors to the circuit.

Begin wiring an Intelligent Module by removing all jumpers to eliminate any termination. If this results in data communication problems, try installing the jumpers on the Intelligent Module at one end of the circuit. In rare cases, you may have to terminate both ends.

4.8 Installing RS232/RS485 Converter Connections

OLTIS Security Systems International LLC, (OSSI) provides an RS232/RS485 Converter Daughterboard (part number CDB-004) (see Figure 4-10) to convert an RS232 cable connection from a Intelli-Site Server host to an RS485 full-duplex communication connection to a series Intelligent Modules.

An RS232/RS485 Converter Daughterboard can support connections to up to 32 Intelligent Modules.

RS485 connections must be multi-dropped. Star configurations are not supported. T-taps of less than eight feet are acceptable.

An RS232/RS485 Daughterboard has the following connectors:

- A standard DB9 male RS232 serial cable connector for the Intelli-Site Server Host connection
- An RS485 terminal block with six terminals for the Intelligent Module connections

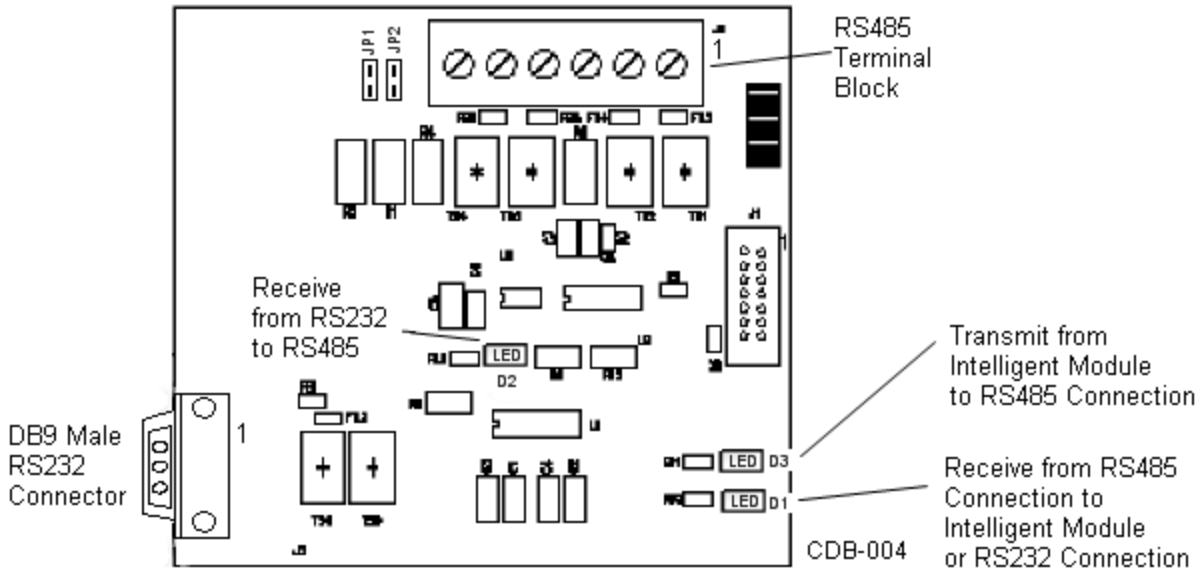

Figure 4-10. RS232/RS485 Converter Daughterboard (CDB-004)

To set up RS232/RS485 Converter connections, only the first Intelligent Module from a Intelli-Site Server Host requires an RS232/RS485 Converter Daughterboard. Each subsequent Intelligent Module requires an RS485 Daughterboard.

Attach the Daughterboard Connector on the Intelligent Module (see Figure 2-1) to the connector on the back of the RS232/RS485 Daughterboard.

To connect the Intelli-Site Server Host to an RS232/RS485 Converter Daughterboard on the first Intelligent Module, do the following:

1. Get a DB9F-to-DB9F RS232 Data Transfer (Null Modem) cable. Use a standard cable or create a cable using the connection requirements in Table 4-1 and Figure 4-3.
2. Plug one end of the cable into the RS232 male connector on the RS232/RS485 Converter Daughterboard. Tighten the connector screws.
3. Plug the other end of the cable directly into the serial communication port on the personal computer used as a Intelli-Site Server Host. Tighten the connector screws.

To connect the terminals on an RS232/RS485 Converter Daughterboard to a series of RS485 Daughterboards for RS485 communication, see Table 4-9 and Figure 4-11 for connections.

Table 4-9. Communication Connections from an RS232/RS485 Converter Daughterboard to a Series of RS485 Daughterboards

3rd Intelligent Module RS485 Daughterboard	2nd Intelligent Module RS485 Daughterboard	1st Intelligent Module RS232/RS485 Converter Daughterboard
RX+ (5)	RX+ (5)	RX+ (5)
RX- (6)	RX- (6)	RX- (6)
TX+ (2)	TX+ (2)	TX+ (2)
TX- (3)	TX- (3)	TX- (3)
—	—	G (4)

Connect the shield(s) around the twisted-pair cable to the **G** (ground) terminal on the terminal block on the RS232/RS485 Converter Daughterboard. To avoid ground loops, connect the shield to a ground terminal in only one enclosure. Cut the ground at the end of the run.

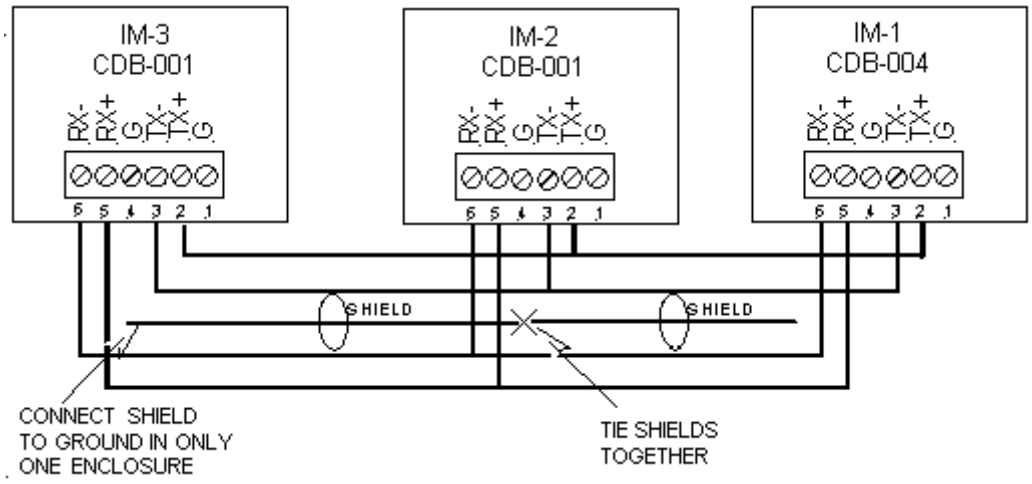

Figure 4-11. Communication Connections from an RS232/RS485 Converter Daughterboard to a Series of RS485 Daughterboards

In some cases, the RS485 wiring may require termination into 120 ohms to eliminate data reflections and the resultant communication errors. If needed, apply this termination only to the extreme ends of the wiring. The Compass hardware includes comes with jumpers for this termination. When the jumpers are in place, they apply 120-ohm resistors to the circuit.

Begin wiring an Intelligent Module by removing all jumpers to eliminate any termination. If this results in data communication problems, try installing the jumpers on the Intelligent Module at one end of the circuit. In rare cases, you may have to terminate both ends.

4.9 Installing RS485/Ethernet Converter Connections

OLTIS Security Systems International LLC, (OSSI) provides an RS485/Ethernet Converter Daughterboard (part number CDB-005) (see Figure 4-12) to enable a Intelli-Site Server Host to communicate with Intelligent Modules using RS485 full-duplex communication over an Ethernet network. Data transmission over an Ethernet network requires Transmission Control Protocol/Internet Protocol (TCP/IP).

An RS485/Ethernet Converter Daughterboard can support connections to up to 32 Intelligent Modules.

RS485 connections must be multi-dropped. Star configurations are not supported. T-taps of less than eight feet are acceptable.

An RS485/Ethernet Converter Daughterboard has the following connectors:

- A Digi Connect ME device server for the connection to a TCP/IP network
- An RS485 terminal block with six terminals for a connection to a series of Intelligent Modules

The Reset button on the RS485/Ethernet Converter Daughterboard is used to reboot the Digi Connect ME device server.

Although the Digi Connect ME device server connects through the virtual link of the Ethernet, the Microsoft Windows operating system recognizes the connection as a physical COM port.

