Micro/5

Installation Manual

Document number/revision: **460130002D** (November 2005).

Intended use Use this product only for the purpose it was designed for; refer to the data sheet and user documentation. For the latest product information, contact your local supplier or visit us online at `www.gesecurity.com`.

FCC compliance 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.

You are cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Regulatory

Contact Direct all inquiries with regard to this product to:

GE
Security

U.S.
T 888 GE SECURITY (1 888 437 3287)
F 561 998 6224

Asia
T 852 2907 8108
F 852 2142 5063

Australia
T 61 3 9259 4700
F 61 3 9259 4799

Europe
T 32 2 725 11 20
F 32 2 721 86-13

Latin America
T 305 593 4301
F 305 267 4300

www.gesecurity.com

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Preface

This is the GE *Micro/5 Installation Manual*. This document includes an overview of the product and detailed instructions explaining:

- how to mount the cabinet;
- how to install and wire the microcontroller boards; and
- how to configure the microcontroller.

There is also information describing how to contact technical support if you have questions or concerns.

Read these instructions and all supporting documentation entirely before installing or operating this product. The most current versions of this and related documentation may be found on our website. Refer to *Online publication library* on page 158 for instructions on accessing our online publication library.

A qualified service person, complying with all applicable codes, should perform all required hardware installation.

Conventions used in this document

The following conventions are used in this document:

Bold	Menu items and buttons.
Italic	Emphasis of an instruction or point; special terms.
	File names, path names, windows, panes, tabs, fields, variables, and other GUI elements.
	Titles of books and various documents.
Blue italic	(Electronic version) Hyperlinks to cross-references, related topics, and URL addresses.
`Monospace`	Text that displays on the computer screen.
	Programming or coding sequences.

Safety terms and symbols

These terms may appear in this manual:

CAUTION:	*Cautions* identify conditions or practices that may result in damage to the equipment or other property.

WARNING:	***Warnings* identify conditions or practices that could result in equipment damage or serious personal injury.**

Chapter 1 Introduction

This chapter provides an overview of your Micro/5 controller along with its technical specifications.

In this chapter:

Product overview

The Micro/5 provides distributed processing for the interface of access control readers, keypads, alarm inputs and outputs back to a host system computer. This distributed processing allows each Micro/5 microcontroller to operate independent of the host system computer with the majority of access control and alarm monitoring decisions made locally at the microcontroller. The Micro/5 provides instant response for door control and alarm sensing in the field, while leaving the host system computer with more processing power for quickly executing daily operations such as alarm response, database updates and reporting.

The Micro/5 has five card file slots for microcontroller boards. All boards plug into the microcontroller backplane making field configuration and maintenance easy and economical.

The Micro/5 additionally incorporates “FLASH” memory technology that provides the ability to receive its operating system and application remotely from the host system over the already established communications path. This allows future firmware upgrades centrally from the host system without requiring costly service trips to each location for firmware replacement. Both the modular design and the “FLASH” memory technology of the Micro/5 provide a simple migration path when considering future host system upgrades.

The Micro/5 consists of the following:

- Enclosure (all steel cabinet with keylock and tamper-switch-protected door)
- Power supply (user-provided)
- Battery backup power supply (user-provided)
- Power/Communications board

Options include:

- CPU board (select one): PX, PXN, or PXNplus
- Reader Processing board (select one type): 2RP, 2SRP, 8RP, or CK8RP
- Digital Input board: 20DI
- Digital Output board: 16DO or 16DOR

The items received in your shipment depend on the items ordered. Inspect the package and contents for visible damage. If any components are damaged or missing, do not use the unit; contact the supplier immediately. If you need to return the unit, you must ship it in the original box.

Specifications

For UL-compliant installations, refer to *UL compliance* on page 143.

Enclosure specifications

Enclosure specifications		
Physical dimensions	14 inches high x 10.5 inches wide x 6.25 inches deep 356mm high x 267mm wide x 159mm deep	
Operating environment	+35F to +122F (+2C to +50C)	
Humidity range	5% to 95% non-condensing	
Thermal air cooling	At least 6 inches (15.2 cm) of clearance is required on all four sides of the controller	
Power (Door strikes powered separately)		
Controller powered by	External 12 - 15 VDC, 3 to 6 amp power supply (purchased separately) Battery backup recommended (purchased separately)	
Controller power requirements	12 to 15 VDC, 3 to 5 amps Recommended power supply rating: • 8 reader Proximity (9xx): 3 amp • 8/16 reader non-Proximity: 3 amp • 16 reader Proximity: 5 amp (If installing more than two 16 DO/DOR boards in the same Micro/5, a 5 amp power supply is recommended.)	
Power dissipation	50 watts maximum	
Cabling		
Host to micro	Network: Cat5 Serial: Dedicated Belden 8723 22-AWG, 2-pair twisted shielded wire recommended • RS-232: 100 feet maximum • RS-422: 2000 feet maximum Dial-up: Short or long haul modems for distances greater than 100 feet (30.5m)	
Micro to readers	(Refer to specific reader manual for more details.)	
	5V	Maximum cable distance 300 feet with pull-up resistors
	12V	Cable distance • greater than 500 feet and/or current per reader greater than 150 mA: use Belden 8725 (or equivalent) 20-AWG, 4-pair twisted shielded wire • less than 500 feet: use wire within 18- to 22-AWG range
micro to DIs or DOs	Use any cable with the desired number of individually shielded pairs	

Boards and devices		
CPU boards	PX, PXN, and PXNplus (See *CPU Specifications* on page 5.)	
Reader boards	Reader port power rating: 300mA maximum per port with a total micro power capacity of 2.7 amps	
	2RP or 2SRP	Number supported: four boards for maximum of eight readers Reader technology supported: Wiegand, Strobed, F/2F and Supervised F/2F Supports keypad only and keypad/reader technology Output devices maximum ratings: • Door DO (Reader LED) = 0.04 amps @ 24 VDC • Door strike (DO) relay = 2 amps @ 28 VDC or 30 VAC maximum • Aux output (DO) relay = 0.25 amps @ 40 VDC maximum • Alarm shunt relay = 0.25 amps @ 40 VDC maximum
	8RP	Number supported: two boards for maximum of sixteen readers Reader technology supported: F/2F or supervised F/2F Supports keypad only and keypad/reader technology Output devices maximum ratings: • Door DO (Reader LED) = 0.04 amps @ 24 VDC • 8RP board outputs = 0.10 amps @ 12 VDC maximum
20 DI board	Number supported: one to four boards	
16DO or 16DOR	Number supported: one to four boards Output devices maximum ratings: • 16DO board outputs: 0.04 amps @ 24 VDC maximum • 16DOR board relays: 2 amps @ 40 VDC or 30 VAC maximum	
Regulatory information		
Listings	FCC Class A UL 1076 UL 294 CE See *Chapter 8 Regulatory information* for more information.	

CPU Specifications

	PXNplus CPU board	PXN CPU board	PX CPU board
Communications interfaces			
Direct Serial (RS-232, RS-422)	Supported	N/A	Supported
Direct Serial Baud Rates	2400 4800 9600 19200	N/A	2400 4800 9600 19200
Direct Serial cabling	Belden 8723, 2-pair shielded, 22-AWG	N/A	Belden 8723, 2-pair shielded, 22-AWG
Dial-up Serial	Two options available: • Optional plug-in modem card. Can be either primary communications or fallback dial-up for network communications. • External modem.	For redundant communications channels. In case of network failure, dial-up connection to the host can be made. Requires optional PCMCIA modem card.	With external modem
Network	10/100 MB Ethernet, on-board Ethernet RJ-45 connection, TCP/IP	10/100 MB Ethernet PCMCIA Card, RJ-45 connection, TCP/IP	N/A
Network, Static IP	Supported	Supported	N/A
Network, DNS, DHCP	Supported	Not supported	N/A
CPU specifications			
Operating system	uClinux	VRTX	VRTX
Processor	Xilinx	Motorola	Motorola
RAM	32 MB	8 MB	8 MB
FLASH memory	8 MB	2 MB	2 MB
Applications supported			
Secure Perfect	SP 6.11 or later	SP 3.x or later	SP3.x or later
Picture Perfect	PP 2.x or later	PP 1.5 or later	PP 1.4 or later

	PXNplus CPU board	PXN CPU board	PX CPU board
Application Capacities			
Secure Perfect 6.x			
Badge capacity	128,000	128,000	128,000
Offline badge history capacity	8,192*	8,192	8,192
Offline alarm history capacity	8,192*	8,192	8,192
Picture Perfect 2.x			
Badge capacity	200,000	125,000	125,000
Offline badge history capacity	5,000*	5,000	5,000
Offline alarm history capacity	2,000*	2,000	2,000
Picture Perfect 3.x			
Badge capacity	145,000	90,000	90,000
Offline badge history capacity	5,000*	5,000	5,000
Offline alarm history capacity	2,000*	2,000	2,000

*. This is a default allocation. The capacity can be re-allocated using the Integrated Configuration Tool.

Chapter 2 Installation planning and mounting

This chapter provides instructions for planning your installation and mounting of your Micro/5.

In this chapter:

Getting started roadmap

The following is a basic outline for installing and setting up your Micro/5 system. Some steps may have been done for you depending on what you ordered. Some steps are optional, depending on the additional equipment you plan to use. These steps are noted.

CAUTION: Do not apply power to any component until the installation is complete. Damage to components may occur if power is incorrectly applied.

1. Determine the cable clamps needed and obtain them prior to starting the installation.

   During the installation, remember to:

   - label all connections/cables for ease of maintenance.
   - leave enough slack in the wiring so the cables can be “dressed.” This minimizes interference during board removal or replacement.

2. Unpack your system. See *Product overview* on page 2.
3. Mount the enclosure. See *Mounting* on page 12.
4. Mount and install the power supply. See *Installing the power supply* on page 27.
5. Mount and install the battery backup. See *Installing the battery backup* on page 29.
6. Wire up the Power/Communications board. Be sure to configure and verify the switch settings. Refer to *Chapter 3, The Power/Communications Board* on page 15.
7. If using networked micros, verify your network is up and running.
8. Install and wire up the CPU board. For the PXNplus CPU board, be sure to configure and verify the jumpers. If this is a nework micro, plug in the network cable. Refer to *Chapter 4, The CPU Board* on page 33.
9. Insert the reader board(s) into the enclosure and wire up the readers to the micro. Be sure to configure and verify the switch settings, jumpers, and/or resistor packs. Refer to *Chapter 5, The reader processing board* on page 53.
10. If using digital inputs, insert the DI board into the enclosure and wire the digital inputs to the board. Be sure to configure and verify the switch settings. See *20 DI board* on page 106.
11. If using digital outputs, insert the DO board into the enclosure and wire the digital outputs to the board. Be sure to configure and verify the switch settings. See *16 DO and DOR boards* on page 110.
12. Test the wiring before you apply power. Refer to *Testing* on page 9.
13. Configure your micro. If using the PXNplus CPU board, configure the micro using the Integrated Configuration Tool. Refer to *Chapter 7, The Integrated Configuration Tool* on page 115.

Testing

Follow the steps below before powering up the controller.

1. Measure the AC power supplied to the power supply (110 VAC or 220 VAC, depending on the power supply installed). The power supply must have a dedicated circuit breaker. Do NOT plug into an outlet that is controlled by an on/off switch.
2. Test the reader power wiring to determine if a short circuit exists. Unplug each reader connector and measure, from the reader connector going out to the readers between pin 1 to chassis and pin 1 to pin 2, with an ohmmeter.

   Result: A measurement of less than 100 ohms indicates a short circuit. Correct this condition before powering up.
3. If a 16 DO board is installed, check for a short circuit. Unplug each connector and measure from chassis ground to all pins on the DO connector.

   Result: A measurement of less than 100 ohms indicates a short circuit. Trace out the wiring to locate the short circuit.
4. Reconnect all connectors.
5. Disconnect power input connector J6 on the Power/Communications board.
6. Use a voltmeter to measure input voltage across J6. Pin 3 = +, pin 4 = Ground.

   Result: If the meter reads -12 to -15 VDC, the wires are reversed.

   Solution: Reverse the wires on pins 3 and 4 so pin 3 is the + voltage. The meter should read +12 to 15 VDC.
7. Reconnect the J6 connector.

Once you have completed these steps, power up the Micro/5.

Safety

Radio interference

WARNING: **This is an FCC Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take adequate measures.**

WARNUNG: **Dies ist ein Klasse A Produkt. In Haushalten kann es zu Interferenzen kommen. Der Benutzer ist in diesem Fall angehalten angemessene Maßnahmen auszuführen.**

Electrostatic Discharge (ESD) precaution

WARNING: **Circuit board components are vulnerable to damage by electrostatic discharge (ESD). ESD can cause immediate or subtle damage to sensitive electronic parts. An electrostatic charge can build up on the human body and then discharge when you touch a board. A discharge can be produced when walking across a carpet and touching a board, for example. Before handling any board, make sure you dissipate your body's charge by touching ground. This discharges any static electricity build-up.**

General installation rules

CAUTION: This equipment is to be installed, maintained and serviced by "authorized service persons only."

ACHTUNG: Dieses Gerät darf ausschließlich von einem „autorisierten Kundendienst" installiert, gewartet und repariert werden.

The authorized installation contractor should comply with the following rules:

- Neatly label cables at both ends.
  (For example, label should include: Micro Address Number/Device or Reader Number)
- Use individually shielded pairs of cables only. All wiring must comply with local, state, and federal electrical codes and fire codes.
- Obey all national, state, and local electrical and safety codes.
- Obtain any required permits and/or inspections. Contact the local fire marshal for assistance if necessary.
- Safety of customer personnel is the primary consideration of the installation.
- Neatly dress and tie or lace all wiring in a professional manner.
- Gather together and tape all unused conductors in multiple conductor cables.
- Shield all cabling and terminate properly.

Observing noise prevention procedures

Signal transmission

- Where practical, keep cables well separated from each other. Separate power cables from signal cables.
- Keep the break-out at the ends of signal cables as short as possible.
- Ground all shield drain wire(s) at the Micro/5 controller using the grounding studs provided inside the cabinet enclosure.
- For communication cables between microcontrollers, ground shield to the upstream microcontroller only.

CAUTION: Do not ground both cable ends.

Cable routing

Keep cabling at least one foot (30.5 cm) away from any power line or other AC voltage source.

Exercise caution when locating cables and Micro/5 components near any other equipment that may cause electrical interference (noise). Examples of electrical and electro-magnetic noise sources are:

- Fluorescent lighting and neon fixtures.
- Power distribution panels, including wiring, transformers, generators, and alternators.
- Motors that drive machinery such as air conditioners, elevators, escalators, large blowers, and machine tools. Electromagnetic equipment such as degaussers, magnetic chucks, etc. Control equipment (relays) for machinery and other switching devices that carry or switch large currents.
- Radio and television receivers and transmitters. Signal generators and intercom systems. Radar transmitting equipment.
- Arc welders, electrodischarge machinery and related equipment.
- RF induction heaters.

Cable length

- Minimize long parallel cable runs since they increase the likelihood of interference between signal cables and electrical interference sources.
- Avoid excess cable length between the Micro/5 and the optional equipment, such as readers and digital outputs, to reduce signal degradation due to external effects.

Mounting

Be sure to read the mounting and handling guidelines below before beginning to mount the micro.

Mounting and handling guidelines

Comply with the following guidelines:

- Locate the host computer and the Micro/5 controller in areas secure from any disruption to data communications or tampering.
- All mounting areas must be clean and clear of corrosive gases and airborne metallic particles. Avoid installing near photocopiers due to contamination from toner particles.
- The Micro/5 must be protected from hazardous (high) voltages.
- Mount the Micro/5 on vertical surface with at least six inches (15.2 centimeters) clearance on all four sides to support thermal air cooling.
- Locate the Micro/5 in a place that provides dedicated AC earth ground. The Micro/5 must be earth grounded.
- Keep interior and exterior housing of all Micro/5 cabinets and other components free of wire remnants.
- Avoid temperatures outside range specified for Micro/5 operating environment. Do not leave boards or other components in direct sunlight.
- To avoid mechanical damage, do not drop or stack boards.
- Do not subject printed circuit boards to electrostatic discharge.

Mounting instructions

Mount the controller cabinet using the following steps and referring to *Figure 1* on page 13.

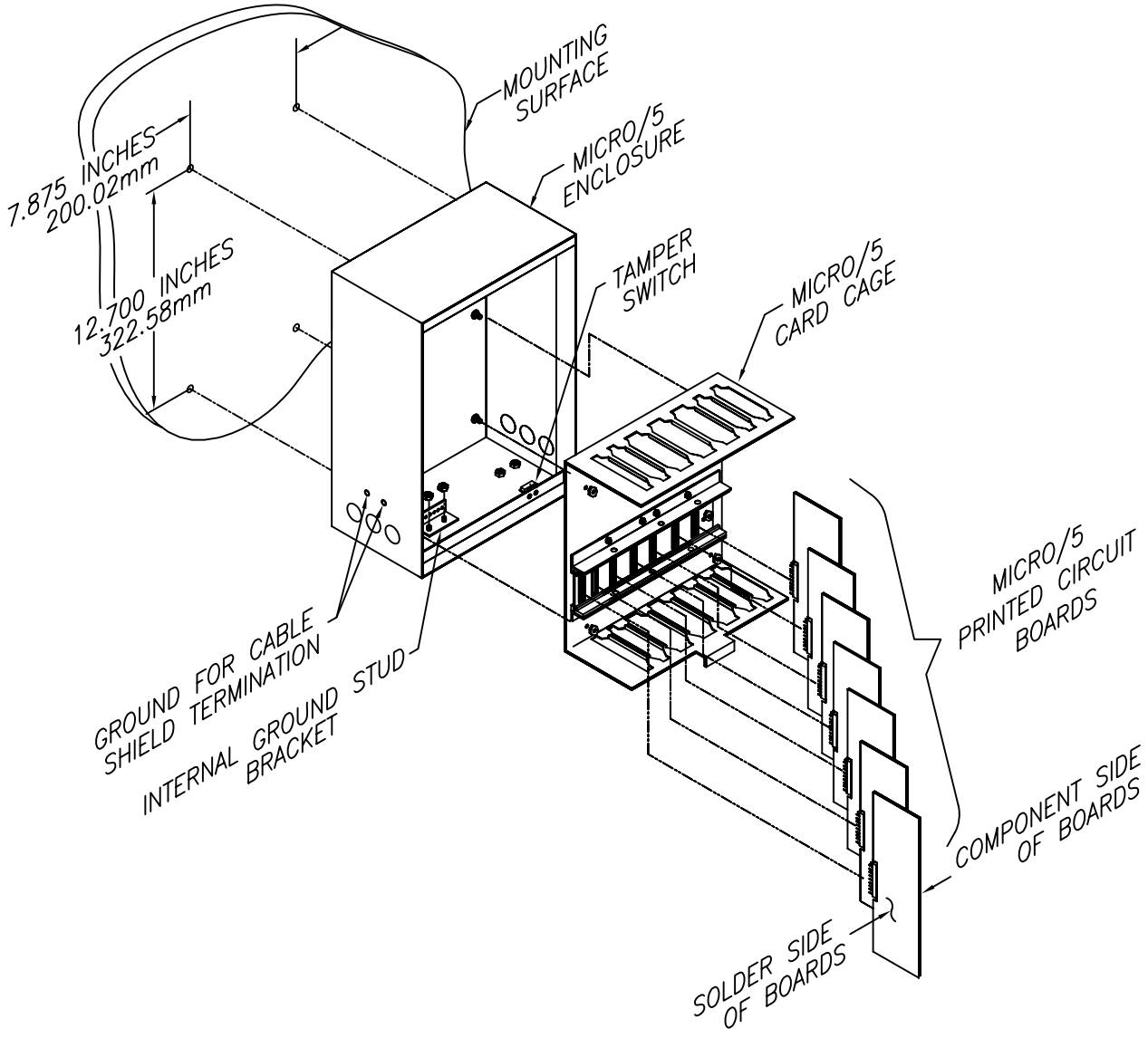
CAUTION: Do not apply power to any component during installation. Damage to components may occur if power is incorrectly applied.

1. Remove the packing material from the cabinet.
2. Unscrew four nuts to remove card cage. Use socket wrench for #10 nuts.
3. Measure and drill four mounting holes if required.
4. Bolt the cabinet securely to the wall using four 1/4 inch diameter thread lag bolts or equivalent with screw heads and washers. Replace the card cage.
5. Install cable conduit to Micro/5 cabinet knockout holes if required.

   Cabinet has knockout holes on three sides; cable is pulled through these holes. To open holes, strike knockouts from outside of cabinet.
6. Fit and tighten one 3/4 inch strain relief clamp in each knockout hole to be used.
7. Find the nearest earth ground (electrical box, ground bus, etc.). Run wire from the Micro/5 cabinet ground terminal (cabinet bottom left) to earth ground point. Use wire size in accordance with local and national electrical codes.

CAUTION: The Micro/5 must be earth grounded.

Figure 1. Micro/5 controller and components assembly drawing in standard enclosure



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Note: The Power/Communications board must be in far right slot and the CPU board must be in second right slot next to the Power/Communications board.

OEM - Micro/5

The OEM - Micro/5 is delivered without a GE enclosure for installation in another customer-specific enclosure. It is the responsibility of the installer to mount the controller in compliance with local safety codes and regulations.

Chapter 3 The Power/Communications Board

This chapter provides information about and instructions for using the Power/Communications microcontroller board.

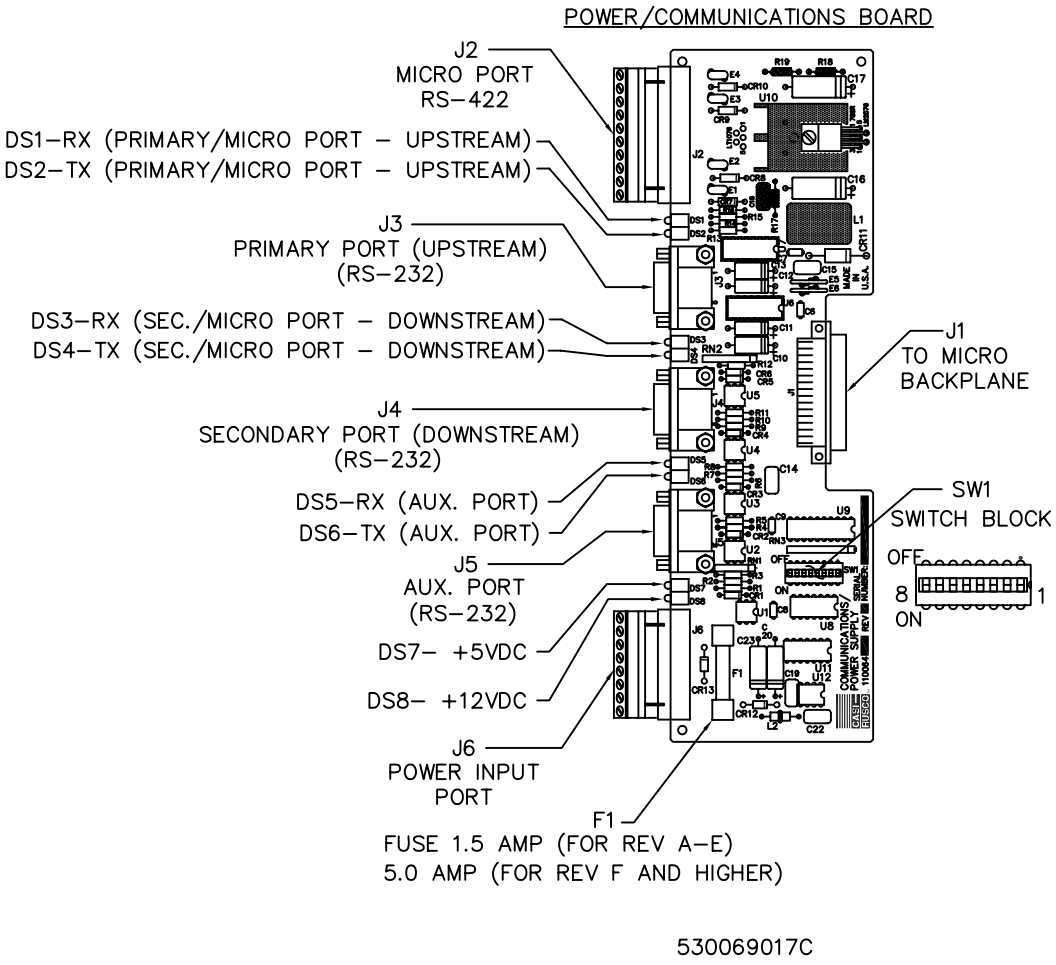
In this chapter:

Introduction

The Power/Communications board manages the power and controls the communications for the microcontroller.

Note: For the PX, PXN, and PXNplus using more than eight readers, the Power/Communications board requires a board revision of E or later.

Figure 2. Power/Communications board layout



Serial communications setup

DIP switch settings

The Power/Communications board contains one switch block (SW1). Use SW1 to set the micro port baud rate.

Note: Set both SW1-1 and SW1-2 to ON.

Table 1. Power/Communications board - micro port baud rate

Baud rate	Micro port			
	SW1-3	SW1-4	SW1-5	SW1-6
2400	ON		ON	
4800		ON		ON
9600	ON	ON	ON	ON
19200				

= OFF

Connector pinouts

The Power/Communications board contains five connectors which are detailed in the tables below.

Table 2. J2 - Micro port (RS-422)

Connector J2		
Pin	Signal name	
1	RX+	Receive data from upstream device (micro, host, or modem)
2	RX-	
3	RX2+	Receive secondary data from downstream micro
4	RX2-	
5	RX+	Receive data from downstream micro
6	RX-	
7	TX+	Transmit data to upstream device (micro, host, or modem)
8	TX-	
9	TX+	Transmit data to downstream micro
10	TX-	

Table 3. J3 - Primary port (RS-232)

Connector J3	
Pin	**Signal name**
1	CTS (jumped to pin 9)
2	(jumped to pin 7)
3	Ground
4	+5 VDC
5	Not used
6	Transmit (TX) data
7	(jumped to pin 2)
8	Received (RX) data
9	RTS (jumped to pin 1)

Table 4. J4 - Secondary port (RS-232)

Connector J4	
Pin	**Signal name**
1	CTS (jumped to pin 9)
2	(jumped to pin 7)
3	Ground
4	+5 VDC
5	Not used
6	Transmit (TX) data
7	(jumped to pin 2)
8	Receive (RX) data
9	RTS (Jumped to pin 1)

Table 5. J5 - Auxiliary port (RS-232)

Connector J5	
Pin	**Signal name**
1	CTS (jumped to pin 9)
2	(jumped to pin 7)
3	Ground
4	+5 VDC
5	Not used
6	TX - Transmit data
7	(jumped to pin 2)
8	RX - Receive data
9	RTS (jumped to pin 1)

Table 6. J6 - Power input port

Connector J6	
Pin	**Signal name**
1	+12 VDC
2	Ground
3	+12 VDC
4	Ground
5	+12 VDC
6	Ground
7	Micro cabinet tamper input
8	AC power fail input

Host computer wiring

Figure 3. Wiring host computer to first Micro/5

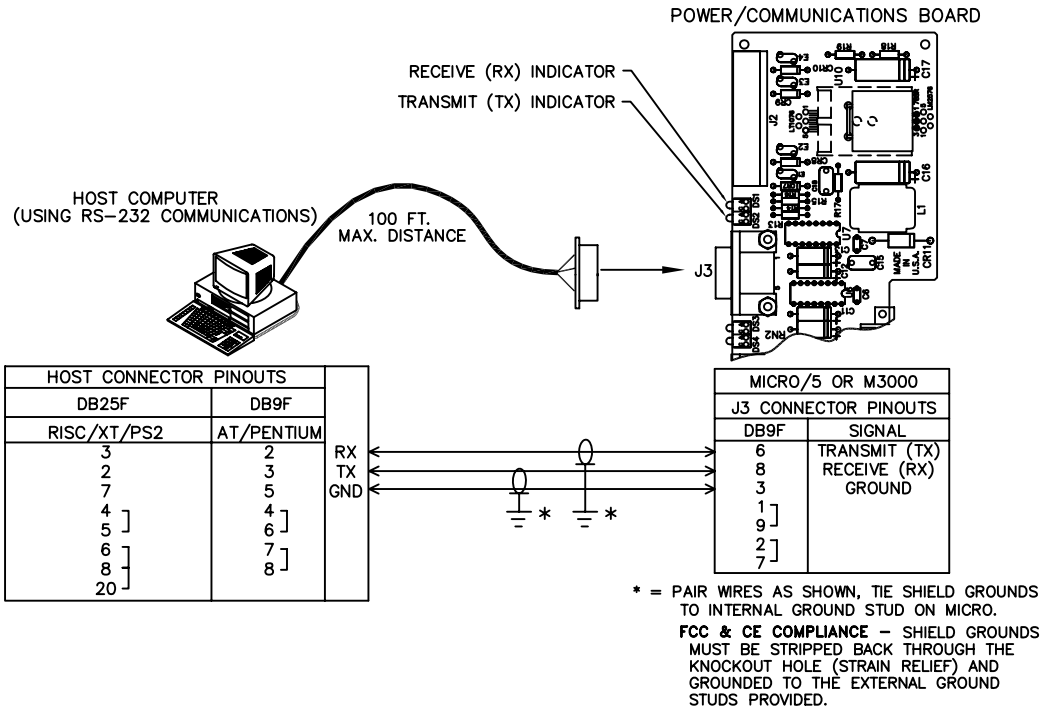
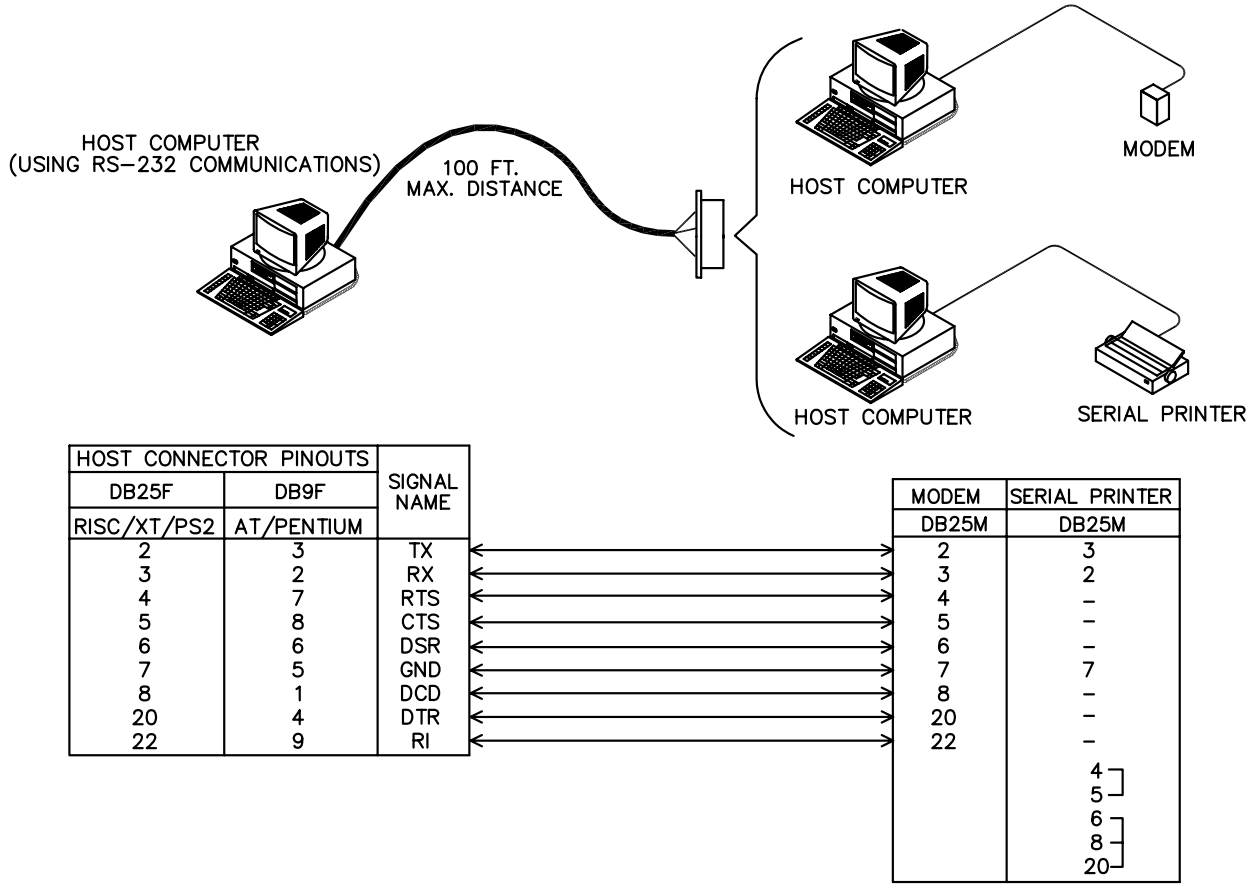
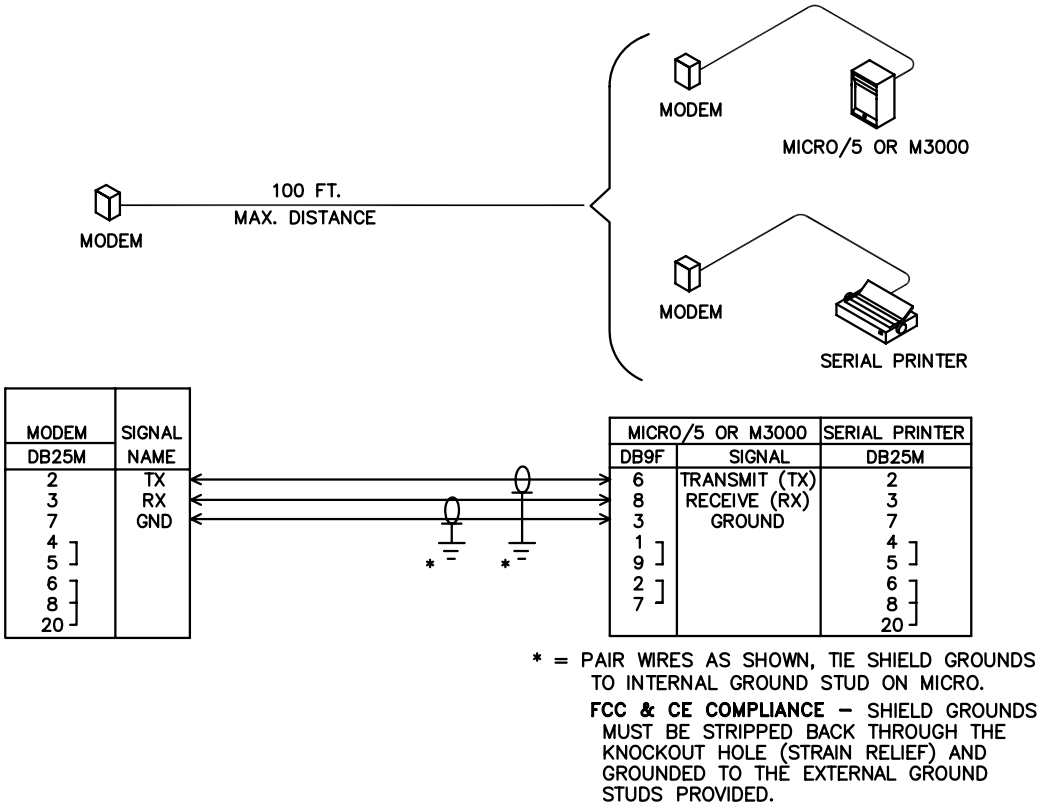


Figure 4. Wiring host computer to modem or serial printer



Note: If using a Digi board, use same pinouts listed in DB25F column.

Figure 5. Wiring modem to Micro/5 or serial printer



Microcontroller wiring

Once you have connected the first microcontroller to the host, you can continue to connect (daisy chain) additional microcontrollers together using the RS-232 or RS-422 port. Maximum cabling distance is 100 feet for RS-232 and 2,000 feet for RS-422. Detailed instructions on connecting microcontrollers follow.

RS-232 connection

The Power/Communications board RS-232 ports J3 and J4 can be used to connect microcontrollers together. Connect the host, modem, or upstream microcontroller to port J3. Connect downstream microcontroller to port J4.

Figure 6. Wiring upstream (toward the host) using RS-232

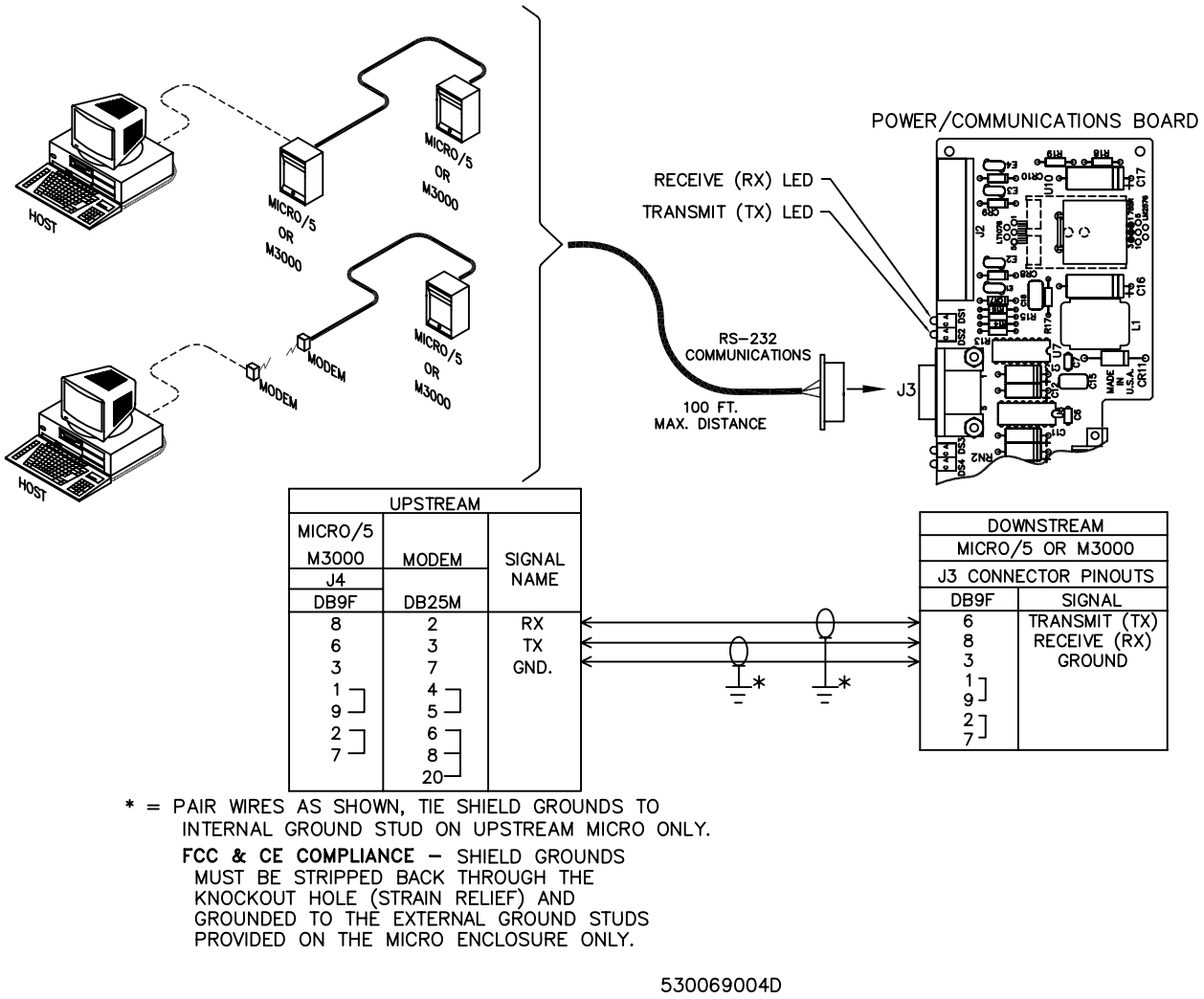
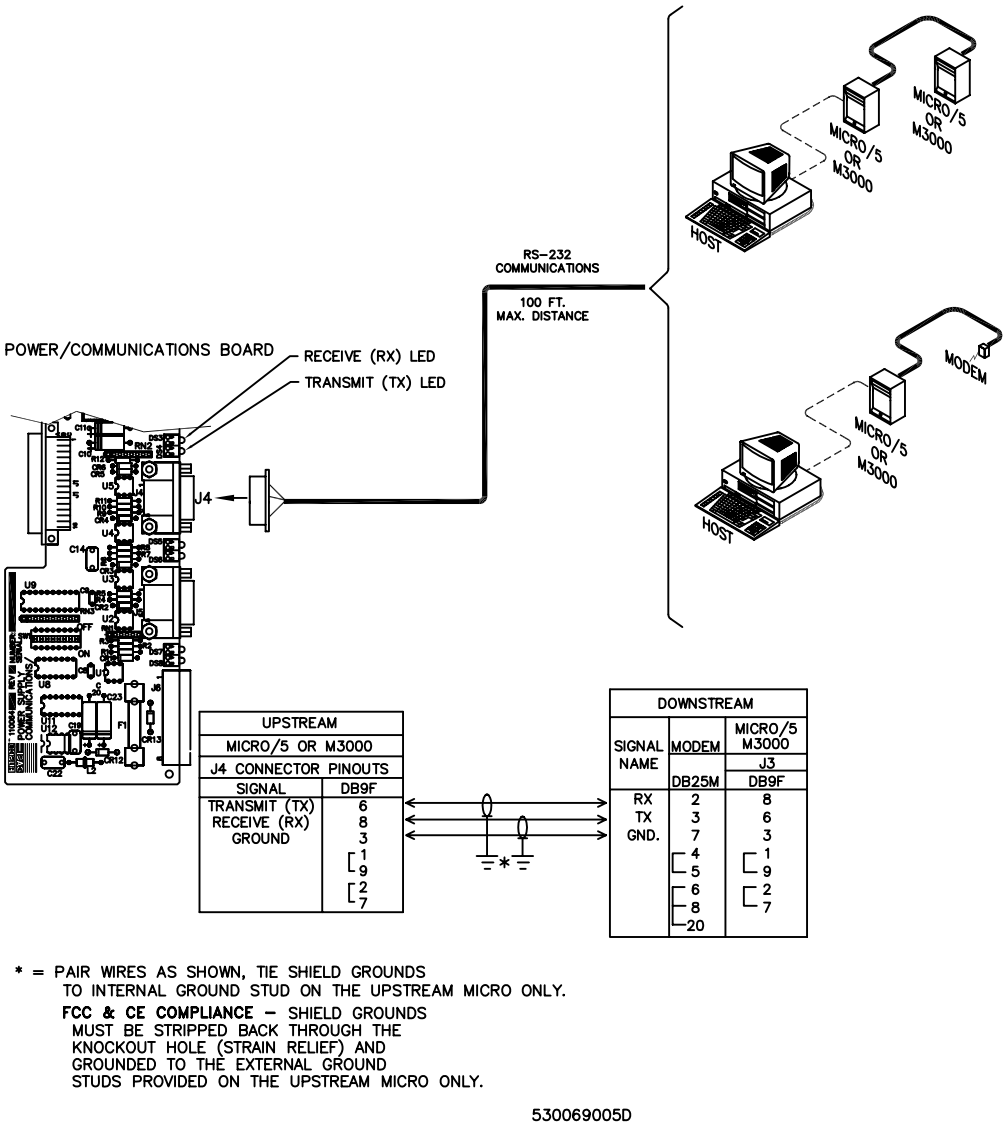


Figure 7. Wiring downstream (away from the host) using RS-232



* = PAIR WIRES AS SHOWN, TIE SHIELD GROUNDS TO INTERNAL GROUND STUD ON THE UPSTREAM MICRO ONLY.

FCC & CE COMPLIANCE – SHIELD GROUNDS MUST BE STRIPPED BACK THROUGH THE KNOCKOUT HOLE (STRAIN RELIEF) AND GROUNDED TO THE EXTERNAL GROUND STUDS PROVIDED ON THE UPSTREAM MICRO ONLY.

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RS-422 connection

The Power/Communications board RS-422 port J2 can be used to connect microcontrollers together.

Figure 8. Wiring upstream (toward the host) using RS-422

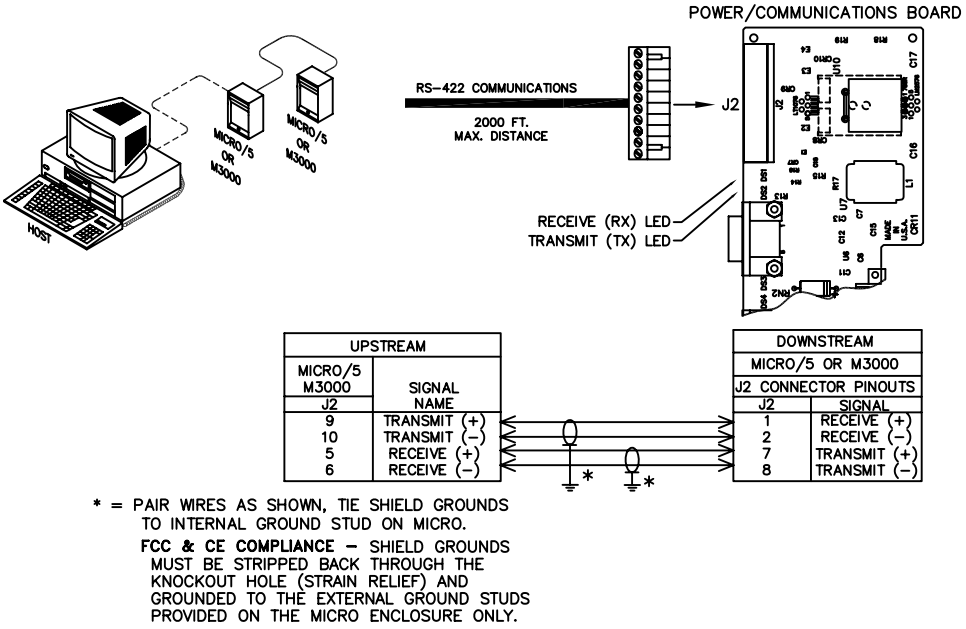
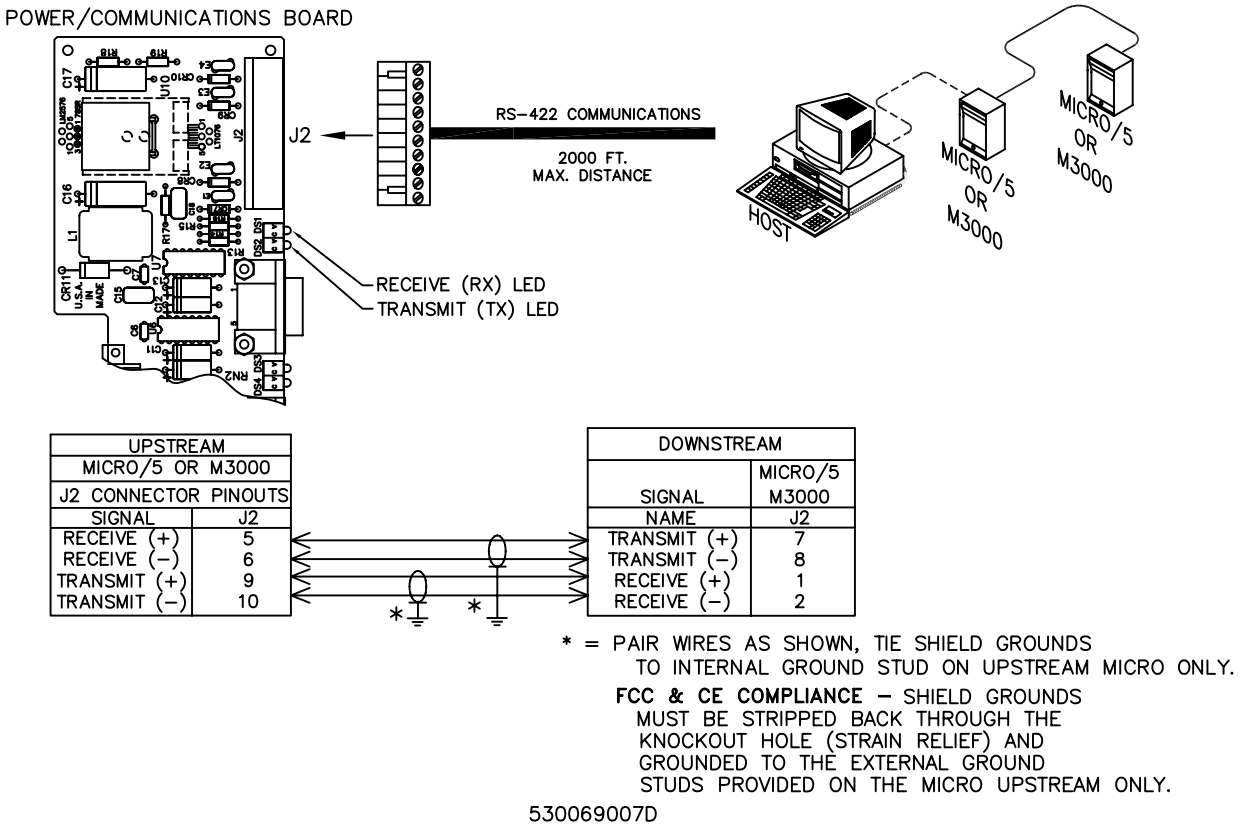


Figure 9. Wiring downstream (away from the host) using RS-422



Shield wire grounding

To ground the shield wire:

1. Connect the communications cable shield to the ground nut adjacent to the cable entrance knockout of the cabinet enclosure. For more details, see *Figure 55, Typical installation using shielded cable/drain wire - outside and inside the enclosure* on page 140 or *Figure 56, Typical network installation for Micro/5-PXN only* on page 141.
2. **For host-to-micro connection:** ground shield wire at micro.
   For micro-to-micro connection: ground shield wire at upstream micro.

CAUTION: Do not ground both cable ends.

Wiring the Aux port

The Aux port J5 is used to connect a Model 351 Time Display or to supply diagnostic information to a diagnostics program running on the host. Pinouts for this port are the same as J3 and J4.

Power setup

Installing the power supply

This section describes wiring and using a power supply.

Note: **1.** A readily accessible disconnect device shall be incorporated in the building installation wiring.
2. This equipment has been designed for connection to an IT power distribution system.

Hinweis: **1.** Ein leicht zugängliches Ausschaltgerät muss in die Installationsverkabelung des Gebäudes integriert werden.
2. Dieses Gerät wurde für den Anschluss an ein IT-Stromverteilungssystem entworfen.

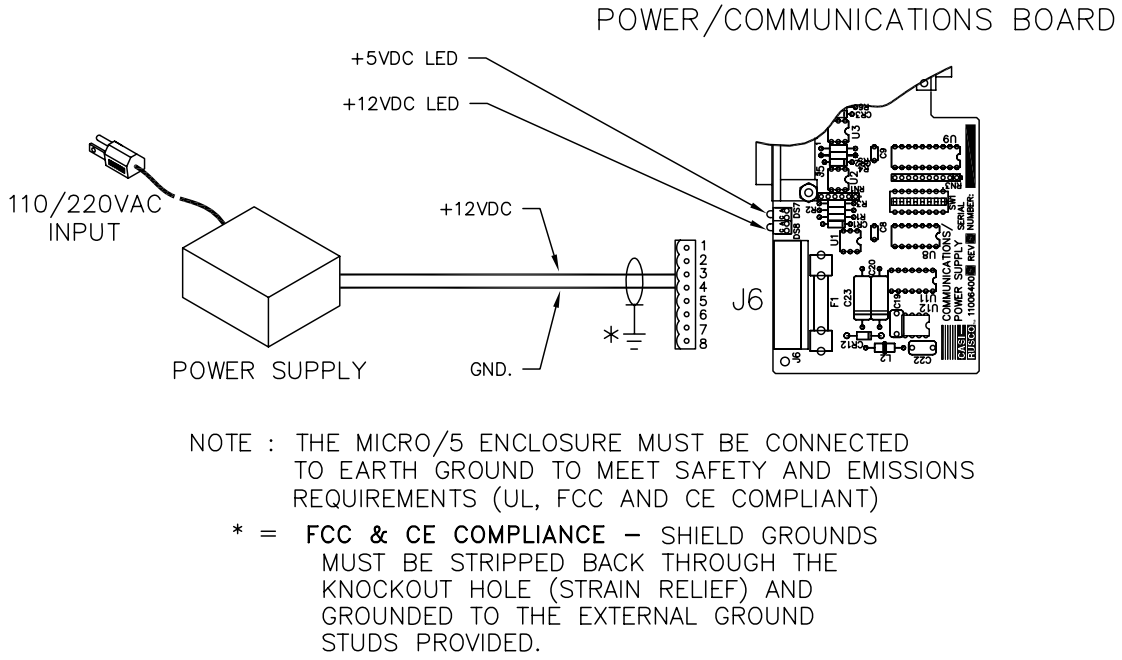
The Micro/5 requires a 12 to 15 VDC power supply with a 3 amp current rating or greater depending on the configuration. (Refer to *Specifications* on page 3.) Several Micro/5 controllers can be powered by the same power supply. If this is done, the rating, if using 3 amps per Micro/5 installed, would be 9 amps (for example: 3 Micro/5s x 3 amps = 9 amps). If using high current readers, increase the rating as needed. All micros, readers and other devices should be referenced to the same AC ground.

Note: If installing two 8RP boards or one or more 4CRP boards, use a 5-amp power supply. For UL Listed systems, 3 amp power supply MUST be used (refer to *Chapter 8, Regulatory information* on page 139).

1. Mount the power supply near the Micro/5 cabinet.
2. Run the wire through the knockout hole to the Power/Communications board J6 connector; pinouts are:
   - Pin 3 = + 12 VDC
   - Pin 4 = - Ground (12 VDC return)

CAUTION:
1. Do not ground both cable ends.
2. If the polarity is reversed, the fuse will blow to prevent damage. If the fuse blows, replace with a fuse of the same type and rating:
For board revisions A - E, replace with a 1.5 amp 220V fuse.
For board revisions F and later, replace with a 5.0 amp 220V fuse.

Figure 10. Wiring power supply



3. Install the cabinet ground complying with the following guidelines:
   - Provide a dedicated AC ground for each microcontroller.
   - Find the nearest earth ground, such as an electrical box or a ground bus.
   - Run a 14-18 AWG wire from the microcontroller cabinet ground stud (located at the cabinet bottom left) to the earth ground point.

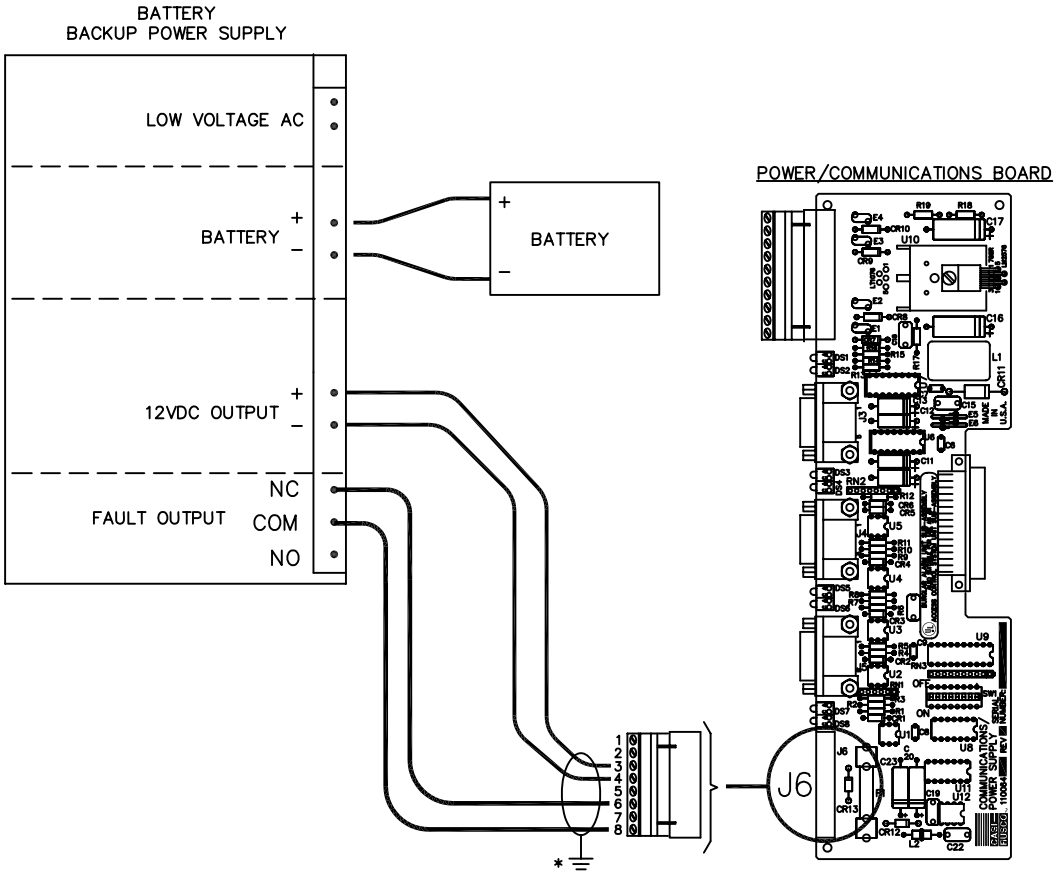
CAUTION: Microcontroller earth grounding (AC grounding) is a critical element for proper operation. Test AC power ground to ensure proper earth grounding. Using ohmmeter, measure resistance between Micro/5 ground stud and known good earth ground (metal water pipe or building structural steel frame). If resistance is greater than 50 ohms, it indicates poor AC ground. Good earth ground must be made before completing installation.

Installing the battery backup

The battery backup acts as a temporary power supply to Micro/5 when AC power is lost. *Figure 11* below shows a typical wiring between a battery backup power supply and a Micro/5 Power/Communications board. Refer to the manual or insert that came with your battery backup unit for specific wiring information.

CAUTION: Make sure AC input and battery backup power is disconnected prior to installing CPU, reader, DI and DO boards.

Figure 11. Wiring battery backup with built-in relay for fault output (AC power fail)



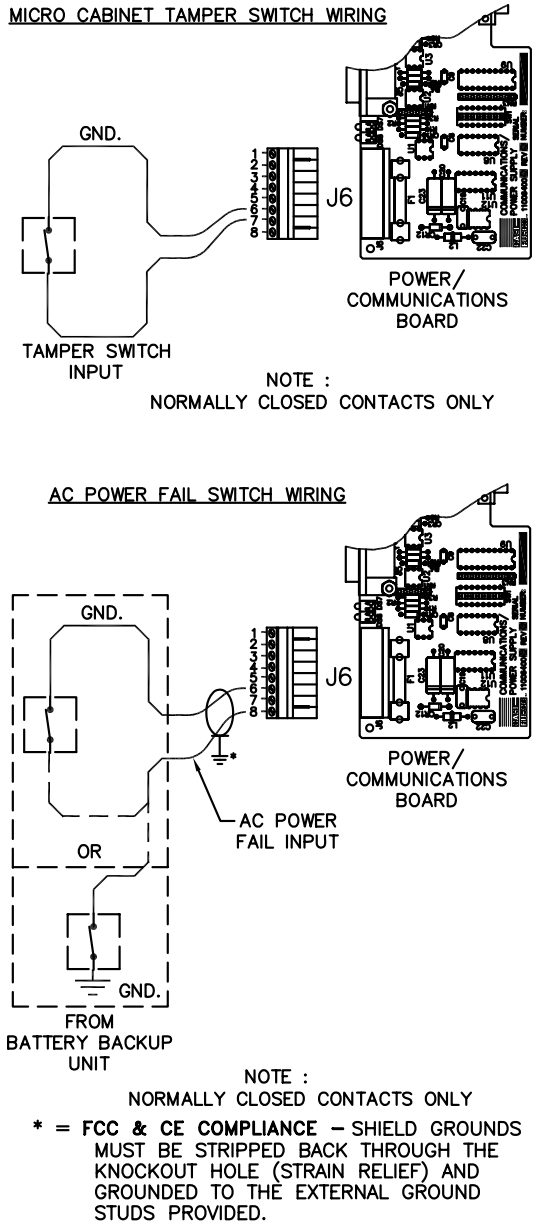
* = **FCC & CE COMPLIANCE** – SHIELD GROUNDS MUST BE STRIPPED BACK THROUGH THE KNOCKOUT HOLE (STRAIN RELIEF) AND GROUNDED TO THE EXTERNAL GROUND STUDS PROVIDED.

530089016A

Wiring micro tamper and AC power fail inputs

1. Connect the tamper switch to the power input connector J6 between pin 6 (Gnd) and pin 7 (tamper input). Use a normally closed contact only.
2. Connect AC power fail input from a battery backup unit to connector J6 between pin 6 (Gnd) and pin 8 (AC fail). The battery backup unit must supply either normally closed dry contact or a sense line that is low (Gnd), meaning no AC power failure.

Figure 12. Wiring micro tamper and AC power fail inputs



LED indicators on the Power/Communications board

The Power/Communications board has eight LEDs.

Table 7. LEDs on the Power/Communications board

LED number	State	Description
DS1	Flashing	Data received from upstream host/micro connected to primary/ micro port (Receive RX).
DS2	Flashing	Data transmitted to upstream host/micro connected to primary/ micro port (Transmit TX).
DS3	Flashing	Data received from downstream micro connected to secondary/ micro port.
DS4	Flashing	Data transmitted to downstream micro connected to secondary/ micro port.
DS5	Flashing	Data received from device connected to auxiliary port.
DS6	Flashing	Data transmitted to device connected to auxiliary port.
DS7	On	Indicates +5 VDC is present.
DS8	On	Indicates +12 VDC is present.

Chapter 4 The CPU Board

This chapter provides information about and instructions for using the CPU microcontroller board.

In this chapter:

Introduction

The Micro/5 controller supports three CPU boards: PX, PXN, and PXNplus. Each is explained in detail in the sections that follow.

PXNplus CPU board

Introduction

The PXNplus CPU board provides direct-connect, dial-up, and network capabilities in one board.

The following are some product highlights:

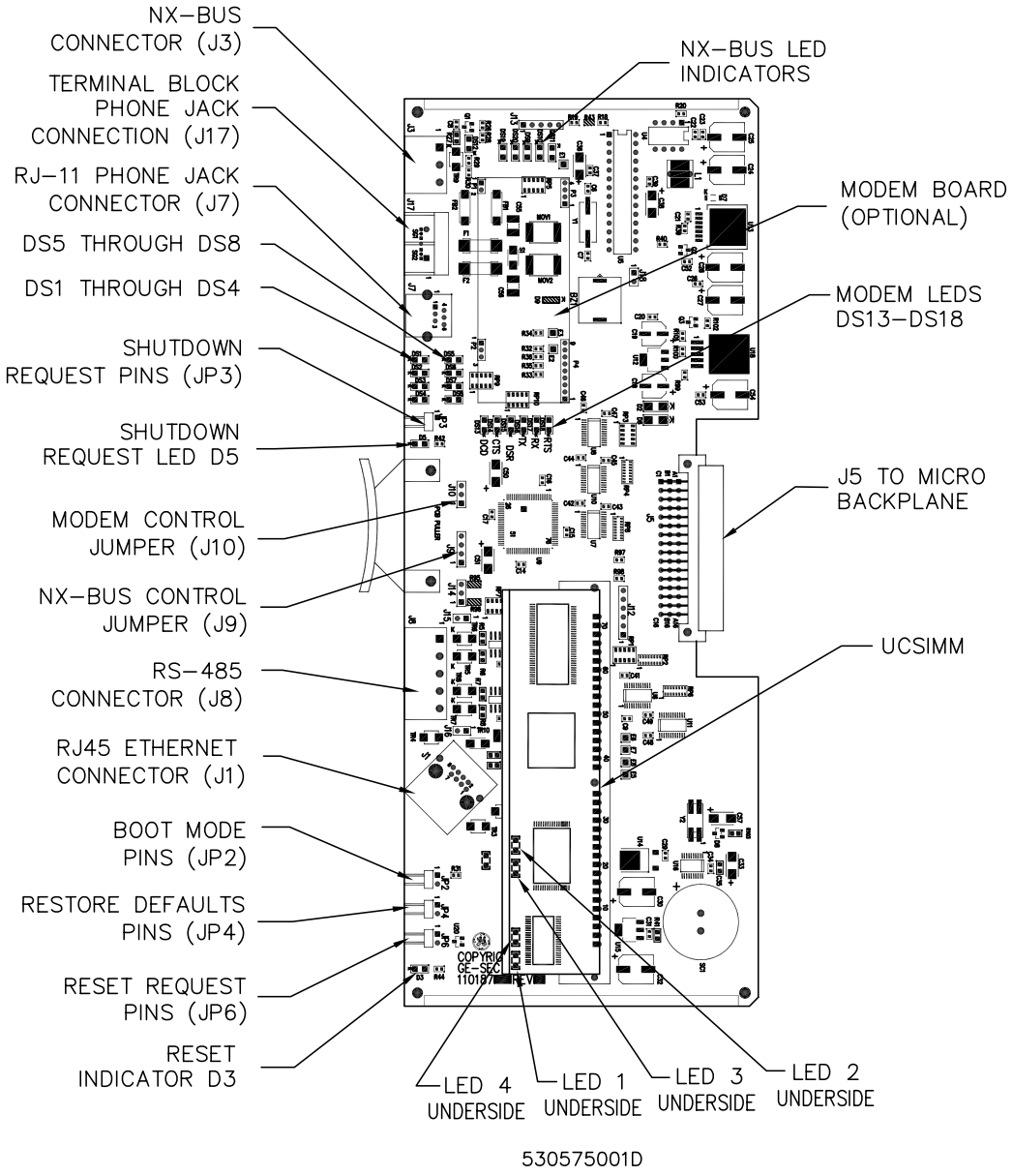
- Supports Ethernet networks.
- Supports the following network protocols: DHCP, TCP/IP, UDP, and DNS.
- Supports an optional, integrated modem board for dial-up connection or fallback dial-up.
- Provides nonvolatile storage which provides faster reset recovery and allows host-less operation.
- Utilizes a 32-bit platform which provides better response times and higher capacity.
- Allows for remote diagnostics.
- Supports up to seven downstream controllers using RS-232 or RS-422 serial connection and up to 64 readers.
- Provides a browser-based configuration tool. Refer to *Chapter 7, The Integrated Configuration Tool* on page 115.
- Works with either:
  - **Picture Perfect** Version 2.0 or later
  - **Secure Perfect** 6.1.1 or later.

  Refer to the appropriate Administrator's Guide for configuration of this board within the software.
- Provides a tunable offline history buffer.

A layout of the PXNplus CPU Board is shown on the following page.

Board layout

Figure 13. PXNplus CPU board layout



Pins and jumpers

General purpose pins

Table 8. General purpose pins

Pins	Shorting these pins ...
JP2 Boot Mode	Returns the board to boot maintenance mode.
JP3 Shutdown Request	Stops the application and allows the board to be removed.
JP4 Restore Defaults	Returns the configuration to the factory defaults.
JP6 Hardware Reset	Reboots the CPU board.

CAUTION: Earlier lines of GE micros sometimes required the "wrap plug" to force the CPU into maintenance mode. DO NOT use the wrap plug on the PXNplus CPU board. To properly set the micro into maintenance mode, short JP3 (Shutdown Request) for about 5 seconds until DS8 turns on. DS2 and DS3 then alternate On.