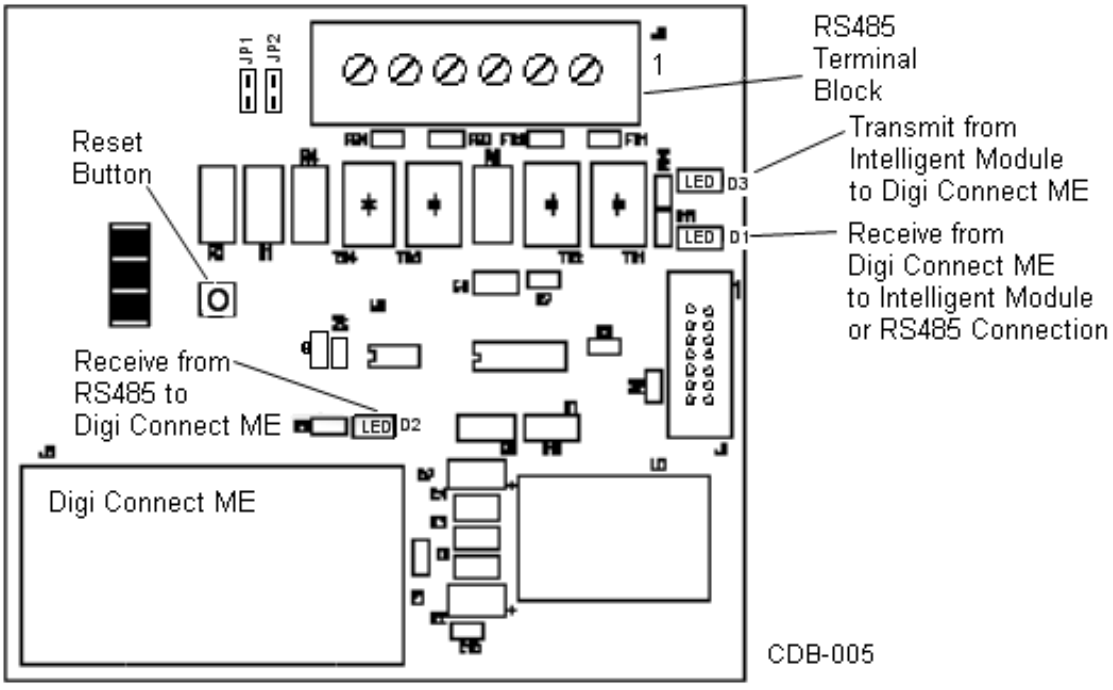

Figure 4-12. RS485/Ethernet Converter Daughterboard (CDB-005)

To set up TCP/IP connections for a series of Intelligent Modules using the RS485/Ethernet Converter Daughterboard, do the following as described in subsections 4.9.1 through 4.9.5:

1. Connect a Intelli-Site Server Host to a Digi Connect ME device server on an RS485/Ethernet Converter Daughterboard in the TCP/IP network.
2. Connect the terminals on an RS485/Ethernet Converter Daughterboard to the terminals on each RS485 Daughterboard on each subsequent Intelligent Module in the series.
3. Configure the IP address for the Digi Connect ME device server.

4.9.1 Connecting a Intelli-Site Server Host to a Digi Connect ME

Attach the Daughterboard Connector on the Intelligent Module (see Figure 2-1) to the connector on the back of the RS485/Ethernet Converter Daughterboard.

To connect a Intelli-Site Server Host to a Digi Connect ME in the TCP/IP network, plug one end of an Ethernet cable into the 10/100 Base-T jack on the Digi Connect ME and plug the other end into a hub, switch, or directly into the network using a straight-through Ethernet cable.

To connect the Digi Connect ME directly to the network interface card (NIC) on the Intelli-Site Server Host, use a crossover Ethernet cable.

4.9.2 Connecting an RS485/Ethernet Converter Daughterboard to a Series of RS485 Daughterboards

To connect the terminals on an RS485/Ethernet Converter Daughterboard (CDB-005) to a series of RS485 Daughterboards (CDB-001) for RS485 communication, see Table 4-10 and Figure 4-13 for connections.

Table 4-10. Communication Connections from an RS485/Ethernet Converter Daughterboard to a Series of RS485 Daughterboards

3rd Intelligent Module RS485 Daughterboard	2nd Intelligent Module RS485 Daughterboard	1st Intelligent Module RS485/Ethernet Converter Daughterboard
RX+ (5)	RX+ (5)	RX+ (5)
RX- (6)	RX- (6)	RX- (6)
TX+ (2)	TX+ (2)	TX+ (2)
TX- (3)	TX- (3)	TX- (3)
—	—	G (4)

		(1)

Connect the shield(s) around the twisted-pair cable to the **G** (ground) terminal on the terminal block on the RS485/Ethernet Converter Daughterboard. To avoid ground loops, connect the shield to a ground terminal in only one enclosure. Cut the ground at the end of the run.

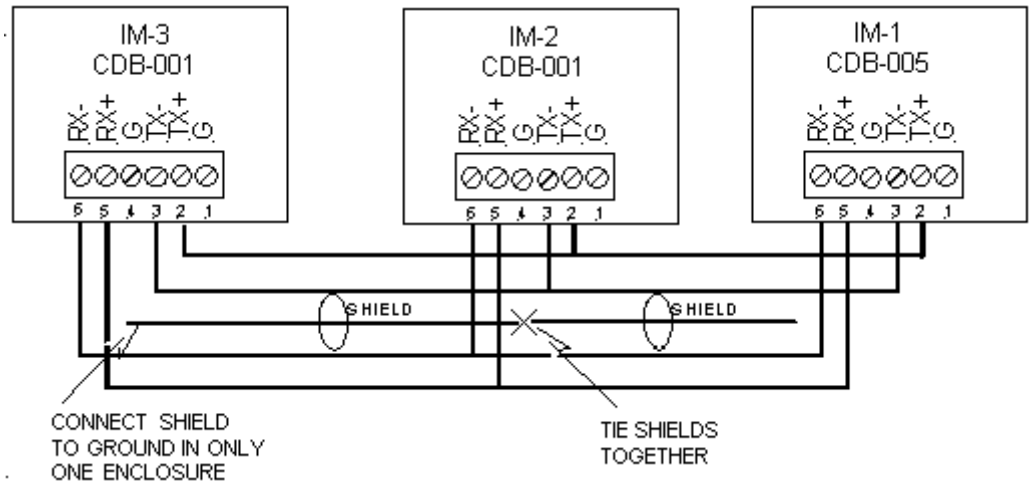

Figure 4-13. Communication Connections from an RS485/Ethernet Converter Daughterboard to a Series of RS485 Daughterboards

In some cases, the RS485 wiring may require termination into 120 ohms to eliminate data reflections and the resultant communication errors. If needed, apply this termination only to the extreme ends of the wiring. The Compass hardware includes jumpers for this termination. When the jumpers are in place, they apply 120-ohm resistors to the circuit.

Begin wiring an Intelligent Module by removing all jumpers to eliminate any termination. If this results in data communication problems, try installing the jumpers on the Intelligent Module at one end of the circuit. In a rare case, you may have to terminate both ends.

4.9.3 Configuring the IP Address for a Digi Connect ME Device Server

Only a qualified network administrator who understands how to assign IP addresses should assign a unique IP address to each Digi Connect ME device server in the network. For example, a network that uses three Digi Connect ME device servers requires three IP addresses, one for each Digi Connect ME device server. It is important to configure the correct IP address and the Subnet Mask for each Digi Connect ME device server.

To determine the IP address for a Digi Connect ME device server, a network administrator must do the following:

1. Find the MAC address (MA) on the sticker on the Digi Connect ME device server. An example of a MAC address is **00409D2610C3**.

2. Determine the unique IP address that is to be assigned to Digi Connect ME device server.

3. Record the MAC address and IP address for reference.

After determining the IP address for all Digi Connect ME device servers, a network administrator can configure each Digi Connect ME device server in the network. This procedure requires the following conditions:

- The Intelli-Site Server Host must be running the Microsoft Windows operating system and be connected to the same network as the Digi Connect ME device server being configured.

- Each Digi Connect ME device server must be connected to the network.

- The Discovery Utility uses multicast to communicate with devices. Anything that interferes with multicast will make the application inoperable. Examples of known conflicts:
  - Having a firewall between (or on) your PC and the target device.
  - Having a router or other network hardware between your PC and the target device.
  - Running over a VPN or dial up connection that does not support multicast traffic.

Intelli-Site Software Installation CD contains the Device Discovery Utility program and the instruction manual for the Digi Connect ME device server. To assign an IP address for a Digi Connect ME device server in the network, do the following:

1. Insert the Intelli-Site CD into the CD-ROM drive on the Intelli-Site Server Host. Launch the Device Discovery Utility.

2. The Device Discovery Utility application finds and lists all of the device servers in the network.

3. Locate the MAC address for the Digi Connect ME device server to be configured. Double-click the MAC address. The **Configure Network Settings** dialog box opens.

4. Select Manually Configure Network Settings.

5. Fill in the IP address box, Subnet Mask box, and Default Gateway box.

6. Click **Save**. The device will be rebooted.

7. Right Click the device and choose **Open Web Interface**. A web browser will launch and display the web interface of the device.

8. Login using *root* as the username and *dbps* as the password.

9. Click the **Serial Ports** shortcut under **Configuration**.

10. Choose **Port 1**.

11. Under the **Select Port Profile** dialog, select the option for **TCP Sockets** and click **Apply**.

12. Under **Serial Port Configuration**, select **Basic Serial Settings**.
13. Set the serial settings as follows:

    Baud Rate: 115200

    Data Bits: 8

    Parity: None

    Stop Bits: 1

    Flow Control: None
14. Click the **Apply** button, wait for the settings to save, then choose **Logout** from the menu on the left.

Section 5. Wiring Input Connections

5.1 Input Connection Types

Each IRM monitors inputs that can detect a change in state generated by a device wired to the IRM.

A normally-opened input device maintains an open or incomplete circuit. When the input device closes, it generates a change in state (alarm).

A normally-closed input device maintains a closed or complete circuit. When the input device opens, it generates a change in state (alarm).

Each input is individually programmable for 2-state, 3-state, or 4-state supervision.