Upstream configuration jumper - J10

Table 9. Upstream configuration jumper

J10	
Pins	**Function**
1 and 2[1]	Upstream direct using J3 on the Power/Communications board
	External modem using J3 on the Power/Communications board
2 and 3	On-board modem on the CPU board

1. This is the default setting. If the jumper is missing, the default setting is used.

Downstream configuration jumper - J9

Table 10. Downstream configuration jumper

J9	
Pins	**Function**
1 and 2[1]	RS-232 using J4 on Power/Communications board
	RS-422 using J2 on the Power/Communications board
2 and 3	Reserved - Do not use.
3 and 4	Reserved - Do not use.

1. This is the default setting. If the jumper is missing, the default setting is used.

Inserting and removing the PXNplus board

CAUTION: Earlier lines of GE micros sometimes required the "wrap plug" to force the micro into maintenance mode. DO NOT use the wrap plug on the PXNplus CPU board. To properly set the micro into maintenance mode, short JP3 (Shutdown Request) for about 5 seconds until DS8 turns on. DS2 and DS3 then alternate On.

Inserting the PXNplus board

CAUTION: Follow standard static prevention procedures. See *Electrostatic Discharge (ESD) precaution* on page 10

1. Disconnect power and battery backup power.

   Note: When re-inserting the CPU board, the RS-485 J8 connector MUST be connected at all times to comply with CE. See *Figure 57, Location and grounding of the Power/Communications and CPU board for M5PXNplus only* on page 142.

2. Insert the CPU board into the micro.
3. Attach any necessary cables.

Removing the PXNplus board

CAUTION: Follow standard static prevention procedures. See *Electrostatic Discharge (ESD) precaution* on page 10.

1. To safely shut down the micro operating system, short JP3 for approximately 5 seconds until DS8 turns on. DS2 and DS3 then alternate On.
2. Disconnect power and battery backup power.
3. Remove any connected cables.
4. Carefully remove the CPU board from the micro.

LED indicators on the PXNplus CPU board

The LED state depends on which state the micro is in. There are two states:

- **Maintenance mode:** the state of the micro before any application is running. There are two maintenance mode states:
  - **Boot maintenance mode** - Provides initial start-up of the PXNplus.
  - **OS (operating system) maintenance mode** - Is a uClinux operating system.
- **Normal operation state:** the state of the micro after the application is downloaded. Use the Integrated Configuration Tool to select the application.

Table 11 shows the LED state transitions. See *Chapter 9 Troubleshooting, maintenance, support* for error conditions.

See *Figure 13, PXNplus CPU board layout* on page 35 for the location of the LEDs.

Table 11. PXNplus CPU board LED normal state transitions

	DS1	DS2	DS3	DS4	DS5	DS6	DS7	DS8
During power up	ON	ON	ON	ON	ON	ON	ON	ON
Boot maintenance state			ON					
OS (Operating system) maintenance mode		Alternates ON with DS3	Alternates ON with DS2				ON	
Normal operation state								
Micro offline	ON							
Address received		ON						
Badge read OK			ON					
Waiting for database				Flashing[1]				
Restore defaults requested				ON			ON	
Shutdown requested				ON				ON

1. For Picture Perfect systems: DS4 blinks once per second.
   For Secure Perfect systems: DS4 blinks twice followed by a one-second delay before repeating.

= OFF

Modem LED indicators on the PXNplus CPU board

See *Figure 13, PXNplus CPU board layout* on page 35 for the location of the LEDs.

Table 12. Modem LEDs on the PXNplus CPU board

LED number	Name	Description
DS13	DCD - Data Carrier Detect	Modems are connected.
DS14	CTS - Clear To Send	Modem is ready to send data.
DS15	DSR - Data Set Ready	When the modem is present, this LED is always On.
DS16	TX - Transmit	Modem is sending data.
DS17	RX - Receive	Modem is receiving data.
DS18	RTS - Request To Send	Micro is ready to send data.

UCSIMM board LED indicators on the PXNplus board

Table 13. LED indicators on the UCSIMM board

LED	LED2	LED3	LED4	LED1
Color	Yellow	Red	Red	Green
Purpose	100MB	Full Duplex	Collision	Link

Important information for firewall users

If your installation requires ANY micro and its corresponding host to communicate through a firewall, then the firewall must be configured to allow for connections through the following range of ports: 6767 to 7800. Currently, the following ports have been designated for use:

Table 14. For firewall users

Port	Name	Description
6767	Application (**Picture Perfect**)	Normal operation data port between micro and host.
6700-6709	Application (**Secure Perfect**)	Normal operation data port between micro and host.
6768	Key	Port for exchanging DES key information.
6868	Reserved	Future use port.
7777	Reserved	Future use port.

The following is a list of products that use these ports: GE micro firmware installation tools, Picture Perfect, Secure Perfect, Micro/5-PXN, M5PXNplus, Micro/PXN-2000, M2000PXNplus, and M3000PXNplus.

Configuring upstream communications with the host

By network

1. Verify you have a working network. If you need to configure before your network is running, skip to *step 3*.
2. Connect the network cable into J1, the Ethernet connector.
3. Use the Integrated Configuration Tool to set the board to network use. The default for this board is network so you may only need minimal set up. See *Chapter 7, The Integrated Configuration Tool* on page 115.

By network with fallback dial-up

Fallback dial-up is available only using the on-board modem.

1. Install the modem board on the PXNplus CPU board. Refer to the document *PXNplus Modem Board Installation Instructions*.
2. Verify you have a working network. If you need to configure before your network is running, skip to *step 3*.
3. Connect the network cable into J1, the Ethernet connector.
4. Use the Integrated Configuration Tool to set the board to network use with fallback dial-up. See *Chapter 7, The Integrated Configuration Tool* on page 115.

By direct-connect

1. Verify Jumper J10 is set to 1 and 2. See *Upstream configuration jumper - J10* on page 36.
2. Use the Integrated Configuration Tool to set the board to direct-connect. See *Chapter 7, The Integrated Configuration Tool* on page 115.

By dial-up

Using on-board modem board

1. Install the modem board on the PXNplus CPU board. Refer to the document *PXNplus Modem Board Installation Instructions*.
2. Set Jumper J10 to 2 and 3. See *Upstream configuration jumper - J10* on page 36.
3. Use the Integrated Configuration Tool to set the board to dial-up. See *Chapter 7, The Integrated Configuration Tool* on page 115.

Using external modem

1. Set up the external modem.
2. Verify Jumper J10 is set to 1 and 2. See *Upstream configuration jumper - J10* on page 36.
3. Use the Integrated Configuration Tool to set the board to dial-up. See *Chapter 7, The Integrated Configuration Tool* on page 115.

Configuring downstream communications

The PXNplus supports up to seven downstream controllers using RS-232 through J4 of the Power/Communications board or RS-422 through J2 of the Power/Communications board.

To use direct-connect downstream communications, set J9 to pins 1 and 2.

PXN CPU board

Introduction

The PXN CPU board allows you to network your micros by using PCMCIA card technology. Networking provides a faster method of communication and cuts down on wiring costs since it can use existing network wiring, such as Ethernet.

Note: The PXN CPU Board (110124-005) comes with 8 MB of RAM. Previous versions of the PXN came with 4 MB of RAM. If 8 MB is desired on these boards, you must purchase an upgrade.

The following are some product highlights:

- Based on the Motorola MC68302 Processor.
- Uses Dual-Socket PCMCIA controller to allow for a network and an optional dial-up connection.
- Uses TCP/IP network protocol.
- Supports Simple Network Management Protocol, SNMP V1 and V2.
- Provides an optional dial-up connection to the host using a PCMCIA card.
- Supports up to seven Micro/5-PX downstream from the network micro using RS-232 or RS-422 serial connection.
- There are no switches on this board. The IP address/micro address and/or phone number is set using one of the micro firmware installation tools. See the FlashTool online help for additional information.
- This board is used with:
  - **Picture Perfect** Version 1.5 or later. For configuration of this board within the **Picture Perfect** software, refer to your ***Picture Perfect*** *Administration Guide*.
  - **Secure Perfect** 3.0 or later. For configuration of this board within the **Secure Perfect** software, refer to your ***SP 3.0*** *Administrator's Guide*.

A layout of the PXN CPU Board is shown on the following page.

Note: The PXN CPU Board is now UL-compliant in dedicated Ethernet network configurations.

Note: In order for this product to be UL compliant, when the following CPU boards are installed: 110124005 or 110124006, the Picture Perfect firmware level must be 1.7 or later.

Board layouts

Figure 14. PXN CPU board layout (110124-005)

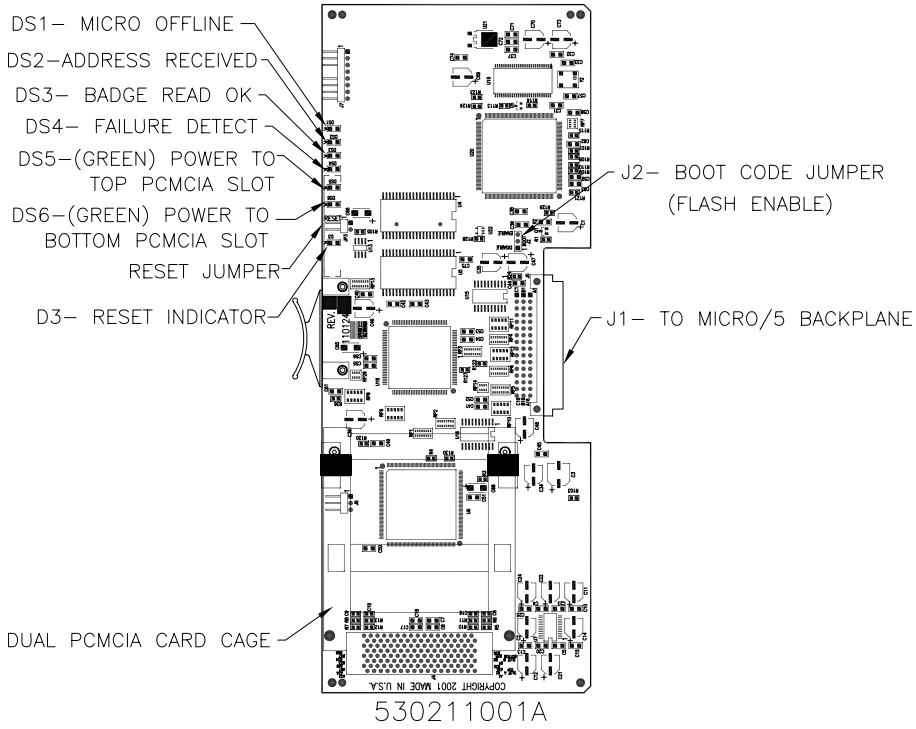
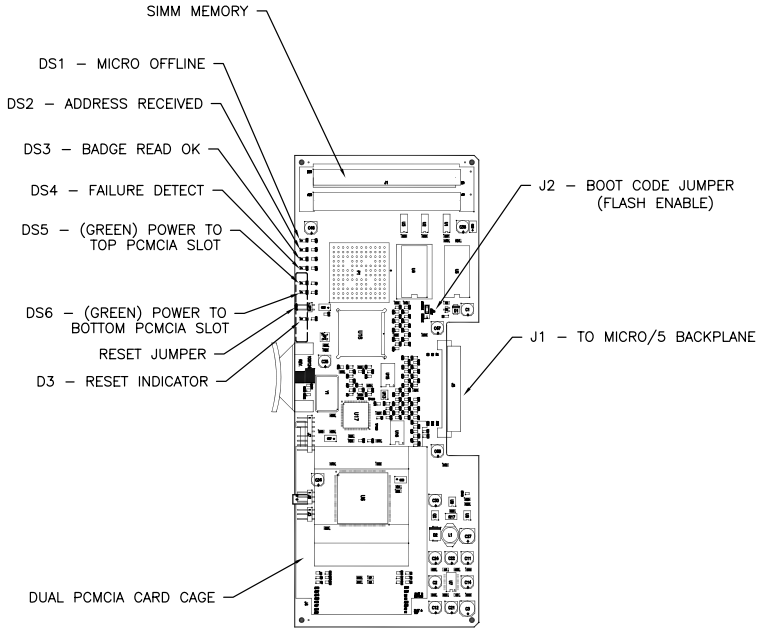


Figure 15. PXN CPU board layout (110124-004 and earlier)



DIP switch settings for the PXN CPU board

There are no switch settings on the PXN CPU board. The addressing is configured within the **Picture Perfect** and **Secure Perfect** software. When **Picture Perfect** is started, the first micro in the chain of micros talks to the host who responds by giving that micro its address. Then the second micro in the chain talks to the host and receives its address. This process continues until all the micros have received their address. When Secure Perfect 3.0 is started, you will need to use Flashtool to set address and network configuration information.

Jumpers

There is one jumper on the PXN CPU board. On the 100115 board, JP1 is the boot code jumper. On the 100124 board, J2 is the boot code jumper. The settings are detailed in the table below.

Table 15. Boot code jumper

Board	Jumper	Pins	Function
100115 -	JP1	1 and 2	Program Boot
		2 and 3	Run Application
100124 -	J2	2 and 3	Program Boot
		1 and 2	Run Application

Application code (firmware)

You will need to download firmware when:

- a micro is in maintenance mode. Refer to *Table 18, LEDs on the PXN CPU board* and *Table 19, State in operating system maintenance mode* on page 47 for the state of the LEDs when the micro is in maintenance mode.
- upgrading to a newer version of application code.

Note: When upgrading application code, you may also need to reflash the OS (Operating System).

The PXN CPU board ships in OS (Operating System) Maintenance Mode where DS2 and DS3 alternate On and Off.

There are two ways to download the application (see the Flashtool online help for additional information):

- a serial connection using one of the micro firmware installation tools.
- a network connection using the flash program from **Picture Perfect.**

Before downloading application, the IP addresses for the micro MUST be set. Refer to the table below for the additional settings needed.

Note: The IP Addresses can be set ONLY by using one of the GE micro firmware installation tools and a serial connection. See the FlashTool online help for additional information.

Table 16. Settings needed

M/5-PXN is...	Ethernet CPU	Token-Ring CPU
On the same LAN as the Host	• Micro IP Address • Host IP Address (**Picture Perfect** only) • Network Mask	• Micro IP Address • Host IP Address (**Picture Perfect** only) • Network Mask • Ring Speed (4MB or 16MB)
On a different LAN as the Host	Above parameters plus: • Router/Gateway IP Address • Hop Count (if not known, use maximum Hop count on Network)	Above parameters plus: • Router/Gateway IP Address • Hop Count (if not known, use maximum Hop count on Network)

If you wish to erase a Micro/5-PXN application code, refer to the FlashTool online help.

Important information for firewall users

If your installation requires ANY micro and its corresponding host to communicate through a firewall, then the firewall must be configured to allow for connections through the following range of ports: 6767 to 7800. Currently, the following ports have been designated for use:

Table 17. For firewall users

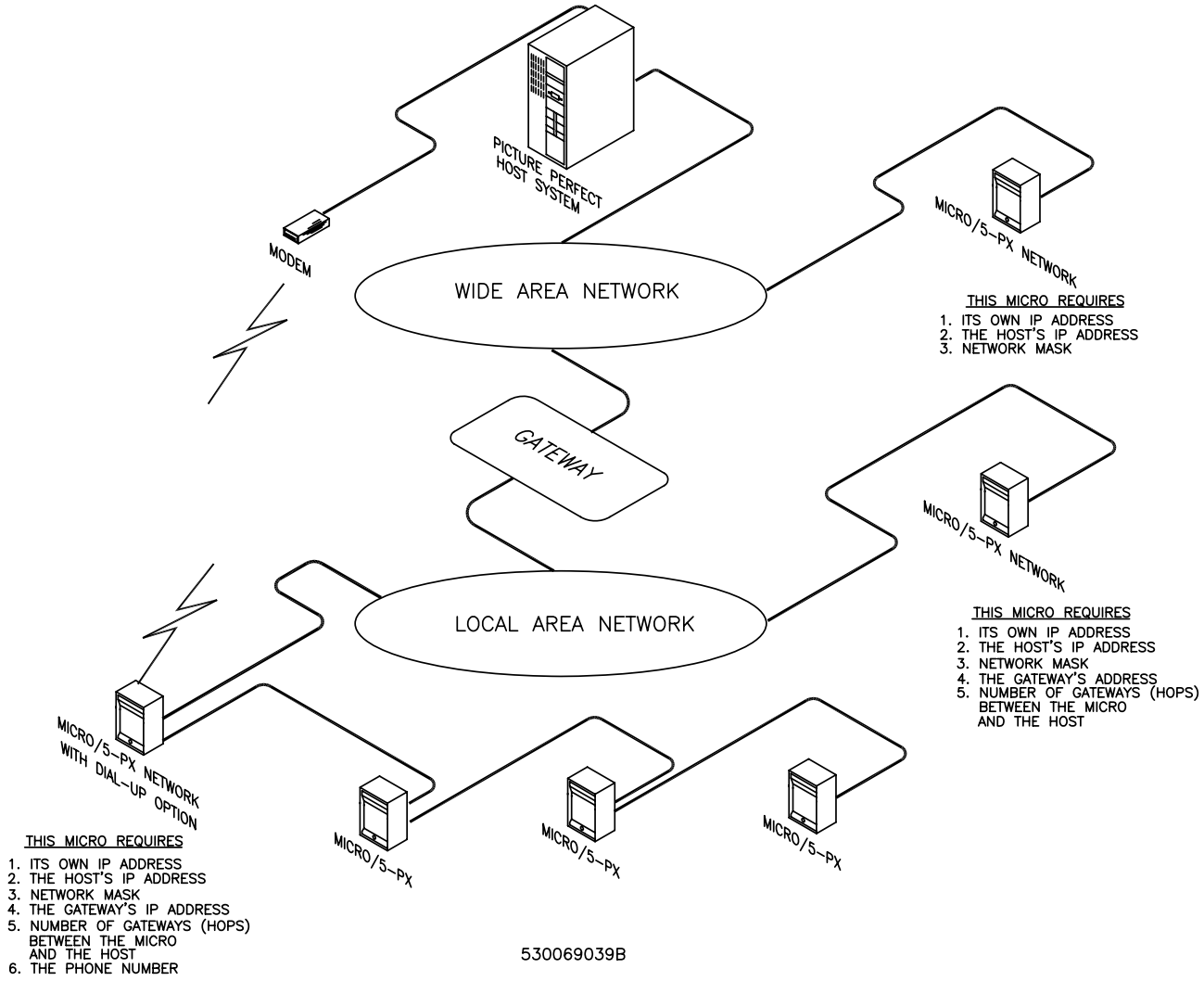
Port	Name	Description
6767	Application (**Picture Perfect**)	Normal operation data port between micro and host.
6700-6709	Application (**Secure Perfect**)	Normal operation data port between micro and host.
6768	Key	Port for exchanging DES key information.
6868	Reserved	Future use port.
7777	Reserved	Future use port.

The following is a list of products that use these ports: GE micro firmware installation tools, Picture Perfect, Secure Perfect, Micro/5-PXN, M5PXNplus, Micro/PXN-2000, M2000PXNplus, and M3000PXNplus.

Networking example

Figure 16 shows three different Micro/5-PXN micro configurations.

Figure 16. Networking example



The sections entitled THIS MICRO REQUIRES in the drawing above refer to the information that must be saved to the micro by using one of the GE micro firmware installation tools.

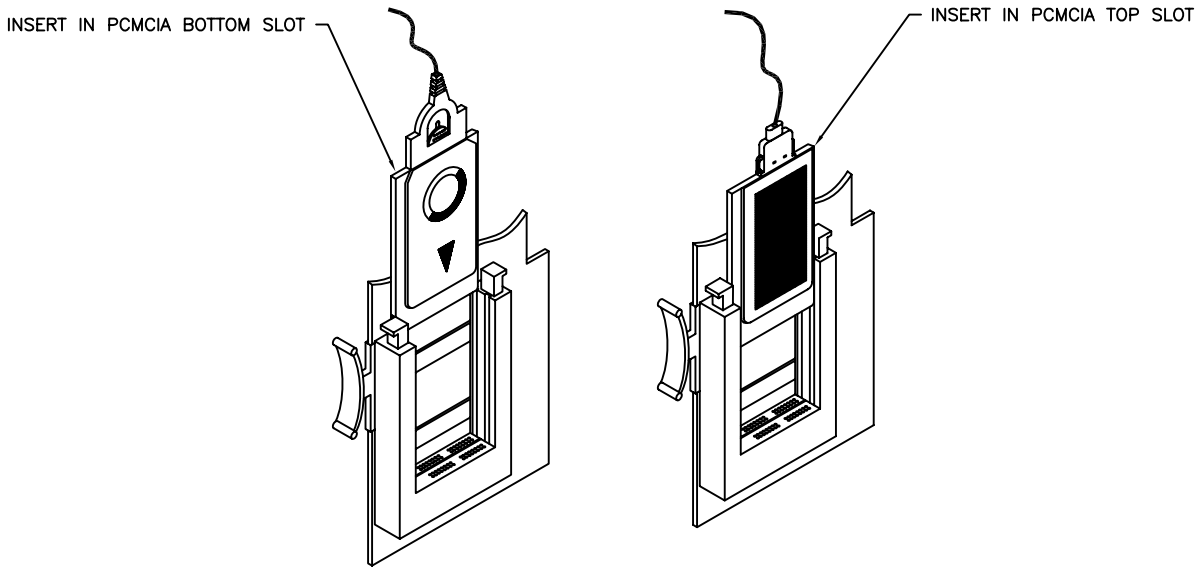
PCMCIA

The PXN CPU board supports the Ethernet network PCMCIA card. An optional dial-up fallback PCMCIA card can be used with a network PCMCIA card. You CANNOT have a Micro/5-PXN micro without a network PCMCIA card. In addition, you CANNOT have two network PCMCIA cards in the same Micro/5-PXN micro.

The PCMCIA card plugs into the small card cage located at the bottom of the board. See *Figure 17* below for more information. There are slots for two PCMCIA cards. The network PCMCIA card can be inserted in either slot. The second slot can be used for the optional dial-up fallback PCMCIA card.

Note: If you are using the US Robotics 33.6 card, the firmware version of the Micro/5-PXN MUST be at 1.5.1C or later.

Figure 17. Plugging in a PCMCIA



LED indicators on the PXN CPU board

Table 18 below shows the function of the LEDs on the PXN CPU board. If you are looking at the LEDs on an installed PXN CPU board, DS1 is the top LED.

Table 18. LEDs on the PXN CPU board

LED number	State in boot maintenance mode	State when application is running
DS1	Off	On = micro offline
DS2	Off	On = address received
DS3	On	On = badge read Ok
DS4	Off	On = CPU Failure Detected Flashing = Waiting for Database
D3	Off	Off = Normal operation Flashes On = Power on reset

Maintenance mode: The Micro/5-PXN is in maintenance mode before any application (personality) is downloaded to its flash EEPROM. **Boot Maintenance Mode** allows the Micro/5-PXN to be flashed or the parameter block to be viewed or changed serially.

The CPU will be in OS (Operating System) Maintenance Mode where:

- **DS2** and **DS3** alternate ON and OFF for **Picture Perfect**, and
- **DS1/2** and **DS3/4** alternate ON and OFF for **Secure Perfect 3.0**.

OS Maintenance Mode allows the Micro/5-PXN to be flashed, or the parameter block to be viewed or changed through the network. See *Table 19* below.

Table 19. State in operating system maintenance mode

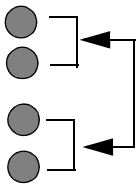
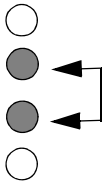
LED number	Secure Perfect 3.0	Picture Perfect
DS1		
DS2		
DS3		
DS4		

Table 20. Diagnostic LEDs on the Micro/5-PXN CPU board

LED number	State	Description
DS5	ON	There is a PCMCIA card plugged into the top slot of the board and the card has power.
DS6	ON	There is a PCMCIA card plugged into the bottom slot of the board and the card has power.

PX CPU board

Introduction

The PX CPU board is switchless. This board is used with **Picture Perfect** Version 1.5 or later and **Secure Perfect** Version 2.0 or later. For configuration of this board within **Picture Perfect** software, refer to the ***PICTURE PERFECT** ADMINISTRATION GUIDE*.

Note: The PX CPU Board (110124-005/006) comes with 8MB of RAM.

Picture Perfect version 1.5 or later

- **Direct-connect micro**: Board addressing is done by configuring the micro location within the **Picture Perfect** software. When **Picture Perfect** is started, the first micro in the chain of micros talks to the host who responds by giving the micro its address. Then the second micro in the chain talks to the host and receives its address. This process continues until all micros have received their address.
- **Dial-up micro**: Use the micro firmware installation tools to set the address and the phone number. See the FlashTool online help for additional information.

Secure Perfect version 2.0 or later

- **Direct Connect** or **Dial-Up Micro**: Use micro firmware installation tools to set board address. See the FlashTool online help for additional information.
- A **Secure Perfect** Micro/5-PX micro can hold 28,000 badges and support 16 readers.

PX board layouts are shown in *Figure 18*, *Figure 19*, and *Figure 20*.

Note: In order for this product to be UL compliant, when the following CPU boards are installed: 110124005 or 110124006, the Picture Perfect firmware level must be 1.7 or later.

Board layouts

Figure 18. Micro/5-PX CPU Board Layout (110124-006)

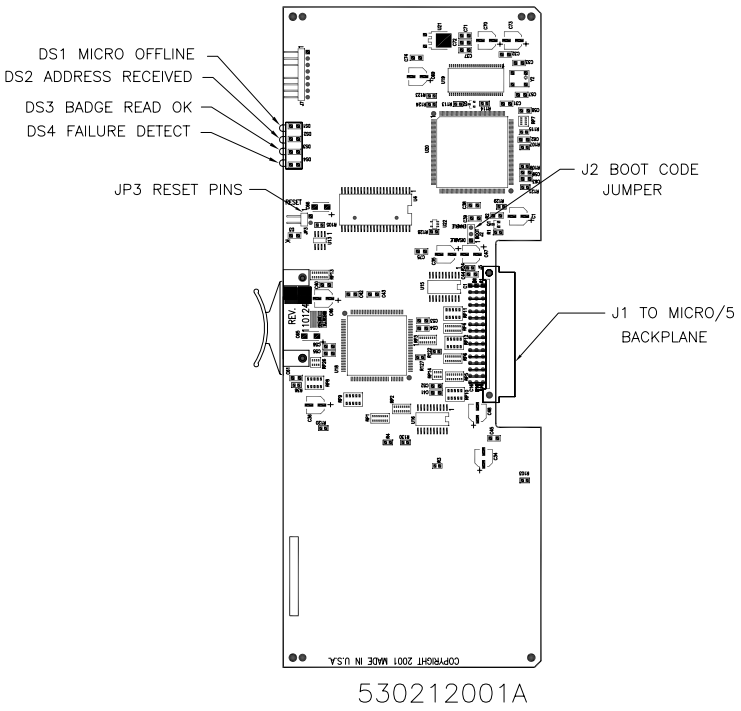
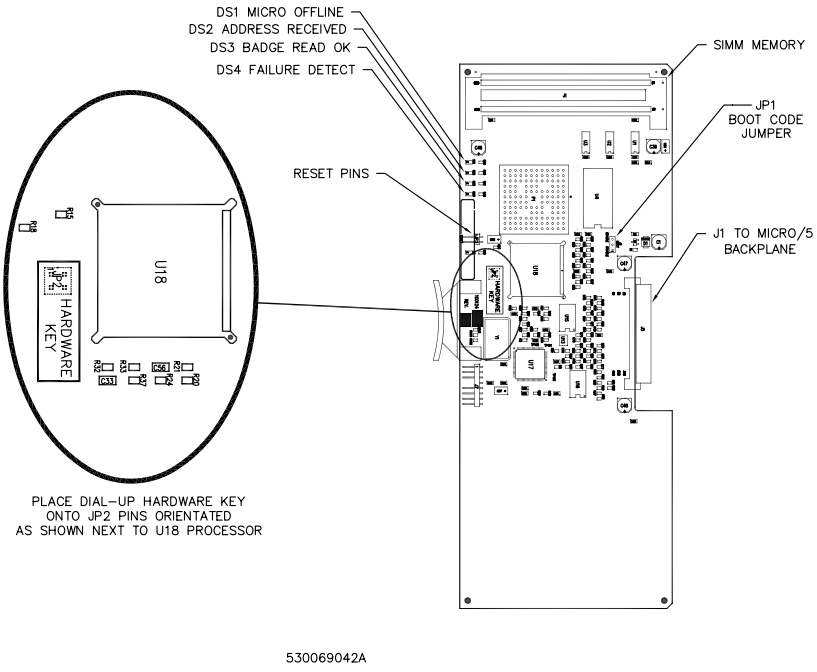
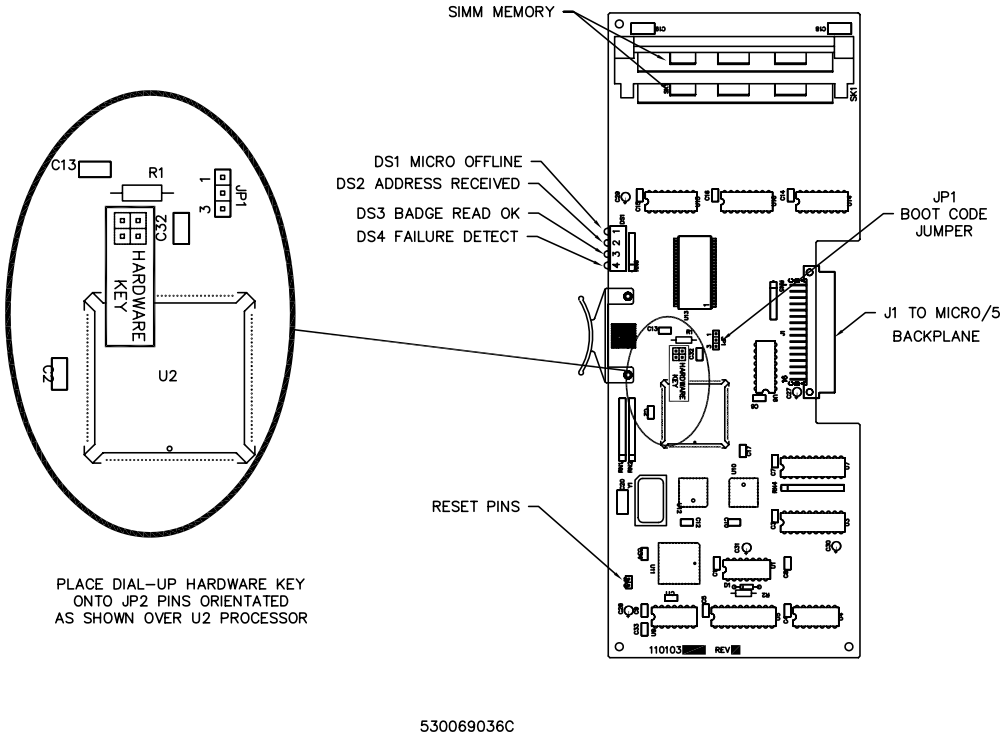


Figure 19. Micro/5-PX CPU Board Layout (110124 -00X)



Note: If using Picture Perfect firmware version 1.5.9 or later, the hardware key is no longer required.

Figure 20. Micro/5-PX CPU Board Layout (110103-00X)



DIP switch settings

There are no switch settings on the PX CPU board.

- **Picture Perfect** systems: addressing is configured within software. When **Picture Perfect** is started, first micro in chain of micros talks to host who responds by giving that micro its address. Then second micro in chain talks to host and receives its address. This process continues until all micros have received their address.
- **Secure Perfect** systems: micro address must be set with one of the GE micro firmware installation tools.

Jumpers

There are two jumpers on the PX CPU Board.

- boot code jumper: 110103 board - JP1, 110124 board - J2
- if using dial-up modem: both boards - dial-up hardware key on JP2. See *Figure 20* (110103 board) and *Figure 19* (110124 board).

Note: If using Picture Perfect firmware version 1.5.9 (or later), or Secure Perfect, the hardware key is no longer required.

Table 21. Boot Code Jumper

Board	Jumper	Pins	Function
110103 -	JP1	1 and 2	Program Boot
		2 and 3	Run Application
110124 -	J2	2 and 3	Program Boot
		1 and 2	Run Application

Application code (firmware)

To download application code (i.e., firmware) refer to the FlashTool online help.

You will need to download firmware when:

- a micro is in maintenance mode. Refer to *Table 22*, *PX CPU board LEDs* on page 51 for LEDs state when micro is in maintenance mode.
- upgrading to a newer version of application code.

If you wish to erase a Micro/5-PX application code, refer to the Micro Configuration Utility.

LED indicators on the PX CPU board

Looking at the LEDs on an installed CPU board, the top LED is DS1.

Table 22. PX CPU board LEDs

LED number	State in maintenance mode	State when application is running
DS1	Off	On = micro offline
DS2	Off	On = address received
DS3	On	On = badge read OK
DS4	Off	On = CPU failure detected Flashing = waiting for database

Maintenance mode: Micro/5-PX must be in maintenance mode before any application (personality) is downloaded to its flash EEPROM. See the FlashTool online help for instructions on downloading a personality to EEPROM.

Chapter 5 The reader processing board

This chapter provides information about and instructions for using the reader processing boards.

In this chapter:

Introduction

The Micro/5 microcontroller supports four types of reader processing boards: 2RP, 2SRP, 8RP, and the CK8RP. Only one type can be used at one time, for a maximum of:

- four 2RP boards (for support of up to 8 readers),
- four 2SRP boards (for support of up to 8 supervised readers),
- two 8RP boards (for support of up to 16 readers), or
- two CK8RP boards (for support of up to 16 readers).

2RP board

Introduction

Each 2RP reader board provides four unsupervised DIs (two alarm, two exit), two reader LED outputs, two door strike DO relays, two auxiliary DO relays, and two alarm shunt relays used to shunt out external alarm inputs. Please note the following:

- Each 2RP board is limited to only one type of reader technology: Wiegand, Strobed, F/2F, and Supervised F/2F. In addition, both readers connected to the board must be the same voltage.
- If nonsupervised F/2F keypad readers are installed, the normal condition of the reader DI must be OPEN. Keypad data is transmitted to the DI line terminating at J2 and J4 pin 8. If the DI contact is in the CLOSED state, no data can be transmitted.
- In Supervised F/2F mode, the open/closed state of the DI is dependent on the reader. When the door is securely closed, the contact will be in the CLOSED state.
- Each reader, DI point, Aux DO, and Exit DI on a 2RP board is addressed differently depending on the host system you are using.

Device addressing

Picture Perfect

Table 23. 2RP device addressing - Picture Perfect

	Board 1	Board 2	Board 3	Board 4
Readers	0 and 1	0 and 1	0 and 1	0 and 1
Door DIs	0 and 1	0 and 1	0 and 1	0 and 1
Exit DIs	8 and 9	8 and 9	8 and 9	8 and 9
Door DOs	0 and 1	0 and 1	0 and 1	0 and 1
Auxiliary/shunt DOs	8 and 9	8 and 9	8 and 9	8 and 9

Secure Perfect

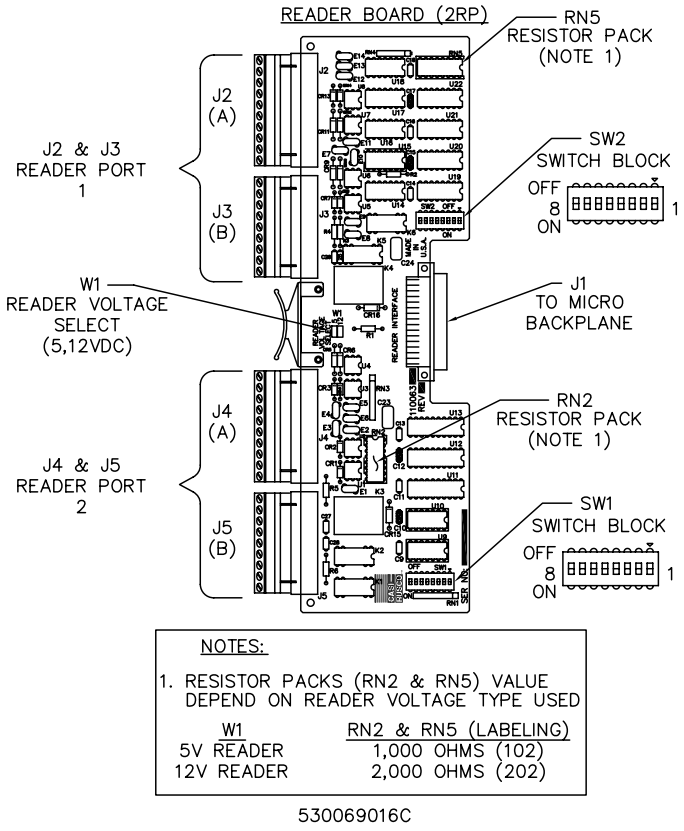
The following Secure Perfect device addresses are created for you by the Secure Perfect software. This table is provided for your reference only. The device address is in the format mmmm-b-pp where mmmm represents the micro number, b represents the board number, and pp represents the point or device number.

Table 24. 2RP device addressing - Secure Perfect

	Board 1	Board 2	Board 3	Board 4
Readers/door DOs	*mmmm*-1-01 *mmmm*-1-02	*mmmm*-2-01 *mmmm*-2-02	*mmmm*-3-01 *mmmm*-3-02	*mmmm*-4-01 *mmmm*-4-02
Door DIs	*mmmm*-1-01 *mmmm*-1-02	*mmmm*-2-01 *mmmm*-2-02	*mmmm*-3-01 *mmmm*-3-02	*mmmm*-4-01 *mmmm*-4-02
Exit DIs	*mmmm*-1-01 *mmmm*-1-02	*mmmm*-2-01 *mmmm*-2-02	*mmmm*-3-01 *mmmm*-3-02	*mmmm*-4-01 *mmmm*-4-02
Auxiliary/shunt DOs	*mmmm*-1-01 *mmmm*-1-02	*mmmm*-2-01 *mmmm*-2-02	*mmmm*-3-01 *mmmm*-3-02	*mmmm*-4-01 *mmmm*-4-02

Board layout

Figure 21. 2RP reader board layout



Setting DIP switches

Set DIP switches as described in Table 25 below before installing and wiring 2RP board.

Table 25. Reader technology and format

Reader technology and format	SW1-1	SW1-2	SW1-3	SW1-4
Not Valid				
Reserved	ON			
Reserved		ON		
Magstripe - Reversed Strobed	ON	ON		
Magstripe - Water-Mark			ON	
Magstripe - GE Supervised F/2F	ON		ON	
Magstripe - Strobed		ON	ON	
Magstripe - F/2F	ON	ON	ON	
Wiegand - 3701, 3702[1]				ON
Wiegand - 3201, 34 bit KSC, 38 bit ADT, 3601	ON			ON
Wiegand - 3202, 4001, 4401, 64 bit BCD[2]		ON		ON
Wiegand - 2802, 2804, 3600	ON	ON		ON
Wiegand - 2700, 2801, 32 bit Motorola Indala			ON	ON
Wiegand - 2800, 35/37 bit Hughes	ON		ON	ON
Wiegand - 26 bit, 34 bit CardKey, 35 bit Hughes, 4002		ON	ON	ON
Wiegand - 2500, 2804, 3400, 3703	ON	ON	ON	ON

1. **Secure Perfect** uses this switch setting as Custom Wiegand.
2. Only the PXNplus CPU board supports the 64 bit BCD badge format. If using the 64 bit BCD format, see *Wiring readers* on page 59 for special wiring instructions.

= OFF

Table 26. 2RP reader board address settings

Reader board	SW1-				SW2-			
	5	6	7	8	1	2	3	4
1	ON				ON			
2		ON				ON		
3			ON				ON	
4				ON				ON

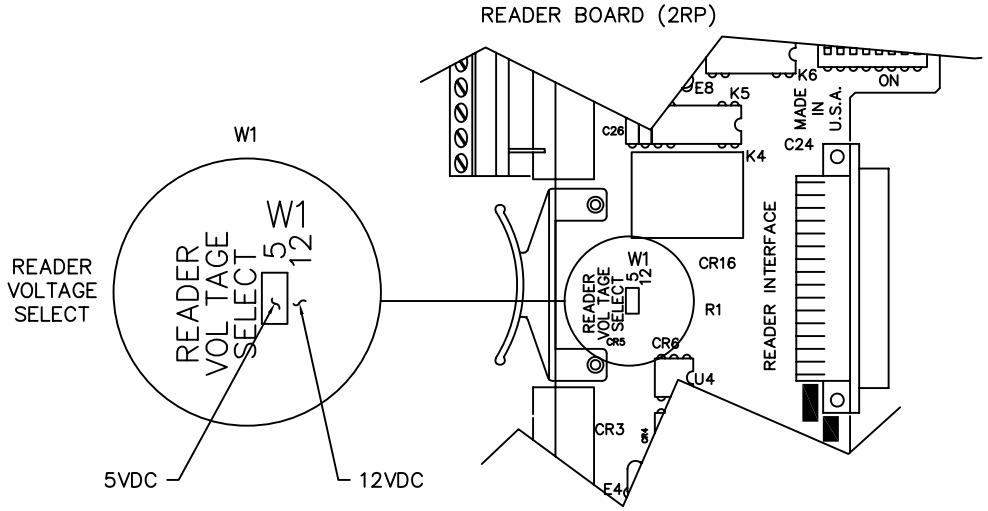
= OFF

Note: Switches SW2-5, 6, 7, and 8 are not used.

Setting reader voltage

Select the proper reader voltage by placing the jumper on W1. See *Figure 22* below for details. Both reader ports are set to the selected voltage.

Figure 22. Setting 2RP reader voltage



READER VOLTAGE	W1
5 VOLTS DC	5
12 VOLTS DC	12

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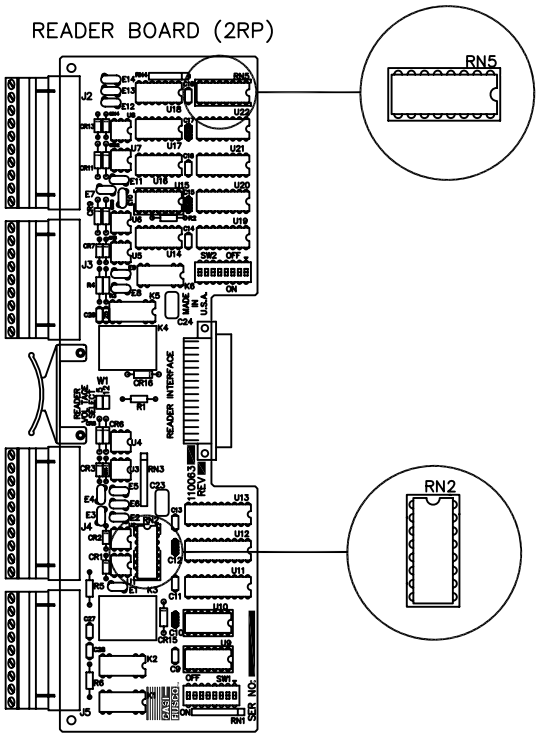
Installing resistor packs

Insert the proper resistor packs in RN2 and RN5. Be sure you insert the correct resistor pack for the reader voltage selected. Both resistor packs must be the same since the voltage for both readers must be the same. See *Figure 23* below for details.

Figure 23. Installing 2RP resistor packs



READER VOLTAGE	RN2 & RN5	
	LABELED	RESISTOR VALUE
5 VOLTS DC	5V READER 1.0K OHM	1,000 OHMS (102)
12 VOLTS DC	12V READER 2.0K OHM	2,000 OHMS (202)

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Wiring readers

If wiring a 12V reader that uses 5V data lines, note the following conditions before continuing:

- Set the reader voltage (W1) to 5V.
- Wire the Reader power (Pin 1) from the reader to the Power input port (J6) on the Power/ Communications board instead of to the 2RP board.

1. Mount the reader. Refer to the manual that came with your reader for specific mounting instructions.
2. Run cable from the reader to the microcontroller. Bring each reader cable through the appropriate knockout hole in the microcontroller enclosure. Allow some slack wire for servicing the cables and for plugging cable into an adjacent slot for troubleshooting.
3. Remove 8 inches of insulating material from the cable. Unwrap shielding and tie all shields together. Connect the shield wire to the ground stud at the bottom lower left of the microcontroller enclosure.
4. Place the appropriate wires to the appropriate screw terminal on the 2RP reader board. Refer to the reader wiring diagrams in this section. Pairing of cables is very important.

   Important: For 12V readers using cable runs over 500 feet, you must install pull-up resistors (470 ohm, 1/2 watt) between Reader Data 0 and +12 VDC and between Reader Data 1 and +12 VDC. Some readers require pull-up resistors regardless of cable length. For 5V readers, the maximum cable distance is 300 feet with pull-up resistors. Refer to your reader manual to see if pull-up resistors are required.
5. Label each cable end with the Micro Address Number/ Device or Reader Number.

Table 27. Recommended pairing of reader wires - Typical reader cable (Use Belden 8725 twisted shielded pair or equivalent)

PIN	Signal name	Typical wire color
1	+5V DC or +12V DC Reader Power	Red
6	Reader Data 0[1]	Black
2	Ground (-)	Green
7	Reader Data 1	White
4	Door DO (Reader LED)	White/Black
8	Door DI (Alarm input)	White/Red
5	Exit Request DI1	White/Green
	Available wire1	White/Yellow

1. Reader Data 0, Door DI, and the Exit Request DI can be replaced or interchanged with Display DO and/or Clock DO when required for a nonsupervised keypad reader.

Table 28. J2/J4 reader connector pinouts

PIN	Signal name
1	+5 VDC/+12 VDC
2	Ground
3	Display DO
4	Door DO (Reader LED)
5	Exit DI (Exit Request)
6	Reader Data 0
7	Reader Data 1
8	Door DI (Alarm Point)
9	Not used
10	Clock DO

Table 29. J3/J5 relay connector pinouts

PIN	Relay
1	Door Strike Relay – Normally Closed (NC)
2	Door Strike Relay – Common (Com)
3	Door Strike Relay – Normally Open (NO)
4	Auxiliary Output Relay – Common (Com)
5	Auxiliary Output Relay – Normally Closed (NC)
6	Auxiliary Output Relay – Normally Open (NO)
7	Alarm Shunt Relay – Common (Com)
8	Alarm Shunt Relay – Normally Closed (NC)
9	Alarm Shunt Relay – Normally Open (NO)

Figure 24. Wiring 2RP to Wiegand, Strobed, F/2F, and supervised F/2F readers

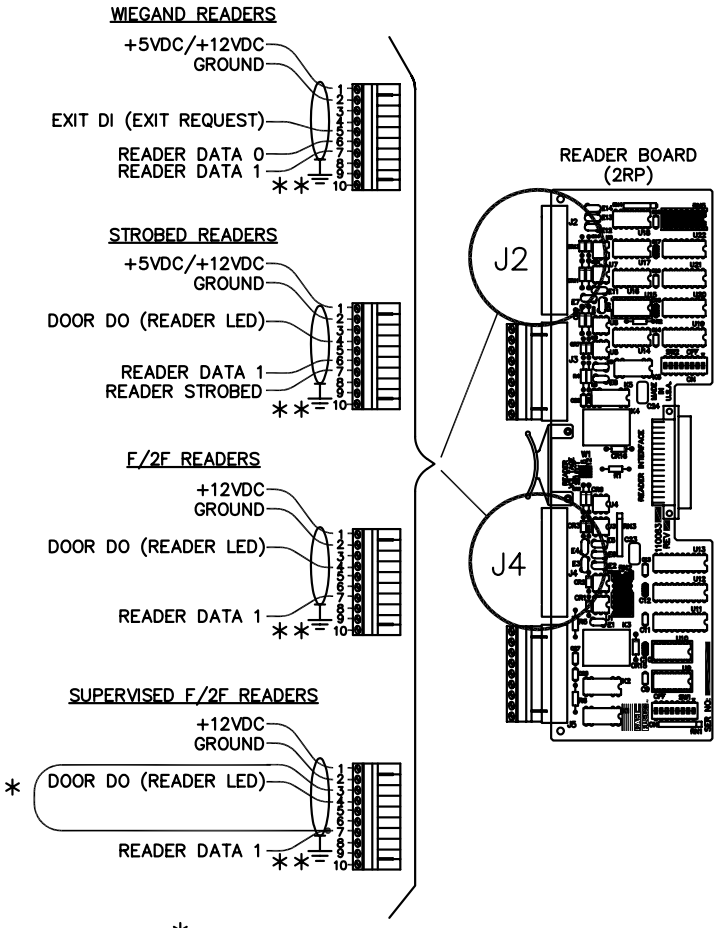
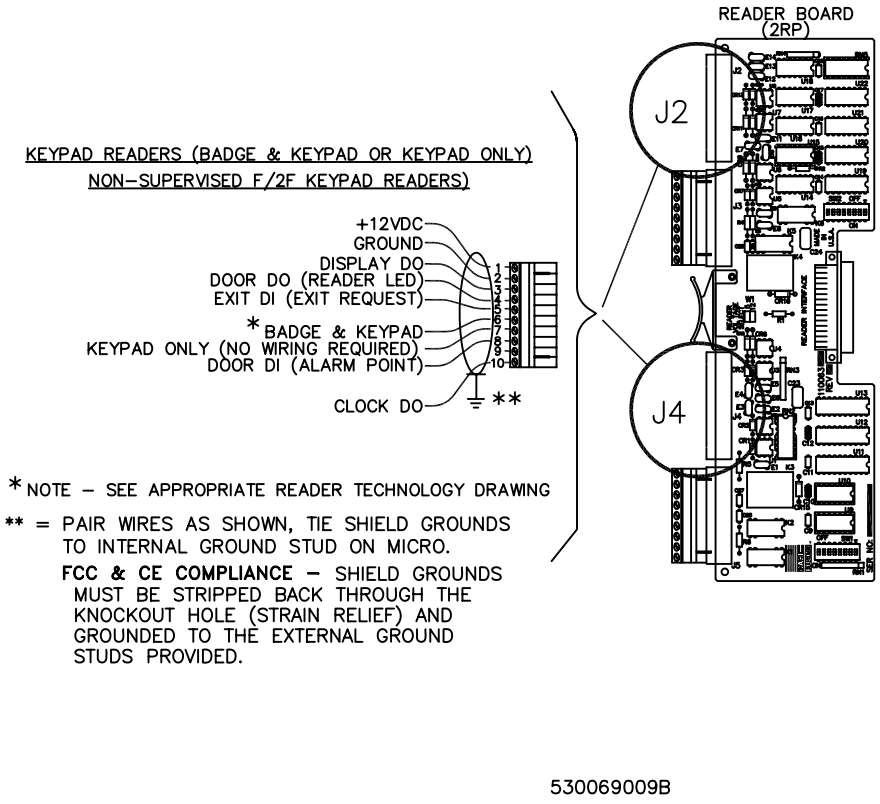


Figure 25. Wiring 2RP to nonsupervised F/2F keypad readers

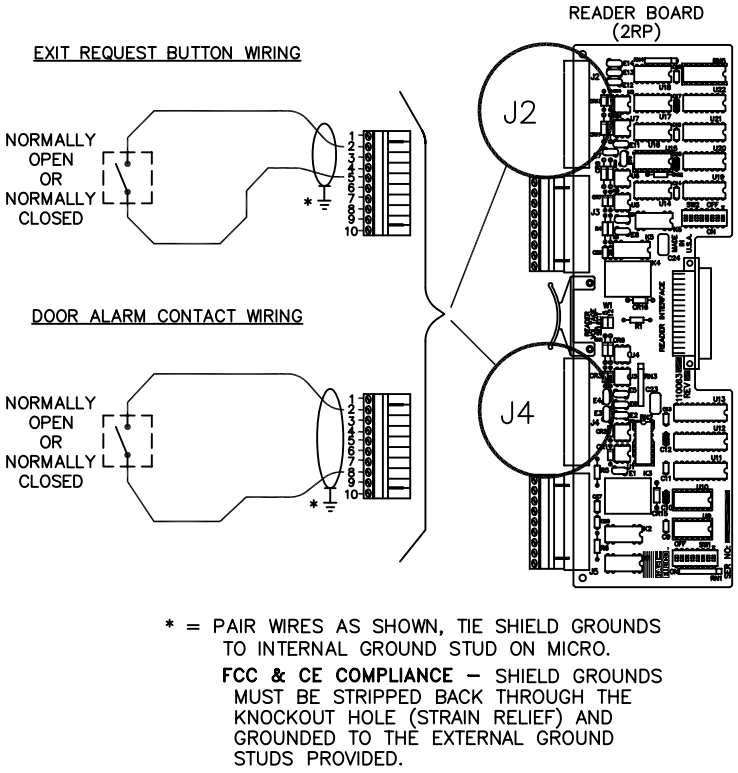


Wiring DIs

Each reader port has two unsupervised digital inputs which are used for door status devices (door contacts and exit request input). Since these digital inputs are not supervised, they do not require end-of-line resistors.

1. Install the door contact and exit contact as required.
2. Wire the door DI between pin 2 (Gnd) and pin 8 (Door DI) and/or exit DI between pin 2 (Gnd) and pin 5 (Exit DI) to the corresponding reader port on the 2RP board. The contact can be normally open or normally closed.

Figure 26. Wiring 2RP exit request and door alarm contact



Wiring door strike

The 2RP provides a door DO relay dedicated to each reader port.

1. Install the door strike (maximum 2 amps @ 28 VDC or 2 amps @ 30 VAC) as required.
2. Wire the door strike to the door DO (internal) relay. Normally open or normally closed dry contacts are available.

Table 30. Pin disposition

Pin Number	Signal
Pin 1	Normally Closed (NC)
Pin 2	Common (COM)
Pin 3	Normally Open (NO)

Figure 27. Wiring 2RP door strike - internal relay

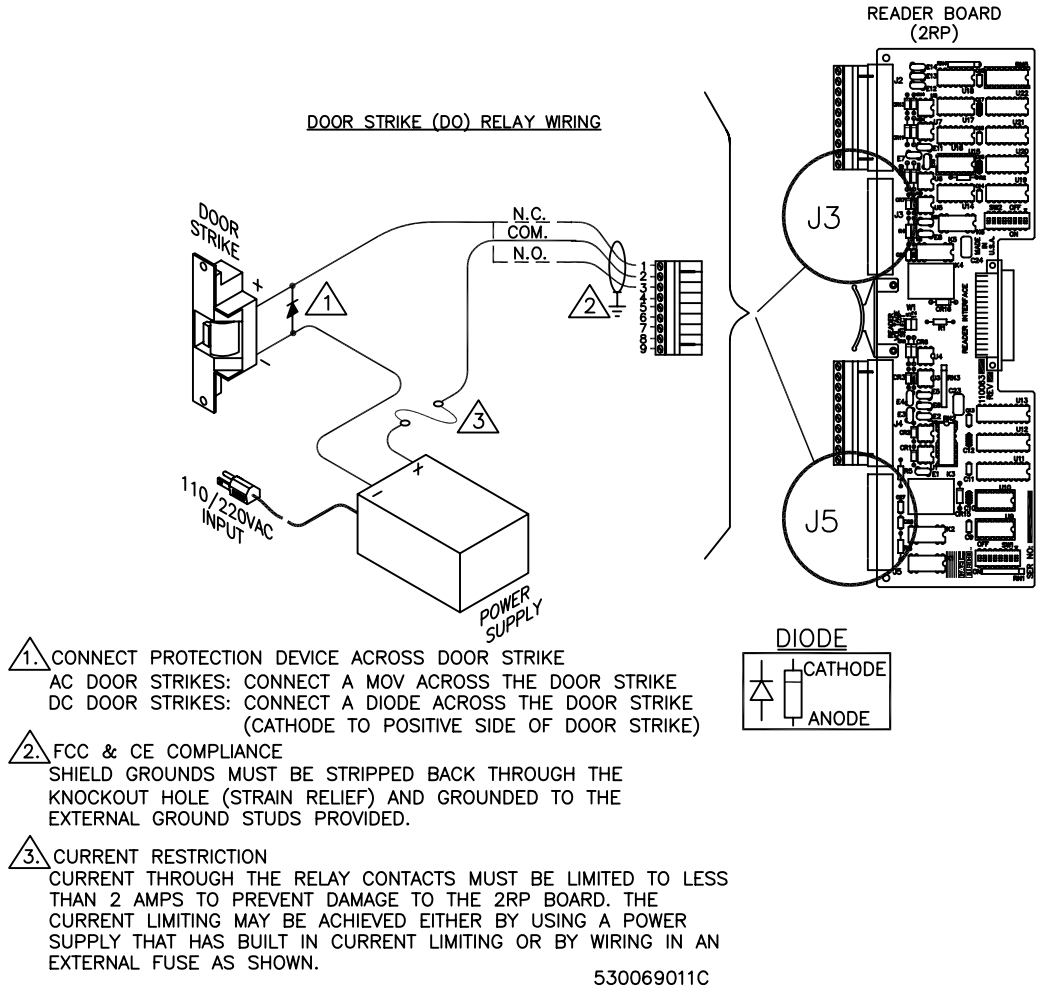
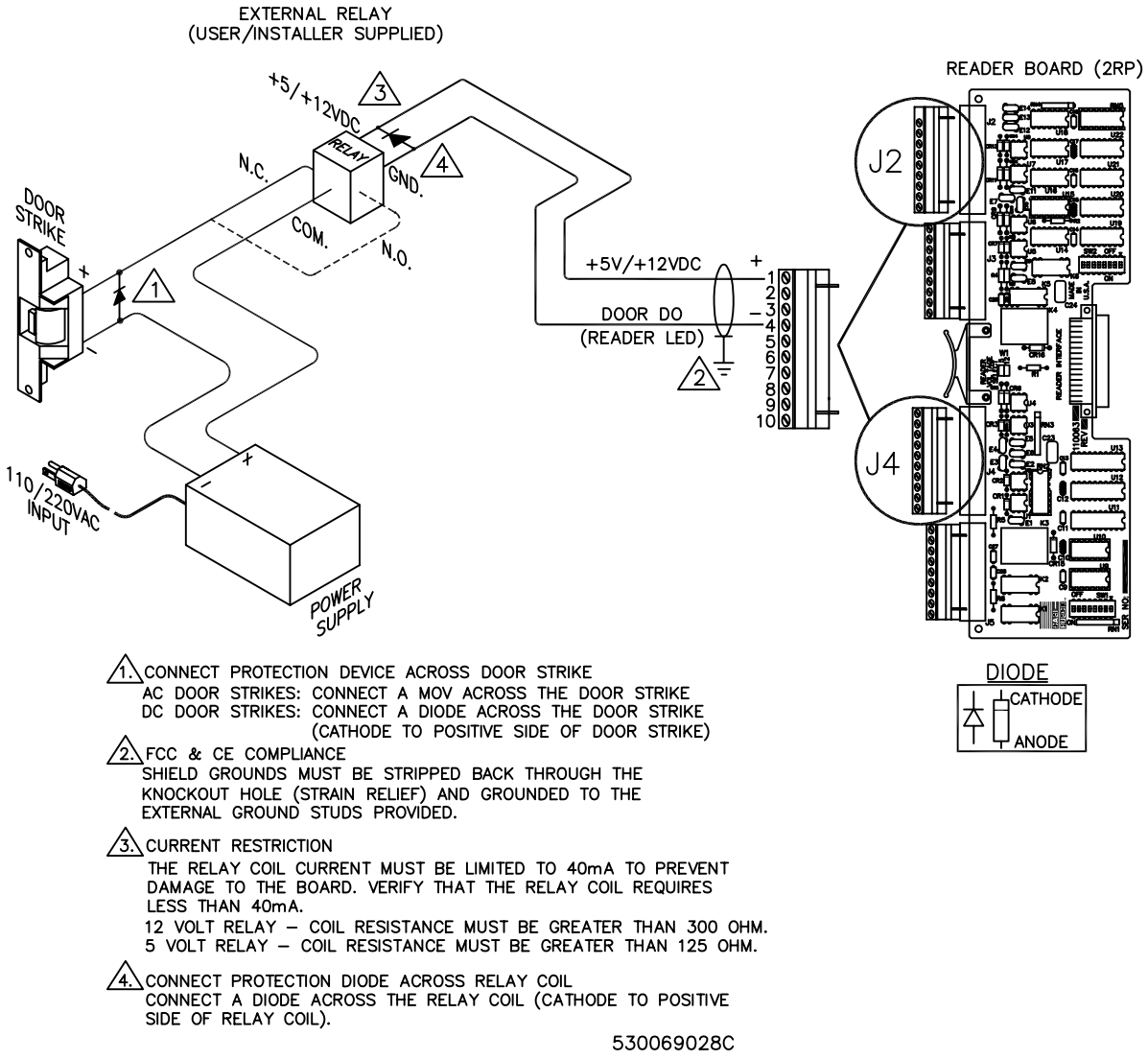


Figure 28. Wiring 2RP door strike - external relay

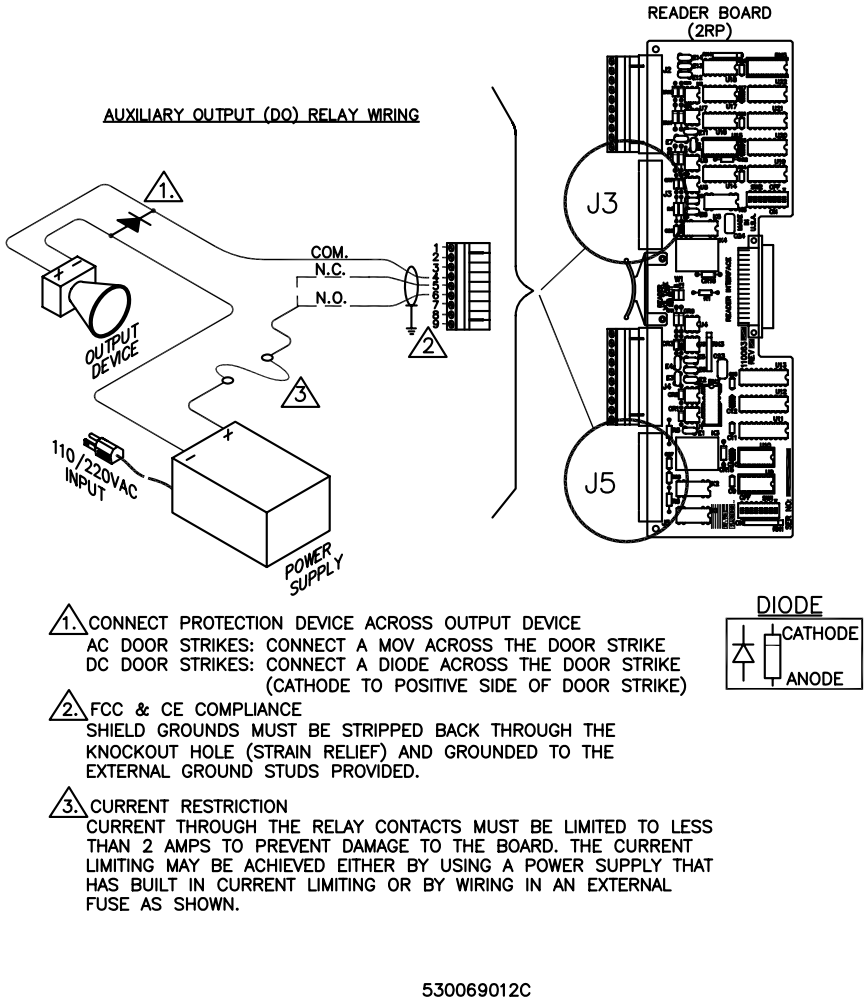


Wiring auxiliary DO relay

One auxiliary DO relay per reader port can be defined by the user. The auxiliary DO relay is used for an auxiliary output device.

1. Install the auxiliary output (rated 0.25 amps @ 40 VDC maximum) as required.
2. Wire the output device to the auxiliary DO relay. The auxiliary DO relay has either a normally open or normally closed dry contact available (pin 4 = common, pin 5 = normally closed, pin 6 = normally open).

Figure 29. Wiring 2RP auxiliary DO relay

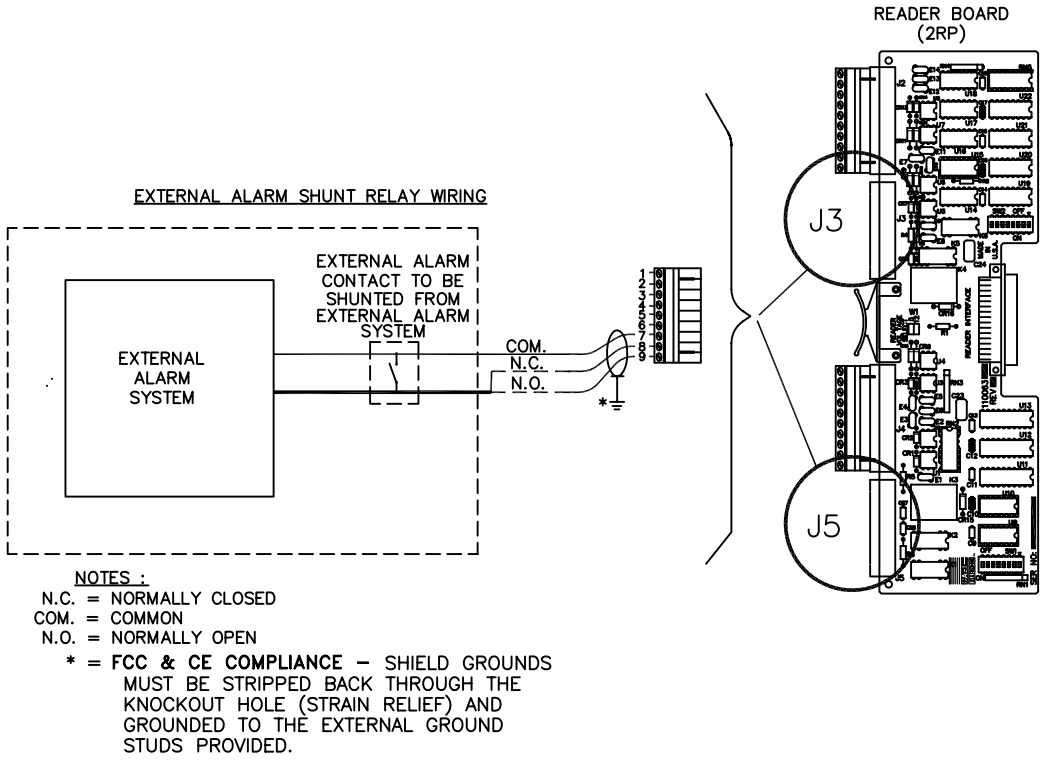


Wiring alarm shunt relay

One alarm shunt relay is available per reader port. The alarm shunt relay is used to shunt (disable) an external alarm system contact (such as burglar alarm) on a valid read or exit pushbutton request.

1. Install the alarm shunt (rated at 0.25 amps @ 40 VDC maximum) as required.
2. Wire the external alarm system to the alarm shunt relay. The relay has either a normally open or normally closed dry contact available (pin 7 = common, pin 8 = normally closed, pin 9 = normally open).

Figure 30. Wiring 2RP external alarm shunt relay



2SRP board

Introduction

Each 2SRP reader board provides four supervised DIs (two alarm, two exit), two reader LED outputs, two door strike DO relays, two auxiliary DO relays, and two alarm shunt relays used to shunt out external alarm inputs. Please note the following:

- Each 2SRP board is limited to only one type of reader technology: Wiegand, Strobed, F/2F, and Supervised F/2F. In addition, both readers connected to the board must be the same voltage.
- The 2SRP board has built-in pull-up resistors to accommodate cable lengths over 500 feet. External pull-up resistors are not required for the 2SRP board.
- If using keypad readers, only Supervised F/2F is supported.
- In Supervised F/2F mode, the DI (alarm point) is available at the reader or at the micro on GE Supervised F/2F readers that support DIs and Exit DIs.
- Each reader, DI point, Aux DO, and Exit DI on the 2SRP board is addressed differently depending on the host system you are using.