- Two-state, or unsupervised inputs monitor Normal and Alarm conditions.
- Three-state, supervised inputs monitor Normal, Alarm, and Short or Open conditions.
- Four-state, supervised inputs monitor Normal, Alarm, Short, and Open conditions.

An example of a short condition is shorting the input wiring.

An example of an open condition is a cut wire.

5.2 Wiring Input Connections on an IRM

Each IRM can monitor eight inputs.

Wire the inputs to the [J3] Connectors (Input Connections) on an IRM.

Table 5-1 lists the wiring pin outs for all input connections on an IRM.

Table 5-1. Input Connections on an IRM

J3 Connector	Input	J3 Connector	Input
1	1+	9	5+
2	1-	10	5-
3	2+	11	6+
4	2-	12	6-
5	3+	13	7+
6	3-	14	7-
7	4+	15	8+

8	4-	16	8-

5.3 Wiring 2-State Unsupervised Inputs

A 2-state unsupervised input monitors Normal and Alarm conditions. The Normal and Alarm condition results from an input device changing state from an open circuit to a closed circuit or from a closed circuit to an open circuit. When the input changes state, the Intelli-Site Access Control application detects it and records the action. Figure 5-1 illustrates these two states.

To wire a 2-state unsupervised input, connect the set of wires on each input to the appropriate pins as illustrated in Figure 5-1 and listed in Table 5-1.

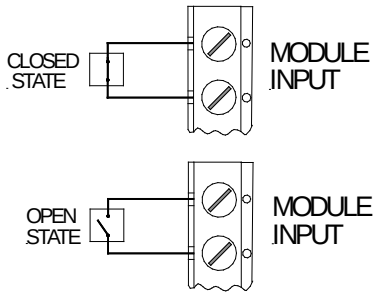

Figure 5-1. Wiring for a 2-State Unsupervised Input

5.4 Wiring 3-State Supervised Inputs

A 3-state supervised input monitors Normal and Alarm conditions and either a supervised Short or Open condition.

To wire a 3-state supervised input, install one supervision resistor near the input device contacts. Wire the end-of-line (EOL) resistor (4.7K-ohm or 15K-ohm) to the input.

Figure 5-2 A illustrates the proper wiring of the EOL resistor as an end-in-line resistor (EILR) for protection against a shorted wire run when the input is programmed for a normally-closed condition. Possible causes for a shorted wire run are an insulation breakdown causing a short, or an intruder shorting the wires to prevent an alarm condition.

Figure 5-2 B illustrates the proper wiring of the EOL resistor as an end-of-line resistor (EOLR) for protection against an open wire run when the input is programmed for a normally-open condition. Possible causes for an open wire run are a break in the wire, a loose terminal connection, or an intruder cutting the wires to prevent an alarm condition.

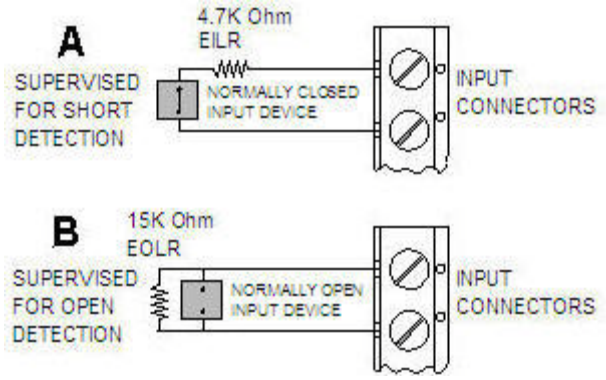

Figure 5-2. Wiring for a 3-State Supervised Input

For maximum protection of the input wiring, install the end-in-line resistors (EILR) or end-of-line resistors (EOLR) at the input device or as close to the input device as possible.

For a Normally Closed (NC) Loop, wire EILR resistor (4.7K-ohm) in series with the input contact.

For a Normally Opened (NO) Loop, wire EOLR resistor (15K-ohm) in parallel with the input contact.

Connect the set of wires for each input (as illustrated in Figure 5-2) to pins 1 through 16 of [J3] connector as listed in Table 5-1.

5.5 Wiring 4-State Supervised Inputs

A 4-state supervised input monitors Normal and Alarm conditions and supervised Short and Open conditions.

To wire a 4-state supervised input, install one set of supervision resistors near the input device contacts. Install EOL resistors as end-in-line resistors (EILR) and end-of-line resistors (EOLR) at the input device or as close to the input device as possible to protect the input wiring for maximum protection.

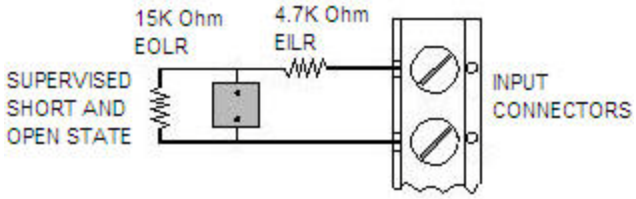

Figure 5-3. Wiring for a 4-State Supervised Input

For a Normally Closed or Normally Opened loop, wire the EOL resistors in series (4.7K-ohm) and in parallel (15K-ohm) with the input contact.

Connect each input's set of wires as shown in Figure 5-3 to the appropriate pins (1-16) of the [J3] Connection as listed in Table 5-1.

Section 6. Wiring Reader Connections

6.1 Reader Data Format Options

An IRM can accept data encoded on ID cards in either of the following formats:

- Wiegand format (up to 64 bits)
- Magnetic Stripe (Clock and Data format)

Each IRM can support up to two readers. Both readers connected to an IRM must be the same type.

For a Intelli-Site Access Control application Version 2.031 or earlier, all readers in a system must be the same type.

A Intelli-Site Access Control application Version 2.041 or later can use both types of readers; but both readers connected to a particular IRM must still be the same type.

6.2 Wiring Reader Connections on an IRM

Wire readers to the [J1] Connectors (Reader Connections) on an IRM.

Connect the set of wires for each reader to the appropriate pins (1 through 9 or 10 through 18) of the [J1] Connector as listed in Table 6-1 as shown in Figure 6-1.

You must power 5VDC readers separately because the IRM reader connection provides +12VDC.

CAUTION: Do not connect or disconnect a reader with the power applied.
For reader current requirements exceeding 200mA, power the reader separately.

Table 6-1. Reader Connections on an IRM

Reader 1	
J1 Connector	**Function**
1	Data0 (Data)
2	Data1 (Clock)
3	Beeper
4	Single LED/Green LED (Use if only one LED)
5	Red LED
6	Ground
7	Power (+12VDC)

Reader 2	
J1 Connector	**Function**
10	Data0 (Data)
11	Data1 (Clock)
12	Beeper
13	Single LED/Green LED (Use if only one LED)
14	Red LED
15	Ground
16	Power (+12VDC)

8	Shield
9	Card Present (Use with swipe readers)

17	Shield
18	Card Present (Use with swipe readers)

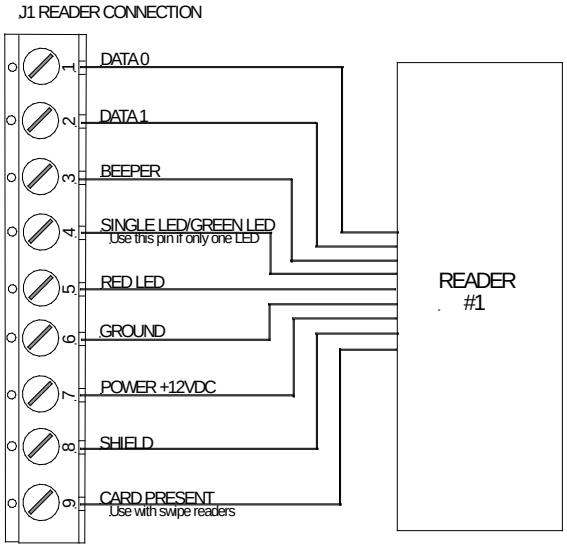

Figure 6-1. Typical Reader Wiring

6.3 Connecting Resistors for Integrated Engineering Smart Card Readers

For use with Integrated Engineering smart card readers, an IRM requires two 1K pull up resistors to be connected to each Reader port. For each reader, connect one resistor between the Data 0 connector and the +12VDC connector and connect another resistor between the Data 1 connector and the +12VDC connector. Figure 6-2 illustrates the resistor connections required for two Integrated Engineering smart card readers.

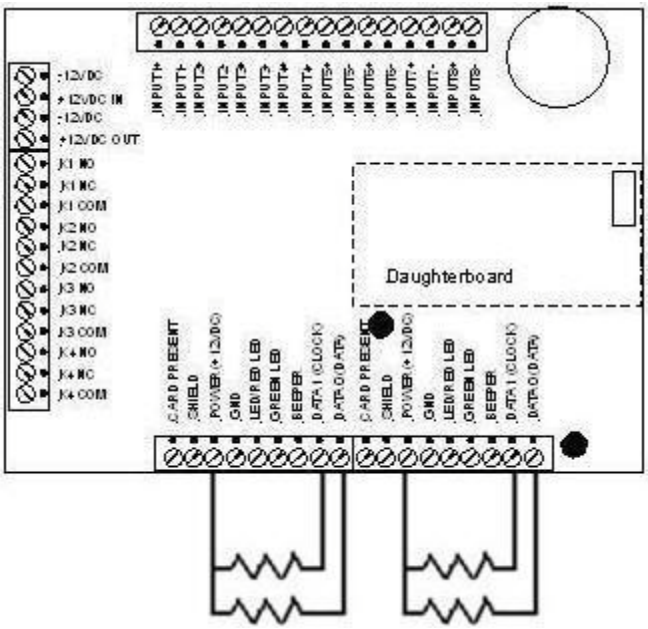

Figure 6-2. Resistor Connections for Integrated Engineering Smart Card Readers

Section 7. Wiring Output Connections

7.1..Output Connection Options

Each output relay on an IRM is a single-pole, double-throw (SPDT) Form C relay rated at 1amp @24VDC.