Device addressing

Picture Perfect

Table 31. 2SRP device addressing - Picture Perfect

	Board 1	Board 2	Board 3	Board 4
Readers	0 and 1	0 and 1	0 and 1	0 and 1
Door DIs	0 and 1	0 and 1	0 and 1	0 and 1
Exit DIs	8 and 9	8 and 9	8 and 9	8 and 9
Door DOs	0 and 1	0 and 1	0 and 1	0 and 1
Auxiliary/shunt DOs	8 and 9	8 and 9	8 and 9	8 and 9

Secure Perfect

The following Secure Perfect device addresses are created for you by the Secure Perfect software. This table is provided for your reference only. The device address is in the format mmmm-b-pp where mmmm represents the micro number, b represents the board number, and pp represents the point or device number.

Table 32. 2SRP device addressing - Secure Perfect

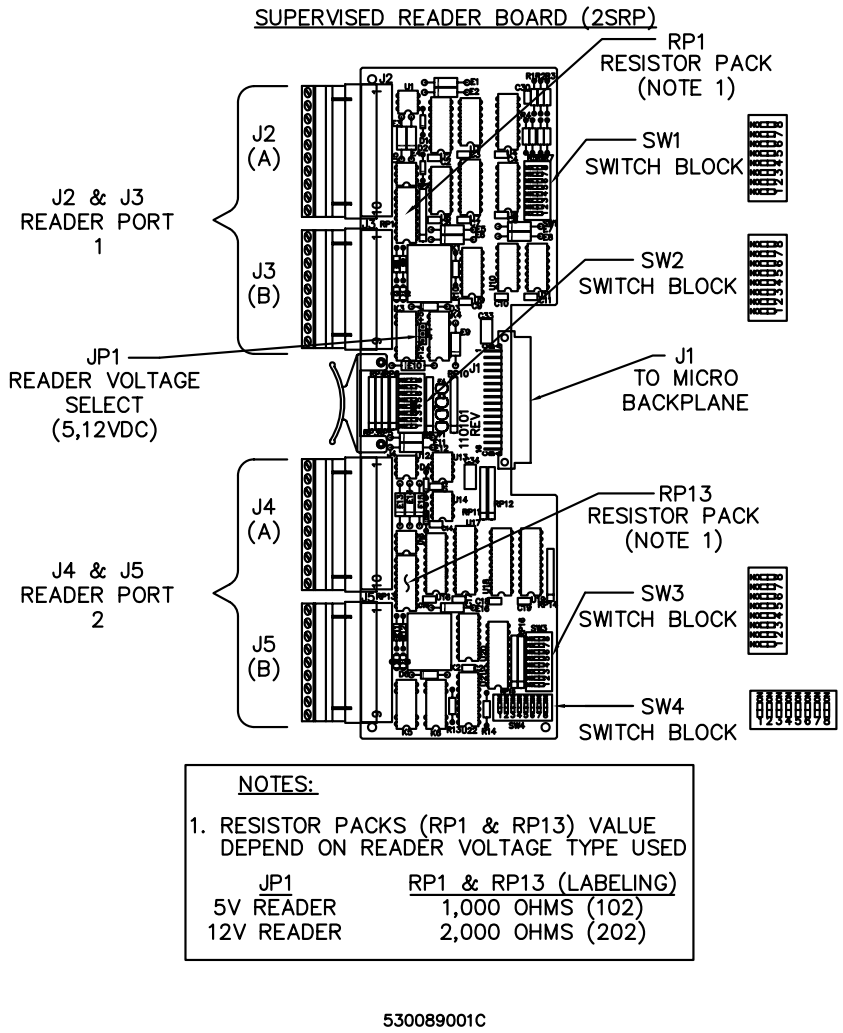
	Board 1	Board 2	Board 3	Board 4
Readers/Door DOs	*mmmm*-1-01 *mmmm*-1-02	*mmmm*-2-01 *mmmm*-2-02	*mmmm*-3-01 *mmmm*-3-02	*mmmm*-4-01 *mmmm*-4-02
Door DIs	*mmmm*-1-01 *mmmm*-1-02	*mmmm*-2-01 *mmmm*-2-02	*mmmm*-3-01 *mmmm*-3-02	*mmmm*-4-01 *mmmm*-4-02

Table 32. 2SRP device addressing - Secure Perfect (continued)

	Board 1	Board 2	Board 3	Board 4
Exit DIs	*mmmm*-1-01 *mmmm*-1-02	*mmmm*-2-01 *mmmm*-2-02	*mmmm*-3-01 *mmmm*-3-02	*mmmm*-4-01 *mmmm*-4-02
Auxiliary/shunt DOs	*mmmm*-1-01 *mmmm*-1-02	*mmmm*-2-01 *mmmm*-2-02	*mmmm*-3-01 *mmmm*-3-02	*mmmm*-4-01 *mmmm*-4-02

Board layout

Figure 31. 2SRP supervised reader board layout



Setting the DIP switches

Set DIP switches as described in tables below before installing and wiring 2SRP board.

Table 33. Supervised DI end-of-line resistors

	SW1-				SW2-				
	1	2	3	4 - 8	1	2	3	4	5 - 8
Standard (1K, 1K)	ON	ON			ON		ON		ON
Special (6.8K, 18K)	ON		ON		ON		ON		
Time Display Readers (T&A)		ON	ON			ON		ON	ON

= OFF

Table 34. Reader technology and format

Reader technology and format	SW3-1	SW3-2	SW3-3	SW3-4
Not Valid				
Reserved	ON			
Reserved		ON		
Magstripe - Reversed Strobed	ON	ON		
Magstripe - Water-Mark			ON	
Magstripe - GE Supervised F/2F	ON		ON	
Magstripe - Strobed		ON	ON	
Magstripe - F/2F	ON	ON	ON	
Wiegand - 3701, 3702[1]				ON
Wiegand - 3201, 34 bit KSC, 38 bit ADT, 3601	ON			ON
Wiegand - 3202, 4001, 4401, 64 bit BCD[2]		ON		ON
Wiegand - 2802, 2804, 3600	ON	ON		ON
Wiegand - 2700, 2801, 32 bit Motorola Indala			ON	ON
Wiegand - 2800, 35/37 bit Hughes	ON		ON	ON
Wiegand - 26 bit, 34 bit CardKey, 35 bit Hughes, 4002		ON	ON	ON
Wiegand - 2500, 2804, 3400, 3703	ON	ON	ON	ON

1. **Secure Perfect** uses this switch setting as Custom Wiegand.
2. Only the PXNplus CPU board supports the 64 bit BCD badge format. If using the 64 bit BCD format, see *Wiring the readers* on page 74 for special wiring instructions.

= OFF

Table 35. Reader board (2SRP) address settings

Reader board	SW3-				SW4-			
	5	6	7	8	1	2	3	4
1	ON				ON			
2		ON				ON		
3			ON				ON	
4				ON				ON

= OFF

Note: The boards MUST be numbered consecutively. This means that the first reader board must be set to Address 1, the second reader board must be set to Address 2, and so on. If they are not, the supervised DI points will not work correctly.

Table 36. Special reader types

Reader type	SW4-5	SW4-6	SW4-7	SW4-8
Standard Readers	ON	ON	ON	ON
Special Readers (single-color LEDs)[1]		ON	ON	ON
Time Display Readers (T&A)	ON		ON	ON
HID Pin Pad Readers for Fidelity			ON	ON

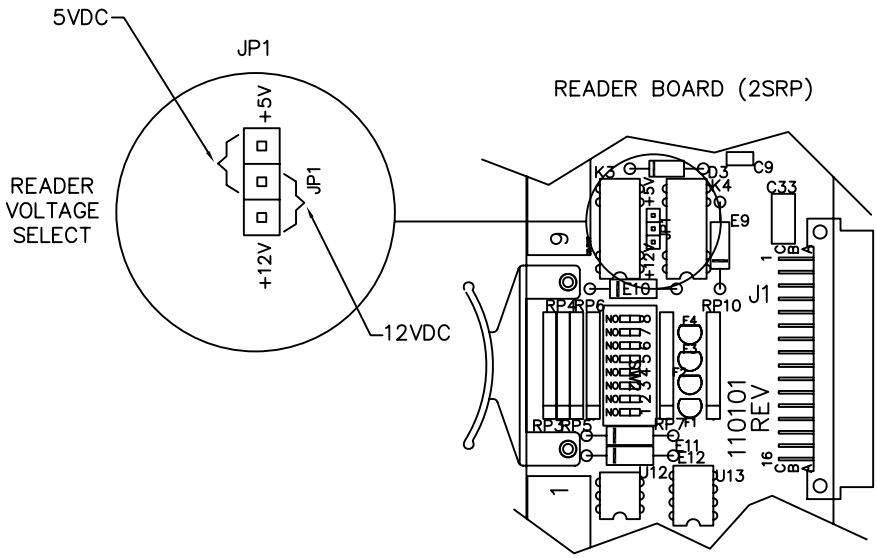
1. For special readers, see *Figure 35* on page 77.

= OFF

Setting reader voltage

Select the proper reader voltage by placing the jumper on JP1. See *Figure 32* below for details. Both reader ports are set to the selected voltage.

Figure 32. Setting 2SRP reader voltage



READER VOLTAGE	JP1
5 VOLTS DC	5
12 VOLTS DC	12

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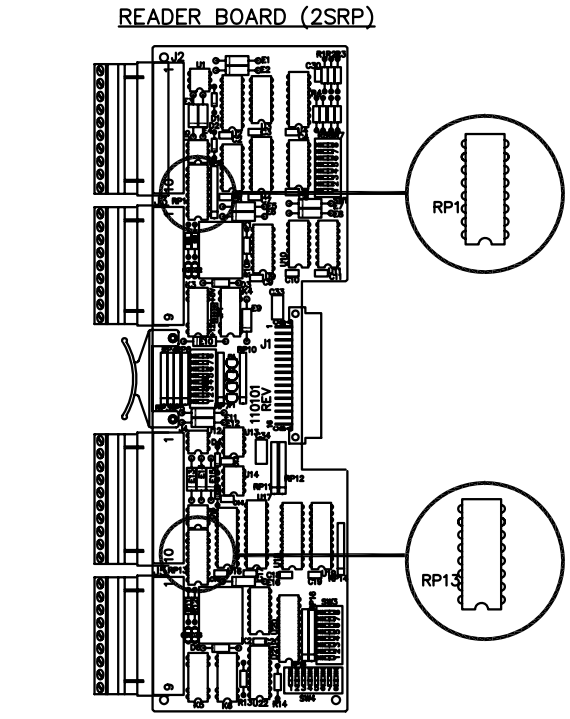
Installing resistor packs

Insert proper resistor packs in RP1 and RP13. Be sure you insert the correct resistor pack for the reader voltage selected. Both resistor packs must be the same since the voltage for both readers must be the same. See *Figure 33* below for details.

Figure 33. Installing 2SRP resistor packs



READER VOLTAGE	RP1 & RP13	
	LABELED	RESISTOR VALUE
5 VOLTS DC	5V READER 1.0K OHM	1,000 OHMS (102)
12 VOLTS DC	12V READER 2.0K OHM	2,000 OHMS (202)

530089003B

Wiring the readers

If wiring a 12V reader that uses 5V data lines, note the following conditions before continuing:

- Set the reader voltage (JP1) to 5V.
- Wire the Reader power (Pin 1) from the reader to the Power input port (J6) on the Power/ Communications board instead of to the 2SRP board.

1. Mount the reader. Refer to the manual that came with your reader for specific mounting instructions.
2. Run cable from the reader to the microcontroller. Bring each reader cable through the appropriate knockout hole in the microcontroller enclosure. Allow some slack wire for servicing the cables and for plugging cable into an adjacent slot for troubleshooting.
3. Remove eight inches of insulating material from the cable. Unwrap shielding and tie all shields together. Connect the shield wire to the ground stud at the bottom lower left of the microcontroller enclosure.
4. Place the appropriate wires to the appropriate screw terminal on the 2SRP reader board. Refer to the reader wiring diagrams in this section. Pairing of cables is very important.

   Note: The 2SRP board has built-in pull-up resistors. Do not install any external pull-up resistors.

5. Label each cable end with the Micro Address Number/ Device or Reader Number.

Table 37. Recommended pairing of reader wires - Typical reader cable (Use Belden 8725 twisted shielded pair or equivalent)

PIN	Signal name	Typical wire color
1	+5V DC or +12V DC Reader Power	Red
6	Reader Data 0[1]	Black
2	Ground (-)	Green
7	Reader Data 1	White
4	Door DO (Reader LED)	White/Black
8	Supervised Door DI (Alarm input)[1]	White/Red
9	Supervised Door DI Return[1]	White/Green
	Available Wire[1]	White/Yellow

1. Reader Data 0, Supervised Door DI, Supervised Door DI Return, and the Supervised Exit Request DI Return can be replaced or interchanged as needed.

Table 38. J2/J4 reader connector pinouts

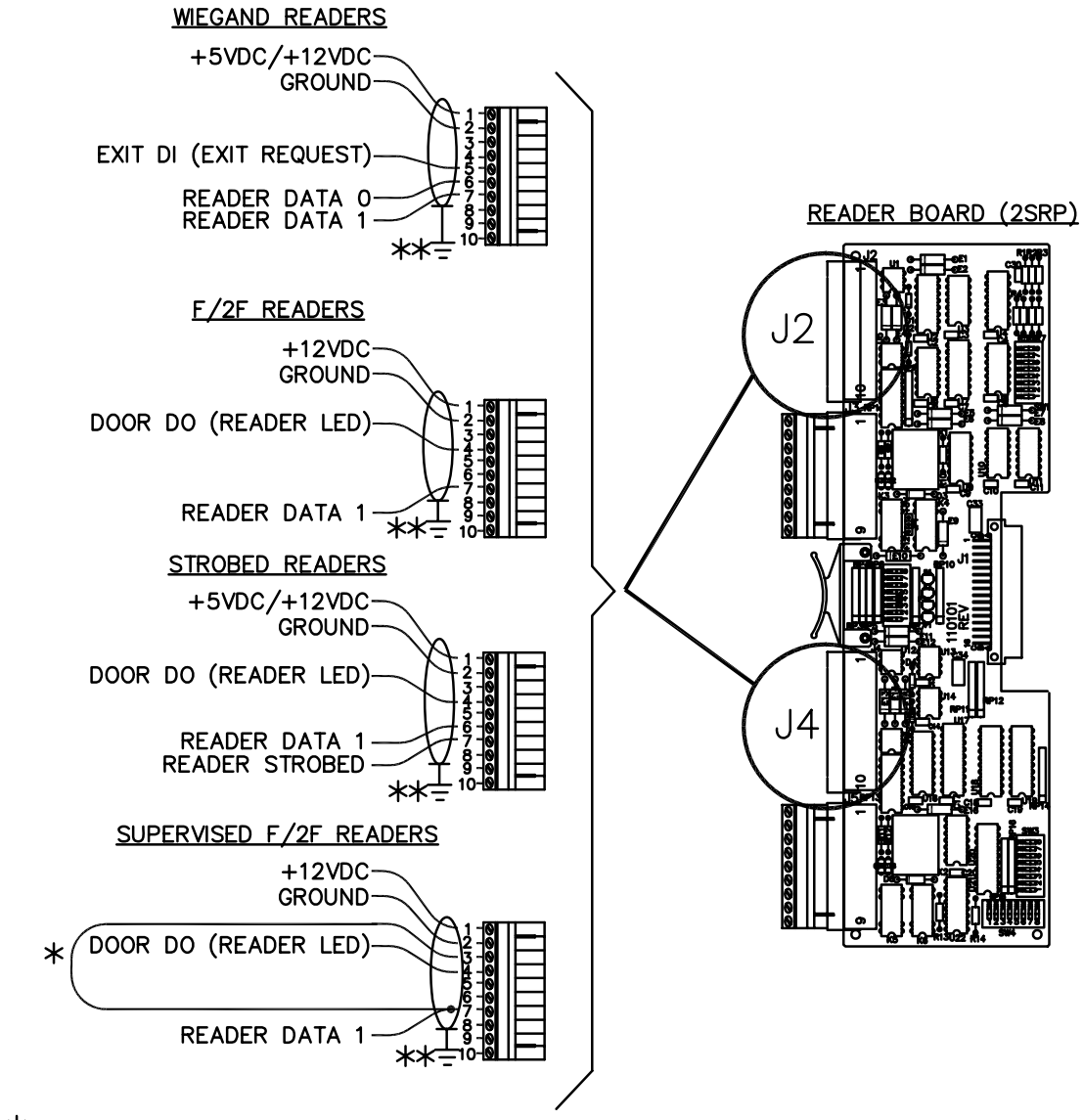
PIN	Signal name
1	+5 VDC/+12 VDC
2	Ground
3	Display DO
4	Door DO (Reader LED)
5	Supervised Exit DI (Exit Request)[1]
6	Reader Data 0
7	Reader Data 1
8	Supervised Door DI (Alarm Point)[1]
9	Supervised Door DI Return[1]
10	Supervised Exit DI Return[1]

1. Supervised Exit DI and supervised Door DI point must use end-of-line resistors and must be terminated at the appropriate Return point (not to ground).

Table 39. J3/J5 relay connector pinouts

PIN	Relay
1	Door Strike Relay – Normally Closed (NC)
2	Door Strike Relay – Common (Com)
3	Door Strike Relay – Normally Open (NO)
4	Auxiliary Output Relay – Common (Com)
5	Auxiliary Output Relay – Normally Closed (NC)
6	Auxiliary Output Relay – Normally Open (NO)
7	Alarm Shunt Relay – Common (Com)
8	Alarm Shunt Relay – Normally Closed (NC)
9	Alarm Shunt Relay – Normally Open (NO)

Figure 34. Wiring 2SRP to Wiegand, F/2F, Strobed, and Supervised F/2F Readers



* NOTE : JUMPER WIRE OR RESISTOR REQUIRED BETWEEN PIN 3 AND PIN 7 FOR SUPERVISED COMMUNICATION

** = PAIR WIRES AS SHOWN, TIE SHIELD GROUNDS TO INTERNAL GROUND STUD ON MICRO.

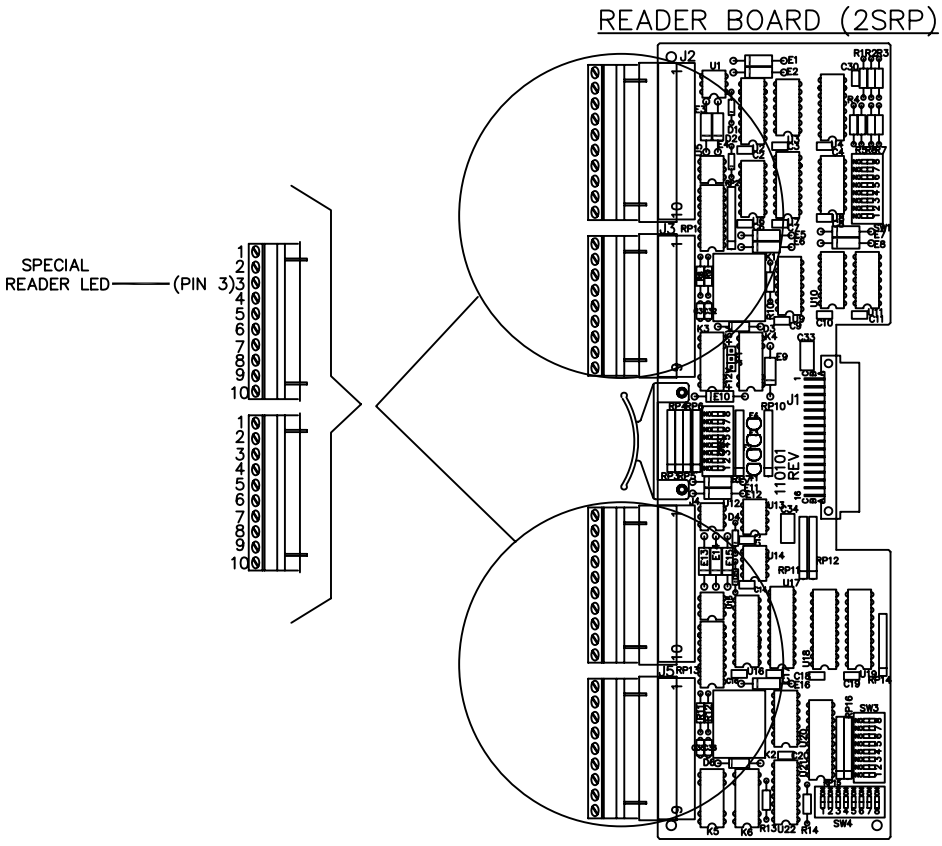
FCC & CE COMPLIANCE – SHIELD GROUNDS MUST BE STRIPPED BACK THROUGH THE KNOCKOUT HOLE (STRAIN RELIEF) AND GROUNDED TO THE EXTERNAL GROUND STUDS PROVIDED.

530089004D

Special readers with single color LEDs

The LED will flash fast upon a valid access condition and turn off for 3 to 4 seconds upon an invalid attempt. See *Table 36, Special reader types* on page 71 for switch setting information. In this configuration, the Alarm Shunt Relay is no longer available.

Figure 35. Wiring 2SRP to single color LED reader



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Wiring the DIs

Each reader port has two supervised digital inputs which are used for door status devices (door contacts and exit request input). Since these digital inputs are supervised, they require end-of-line resistors.

1. Follow the installation specifications for the device. Mount the device according to the manufacturer's specifications. The alarm device (door contact) should have a dry contact which can have a normally open or normally closed type switch. A normally closed contact is in its normal or resting position when it is closed. For example, the contact is closed when the door is closed. The opposite is true for a normally open contact. In this case, the contact is open when the door is closed.
2. Select the appropriate digital input for each alarm input device.
3. Ground the shields of the cable at the Micro/5 enclosure grounding studs. Insulate the shield (with tape or shrink tubing) at the DI device end to avoid electrical noise.
4. Install two end-of-line resistors. Install each resistor as close to the door status contact as possible.
5. We recommend the standard 1,000 (1K) ohm, 1/4 watt, 1 to 5% tolerance, high-quality end-of-line resistors. This board also supports 6.8K and 18K end-of-line resistors. See *Figure 36* on page 79 for the location of the resistors. See *Table 33*, *Supervised DI end-of-line resistors* on page 70 for the appropriate switch settings.
6. Wire the supervised door DI between pin 8 (Door DI) and pin 9 (Door DI Return). Wire the supervised exit DI between pin 5 (Exit DI) and pin 10 (Exit DI Return). The contact can be normally open or normally closed.

CAUTION: The supervision capability will be impaired if the resistors are NOT wired immediately adjacent to the door status contact.

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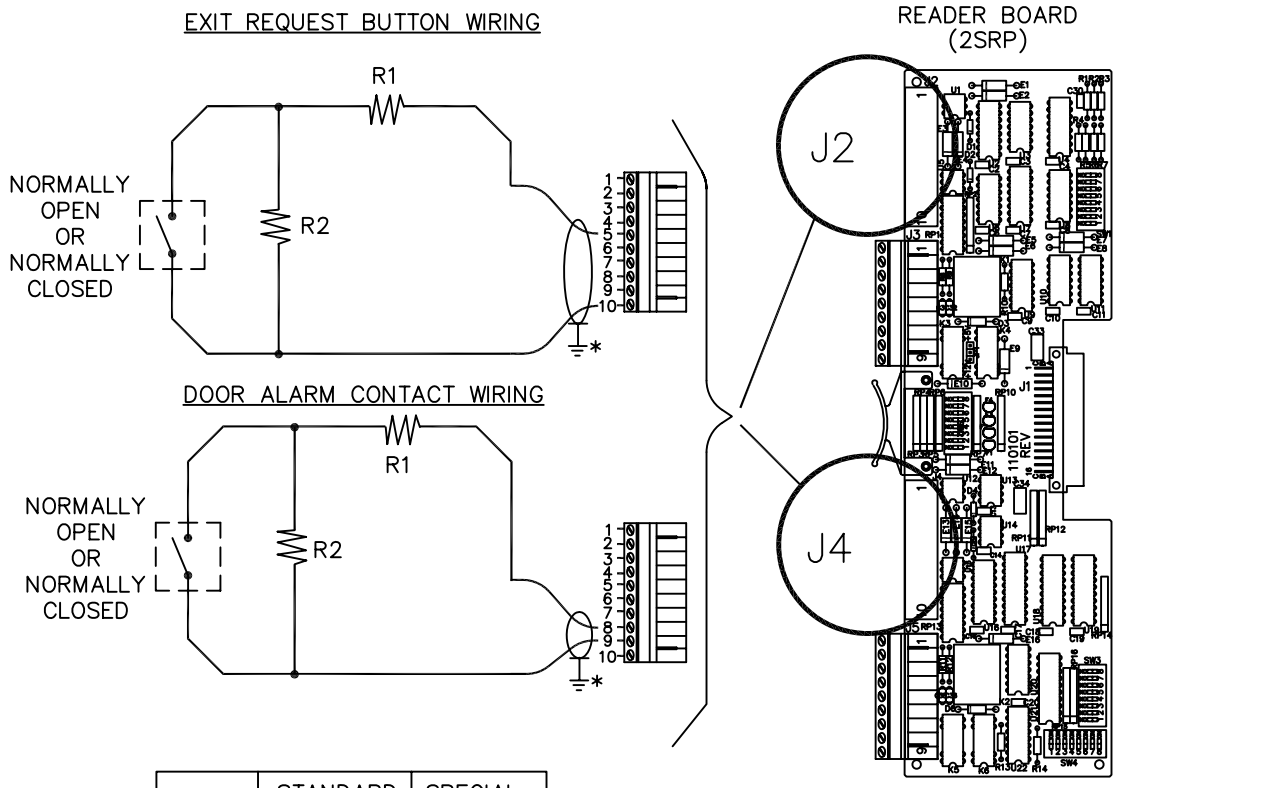
7. Insulate resistors with tape or heat shrink tubing
8. Document how you wired the alarm input devices. Future expansion of the system and its maintenance depend upon accurate documentation.

Figure 36. Wiring 2SRP door alarm contact and exit request



	STANDARD	SPECIAL
R1	1K	6.8K
R2	1K	18K

* = PAIR WIRES AS SHOWN, TIE SHIELD GROUNDS TO INTERNAL GROUND STUD ON MICRO.

FCC & CE COMPLIANCE – SHIELD GROUNDS MUST BE STRIPPED BACK THROUGH THE KNOCKOUT HOLE (STRAIN RELIEF) AND GROUNDED TO THE EXTERNAL GROUND STUDS PROVIDED.

530089006B

Wiring door strike

One reader LED (door DO) and one door DO relay are dedicated to each reader port. The door DO is used for the LED on the reader or an external door relay.

1. Install the door strike (2 amps @ 28 VDC or 30 VAC maximum) as required.
2. Wire the door strike to the door DO (internal) relay. Normally open or normally closed dry contacts are available (pin 1 = normally closed, pin 2 = common, pin 3 = normally open). Use pin 1 (+5/+12 VDC) and pin 4 (Reader LED) for wiring the external relay. See *Figure 37* on page 80 and *Figure 38* on page 81.
3. Install a protection diode. Use 1N4002, 1N4003, or 1N4004 diodes for DC door strikes and Metal Oxide Varistors (MOV) for AC door strikes.

Note: Protection diode or MOV required at all electronic door locks.

Figure 37. Wiring 2SRP door strike - internal relay

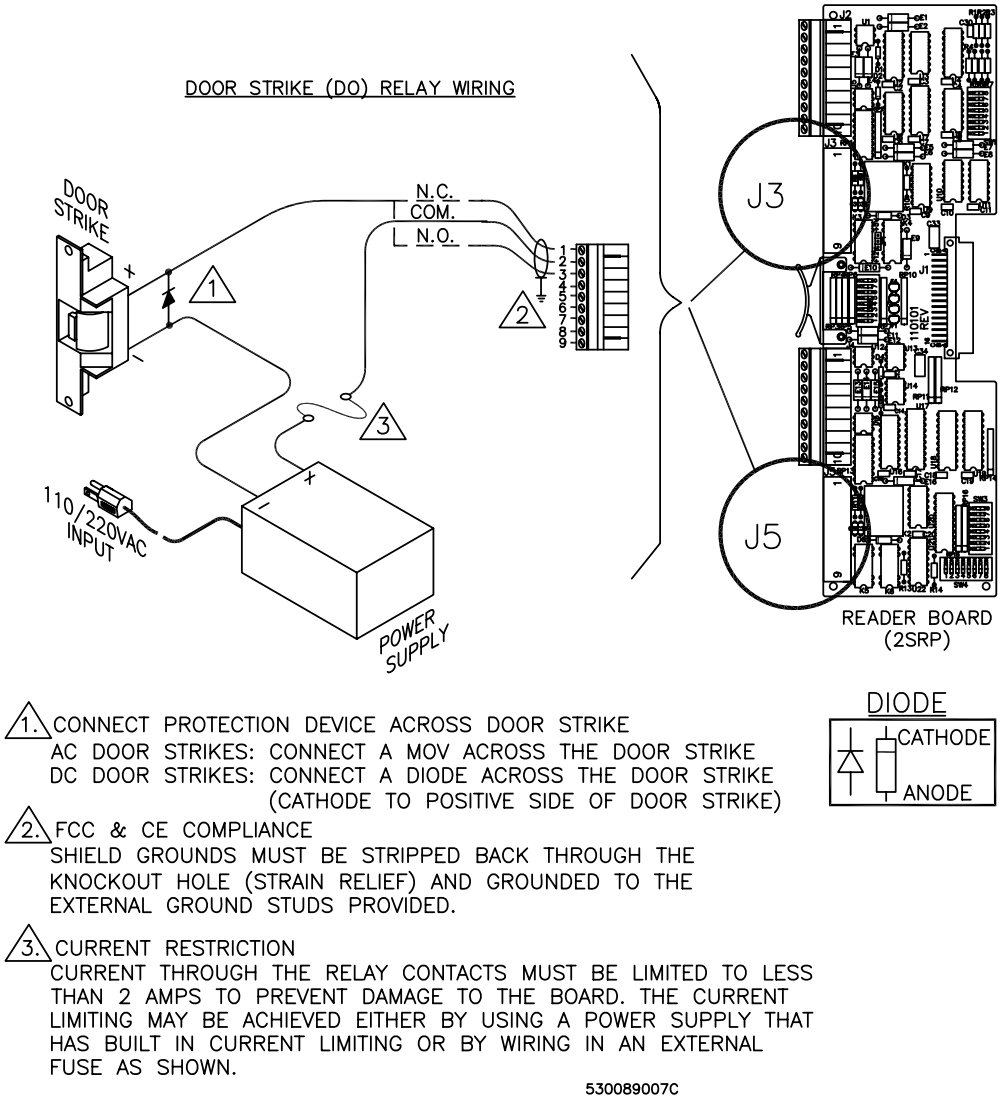
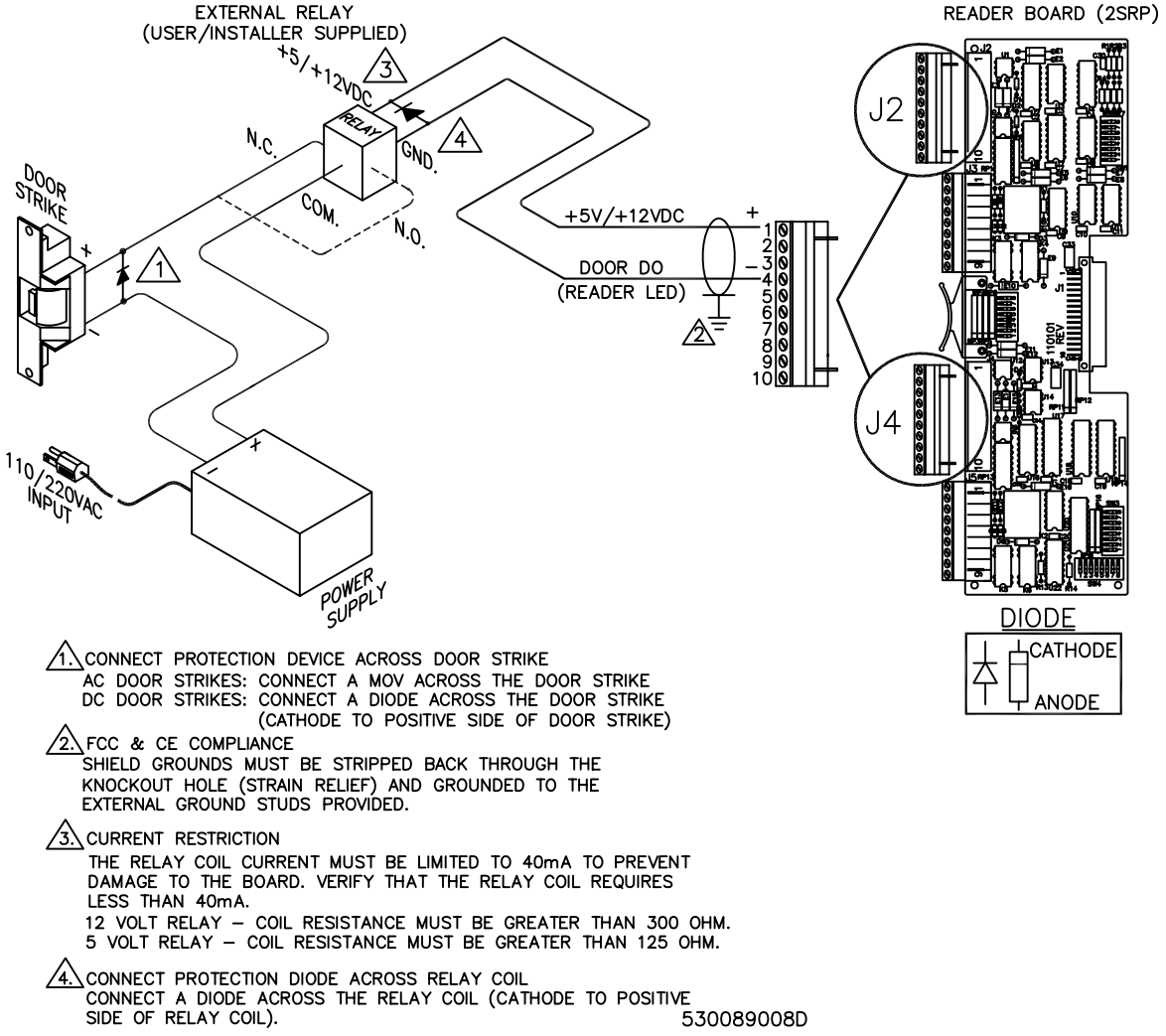


Figure 38. Wiring 2SRP door strike - external relay

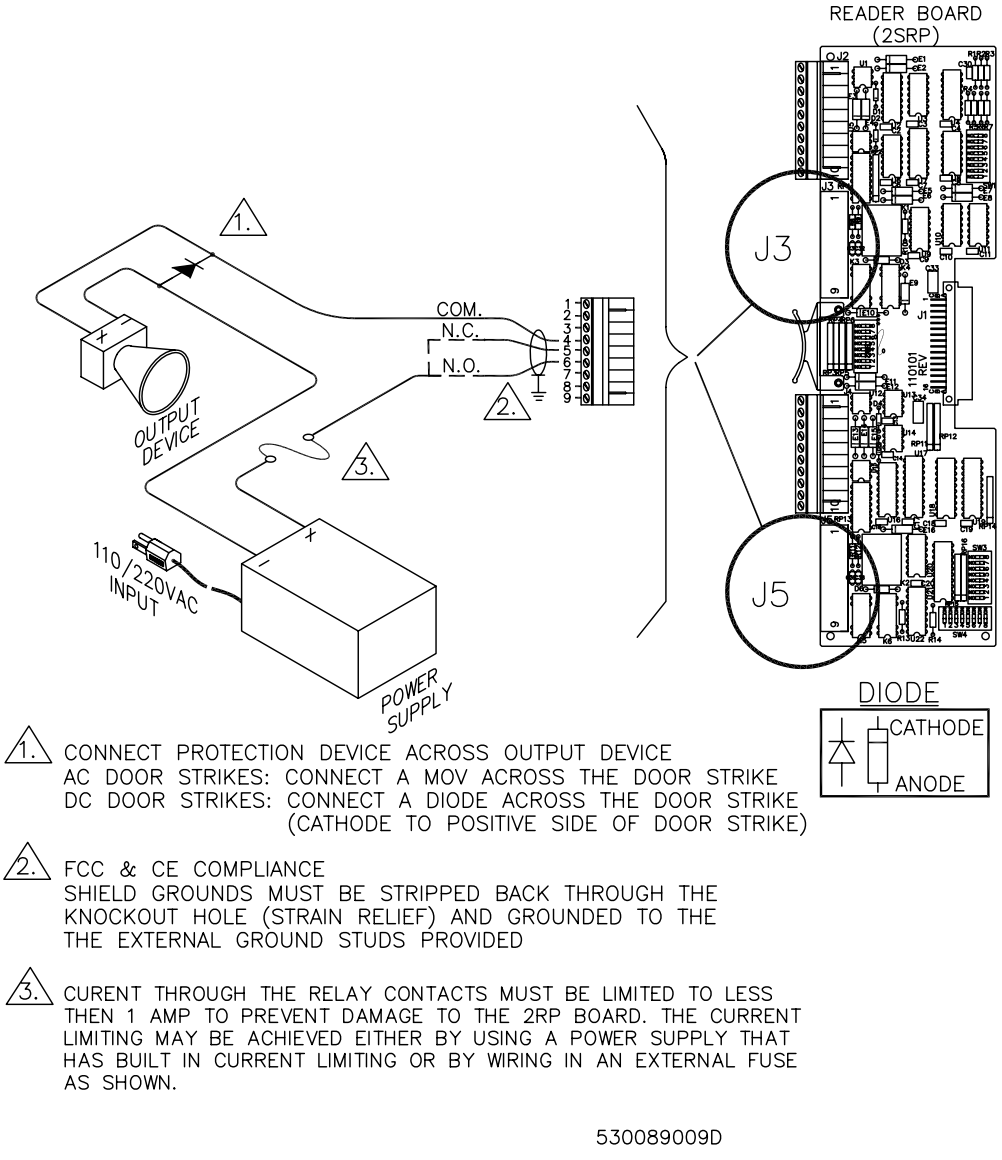


Wiring auxiliary DO relay

One auxiliary DO relay per reader port can be defined by the user. The auxiliary DO relay is used for an auxiliary output device.

1. Install the auxiliary output device (rated 0.25 amps @ 40 VDC maximum) as required.
2. Wire the output device to the auxiliary DO relay. The auxiliary DO relay has either a normally open or normally closed dry contact available (pin 4 = common, pin 5 = normally closed, pin 6 = normally open).

Figure 39. Wiring 2SRP auxiliary DO relay



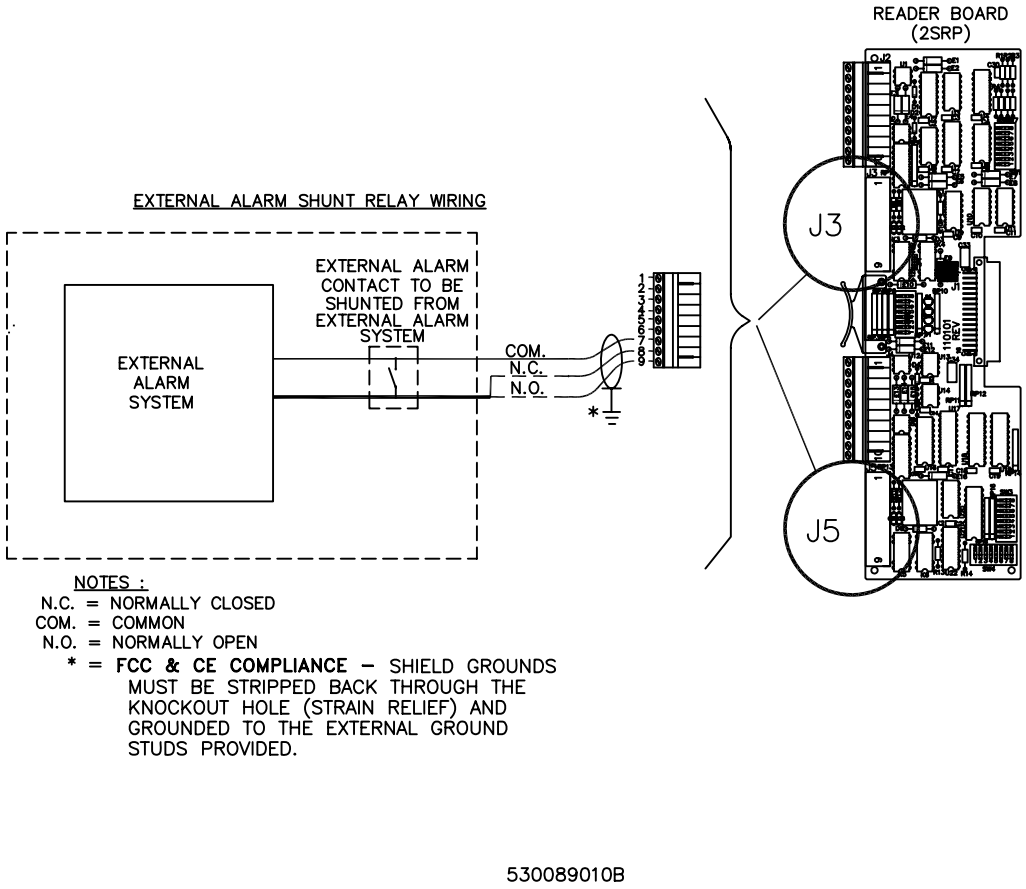
Wiring alarm shunt relay

One alarm shunt relay is available per reader port. The alarm shunt relay is used to shunt (disable) an external alarm system contact (e.g. burglar alarm) on a valid read or exit pushbutton request.

1. Install the alarm shunt (rated at 0.25 amps @ 40 VDC maximum) as required.
2. Wire external alarm system to the alarm shunt relay. The relay has either a normally open or normally closed dry contact available (pin 7 = common, pin 8 = normally closed, pin 9 = normally open).

Note: Single color LED readers do not support alarm shunt relays.

Figure 40. Wiring 2SRP external alarm shunt relay



8RP board

Introduction

The number of 8RP boards supported by different host software systems varies. Consult the manual that came with your software for this information.

- The 8RP board has been redesigned to work with 12V readers only. This new version of the 8RP board can be identified by the assembly number 110100001 with a revision of C or later.
- Each 8RP board is limited to only one type of reader technology: F/2F or Supervised F/2F.
- External pull-up resistors are not required for the 8RP board.
- No DI (alarm points) or exit DIs are available on the 8RP board. Therefore, use of supervised readers is recommended since these points are available on the reader.
- In Supervised F/2F mode, the DI (alarm input) is available at the reader on GE Supervised F/2F readers, except for the Model 440 and the Model 445.
- If keypad readers are needed, use ONLY GE Supervised F/2F keypad readers or Wiegand Interface Units (WIU-2/WIU-4).
- Each reader, reader-based DI (input) point, and reader-based Exit DI on the 8RP board is addressed differently depending on the host system you are using.
- The 8RP board provides one digital output (reader LED) per reader port, 0.10 amps @ 12 VDC maximum per output point.

Device addressing

Picture Perfect

Note: Picture Perfect uses 2RP board numbers to address readers, DIs, and DOs on the 8RP board; See *Table 40* and *Table 41* for further information. Therefore, in Picture Perfect:

- Reader ports 1 and 2 are configured as Board number 1, reader address 0 and 1;
- Reader ports 3 and 4 are configured as Board number 2, reader address 0 and 1;
- Reader ports 5 and 6 are configured as Board number 3, reader address 0 and 1;
- Reader ports 7 and 8 are configured as Board number 4, reader address 0 and 1.

Table 40. 8RP device addressing - Picture Perfect Board 1

	Board type: Board 1[1]			
	Reader 1 and 2	Reader 3 and 4	Reader 5 and 6	Reader 7 and 8
Picture Perfect board number	1	2	3	4
Readers	0 and 1	0 and 1	0 and 1	0 and 1
Door DIs	0 and 1	0 and 1	0 and 1	0 and 1
Exit DIs	8 and 9	8 and 9	8 and 9	8 and 9
Door DOs	0 and 1	0 and 1	0 and 1	0 and 1
Auxiliary/shunt DOs	Reserved	Reserved	Reserved	Reserved

1. The first 8 readers out of 16. See *Table 44* on page 86 for board type settings.

Table 41. 8RP device addressing - Picture Perfect Board 2

	Board type: Board 2[1]			
	Reader 9 and 10	Reader 11 and 12	Reader 13 and 14	Reader 15 and 16
Picture Perfect board number	**5**	**6**	**7**	**8**
Readers	0 and 1	0 and 1	0 and 1	0 and 1
Door DIs	0 and 1	0 and 1	0 and 1	0 and 1
Exit DIs	8 and 9	8 and 9	8 and 9	8 and 9
Door DOs	0 and 1	0 and 1	0 and 1	0 and 1
Auxiliary/shunt DOs	Reserved	Reserved	Reserved	Reserved

1. The second 8 readers out of 16. See *Table 44* on page 86 for board type settings.

Secure Perfect

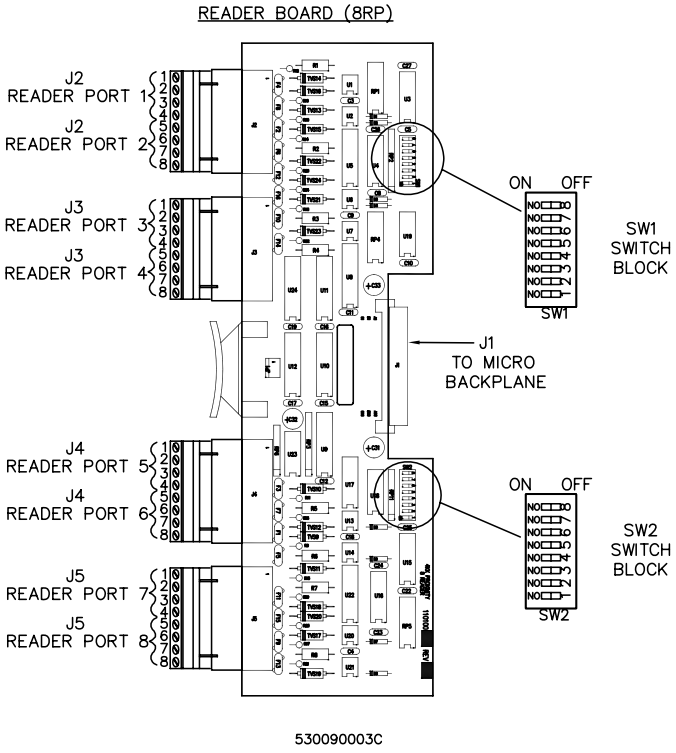
The following Secure Perfect device addresses are created for you by the Secure Perfect software. This table is provided for your reference only. The device address is in the format `mmmm-b-pp` where `mmmm` represents the micro number, `b` represents the board number, and `pp` represents the point or device number.

Table 42. 8RP device addressing - Secure Perfect

	Standard/Board 1	Board 2
Readers/Door DO	*mmmm*-1-01 through *mmmm*-1-08	*mmmm*-2-01 through *mmmm*-2-08
Door DIs	*mmmm*-1-01 through *mmmm*-1-08	*mmmm*-2-01 through *mmmm*-2-08
Exit DIs	*mmmm*-1-01 through *mmmm*-1-08	*mmmm*-2-01 through *mmmm*-2-08
Auxiliary/shunt DOs	*mmmm*-1-01 through *mmmm*-1-08	*mmmm*-2-01 through *mmmm*-2-08

Board layout

Figure 41. 8RP reader board layout



Setting DIP switches

Set the DIP switches as described in the table below before installing and wiring the 8RP board.

Table 43. Reader technology and format

Reader technology and format	SW 1-1	SW 1-2	SW 1-3	SW 1-4
Magstripe - GE Supervised F/2F	ON		ON	
Magstripe - F/2F	ON	ON	ON	

= OFF

Table 44. Picture Perfect 8RP board address settings

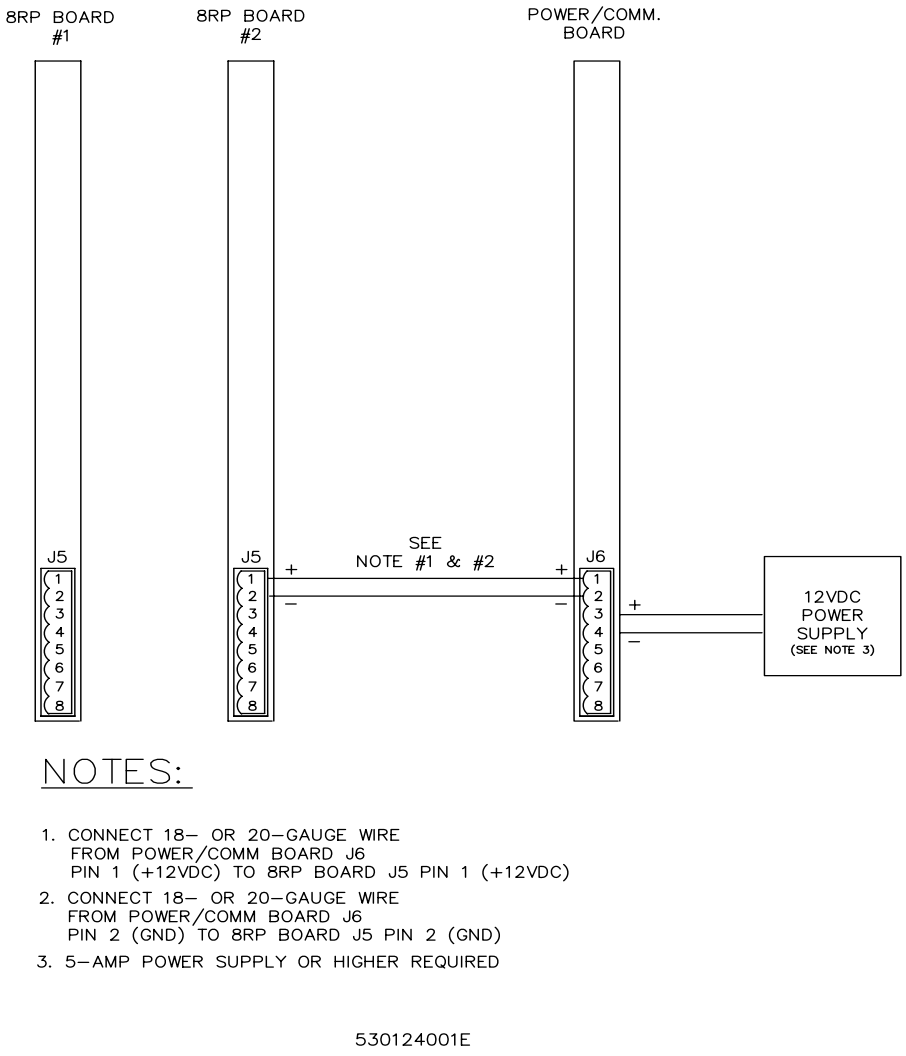
Board type	SW 1-				SW 2-							
	5	6	7	8	1	2	3	4	5	6	7	8
Board 1[1]	Does not apply.			ON	ON		ON		ON		ON	
Board 2[2]				ON	ON	ON				ON		ON

1. The first 8 readers out of 16.
2. The second 8 readers out of 16.

= OFF

Powering two 8RP boards

Figure 42. Powering two 8RP boards



Wiring the readers

1. Mount the reader. Refer to the manual that came with your reader for specific mounting instructions.
2. Run cable from the reader to the microcontroller. Bring each reader cable through the appropriate knockout hole in the microcontroller cabinet. Allow some slack wire for servicing the cables and for plugging the cable into an adjacent slot for troubleshooting.
3. Remove eight inches of insulating material from the cable. Unwrap shielding and tie all shields together. Connect the communications cable shield to the ground nut adjacent to the cable entrance knockout of the cabinet enclosure. For more details, see *Figure 55, Typical installation using shielded cable/drain wire - outside and inside the enclosure* on page 140.
4. Place the appropriate wires to the appropriate screw terminal on the 8RP reader board. Refer to the reader wiring diagrams in this section. Pairing of cables is very important.

CAUTION: The 8RP board has built-in pull-up resistors. Do not install the external pull-up resistors supplied with the GE Proximity Readers.

5. Label each cable end with Micro Address Number/ Device or Reader Number.

Table 45. Recommended pairing of reader wires - Typical reader cable

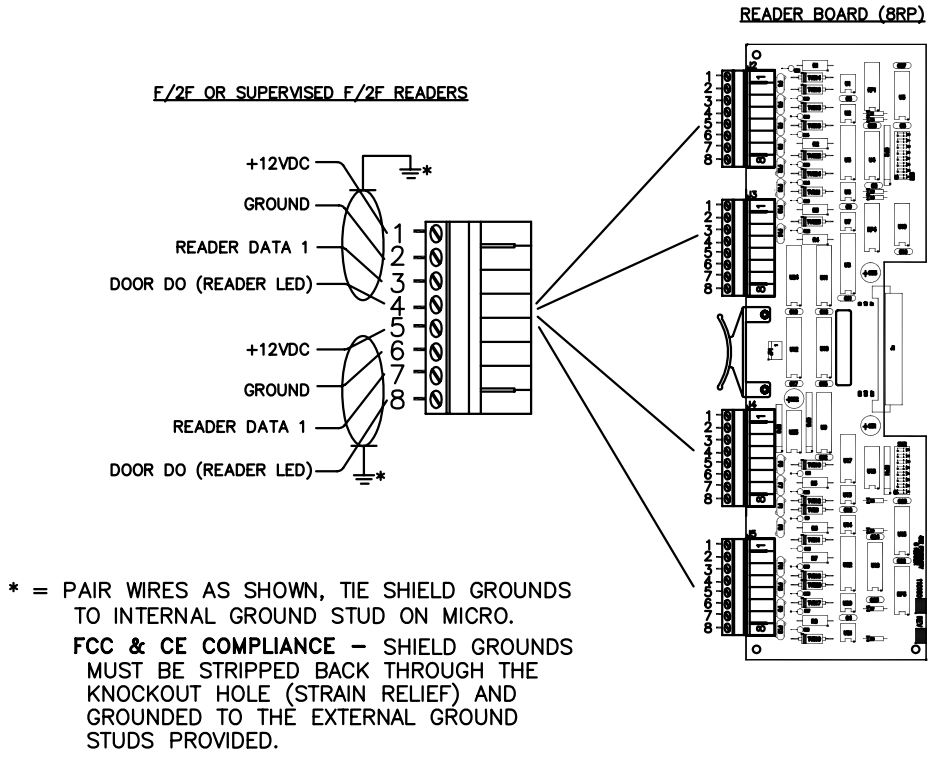
PIN	Signal name	Typical wire color
1	+12 VDC Reader Power	Red
4	Door DO (Reader LED)	Black
2	Ground (-)	Green
3	Reader Data 1	White
5	+12 VDC Reader Power	White/Red
8	Door DO (Reader LED)	White/Black
6	Ground (-)	White/Green
7	Reader Data 1	White/Yellow

Note: Use Belden 8723 or 8725 twisted shielded pair or equivalent.

Table 46. J2/J3/J4/J5 reader connector pinouts

Reader port	PIN	Signal name
1/3/5/7	1	+12 VDC
	2	Ground
	3	Reader Data 1
	4	Door DO (Reader LED)
2/4/6/8	5	+12 VDC
	6	Ground
	7	Reader Data 1
	8	Door DO (Reader LED)

Figure 43. Wiring 8RP to F/2F or Supervised F/2F Readers



Wiring door strike

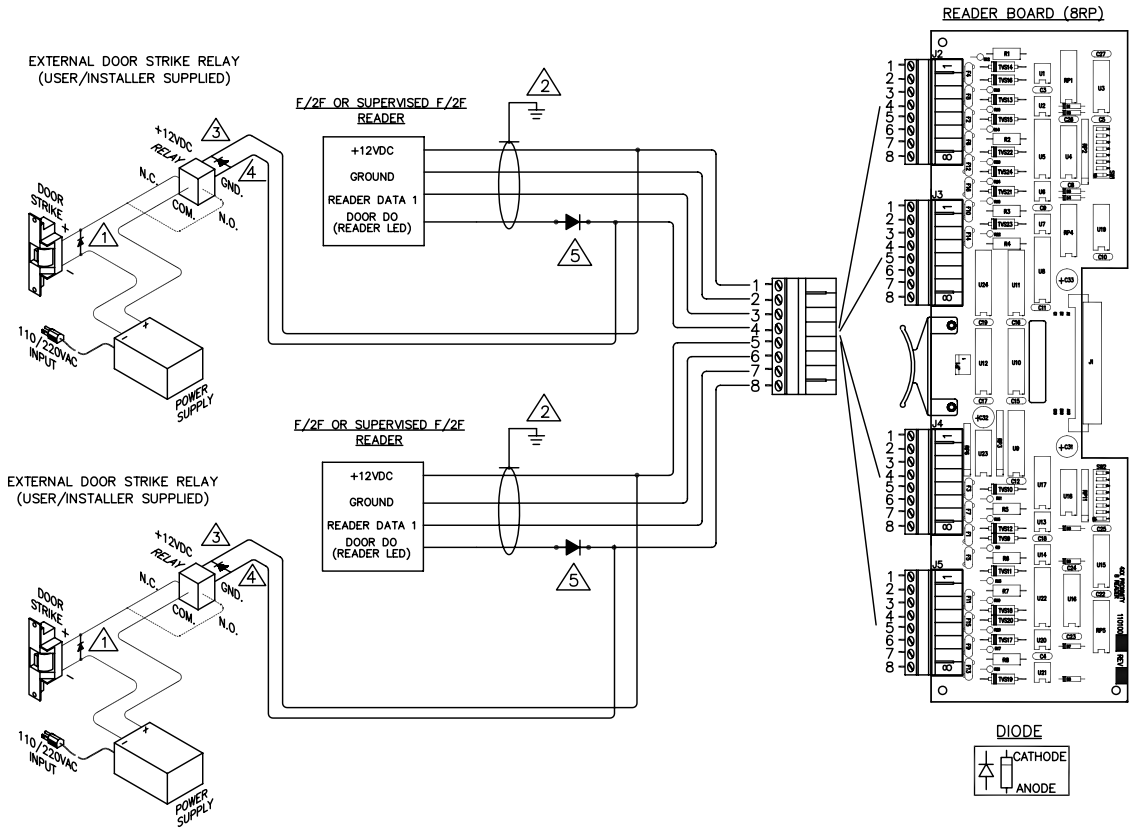
One reader LED (door DO) is dedicated to each reader. The reader LED (door DO) is used for the reader LED and/or for an external door strike relay.

1. Install the door strike as required.
2. Wire the door strike to the external door strike relay. The door strike relay is connected to +12 VDC (pin 1 and/or pin 5) and door DO (pin 4 and/or pin 8).
3. Install a **protection diode** across the relay and the door strike. Use 1N4002, 1N4003, 1N4004 or equivalent diodes for DC door strikes and Metal Oxide Varistors (MOV) for AC door strikes. See Note 4 and Note 1 in *Figure 44*.

   Note: Protection diode or MOV and blocking diode required at all electronic door locks.

4. Install a **blocking diode** on the door DO (Reader LED) line between the reader and the door strike relay. Use 1N5817 or GE part number 521224001 (included with reader). The diode must be installed on the secure side of the door in order to be UL compliant. See Note 5 in *Figure 44*.

Figure 44. Wiring 8RP door strike - external relay



1. CONNECT PROTECTION DEVICE ACROSS DOOR STRIKE
   AC DOOR STRIKES: CONNECT A MOV ACROSS THE DOOR STRIKE
   DC DOOR STRIKES: CONNECT A DIODE ACROSS THE DOOR STRIKE
   (CATHODE TO POSITIVE SIDE OF DOOR STRIKE)

2. FCC & CE COMPLIANCE
   SHIELD GROUNDS MUST BE STRIPPED BACK THROUGH THE KNOCKOUT HOLE (STRAIN RELIEF) AND GROUNDED TO THE EXTERNAL GROUND STUDS PROVIDED.

3. CURRENT RESTRICTION
   THE RELAY COIL CURRENT MUST BE LIMITED TO 40mA TO PREVENT DAMAGE TO THE BOARD. VERIFY THAT THE RELAY COIL REQUIRES LESS THAN 40mA.
   12 VOLT RELAY – COIL RESISTANCE MUST BE GREATER THAN 300 OHM.

4. CONNECT PROTECTION DIODE ACROSS RELAY COIL
   CONNECT A DIODE ACROSS THE RELAY COIL (CATHODE TO POSITIVE SIDE OF RELAY COIL).

5. OPTION : BLOCKING DIODE FOR UL COMPLIANCE. USE DIODE 1N5817 OR GE p/n 521224001
   A BLOCKING DIODE CAN BE USED ON DOOR DO (READER LED) LINE IN BETWEEN READER AND DOOR STRIKE RELAY TO PREVENT ENERGIZING THE RELAY BY SHORTING THE LED LINE TO GROUND. LOCATE BLOCKING DIODE ON THE SECURE SIDE OF THE DOOR.

530090005H

CK8RP board

Introduction

The Cardkey 8RP (CK8RP) board, along with the Secure Terminal Interface (STI) Adapter, is designed to interface with the Cardkey system.

- Each CK8RP board will support up to 8 STI adapters. Each STI adapter supports one reader.
- Firmware on the STI adapters can be updated using the CK8RP board.
- Up to two boards can be used per micro. If you plan on using one CK8RP board, you can also use an 8RP board, up to two 20 DI boards, and up to two 16 DO boards. Be careful that the address selection on each board is not in conflict.
- Each CK8RP board maps into the address of one 8RP board, two 20 DI boards, and two 16 DO boards.

Device addressing

Picture Perfect

Table 47. Device Addressing: Picture Perfect Board 1 - CK8RP Board 1

Cardkey	Picture Perfect Board 1	
	Reader 1	Reader 2
LED #1 (Green)	Board 1 - Reader 0	Board 1 - Reader 1
LED #2 (Red)	16 DO Board 1 - #2 (DO 17)	16 DO Board 1- #5 (DO 20)
Aux 2	16 DO Board 1 - #3 (DO 18)	16 DO Board 1 - #6 (DO 21)
Aux 3	Board 1 - (DO 2)	Board 1 - (DO 4)
Aux 4	16 DO Board 1 - #1 (DO 16)	16 DO Board 1 - #4 (DO 19)
DI #1	Door DI (0)	Door DI (1)
DI #2	Exit DI (8)	Exit DI (9)
DI #3	20 DI Board 1 - #1 (DI 16)	20 DI Board 1 - #7 (DI 22)
DI #4	20 DI Board 1 - #2 (DI 17)	20 DI Board 1 - #8 (DI 23)
DI #5	20 DI Board 1 - #3 (DI 18)	20 DI Board 1 - #9 (DI 24)
DI #6	20 DI Board 1 - #4 (DI 19)	20 DI Board 1 - #10 (DI 25)
DI #7	20 DI Board 1 - #5 (DI 20)	20 DI Board 1 - #11 (DI 26)
DI #8	20 DI Board 1 - #6 (DI 21)	20 DI Board 1 - #12 (DI 27)

Table 48. Device Addressing: Picture Perfect Board 2 - CK8RP Board 1

Cardkey	Picture Perfect Board 2	
	Reader 3	Reader 4
LED #1 (Green)	Board 2 - Reader 0	Board 2 - Reader 1
LED #2 (Red)	16 DO Board 1 - #8 (DO 23)	16 DO Board 1 - #11 (DO 26)
Aux 2	16 DO Board 1 - #9 (DO 24)	16 DO Board 1 - #12 (DO 27)
Aux 3	Board 2 - (DO 2)	Board 2 - (DO 4)
Aux 4	16 DO Board 1 - #7 (DO 22)	16 DO Board 1 - #10 (DO 25)
DI #1	Door DI (0)	Door DI (1)
DI #2	Exit DI (8)	Exit DI (9)
DI #3	20 DI Board 1 - #13 (DI 28)	20 DI Board 1 - #19 (DI 34)
DI #4	20 DI Board 1 - #14 (DI 29)	20 DI Board 1 - #20 (DI 35)
DI #5	20 DI Board 1 - #15 (DI 30)	20 DI Board 2 - #1 (DI 16)
DI #6	20 DI Board 1 - #16 (DI 31)	20 DI Board 2 - #2 (DI 17)
DI #7	20 DI Board 1 - #17 (DI 32)	20 DI Board 2 - #3 (DI 18)
DI #8	20 DI Board 1 - #18 (DI 33)	20 DI Board 2 - #4 (DI 19)

Table 49. Device Addressing: Picture Perfect Board 3 - CK8RP Board 1

Cardkey	Picture Perfect Board 3	
	Reader 5	Reader 6
LED #1 (Green)	Board 3 - Reader 0	Board 3 - Reader 1
LED #2 (Red)	16 DO Board 1 - #14 (DO 29)	16 DO Board 2 - #1 (DO 16)
Aux 2	16 DO Board 1 - #15 (DO 30)	16 DO Board 2 - #2 (DO 17)
Aux 3	Board 3 - (DO 2)	Board 3 - (DO 4)
Aux 4	16 DO Board 1 - #13 (DO 28)	16 DO Board 1 - #16 (DO 31)
DI #1	Door DI (0)	Door DI (1)
DI #2	Exit DI (8)	Exit DI (9)
DI #3	20 DI Board 2 - #5 (DI 20)	20 DI Board 2 - #9 (DI 24)
DI #4	20 DI Board 2 - #6 (DI 21)	20 DI Board 2 - #10 (DI 25)
DI #5	20 DI Board 2 - #7 (DI 22)	20 DI Board 2 - #11 (DI 26)
DI #6	20 DI Board 2 - #8 (DI 23)	20 DI Board 2 - #12 (DI 27)

Table 49. Device Addressing: Picture Perfect Board 3 - CK8RP Board 1 (continued)

Cardkey	Picture Perfect Board 3	
	Reader 5	Reader 6
DI #7	Not Used	Not Used
DI #8	Not Used	Not Used

Table 50. Device Addressing: Picture Perfect Board 4 - CK8RP Board 1

Cardkey	Picture Perfect Board 4	
	Reader 7	Reader 8
LED #1 (Green)	Board 4 - Reader 0	Board 4 - Reader 1
LED #2 (Red)	16 DO Board 2 - #4 (DO 19)	16 DO Board 2 - #7 (DO 22)
Aux 2	16 DO Board 2 - #5 (DO 20)	16 DO Board 2 - #8 (DO 23)
Aux 3	Board 4 - (DO 2)	Board 4 - (DO 4)
Aux 4	16 DO Board 2 - #3 (DO 18)	16 DO Board 2 - #6 (DO 21)
DI #1	Door DI (0)	Door DI (1)
DI #2	Exit DI (8)	Exit DI (9)
DI #3	20 DI Board 2 - #13 (DI 28)	20 DI Board 2 - #17 (DI 32)
DI #4	20 DI Board 2 - #14 (DI 29)	20 DI Board 2 - #18 (DI 33)
DI #5	20 DI Board 2 - #15 (DI 30)	20 DI Board 2 - #19 (DI 34)
DI #6	20 DI Board 2 - #16 (DI 31)	20 DI Board 2 - #20 (DI 35)
DI #7	Not Used	Not Used
DI #8	Not Used	Not Used