A Form C relay can be wired for normally-opened or normally-closed operation.

An output relay can be wired as a lock relay or an auxiliary relay.

7.2 Wiring Output Connections on an IRM

Each IRM can monitor four output relays.

Wire all outputs to the [J2] Connector (Output Connections) on an IRM.

Table 7-1 lists the wiring pin outs for all output connections on an IRM.

Table7-1. Output Connections on an IRM

J2 Connector	Function	Output Relay
5	Normally Opened	1
6	Normally Closed	
7	Common	
8	Normally Opened	2
9	Normally Closed	
10	Common	
11	Normally Opened	3
12	Normally Closed	
13	Common	
14	Normally Opened	4
15	Normally Closed	
16	Common	

7.3 Wiring Diodes

To eliminate problems caused by voltage spikes, wire a diode (IN4001) across each electromagnetic device. Place the diode within three inches of the electromagnetic strike. The diode provides a short

circuit path for a voltage spike and does not interfere with normal operation. Figure 7-1 illustrates the placement of the diode and its orientation on an electromagnetic device.

CAUTION: Connect the band end of a diode to the positive side of the door lock power. Installing a diode in the incorrect orientation may damage the Intelligent Module and/or the lock power supply. It may also cause a fire.

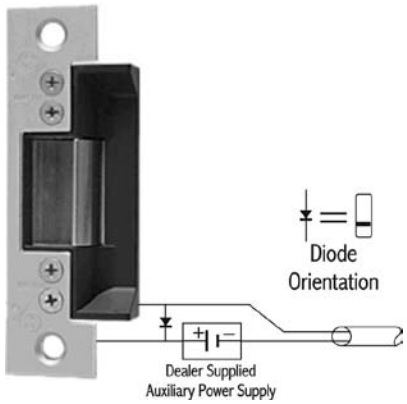

Figure 7-1. Diode Orientation on Electromagnetic Door Lock

CAUTION: A diode does not provide lightning protection.

7.4 Wiring Lock Relays

7.4.1 General Requirements for Wiring Lock Relays

A lock relay works in conjunction with a reader to control access at a specific door location. Depending upon the type of lock, you can wire the lock relay for fail-secure operation or fail-safe operation.

With fail-secure operation, a locking device (electric strike) is locked when power is removed (see Figure 7-2). Normally, the device is locked requiring power to open it. When the relay activates, it provides the power. When a cardholder presents a valid access card to the card reader, the relay closes and applies power to the fail-secure device.

With fail-safe operation, a locking device (magnetic lock) is locked when power is applied (see Figure 7-2). Normally, the device is unlocked requiring power to lock it. When the relay activates, it removes power. When a cardholder presents a valid access card to the card reader, the relay opens and removes power from the fail-safe device.

To wire a lock relay, connect the wires for the output to the Output Connector [J2] as listed in Table 7-1 and illustrated in Figure 7-2.

CAUTION: Use a separate power supply for all electrical locking devices. Do not use the Intelligent Module power supply to power electrical locking devices.

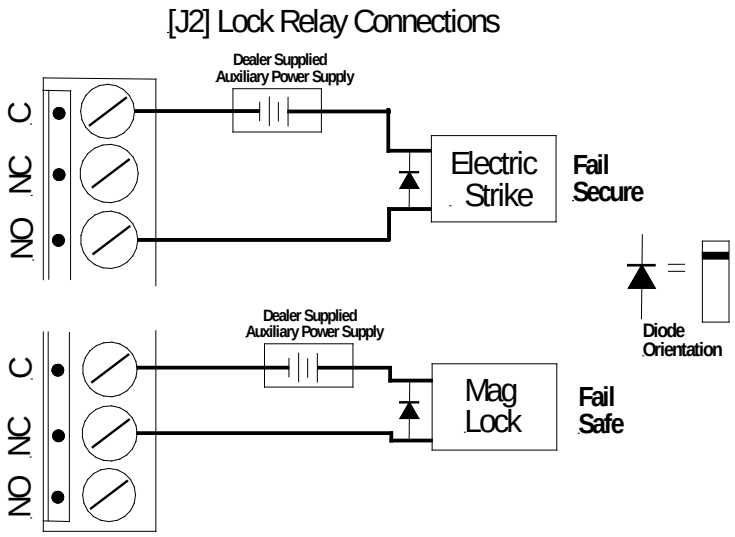

Figure 7-2. Typical Lock Relay Wiring

7.5 Wiring Auxiliary Relays

An auxiliary relay can control an external device, such as an annunciator, door-alarm shunt, or area lighting.

Figure 7-3 illustrates typical auxiliary relay connections.

See Subsection 3.6.4 for more information about powering auxiliary devices.

Connect the wires for the output to the [J2] Connector as shown in Figure 7-3.

CAUTION: An IRM provides up to 100ma for auxiliary devices.
If total power consumption for all auxiliary devices connected to an IRM will exceed 100ma, use a separate power supply for the auxiliary devices.

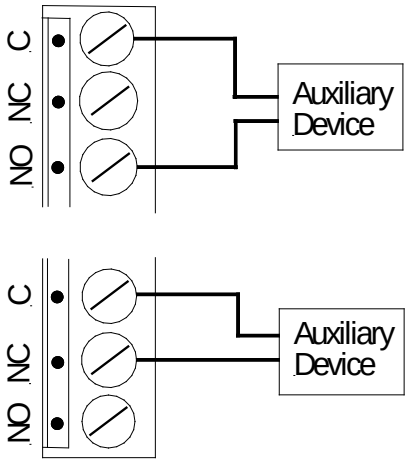

Figure 7-3. Typical Auxiliary Relay Wiring

Section 8. Initially Powering up Intelligent Modules

8.1 Checking Intelligent Module Hardware Before Power-up

Before an Intelligent Module is powered up for the first time, a hardware technician should ensure that the following requirements are met:

- The enclosure is clear of all debris or filings.
- All connections to the quick-disconnect terminals are tight.
- There are no shorts or opens in the wiring.
- The communication daughterboard is seated properly.
- The communication cable is connected to the Intelligent Module daughterboard and to the comm port on the personal computer that is used as the Intelli-Site Server Host.
- The communication daughterboard connections are properly wired and configured.

Section 9. Normal Intelligent Module Operation

9.1 Inspecting Intelligent Modules Periodically

An Intelligent Module does not require ongoing maintenance; however, a hardware technician should inspect each Intelligent Module periodically, as follows:

- Inspect all connectors, wiring, and cables on all system devices and verify they are secure and show no signs of damage or wear. Replace as needed.
- If an Intelligent Module uses an optional backup battery, inspect the battery for warping, cracks, corrosion, and so on. Replace as needed.
- If using a backup battery, disconnect AC power to the power supply and verify that the Intelligent Module continues to operate using the backup battery. Replace the battery as needed. Restore AC power when finished.

9.2 Normal LED Operation

During normal operation, the LED indicators on each Intelligent Module, power supply, daughterboard, and device server operate as described in Table 9-1. Figure 9-1 and Figure 9-2 illustrate the LED locations.

Table 9-1. Normal LED Operation

LED Location	LED Description	Normal Operation
Intelligent Module	Heartbeat	Blinks a coded signal that identifies the location of the Intelligent Module in the system. A long blink denotes an increment of ten and a short blink denotes a single-digit number. For example, two short successive blinks denote an address of 2; two successive long blinks followed by a pause and then two successive short blinks denote an address of 22.
	Output 1 Output 2 Output 3 Output 4	Lights when its corresponding output relay on the Intelligent Module energizes.
Power Supply	AC (green)	On when power is being applied. Goes out if the power supply loses AC power and there is a backup battery.

LED Location	LED Description	Normal Operation
	DC (red)	On when power supply generates a DC voltage. Remains lit if the power supply loses AC power and there is a backup battery.
RS232 Daughterboard	RX (receive)	Lights when the Intelligent Module receives data from the Intelli-Site Server Host through the daughterboard. Blinks alternately while the Intelli-Site software runs on the Intelli-Site Server Host. At higher baud rates, this LED appears to be lit continuously.
	TX (transmit)	Lights when the Intelligent Module transmits data through the daughterboard to the Intelli-Site Server Host. Blinks alternately while the Intelli-Site software runs on the Intelli-Site Server Host. At higher baud rates, this LED appears to be lit continuously.
RS485 Daughterboard	RX (receive)	Lights when the Intelligent Module receives data from the Intelli-Site Server Host through the daughterboard. Blinks alternately while the Intelli-Site software runs on the Intelli-Site Server Host. At higher baud rates, this LED appears to be lit continuously.
	TX (transmit)	Lights when the Intelligent Module transmits data through the daughterboard to the Intelli-Site Server Host. Blinks alternately while the Intelli-Site software runs on the Intelli-Site Server Host. At higher baud rates, this LED appears to be lit continuously.
Digi One SP device server	Power (red)	After an IP address is assigned to the device server, remains lit continuously while the device server is receiving power.
	Link (green)	Lights when the physical network is detected.
	ACT (Activity) (yellow)	Blinks when there is network activity.
RS232/RS485 Converter Daughterboard	D1	Lights when a poll is received from the RS232 connection.
	D2	Lights when a response is received from the RS485 daisy chain.
	D3	Lights when the local Intelligent Module transmits data to the RS232 connection of the daughterboard.
RS485/Ethernet Converter Daughterboard	D1	Lights when a poll is received from the Ethernet connection.
	D2	Lights when a response is received from the RS485 daisy chain.