Table 51. Device Addressing: Picture Perfect Board 5 - CK8RP Board 2

Cardkey	Picture Perfect Board 5	
	Reader 9	Reader 10
LED #1 (Green)	Board 5 - Reader 0	Board 5 - Reader 1
LED #2 (Red)	16 DO Board 3 - #2 (DO 17)	16 DO Board 3 - #5 (DO 20)
Aux 2	16 DO Board 3 - #3 (DO 18)	16 DO Board 3 - #6 (DO 21)
Aux 3	Board 5 - (DO 2)	Board 5 - (DO 4)
Aux 4	16 DO Board 3 - #1 (DO 16)	16 DO Board 3 - #4 (DO 19)
DI #1	Door DI (0)	Door DI (1)

Table 51. Device Addressing: Picture Perfect Board 5 - CK8RP Board 2 (continued)

Cardkey	Picture Perfect Board 5	
	Reader 9	Reader 10
DI #2	Exit DI (8)	Exit DI (9)
DI #3	20 DI Board 3 - #1 (DI 16)	20 DI Board 3 - #7 (DI 22)
DI #4	20 DI Board 3 - #2 (DI 17)	20 DI Board 3 - #8 (DI 23)
DI #5	20 DI Board 3 - #3 (DI 18)	20 DI Board 3 - #9 (DI 24)
DI #6	20 DI Board 3 - #4 (DI 19)	20 DI Board 3 - #10 (DI 25)
DI #7	20 DI Board 3 - #5 (DI 20)	20 DI Board 3 - #11 (DI 26)
DI #8	20 DI Board 3 - #6 (DI 21)	20 DI Board 3 - #12 (DI 27)

Table 52. Device Addressing: Picture Perfect Board 6 - CK8RP Board 2

Cardkey	Picture Perfect Board 6	
	Reader 11	Reader 12
LED #1 (Green)	Board 6 - Reader 0	Board 6 - Reader 1
LED #2 (Red)	16 DO Board 3 - #8 (DO 23)	16 DO Board 3 - #11 (DO 26)
Aux 2	16 DO Board 3 - #9 (DO 24)	16 DO Board 3 - #12 (DO 27)
Aux 3	Board 6 - (DO 2)	Board 6 - (DO 4)
Aux 4	16 DO Board 3 - #7 (DO 22)	16 DO Board 3 - #10 (DO 25)
DI #1	Door DI (0)	Door DI (1)
DI #2	Exit DI (8)	Exit DI (9)
DI #3	20 DI Board 3 - #13 (DI 28)	20 DI Board 3 - #19 (DI 34)
DI #4	20 DI Board 3 - #14 (DI 29)	20 DI Board 3 - #20 (DI 35)
DI #5	20 DI Board 3 - #15 (DI 30)	20 DI Board 4 - #1 (DI 16)
DI #6	20 DI Board 3 - #16 (DI 31)	20 DI Board 4 - #2 (DI 17)
DI #7	20 DI Board 3 - #17 (DI 32)	20 DI Board 4 - #3 (DI 18)
DI #8	20 DI Board 3 - #18 (DI 33)	20 DI Board 4 - #4 (DI 19)

Table 53. Device Addressing: Picture Perfect Board 7 - CK8RP Board 2

Cardkey	Picture Perfect Board 7	
	Reader 13	Reader 14
LED #1 (Green)	Board 7 - Reader 0	Board 7 - Reader 1
LED #2 (Red)	16 DO Board 3 - #14 (DO 29)	16 DO Board 4 - #1 (DO 16)
Aux 2	16 DO Board 3 - #15 (DO 30)	16 DO Board 4 - #2 (DO 17)
Aux 3	Board 7 - (DO 2)	Board 7 - (DO 4)
Aux 4	16 DO Board 3 - #13 (DO 28)	16 DO Board 3 - #16 (DO 31)
DI #1	Door DI (0)	Door DI (1)
DI #2	Exit DI (8)	Exit DI (9)
DI #3	20 DI Board 4 - #5 (DI 20)	20 DI Board 4 - #9 (DI 24)
DI #4	20 DI Board 4 - #6 (DI 21)	20 DI Board 4 - #10 (DI 25)
DI #5	20 DI Board 4 - #7 (DI 22)	20 DI Board 4 - #11 (DI 26)
DI #6	20 DI Board 4 - #8 (DI 23)	20 DI Board 4 - #12 (DI 27)
DI #7	Not used	Not used
DI #8	Not used	Not used

Table 54. Device Addressing: Picture Perfect Board 8 - CK8RP Board 2

Cardkey	Picture Perfect Board 8	
	Reader 15	Reader 16
LED #1 (Green)	Board 8 - Reader 0	Board 8 - Reader 1
LED #2 (Red)	16 DO Board 4 - #4 (DO 19)	16 DO Board 4 - #7 (DO 22)
Aux 2	16 DO Board 4 - #5 (DO 20)	16 DO Board 4 - #8 (DO 23)
Aux 3	Board 8 - (DO 2)	Board 8 - (DO 4)
Aux 4	16 DO Board 4 - #3 (DO 18)	16 DO Board 4 - #6 (DO 21)
DI #1	Door DI (0)	Door DI (1)
DI #2	Exit DI (8)	Exit DI (9)
DI #3	20 DI Board 4 - #13 (DI 28)	20 DI Board 4 - #17 (DI 32)
DI #4	20 DI Board 4 - #14 (DI 29)	20 DI Board 4 - #18 (DI 33)
DI #5	20 DI Board 4 - #15 (DI 30)	20 DI Board 4 - #19 (DI 34)
DI #6	20 DI Board 4 - #16 (DI 31)	20 DI Board 4 - #20 (DI 35)

Table 54. Device Addressing: Picture Perfect Board 8 - CK8RP Board 2 (continued)

Cardkey	Picture Perfect Board 8	
	Reader 15	Reader 16
DI #7	Not used	Not used
DI #8	Not used	Not used

Secure Perfect

The following Secure Perfect device addresses are created for you by the Secure Perfect software. This table is provided for your reference only. The device address is in the format `mmmm-b-pp` where `mmmm` represents the micro number, `b` represents the board number, and `pp` represents the point or device number.

Table 55. Device addressing: Secure Perfect - CK8RP Board 1

Cardkey	Reader 1	Reader 2	Reader 3	Reader 4
LED #1 (Green)	*mmmm*-1-01 Reader	*mmmm*-1-02 Reader	*mmmm*-1-03 Reader	*mmmm*-1-04 Reader
LED #2 (Red)	*mmmm*-1-02 DO	*mmmm*-1-05 DO	*mmmm*-1-08 DO	*mmmm*-1-11 DO
Aux 2	*mmmm*-1-03 DO	*mmmm*-1-06 DO	*mmmm*-1-09 DO	*mmmm*-1-12 DO
Aux 3	Not Available	Not Available	Not Available	Not Available
Aux 4	*mmmm*-1-01 DO	*mmmm*-1-04 DO	*mmmm*-1-07 DO	*mmmm*-1-10 DO
DI #1	*mmmm*-1-01 Reader	*mmmm*-1-02 Reader	*mmmm*-1-03 Reader	*mmmm*-1-04 Reader
DI #2	Not Available	Not Available	Not Available	Not Available
DI #3	*mmmm*-1-01 DI	*mmmm*-1-07 DI	*mmmm*-1-13 DI	*mmmm*-1-19 DI
DI #4	*mmmm*-1-02 DI	*mmmm*-1-08 DI	*mmmm*-1-14 DI	*mmmm*-1-20 DI
DI #5	*mmmm*-1-03 DI	*mmmm*-1-09 DI	*mmmm*-1-15 DI	*mmmm*-1-21 DI
DI #6	*mmmm*-1-04 DI	*mmmm*-1-10 DI	*mmmm*-1-16 DI	*mmmm*-1-22 DI
DI #7	*mmmm*-1-05 DI	*mmmm*-1-11 DI	*mmmm*-1-17 DI	*mmmm*-1-23 DI
DI #8	*mmmm*-1-06 DI	*mmmm*-1-12 DI	*mmmm*-1-18 DI	*mmmm*-1-24 DI

Table 56. Device Addressing: Secure Perfect - CK8RP Board 1

Cardkey	Reader 5	Reader 6	Reader 7	Reader 8
LED #1 (Green)	*mmmm*-1-05 Reader	*mmmm*-1-06 Reader	*mmmm*-1-07 Reader	*mmmm*-1-08 Reader
LED #2 (Red)	*mmmm*-1-14 DO	*mmmm*-1-17 DO	*mmmm*-1-20 DO	*mmmm*-1-23 DO
Aux 2	*mmmm*-1-15 DO	*mmmm*-1-18 DO	*mmmm*-1-21 DO	*mmmm*-1-24 DO
Aux 3	Not Available	Not Available	Not Available	Not Available
Aux 4	*mmmm*-1-13 DO	*mmmm*-1-16 DO	*mmmm*-1-19 DO	*mmmm*-1-22 DO
DI #1	*mmmm*-1-05 Reader	*mmmm*-1-06 Reader	*mmmm*-1-07 Reader	*mmmm*-1-08 Reader
DI #2	Not Available	Not Available	Not Available	Not Available
DI #3	*mmmm*-1-25 DI	*mmmm*-1-29 DI	*mmmm*-1-33 DI	*mmmm*-1-37 DI
DI #4	*mmmm*-1-26 DI	*mmmm*-1-30 DI	*mmmm*-1-34 DI	*mmmm*-1-38 DI
DI #5	*mmmm*-1-27 DI	*mmmm*-1-31 DI	*mmmm*-1-35 DI	*mmmm*-1-39 DI
DI #6	*mmmm*-1-28 DI	*mmmm*-1-32 DI	*mmmm*-1-36 DI	*mmmm*-1-40 DI
DI #7	Not Available	Not Available	Not Available	Not Available
DI #8	Not Available	Not Available	Not Available	Not Available

Table 57. Device Addressing: Secure Perfect - CK8RP Board 2

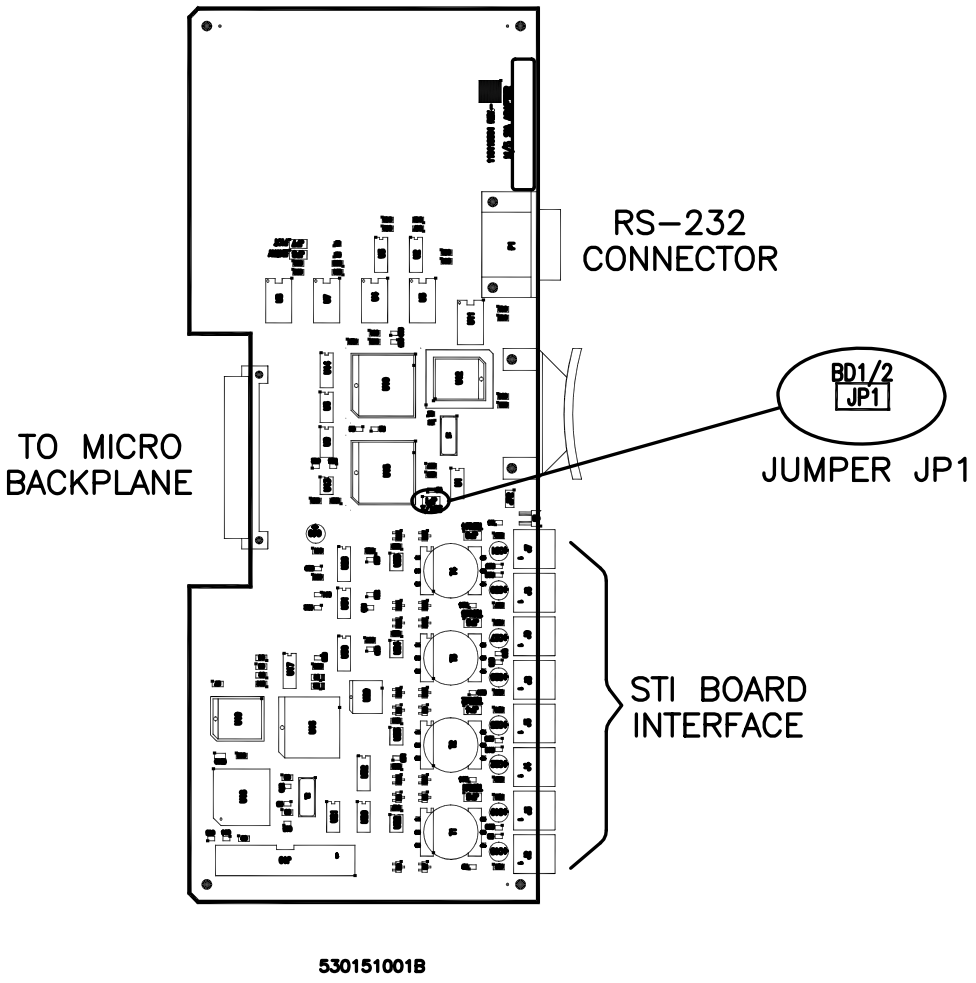
Cardkey	Reader 9	Reader 10	Reader 11	Reader 12
LED #1 (Green)	*mmmm*-2-01 Reader	*mmmm*-2-02 Reader	*mmmm*-2-03 Reader	*mmmm*-2-04 Reader
LED #2 (Red)	*mmmm*-2-02 DO	*mmmm*-2-05 DO	*mmmm*-2-08 DO	*mmmm*-2-11 DO
Aux 2	*mmmm*-2-03 DO	*mmmm*-2-06 DO	*mmmm*-2-09 DO	*mmmm*-2-12 DO
Aux 3	Not Available	Not Available	Not Available	Not Available
Aux 4	*mmmm*-2-01 DO	*mmmm*-2-04 DO	*mmmm*-2-07 DO	*mmmm*-2-10 DO
DI #1	*mmmm*-2-01 Reader	*mmmm*-2-02 Reader	*mmmm*-2-03 Reader	*mmmm*-2-04 Reader
DI #2	Not Available	Not Available	Not Available	Not Available
DI #3	*mmmm*-2-01 DI	*mmmm*-2-07 DI	*mmmm*-2-13 DI	*mmmm*-2-19 DI
DI #4	*mmmm*-2-02 DI	*mmmm*-2-08 DI	*mmmm*-2-14 DI	*mmmm*-2-20 DI
DI #5	*mmmm*-2-03 DI	*mmmm*-2-09 DI	*mmmm*-2-15 DI	*mmmm*-2-21 DI
DI #6	*mmmm*-2-04 DI	*mmmm*-2-10 DI	*mmmm*-2-16 DI	*mmmm*-2-22 DI
DI #7	*mmmm*-2-05 DI	*mmmm*-2-11 DI	*mmmm*-2-17 DI	*mmmm*-2-23 DI
DI #8	*mmmm*-2-06 DI	*mmmm*-2-12 DI	*mmmm*-2-18 DI	*mmmm*-2-24 DI

Table 58. Device Addressing: Secure Perfect - CK8RP Board 2

Cardkey	Reader 13	Reader 14	Reader 15	Reader 16
LED #1 (Green)	*mmmm*-2-05 Reader	*mmmm*-2-06 Reader	*mmmm*-2-07 Reader	*mmmm*-2-08 Reader
LED #2 (Red)	*mmmm*-2-14 DO	*mmmm*-2-17 DO	*mmmm*-2-20 DO	*mmmm*-2-23 DO
Aux 2	*mmmm*-2-15 DO	*mmmm*-2-18 DO	*mmmm*-2-21 DO	*mmmm*-2-24 DO
Aux 3	Not Available	Not Available	Not Available	Not Available
Aux 4	*mmmm*-2-13 DO	*mmmm*-2-16 DO	*mmmm*-2-19 DO	*mmmm*-2-22 DO
DI #1	*mmmm*-2-05 Reader	*mmmm*-2-06 Reader	*mmmm*-2-07 Reader	*mmmm*-2-08 Reader
DI #2	Not Available	Not Available	Not Available	Not Available
DI #3	*mmmm*-2-25 DI	*mmmm*-2-29 DI	*mmmm*-2-33 DI	*mmmm*-2-37 DI
DI #4	*mmmm*-2-26 DI	*mmmm*-2-30 DI	*mmmm*-2-34 DI	*mmmm*-2-38 DI
DI #5	*mmmm*-2-27 DI	*mmmm*-2-31 DI	*mmmm*-2-35 DI	*mmmm*-2-39 DI
DI #6	*mmmm*-2-28 DI	*mmmm*-2-32 DI	*mmmm*-2-36 DI	*mmmm*-2-40 DI
DI #7	Not Available	Not Available	Not Available	Not Available
DI #8	Not Available	Not Available	Not Available	Not Available

Board layout

Figure 45. CK8RP board layout



Jumpers

Set jumper as described in *Table 59* on page 101 before installing and wiring the CK8RP board.

Table 59. Board number

Board number	JP1
Board 1	Open Terminals
Board 2	Short Terminals

Wiring STI adapters and the CK8RP board

1. Run two wires for NETA and NETB from the STI to the microcontroller. Bring each cable through the appropriate knockout hole in the microcontroller enclosure. Allow some slack wire for servicing the cables and for plugging the cable into an adjacent slot for troubleshooting.
2. Connect NETA and NETB into any of the eight connectors (J2-J9) on the CK8RP board. Since the address is set on the STI adapter and not on the CK8RP board, you can use any of the connectors. NETA and NETB signals are polarity insensitive; therefore, each can be connected to either pin 1 or pin 2.

   Note: The maximum distance from the last STI to the CK8RP per pair of connectors (J2-J3, J4-J5, J6-J7, and J8-J9) is 6,000 feet. For example, the total cable distance for J2 and J3 can not exceed 6,000 feet.

3. Label each cable end with the Micro Address Number/ Device or Reader Number.

Configuring with other STIs

The CK8RP can support a total of 8 STIs in any combination from one to eight ports of the CK8RP. The configuration is dependent on total wiring length and installer preferences.

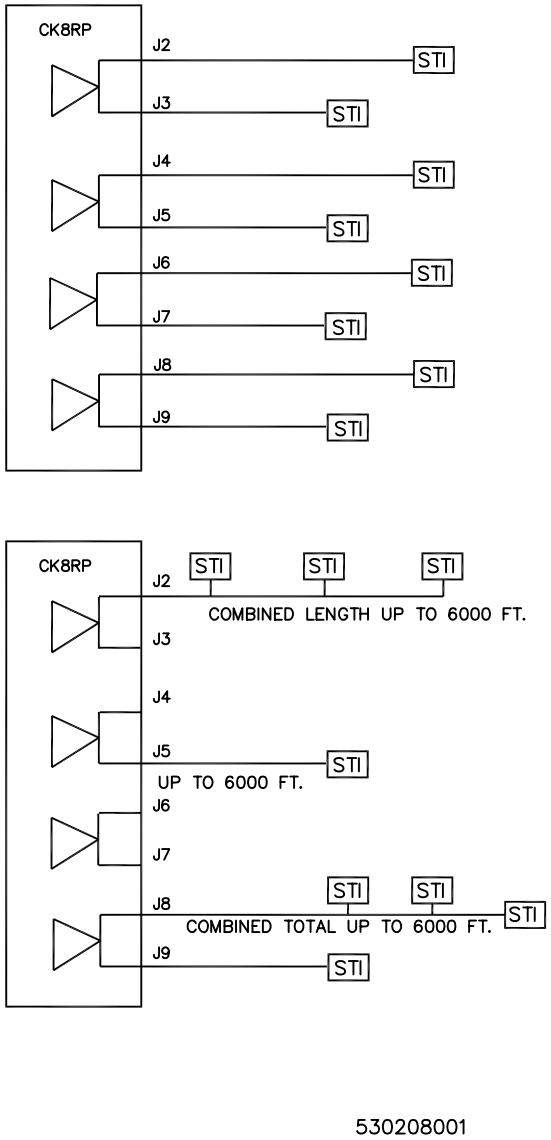
A basic rule for determining wiring harness distances is that the total wire length for each connector pair (J2-J3, J4-J5, J6-J7, and J8-J9) cannot exceed 6,000 feet. For examples, see *Table 60*.

Table 60. Example of wiring distances

Connector	Example 1	Example 2	Example 3	Example 4
J2	3,000 ft.	1,500 ft.	6,000 ft.	200 ft.
J3	3,000 ft.	4,500 ft.	0 ft.	5,800 ft.
Total	6,000 ft.	6,000 ft.	6,000 ft.	6,000 ft.

Since each connector pair can drive up to 6,000 feet, a total of 4 separate 6,000 foot runs can be made from the CK8RP.

Figure 46. Examples of CK8RP/STI wiring configurations



Downloading firmware to STI adapters

The CK8RP board, in conjunction with one of the GE micro firmware installation tools, can be used to download firmware to STI Adapters. The P1 9-pin connector is an RS-232 modem interface that can be connected to a PC running the micro installation tool using a NULL modem cable. Refer to the micro installation tool's online help for more information on this utility.

Before continuing, however, review the list below containing items to note:

- Any host (**Picture Perfect** or **Secure Perfect**) can be selected.
- The HEX file to be downloaded must be resident in the same directory as the micro firmware installation tool.
- The micro address will correspond to the STI adapter to be updated. For example, select micro address 1 to download to STI adapter 1. Selecting 9 will update all STI adapters in the network.
- The micro phone number and Version file field should be left blank.
- The HEX file name should correspond to the download file.
- The baud rate should be set to 4800.

Note: The STI being updated will not be operational for the entire downloading time; all other STI adapters will remain operational. If "9" is selected for the micro address, all STI adapters will be updated simultaneously, and all will be non-operational for the entire downloading time.

Chapter 6 The optional DI and DO boards

This chapter provides information about and instructions for using the optional DI and DO boards.

In this chapter:

Introduction

The Micro/5 Controller supports the 20 Digital Input board, the 16 Digital Output board, and the 16 Digital Output with Relays board. Although the Micro/5 enclosure holds up to seven boards, the specific number of DI and DO boards supported by the different host software systems varies. Reference the manual that came with your host system for further information on how many boards it supports.

20 DI board

Introduction

The 20 DI board provides 20 supervised digital input (alarm) points. Supervised DIs have end-of-line resistors on the contacts which enable the microcontroller to detect line shorts and breaks in addition to the open and closed contact conditions. Please note the following:

- Maximum distance allowed between the Micro/5 and the alarm input device is 1,000 feet.
- Recommended cable wire is 2-conductor, 22-AWG shielded, stranded.
- Each DI point is addressed differently depending on the host system you are using.

Device addressing

Picture Perfect

From one to four boards can be configured with DI points from 16 to 35. Picture Perfect addresses DIs by board number; therefore, the DI numbers are the same for each of the possible four DI boards.

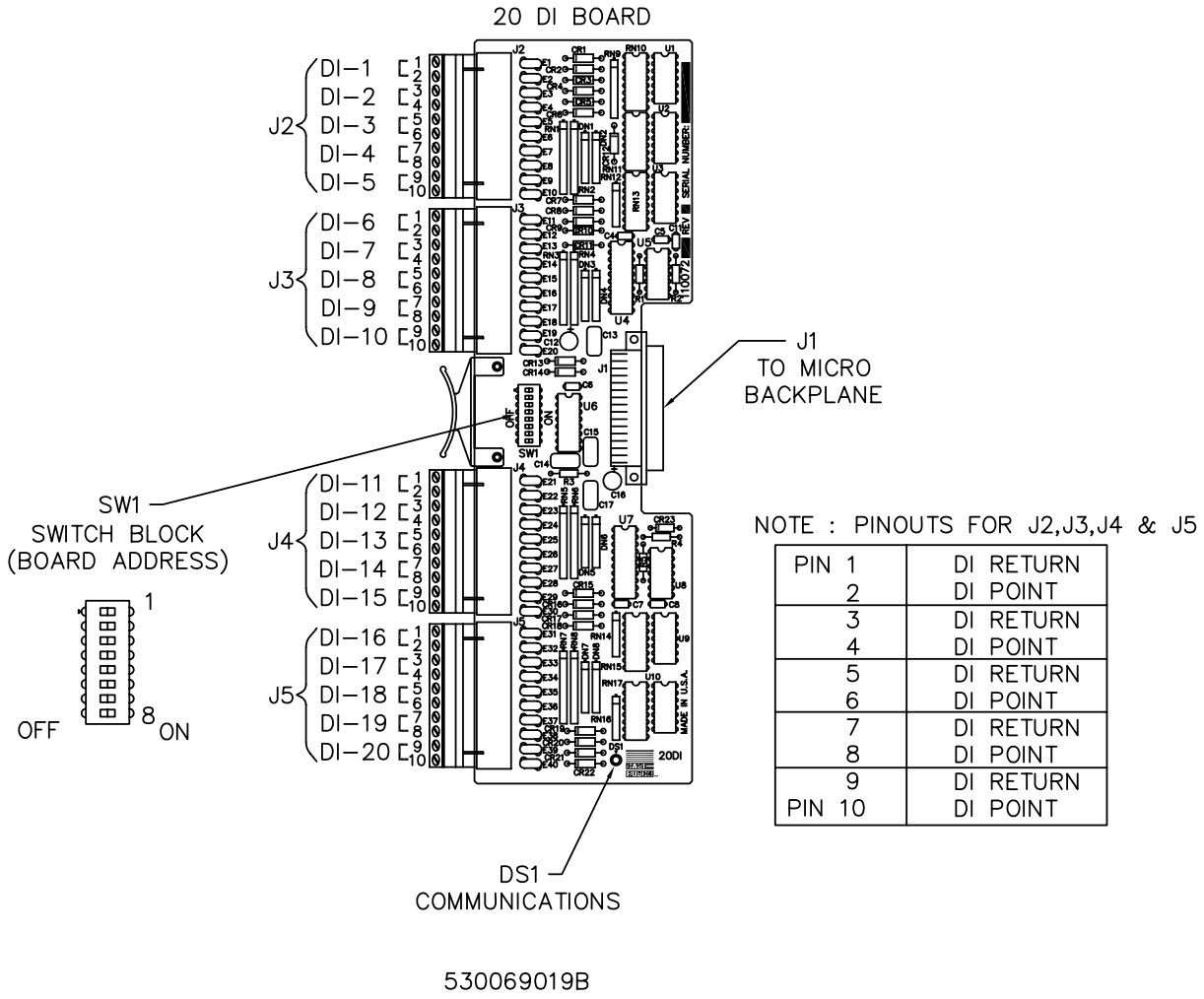
Secure Perfect

From one to four boards can be configured with DI points from 1 to 20. Addressing of DI boards follows the format: **mmmm-b-pp** where **mmmm** represents the micro number to which this DI is associated, **b** represents the board number, and **pp** represents the point or device number.

For example:

0001-1-01 = DI on micro 1, DI board 1, DI 1
0001-2-01 = DI on micro 1, DI board 2, DI 1

Figure 47. 20 DI board layout



Setting the DIP switches

Set the DIP switches on the 20 DI board before installing it and wiring the alarm input devices.

Note: Switch SW1-8 on the 20 DI board must be set to OFF.

The following are the minimum required board revisions to use a 20 DI board (P/N 110072003) with the:

Micro/5-PX or -PXN:

- 20 DI PCB board, Revision G or later. (The revision level appears on the back or noncomponent side of board.)
- Micro/5-PX or Micro/5-PXN CPU board, Revision E or later. (The revision level can be found on the underside of the circuit board in the lower right corner.)

M5PXNplus:

- 20 DI PCB board, Revision G or later. (The revision level appears on the back or noncomponent side of board.)

Table 61. DI board addressing

Board Number	SW1-1	SW1-2	SW1-3	SW1-4[1]	SW1-8
1	ON				
2		ON			
3			ON		
4				ON	

1. SW1-5, 1-6, and 1-7 are not used.

= OFF

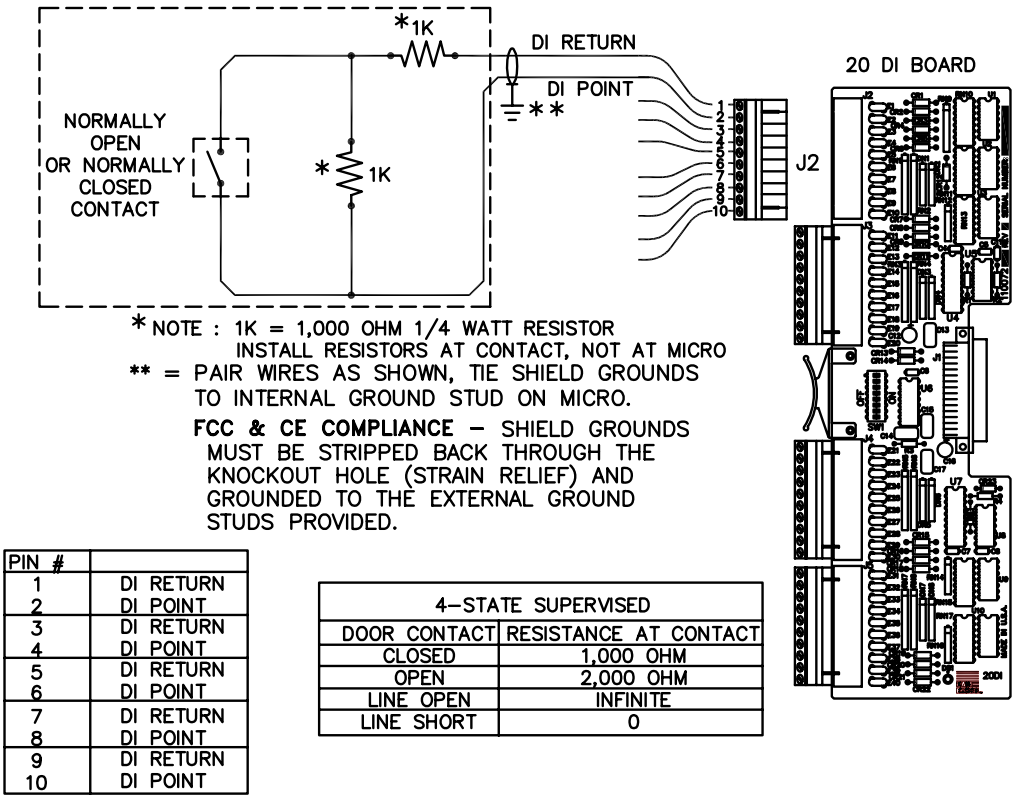
Wiring the digital input devices

1. Follow the installation specifications for the device. Mount the device according to the manufacturer's specifications. The alarm device (door contact) should have a dry contact which can have a normally open or normally closed type switch. A normally closed contact is in its normal position when it is closed. The opposite is true for a normally open contact.
2. Select the appropriate digital input for each alarm input device.
3. Ground the shields of the cable at the Micro/5 enclosure grounding studs. Float the shield (with tape or shrink tubing) at the DI device end to avoid electrical noise.
4. Install two end-of-line resistors (user supplied). We recommend high quality, 1,000 (1K) ohm, 1/4 watt, 1 to 5% tolerance end-of-line resistors. Install each resistor as close to the door status contact as possible.

CAUTION: The supervision capability will be impaired if the resistors are NOT wired immediately adjacent to the door status contact.

5. Insulate resistors with tape or heat shrink tubing.
6. Document how you wired the alarm input devices. Future expansion of the system and its maintenance depend upon accurate documentation.

Figure 48. Wiring DI point



PIN #	
1	DI RETURN
2	DI POINT
3	DI RETURN
4	DI POINT
5	DI RETURN
6	DI POINT
7	DI RETURN
8	DI POINT
9	DI RETURN
10	DI POINT

4–STATE SUPERVISED	
DOOR CONTACT	RESISTANCE AT CONTACT
CLOSED	1,000 OHM
OPEN	2,000 OHM
LINE OPEN	INFINITE
LINE SHORT	0

530069015B

16 DO and DOR boards

Introduction

There are two different DO boards available: the 16 DO and the 16 DOR.

The 16 DO board provides 16 digital outputs rated at 0.04 amps @ 24 VDC maximum per output point.

The 16 DOR board has 16 relay output points rated at 2 amps @ 40 VDC or 30 VAC maximum per output point. The first two relays on each J connector can be wired as normally open or normally closed. The last two relays on each J connector are factory set as normally open. Note the following:

- The maximum allowable distance from the Micro/5 16 DO board and the output device is 1,000 feet.
- Two-conductor, 22-AWG shielded, stranded wire is recommended for the 16 DO board. Two conductor 12- to 22-AWG shielded, stranded wire is recommended for the 16 DOR board depending on the cable distance, amperage (current draw), and voltage of the output device.
- Each DO point is addressed differently depending on the host software you are using.

Device addressing

Picture Perfect

From one to four boards can be configured with DO points from 16 to 31. Picture Perfect addresses DOs by board number; therefore, the DO numbers are the same for each of the possible four DO/DOR boards.