LED Location	LED Description	Normal Operation
	D3	Lights when the local Intelligent Module transmits data to the Ethernet connection of the daughterboard.
Digi Connect ME device server on an RS485/Ethernet Converter Daughterboard	Network Link (yellow in upper-left corner)	Remains lit continuously when a network connection is active.
	Network Activity/Diagnostic (green in upper-right corner)	On when network traffic is detected. Off when no network traffic is detected.

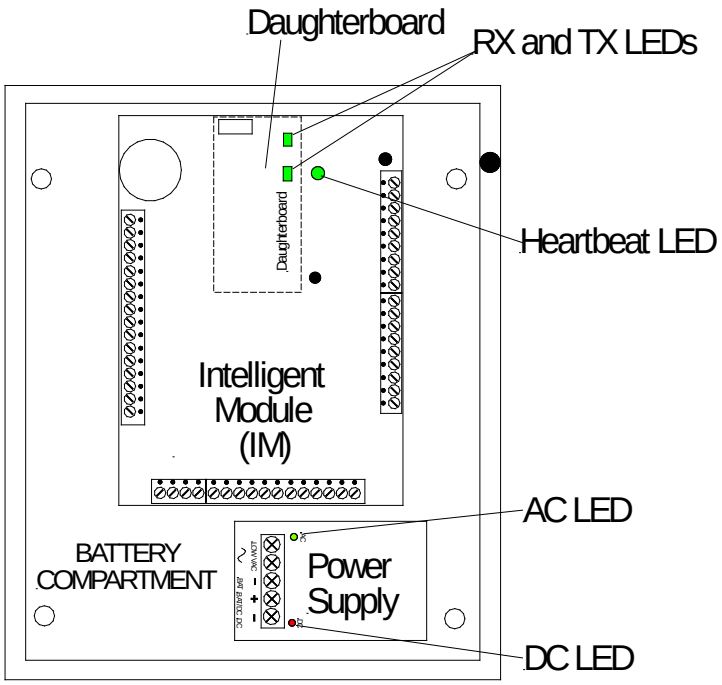

Figure 9-1. Single Intelligent Module Panel LED Locations

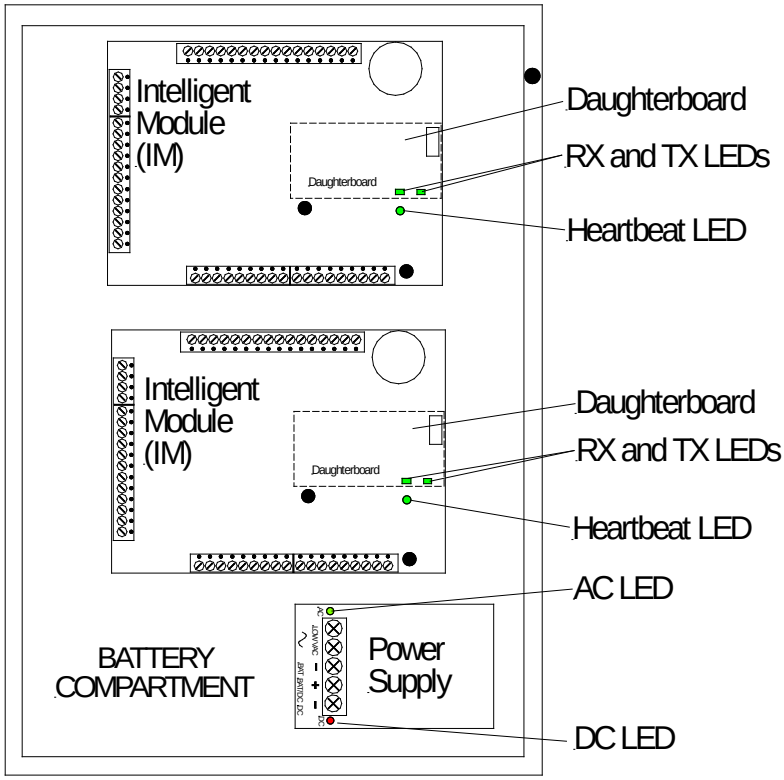

Figure 9-2. Two Intelligent Module Panels with LED Locations

Section 10. Troubleshooting

10.1 Troubleshooting a Power Supply

Verify that the correct power supply transformer is installed in a Compass panel enclosure, according to the following requirements:

- A single-module panel requires a 16.5VAC transformer rated at 20VA.
- A dual-module panel requires a 16.5VAC transformer rated at 40VA.
- A four-module panel does not use a transformer.

If the power supply loses power and there is a backup battery, the DC LED remains lit and the AC LED goes out.

If an overcurrent condition exists in a power supply and there are backup batteries, the batteries slowly drain, lowering the battery potential to that of the power supply.

The following conditions may cause a power supply overcurrent condition that may drop the output voltage by approximately five volts:

- Faulty Intelligent Module
- Excessive current on the 12VDC auxiliary supply on the Intelligent Module
- Excessive current on a reader

The following conditions indicate an overcurrent condition:

- Both the AC LED and DC LED (see Figure 9-1 and Figure 9-2) on the power supply remain lit; but the Intelligent Module malfunctions.
- The daughterboard emits a high-pitched whine and the RX LED on the daughterboard does not light.

To verify that it is an overcurrent condition, remove the battery. If the voltage on the power supply remains low, an overcurrent condition probably exists.

10.2 Troubleshooting an Intelligent Module

An Intelligent Module has four output LEDs, a Heartbeat LED, a RAM CLEAR button, and a RESET button, as shown in Figure 10-1.

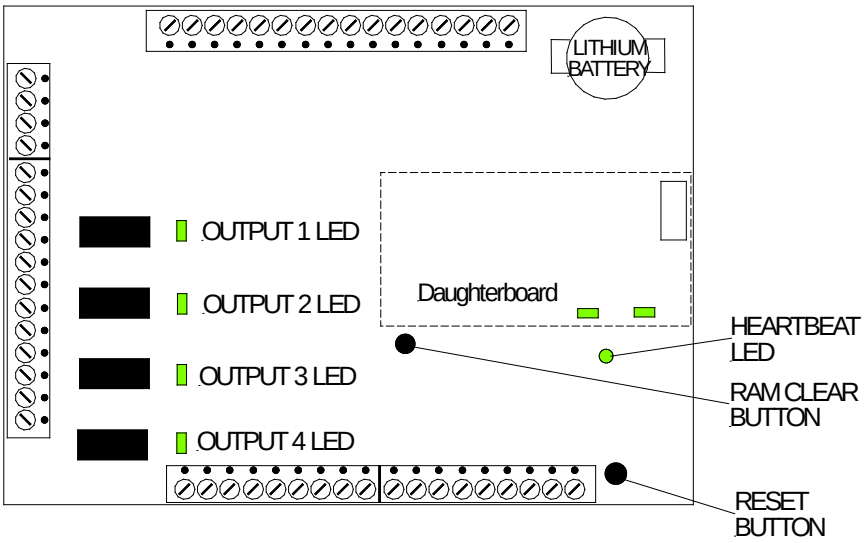

Figure 10-1. Location of LEDs, RAM CLEAR Button, and RESET Button on an Intelligent Module

Each output LED lights when its corresponding output relay on the Intelligent Module energizes. If the LED for an output relay fails to light, the problem could be one of the following:

- The configuration data and the location of the intelligent Module do not match.
- The input device that corresponds to that output has failed.
- The Intelligent Module has failed.

To correct these problems, use the RESET and RAM CLEAR buttons as described in Table 10-1.

10-1. RESET button and RAM CLEAR Button Operation

Buttons	Operation
RESET only	Use this function only if you suspect a problem with the data in the Intelligent Module. To check an Intelligent Module's data tables for errors, press the Reset button, hold it down for three seconds, and then release it. If an error is found, the Intelligent Module requests a new data download from a Intelli-Site Server Host.
RAM CLEAR only	Use this function only when you suspect there is problem with an Intelligent Module's data and you want to force a download of new data tables from a Intelli-Site Server Host. To force a download of new data tables from the Intelli-Site Server Host to an Intelligent Module, press and hold the RAM Clear button until the Heartbeat LED stops blinking and remains lit. This operation clears all the current data in the Intelligent Module and the Intelligent Module requests new data tables from the Intelli-Site Server Host.

Buttons	Operation
RAM CLEAR and RESET	Use this function only when you need to repeat auto-recognition or to clear all data, including firmware, from an Intelligent Module. This action restores the Intelligent Module to its factory default settings. The Intelligent Module then has no address assigned to it, no data tables, and no firmware. To reset an Intelligent Module to its factory default settings, do the following: 1. Press the RAM CLEAR button. 2. Continue to hold the RAM CLEAR button while you press the RESET button for three seconds. 3. Continue to hold the RAM CLEAR button as you release the RESET button. The Heartbeat LED goes out. 4. Continue to hold the RAM CLEAR button and wait for the Heartbeat LED to start blinking. 5. Release the RAM CLEAR button.

10.3 Troubleshooting a Daughterboard

Any of the following conditions may cause the receive LED, transmit LED, or both to go out on any daughterboard:

- Software not running on the Intelli-Site Server Host, indicated by an receive LED that is not lit
- Communications port or cabling failure
- Intelligent Module failure, indicated by a transmit LED that is not lit
- Power Supply in overcurrent condition, indicated by a high pitch wine on the daughterboard and an receive LED that is not lit
- Daughterboard failure
- LED failure

Section 11. Implementing Reader Controlled Output (RCO) Operation

11.1 Reader Controlled Output (RCO) Operation

Reader Controlled Output (RCO) operation is a standard feature in SafeAxis, 5E and 6e application. RCO operation enables the application to activate specific output relays or sets of output relays based upon privileges assigned to users. RCO operation can be used to control of elevators, lighting fixtures, Heating, Ventilation, and Air Conditioning (HVAC) systems, and other building systems, for example.

For example, when RCO operation is used to control elevators, the output relays interface with the floor buttons. When a user presents an ID card to a reader located inside the elevator cab, the user's privileges activate selected output relays to enable only the floor buttons for the floors that the user is permitted to access. The output relays are enabled for a time specified in the software as the door strike time. The timeout value for these output relays prevents another person from entering the elevator cab after the initial user.

An RCO configuration includes an IRM that is wired to communicate with one IOM in a SafeAxis application or a series of one to seven IOMs in a 5E or 6e application. A reader attached to the IRM provides controlled on/off capabilities for Form C output relays on the IOMs. These output relays make or break circuits to the elevator buttons for designated floors. One output relay is used for each floor button.

Before any input signal is received from a reader, each IOM energizes all of its output relays. Upon receiving input from a reader, the IRM de-energizes designated output relays on each IOM to enable buttons for designated floors. These outputs remain de-energized for a designated period of time and then return to the normal energized state.

As a Fail-Safe control measure in the event of a power failure, IRM failure, or IOM failure, the output relays on the IOM(s) affected by the power failure automatically de-energize to enable buttons for all elevator doors.

11.2 Determining Hardware Requirements for RCO Operation

11.2.1 Reader Requirements for RCO Operation

Table 11-1 summarizes the reader requirements for RCO operation.

Table 11-1. Reader Requirements for RCO

Item	Purpose	Requirements
Reader	To provide on/off capability for lighting switches for an area, HVAC system switches for an area, or floor buttons for an elevator cab.	One reader is needed for each lighting area, HVAC system area, or elevator cab that requires access control.

11.2.2 IRM Requirements for RCO Operation

Table 11-2 summarizes the IRM requirements for RCO operation.

Table 11-2. IRM Requirements for RCO Operation

Item	Purpose	Requirements
Intelligent Reader Module (IRM) (IRM003)	To control readers. Includes, 640K memory, mounting studs, and 4.7K and 15K resistor packs.	Each IRM can support one or two readers.
Communication daughterboard for IRM communication to the Intelli-Site Server Host	To connect the IRM to a Intelli-Site Server Host.	Each IRM requires one of the following: • RS485 Daughterboard (CDB-001) with an RS501a converter (IC620A-F) • RS232 Daughterboard (CDB-002) with a standard DB9F-to-DB9F RS232 Data Transfer (Null Modem) cable • RS232/RS485 Converter Daughterboard (CDB-004) with a standard DB9F-to-DB9F RS232 Data Transfer (Null Modem) cable • Ethernet/RS485 Converter Daughterboard (CDB005)
Control Communication Daughterboard (CCD) (CDB-003)	To connect an IRM to one IOM in a SafeAxis application. To connect an IRM to a series of one to seven IOMs in a 5E or 6e application.	Each IRM requires one Control Communication Daughterboard (CCD) (CDB-003). An IRM with a Control Communication Daughterboard attached is called in Intelligent Control Module (ICM).

11.2.3 IOM Requirements for RCO Operation

Table 11-3 summarizes the IOM requirements for RCO operation. See the *Intelligent Input Module (IIM)/Intelligent Output Module (IOM) Installation Guide* for more information about using IOMs for RCO operation.

Table 11-3. IOM Requirements for RCO Operation

Item	Purpose	Requirements
Intelligent Output Module (IOM) (IOM001)	To control a set of output relays. Includes 128K memory, mounting studs, and 4.7K and 15K resistor packs.	In a Safe Axis application, only one IOM can connect to each IRM. In a 5E or 6e application, a series of one to seven IOMs can connect to each IRM.
Communication daughterboard for an IOM	To enable the IOM to communicate with a Intelli-Site Server Host and an IRM through the CCD on the IRM.	One RS485 Daughterboard (CDB-001) for each IOM.

Each IOM provides 16 Form C output relays. Each output relay can make or break a circuit to turn on or turn off a particular, light switch, HVAC system switch, or elevator floor button.

In a Safe Axis application, one IOM provides 16 relays that can be divided in any combination between two readers attached to the IRM.

In a 5E or 6e application, one to seven IOMs, each with 16 output relays, provides a total of up to 112 output relays that can be divided in any combination between two readers attached to the IRM.

11.2.4 Control Communications Daughterboard (CDB-003)

A Control Communication Daughterboard (CCD) (part number CDB-003) can be purchased as a separate component from OLTIS Security Systems International LLC, (OSSI)

A Control Communication Daughterboard is used to create an RS485 communication sub-bus that links an IRM to one or more IOMs. The Control Communication Daughterboard plugs into the bottom of an IRM and provides a full-duplex RS485 connection to the multi-dropped IOMs.

A Control Communication Daughterboard is shipped with all standoffs required to attach it to an IRM.

The Control Communication Daughterboard (see Figure 11-1) contains two red LED indicators. The LEDs indicate communication between the Control Communication Daughterboard and the RS485 Daughterboards on the multi-dropped IOMs.

A Control Communication Daughterboard has termination pins.

In some cases, the RS485 wiring may require termination into 120 ohms to eliminate data reflections and the resultant communication errors. If needed, apply this termination only to the extreme ends of

the wiring. The Compass equipment comes with jumpers for this termination. When the jumpers are in place, they apply 120-ohm resistors to the circuit.

Begin wiring an Intelligent Module by removing all jumpers to eliminate any termination. If this results in data communication problems, try installing the jumpers on the module at one end of the circuit. In rare cases, you may have to terminate both ends.

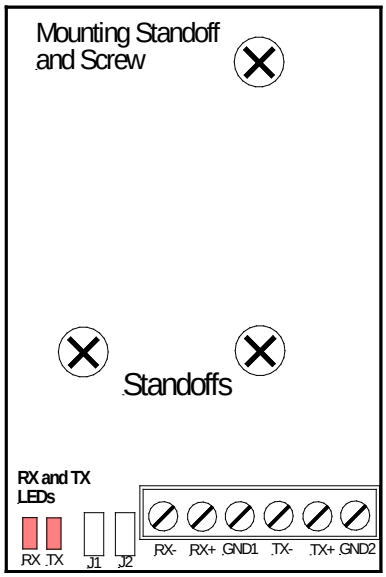

Figure 11-1. Control Communication Daughterboard (CDB-003)

11.2.5 Compass Panel Enclosure Requirements for RCO Operation

Table 11-4 summarizes the Compass panel enclosure requirements for the RCO operation.

Table 11-4. Compass Panel Enclosure Requirements

Item	Purpose	Requirements
Locking enclosure	To house the following: • IRM(s) • IOM(s) • Daughterboards • Power supply • Backup battery	As many enclosures as needed to house all IRMs and IOMs. Locking Dual-Module Enclosure (IMH004) (12" x 16" x 4") to house two Intelligent Modules. Locking Single Module Enclosure (IMH001) to house one Intelligent Module when an IRM and IOM are located in different areas. Distance between CCD on an IRM and the first IOM cannot exceed 4,000 feet. Distance between the first IOM and last IOM cannot exceed 4,000 feet.

Power supply	To power components in the Compass panel enclosure.	A filtered and regulated 12VDC 2.5A power supply (MPS002) for a Locking Dual-Module Enclosure (IMH004). A filtered and regulated 12VDC 1.5A power supply (MPS001) for a Locking Single-Module Enclosure (IMH001).
Backup battery	To sustain power to an Intelligent Module when primary power fails.	For the Expanded Input/Output Control option, see Table 11-5. Otherwise, for RCO operation, see subsection 3.6.3. To enable output relays to de-energize in the event of a primary loss of power, do not install backup batteries in an IOM enclosure

Table 11-5. Battery Backup Times for Expanded Input/Output Control Option for RCO Operation

Battery Size	Backup Time for Single-IOM	Backup Time for Dual-IOM
5 Ah	6 hours	
7 Ah		5 hours
12 Ah		9 hours

11.3 Installing Hardware for RCO Operation

11.3.1 Attaching Daughterboards to an IRM for RCO Operation

An IRM requires one of the following daughterboards to communicate with a Intelli-Site Server Host:

- RS485 Daughterboard (CDB-001)
- RS232 Daughterboard (CDB-002)
- RS232/RS485 Converter Daughterboard (CDB-004)
- Ethernet RS485 Converter Daughterboard (CDB-005)

For the RCO operation, an IRM requires a Control Communication Daughterboard (CDD) to communicate with one or more IOMs connected in a series.

To attach the two required daughterboards to an IRM, do the following (see Figure 11-2):

1. In the center of the IRM, remove the daughterboard post used for the daughterboard that communicates with the Intelli-Site Server Host.
2. In the CCD installation kit, find the two 3/8” female threaded nylon standoffs, one 1/2" male and female threaded nylon standoff, one 1/4" female threaded nylon standoff, and four nylon screws.

3. Install the two 3/8” nylon standoffs to the bottom forward holes of the CCD and secure them with the two nylon screws. Tighten the screws by hand..

4. Install the 1/2" standoff to the top single hole on the CCD securing it with one nylon screw. The male portion of the standoff shall be in the up position. Tighten the screw by hand.

5. Plug the 10-pin receptacle on the CDD into the 10 pins on the bottom of the IRM.

   The CCD terminal block of the CCD should extend out from the IRM. Make sure the nylon standoff male threads protrude through the hole in the IRM.

6. Screw the 1/4" standoff onto the male threads protruding through the IRM. Hand-tighten.

7. On the daughterboard to be used for Intelli-Site Server Host communication, plug the 14-pin receptacle to the 14 pins on the top of the IRM. The terminal block on this daughterboard must face away from the edge and be in the center of the IRM. Make sure that the daughterboard does not press the RAM Clear button in the center of the IRM.

8. On the daughterboard to be used for Intelli-Site Server Host communication, align the hole with the standoff on the IRM. Secure the daughterboard using the nylon screw Tighten the screw by hand.

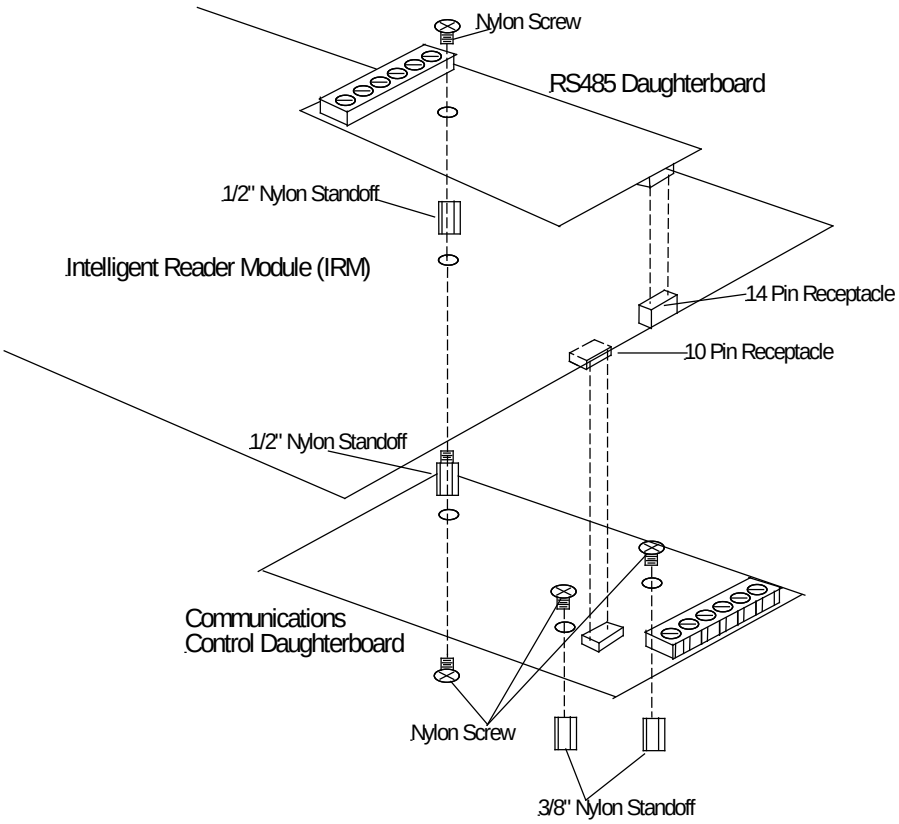

Figure 11-2. Daughterboard Installation on an IRM for RCO Operation

11.3.2 Installing an IRM in an Enclosure for RCO Operation

If you purchased the Expanded Input/Output Control modules as unbundled components, EOL resistors and four standoffs (three plastic, one metal) are shipped with each IRM or IOM. A Control Communication Daughterboard (CCD) is shipped with all standoffs required to attach it to an IRM.

To install an IRM with an attached CCD in an enclosure, do the following:

1. Mount the enclosure as described in Subsection 3.4.
2. Remove and wire the quick-disconnect terminals on the IRM as described in Subsection 3.5.
3. Open the IRM installation kit and remove the metal grounding screw.
4. Align and install the IRM with the CCD attached onto the three fasteners.

   When using the IMH004 dual module enclosure, mount the IRM module on the bottom mount.
5. Insert the metal standoff in the Offset Mounting Hole (see Figure 2-1).
6. Install the metal grounding screw.
7. Install the tamper switch wiring to Input #8 (see Figure 11-5).
8. Place the FCC compliance label that is shipped with each unbundled IRM in a conspicuous place inside the enclosure lid.

11.3.3 Installing a Power Supply for RCO Operation

11.3.3.1 Installing an MPS002 Power Supply for RCO Operation

A dual-module enclosure (IMH004) uses the 12VDC 2.5A power supply (MPS002) (see Figure 11-3).

To install the MPS002 power supply, do the following:

1. If you want battery backup, install the red wire (included) to the positive (+) BAT terminal and the black wire (included) to the negative (-) BAT terminal.
2. Insure that SW1 and SW2 on the power supply module are open.
3. With the power supply terminal block pointing up, align and install the module in the bottom right side of the dual module enclosure.

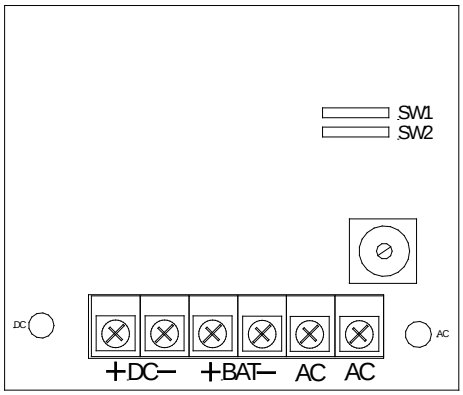

Figure 11-3. MPS002 Power Supply

11.3.3.2 Installing an MPS001 Power Supply for RCO Operation

A single-module enclosure (part number IMH001) uses the 12VDC 1.5A power supply (part number MPS001) (see Figure 11-4).

To install the MPS001 power supply, do the following:

1. If you want battery backup, attach the red wire (included) to the positive (+) BAT terminal and attach the black wire (included) to the negative (羊)BAT terminal.
2. With the power supply terminal block pointing to the left, align and install the module in the bottom right side of the single-module enclosure.

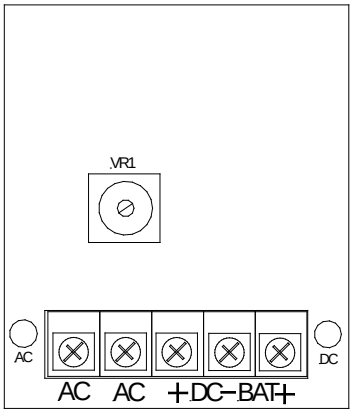

Figure 11-4. MPS001 Power Supply

11.3.4 Wiring IRM connections for RCO Operation

Figure 11-6 illustrates the IRM wiring termination for RCO operation.

The outputs on an IRM are not used for RCO operation. All output functions are communicated through the Control Communication Daughterboard to the IOM(s) attached to it.

The Control Communication Daughterboard and the RS485 Daughterboard have termination jumpers) as shown in Figure 11-8. These jumpers are used to match line impedance of the communication circuit. It is effective at the beginning and end of the wiring. Jumpers on the Control Communication Daughterboard and the last RS485 Daughterboard in the series farthest from the Control Communication Daughterboard are the only ones that affect the circuit. You should remove all other jumpers.

To remove the termination jumpers, place the jumper on a single pin.

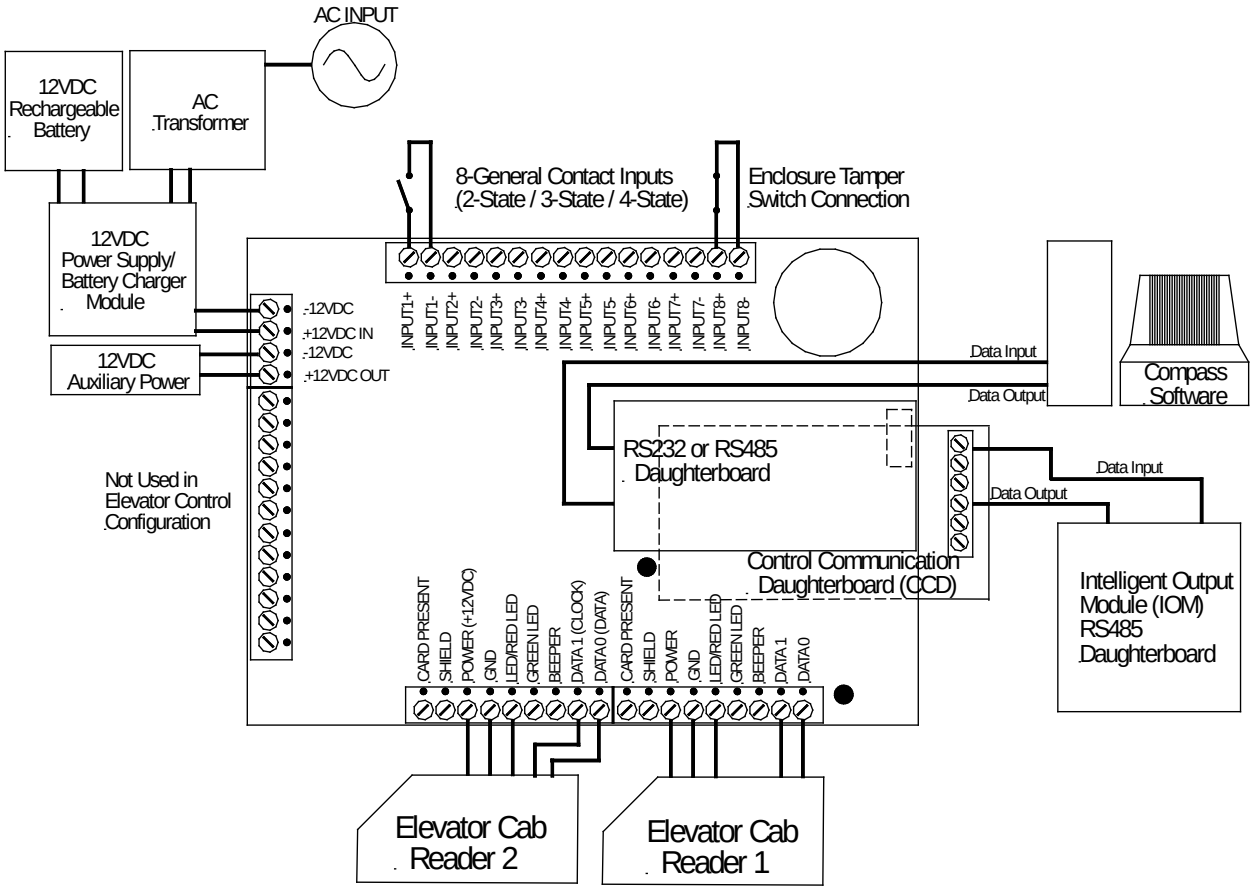

Figure 11-5. IRM Wiring Diagram for RCO Operation

11.3.5 Wiring IOM Connections for RCO Operation

Figure 11-6 illustrates the IOM wiring termination.

For information about installing the Intelligent Output Module (IOM), see the *Intelligent Input Module (IIM)/Intelligent Output Module (IOM) Installation Guide*, *COM-05*.

All output relays are energized when an IOM is used for elevator control. The normally-opened contacts are closed and the normally-closed contacts are open.

Check contacts for the wiring configuration with a resistance meter before connecting the wiring.

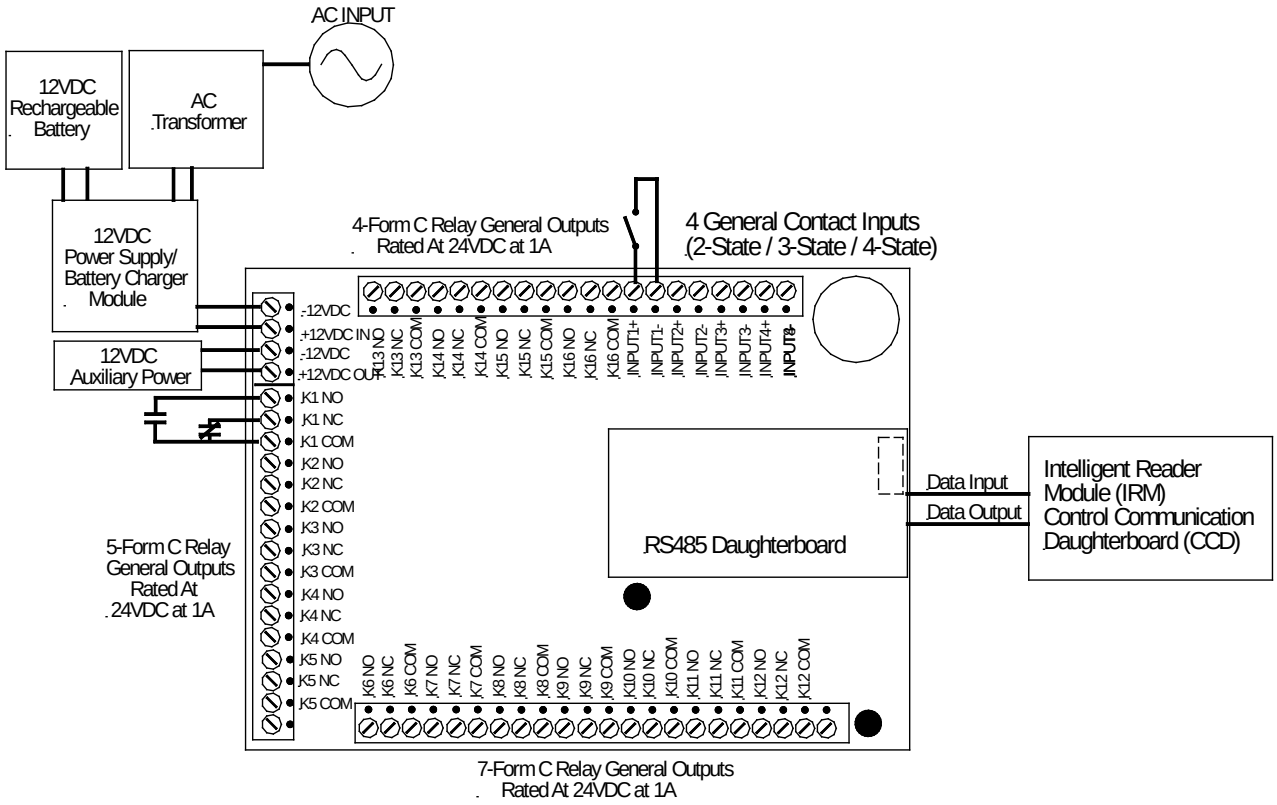

Figure 11-6. IOM Wiring Diagram

11.3.6 Wiring a CCD to RS485 Daughterboards on IOMs

In a SafeAxis application, a Control Communication Daughterboard on an IRM must be connected to an RS485 Daughterboard on the only IOM.

In a 5E or 6e application system, a Control Communication Daughterboard on an IRM must be connected to an RS485 Daughterboard on the first in a series of one to seven IOMs. The RS485 Daughterboard on each IOM must connect to the RS485 Daughterboard on the next IOM.

Table 11-6 identifies the connections from the Figure 11-7 shows the proper connections for these daughterboards from Control Communication Daughterboard on an IRM to the RS485 daughterboard on the first IOM and from the RS485 daughterboard on any IOM to the RS485 daughterboard on next IOM.

Table 11-6. Communication Connections from a CDD to the RS485 Daughterboard(s) on IOM(s)

CDD on IRM	RS485 Daughterboard on First IOM
RX-	TX-
RX+	TX+
TX-	RX-
TX+	RX+

RS485 Daughterboard on an IOM	RS485 Daughterboard on Next IOM
RX-	RX-
RX+	RX+
TX-	TX-
TX+	TX+

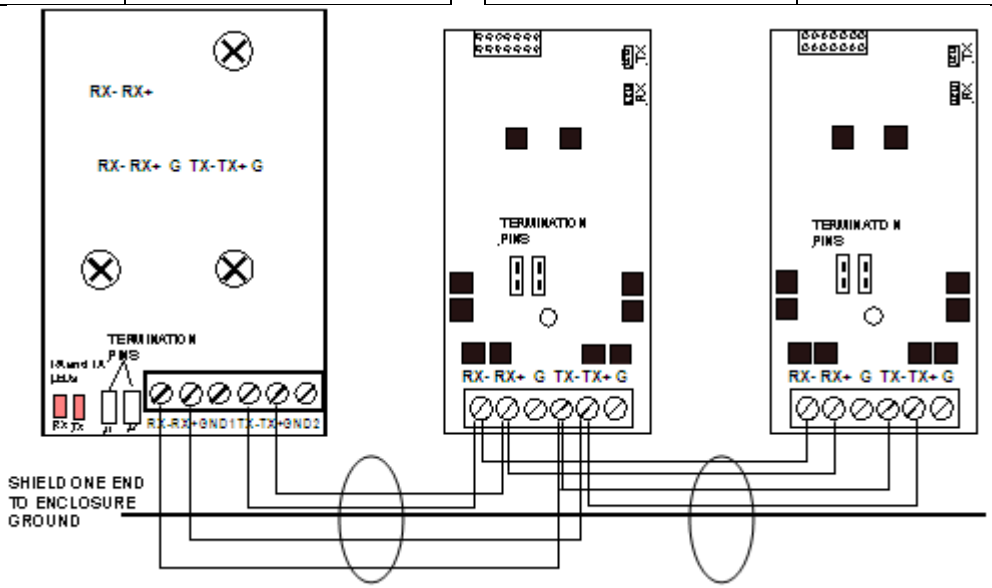

Figure 11-7. CCD to RS485 Daughterboard Connections for RCO Operation

The Control Communication Daughterboard and the RS485 Daughterboard have termination jumpers, as shown in Figure 11-7. These jumpers are used to match line impedance of the communication circuit. It is effective at the beginning and end of the wiring. Jumpers on the Control Communication Daughterboard and the last RS485 Daughterboard in the series farthest from the Control Communication Daughterboard are the only ones that affect the circuit. You should remove all other jumpers.

To remove the termination jumpers, place the jumper on a single pin.