Secure Perfect

From one to four boards can be configured with DO points from 1 to 16. Addressing of DO boards follows the format: **mmmm-b-pp** where **mmmm** represents the micro number to which this DO is associated, **b** represents the board number, and **pp** represents the point or device number. For example:

0001-1-01 = DO on micro 1, DO board 1, DO 1
0001-2-01 = DO on micro 1, DO board 2, DO 1

Figure 49. 16 DO board layout

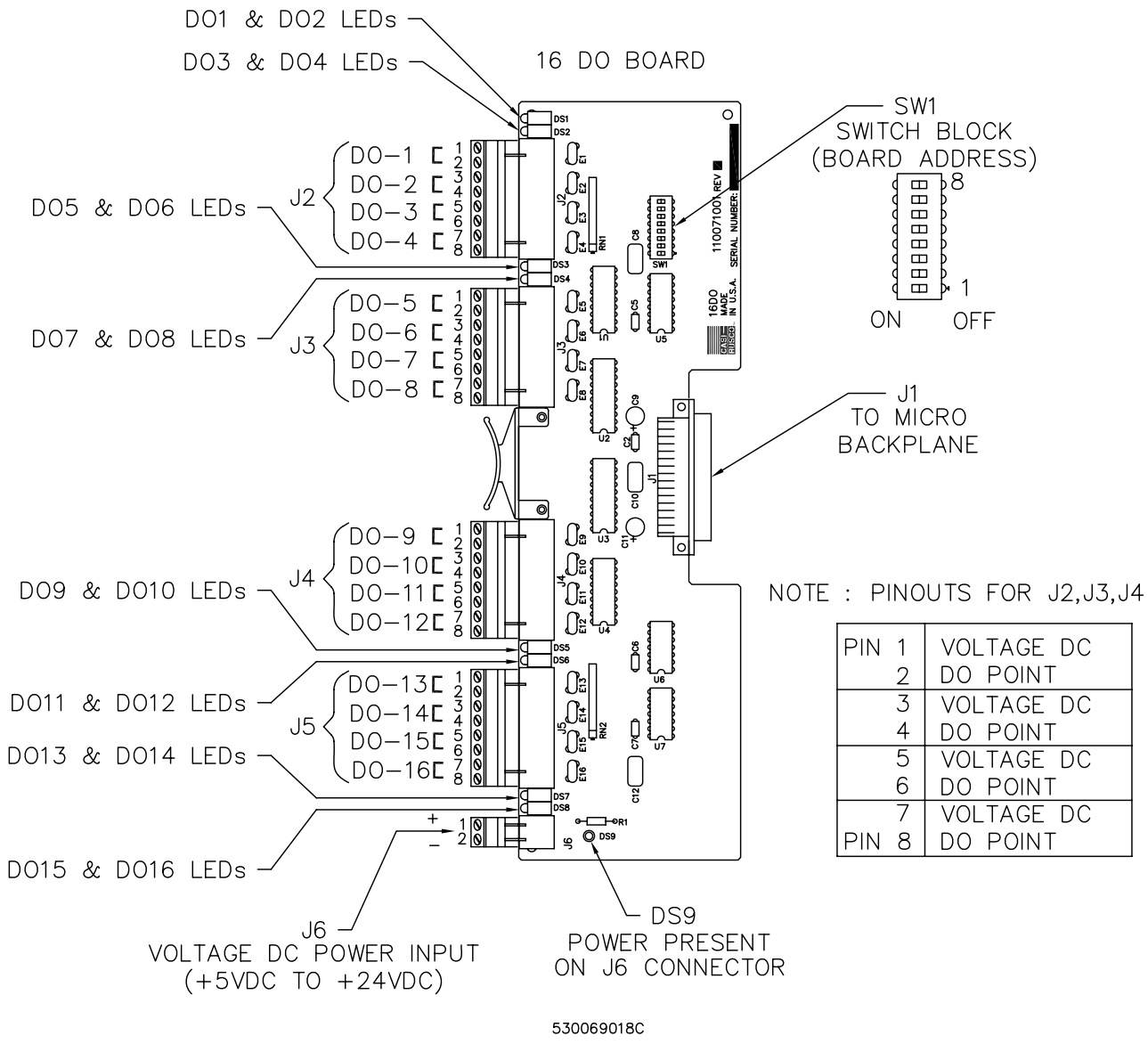
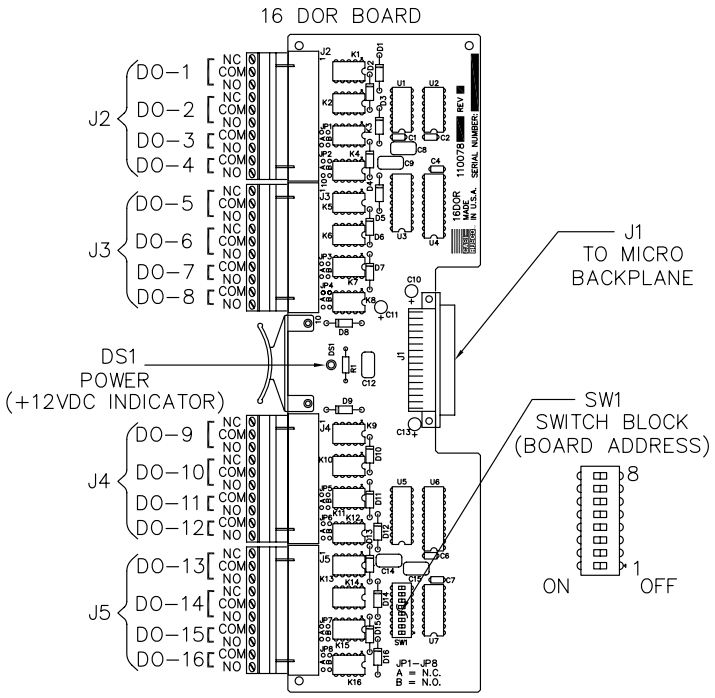


Figure 50. 16 DOR board layout



PIN 1	NORMALLY CLOSED
2	COMMON
3	NORMALLY OPEN
4	NORMALLY CLOSED
5	COMMON
6	NORMALLY OPEN
7	COMMON
8	NORMALLY OPEN
9	COMMON
PIN 10	NORMALLY OPEN

Setting the DIP switches

Set the DIP switches as described in the table below before installing the 16 DO/DOR board and wiring the digital output devices.

Table 62. DO/DOR board addressing

Board number	SW1-1	SW1-2	SW1-3	SW1-4
1	ON			
2		ON		
3			ON	
4				ON

= OFF

Wiring digital output devices

1. Mount the digital output device according to the manufacturer's specifications.
2. Complete the wiring. If the DO is used to energize a relay, install a diode in parallel with the relay coil to absorb transients when the relay is de-energized. A transient protection diode (user supplied) is necessary on the 16 DO board.
3. Connect a 5 to 24 VDC power supply to port J6. The voltage needed depends on the relay requirements of the DO points. Pins 1, 3, 5, and 7 on ports J2, J3, J4, and J5 get their DC voltage from pin 1 on J6.

Figure 51. Wiring output device to 16 DO board

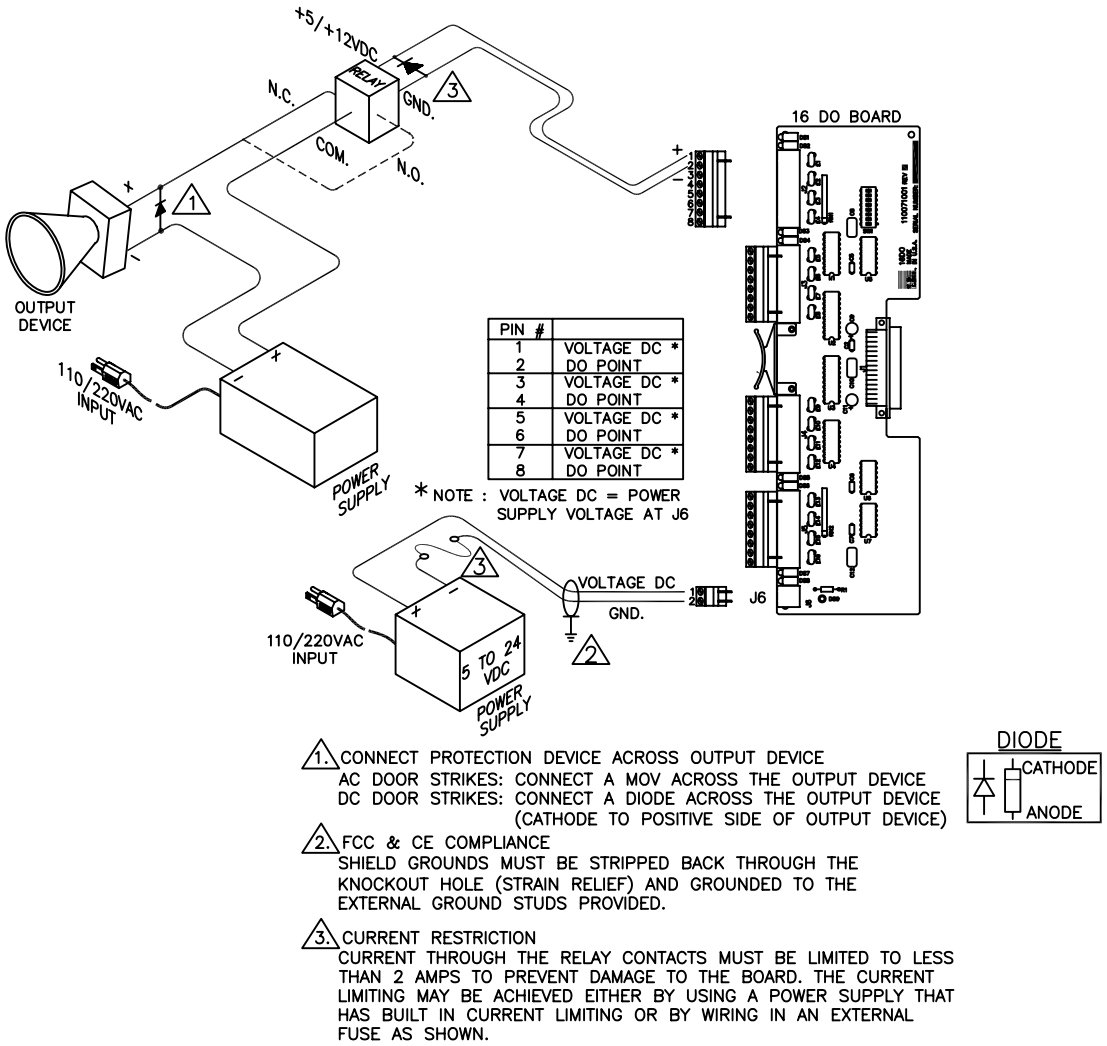
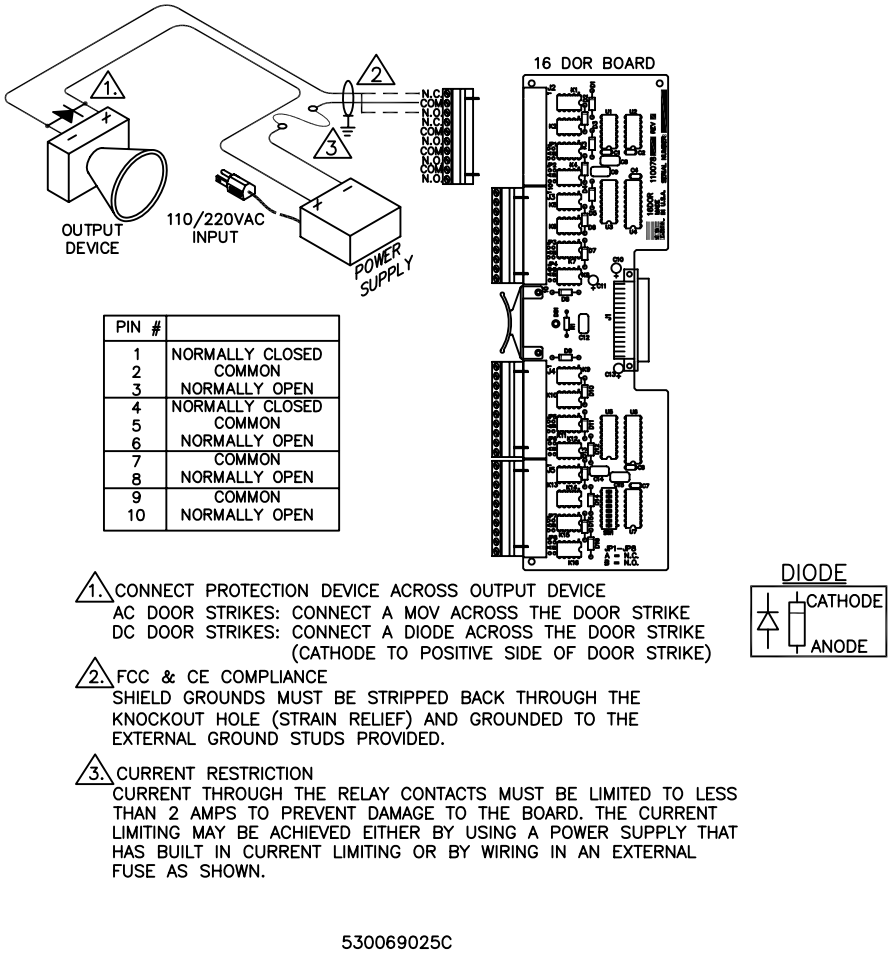


Figure 52. Wiring output device to 16 DOR board



Chapter 7 The Integrated Configuration Tool

This chapter provides information about and instructions for using the Integrated Configuration Tool with the PXNplus CPU board.

In this chapter:

Introduction

The Integrated Configuration Tool is a browser-based utility used to configure the PXNplus CPU board, update the firmware, and view the application log file.

Requirements

Software requirements

One of the following:

- Microsoft Internet Explorer 6.0 or later
- Netscape 7.0 or later
- Mozilla 5.0 or later

Hardware requirements

One of the following (see *Figure 53* and *Figure 54*):

- Cat5 crossover cable for direct connection to a micro
- Standard Cat5 cable with network hub

Figure 53. Connecting directly using crossover cable

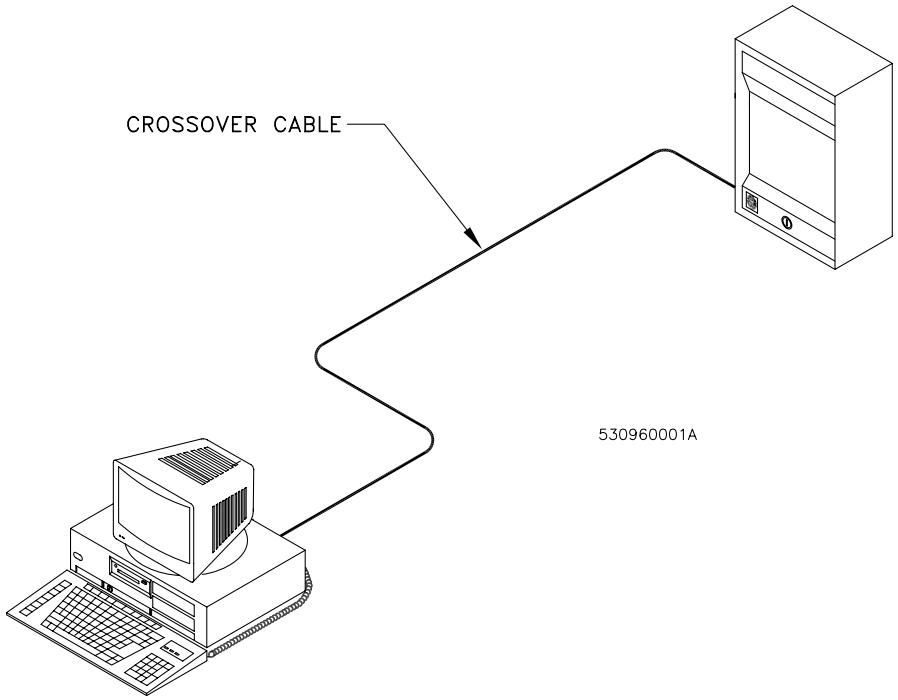
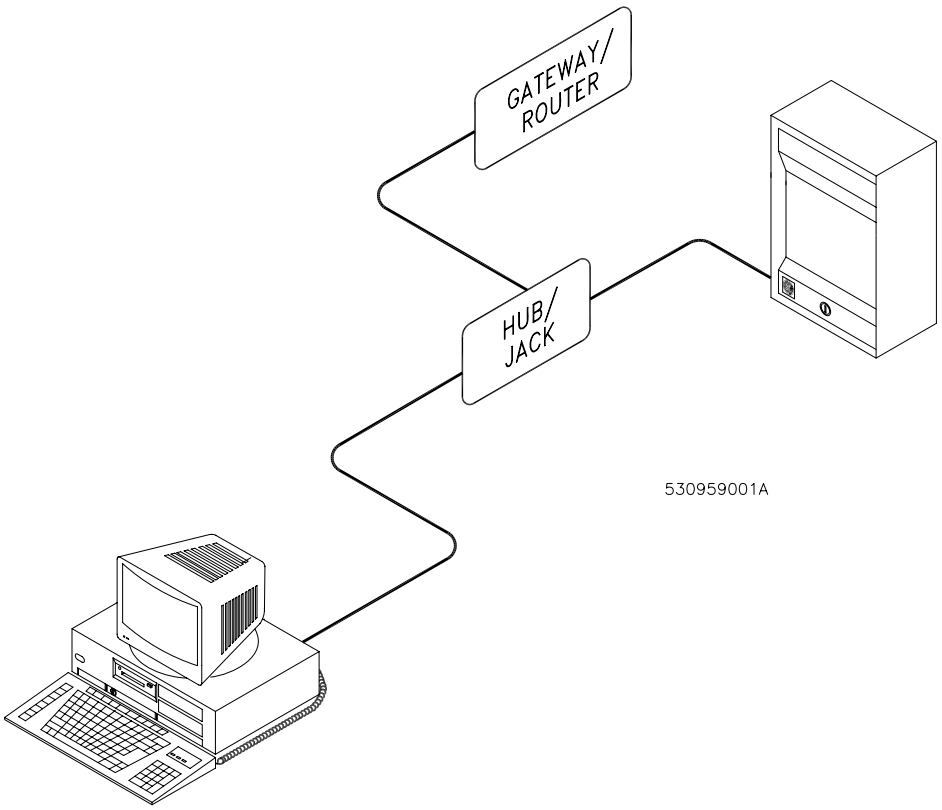


Figure 54. Connecting through network hub



Before you continue

Answer these questions before continuing:

Is there a firewall on the computer you are using to access the Integrated Configuration Tool?

If yes, you will need to disable it in order to use the Integrated Configuration Tool.

Is your network using a proxy?

If yes, you will need to disable the proxy or bypass it.

Complete the *Configuration checklist for Integrated Configuration Tool* on page 138 for each micro that you will be setting up.

Initial configuration

1. By default, the micro's IP address is `192.168.6.6`. To have your laptop/computer communicate with the micro, you must set your laptop/computer IP address to `192.168.6.5`, or similar valid IP address (`192.168.6.`*x* where *x* is any number between 1 and 254 except 6). The setup is different between Windows 2000 and Windows XP. Refer to the appropriate section.

   For Windows 2000:

   a. Click **Start**, **Settings**, then **Network and Dial-up Connections**.

   b. Right-click on **Local Area Connection.** If the first option in the drop-down list box is:

      - **Disable**, then the connection is enabled. Go to *step c*.
      - **Enable**, then select it to enable the connection. Return to *step a*.

   c. Select **Properties** from the drop-down list box.

   d. In the section **Components checked are used in this connection**, select **Internet Protocol TCP/IP**.

   e. Click **Properties**.

   f. If this laptop/computer is set for:

      - DHCP, then the field **Obtain an IP address automatically** is already selected. Select **Use the following IP address**.
      - Static, write down the IP address and Subnet number. You need to reset your computer back to these numbers once the micro configuration is complete.

   g. Enter the IP address `192.168.6.5`, or a similar valid IP address (`192.168.6.`*x* where *x* is any number between 1 and 254 except 6).

   h. Change the subnet mask to `255.255.255.0`.

   i. You do not need to change the gateway.

   j. Click **Ok** until all open windows are closed.

   k. Go to *step 2*.

   For Windows XP:

   a. Click **Start**, then **Control Panel**.

   b. From the **Control Panel** window, select **Network Connections**.

   c. Right-click on **Local Area Connection.** If the first option in the drop-down list box is:

      - **Disable**, then the connection is enabled. Go to *step d*.
      - **Enable**, then select it to enable the connection. Return to *step a*.

   d. Select **Properties** from the drop-down list.

   e. In the section **This connection uses the following items:**, select **Internet Protocol TCP/IP**.

   f. Select **Properties**.

g. If this laptop/computer is set for:
   - DHCP, then the field **Obtain an IP address automatically** is already selected. Select **Use the following IP address**.
   - Static, write down the IP address and Subnet number. You need to reset your computer back to these numbers once the micro configuration is complete.

h. Enter the IP address `192.168.6.5`, or a similar valid IP address (`192.168.6.`*x* where *x* is any number between 1 and 254 except 6).

i. Change the subnet to `255.255.255.0`.

j. You do not need to change the gateway.

k. Click **Ok** until all open windows are closed.

2. Connect the Cat-5 crossover cable from the Ethernet port on your laptop or computer directly to the micro Ethernet port (no hub or switch).
3. If your micro is not yet powered up, do so now.
4. Open an Internet browser window on your laptop/computer.
5. In the browser's Address field, enter the default static IP address of the micro: `192.168.6.6`
6. The Integrated Configuration Tool starts. At the password screen, enter your username and password. The default is `install`, `install`. We recommend that you change this default.

If this is a:

- network configuration, go to *Network micro configuration* on page 121.
- dial-up configuration, go to *Dial-up micro configuration* on page 127.
- direct configuration, go to *Direct-connect micro configuration* on page 130.

Connecting and starting the tool

1. Connect the PC to the RJ45 connector on the PXNplus board using a network hub or "crossover" cable.
2. In the browser Address field, enter the IP address of the micro.
3. At the password screen, enter your username and password. The default is `install`, `install`. We recommend that you change this default.

If you need to flash the micro, see *Flashing micros* on page 120.

If you need to reconfigure the micro, refer to the appropriate section:

- *Network micro configuration* on page 121
- *Dial-up micro configuration* on page 127
- *Direct-connect micro configuration* on page 130

Flashing micros

The PXNplus CPU board uses a single image capable of supporting both Picture Perfect and Secure Perfect hosts. The file is in the format: `PXNP`*`vvvv`*`.efl`, where *`vvvv`* is the four digit version number of the firmware.

System administrators will typically flash software updates from the host server. Those working onsite can use the Application tab.

Note: You should not need to flash a new PXNplus CPU board as it is flashed with the latest code before shipment.

1. If you have not already done so, log in to the Integrated Configuration Tool. See *Connecting and starting the tool* on page 119.
2. Click **Flash Micro**.
3. On the **Application** tab, click **Browse** and locate the new flash file.
4. Click **Save**.
5. Click **Apply Changes**.

Network micro configuration

The PXNplus board is shipped as a network micro with the following default settings:

- **Primary Connection Type:** Ethernet
- **IP Address:** 192.168.6.6
- **Mask:** 255.255.255.0
- **Gateway:** 192.168.6.1

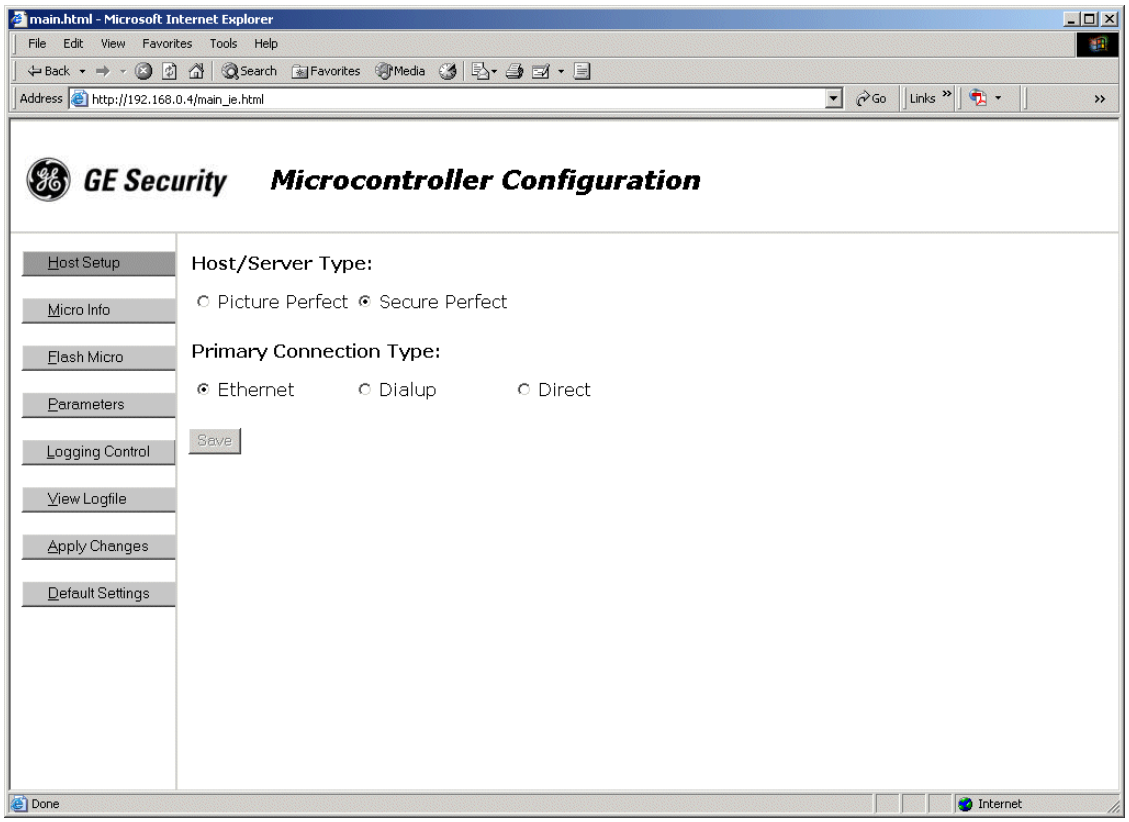
In order to configure the micro as networked, you must complete these screens (the steps are detailed in the sections that follow):

Note: If you start with the Host setup tab, the next recommended tab to configure displays in yellow.

- **Host setup:** Select the software package and network.
- **Parameters:** The setup will depend on whether the IP address will be static or dynamic.
- **Dialup:** If using the optional dial-up fallback feature, you must complete the Dialup tab also.
- **Micro address:** Set the micro address. (Required for Picture Perfect network micros using dial-up fallback and all Secure Perfect micros.)

Note: The **Save** button saves the information for each screen in a configuration file in your micro. These changes are not used unless you click the **Apply Changes** button! The **Apply Changes** button performs a soft boot of the micro. The micro then reads the configuration file and applies any new changes found in the file. To remind you to click the **Apply Changes** button after you make configuration changes, the button turns to pink.

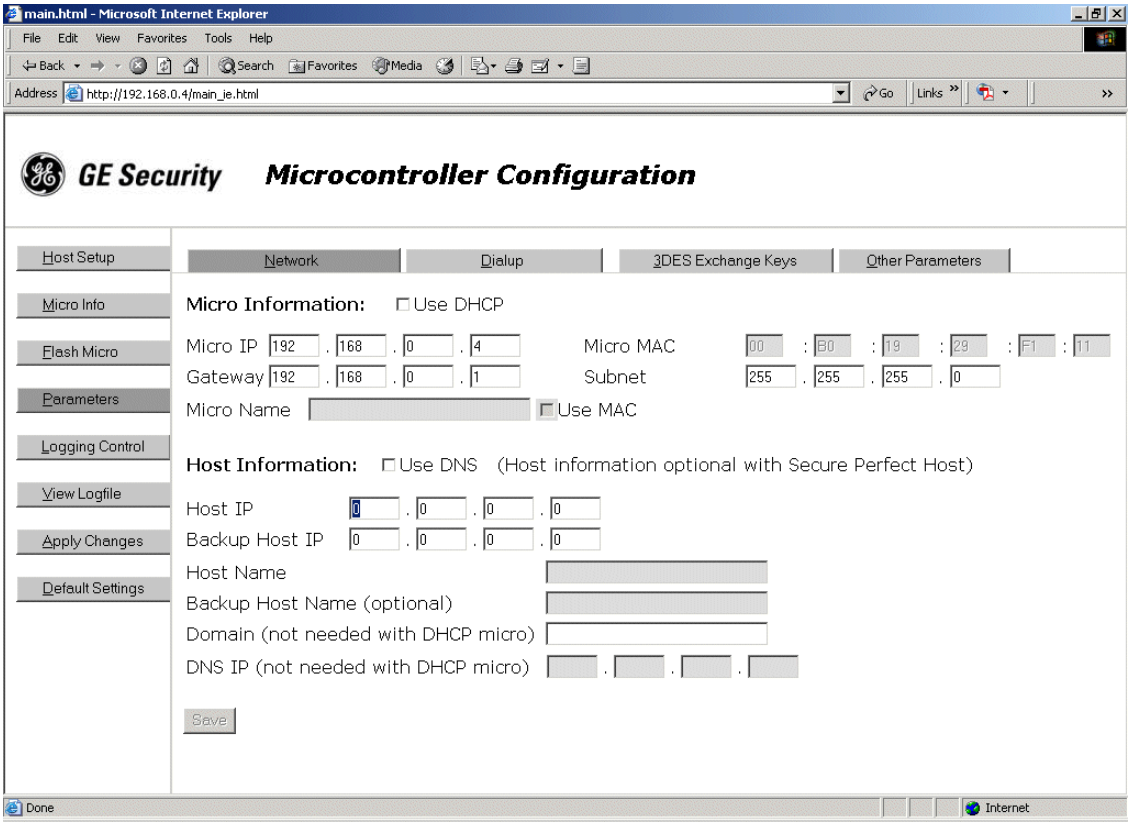
Host setup



1. If you have not already done so, log in to the Integrated Configuration Tool. See *Connecting and starting the tool* on page 119.
2. From the **Host Setup** screen, select the software package you are using in the **Host/Server Type** field.
3. In the **Primary Connection Type** field, select **Ethernet**.
4. Click **Save**.
5. If this completes your micro configuration, click **Apply Changes** now.

Parameters

The network micro can be configured with a static or dynamic IP address.



1. Click **Parameters** and the **Network** tab displays.
2. In the **Micro Information** area, set the micro name or address. Perform one of the following:
   - For a dynamic micro IP address, select **Use DHCP**.

     To name the micro, perform one of the following:

     - Enter a unique name in the **Micro Name** field.
     - Select the checkbox **Use MAC** and the micro name is generated from the Micro MAC address. A MAC address (media access control address) is a unique identifier attached to most forms of networking equipment. The MAC address for your PXNplus board can be found in the **Micro MAC** field. This option disables the **Micro Name** field.

     Note: Give this name or MAC address to your Network Administrator so that it can be added to the DNS database.

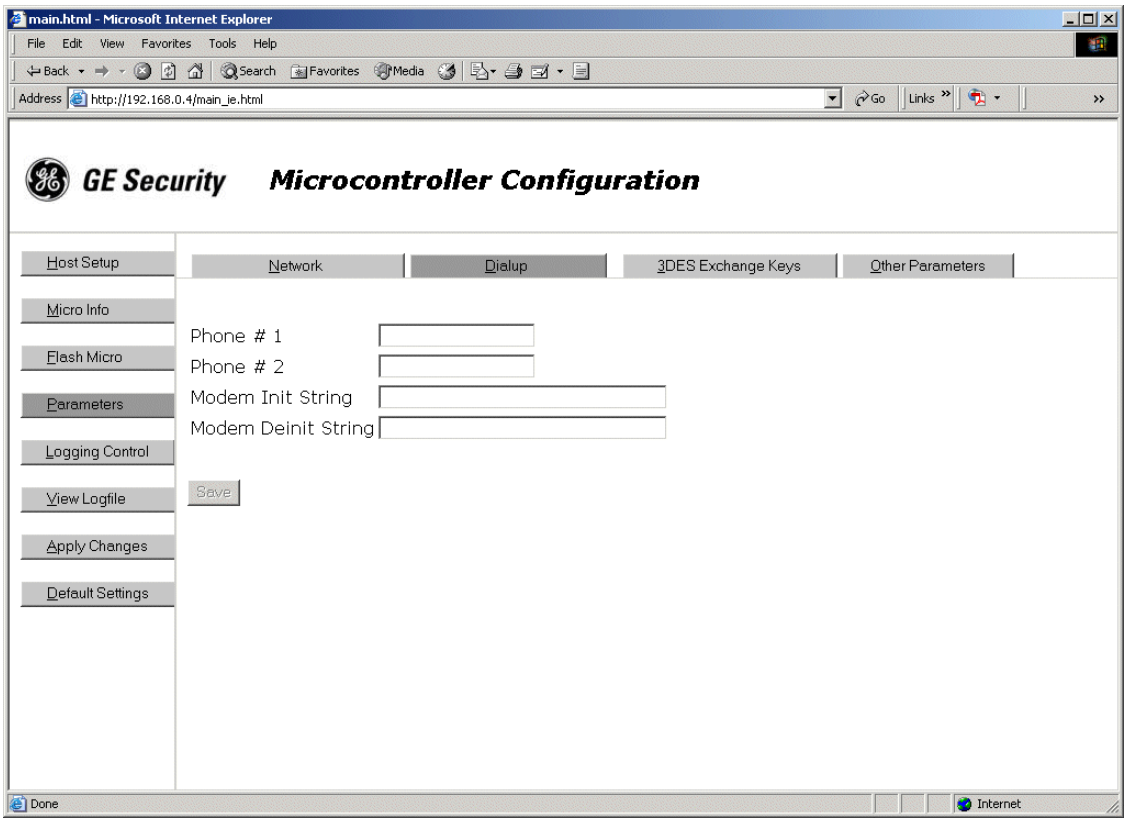
   - For a static micro IP address, enter the IP address of the micro given to you by your Network Administrator in the field **Micro IP**.
3. If using a gateway, you may accept the gateway IP generated based on the micro IP or you may enter a gateway IP address in the **Gateway** field.

4. If using a subnet mask, you may accept the subnet mask generated based on the micro IP or you may enter a subnet mask in the **Subnet** field.
5. If using Secure Perfect, skip to *step 7*. If using Picture Perfect, you must set the host name or address. Perform one of the following:
   - For a dynamic host IP address, select the **Use DNS** checkbox and enter the host name in the **Host Name** field. This option disables both the **Host IP** and **Backup Host IP** fields.
     If you set up a static IP address in the Micro Information section, you will also need to enter the domain for the host in the **Domain** field and the DNS IP address in the **DNS IP** field. If DHCP was selected, this is not necessary.
   - For a static host IP address, enter the IP address in the **Host IP** field.
6. To set the backup host name or address, perform one of the following:
   - If you selected the **Use DNS** checkbox in the previous step, enter the backup host name in the **Backup Host Name** field.
   - Enter the IP address in the **Backup Host IP** field.
7. Click **Save**.
8. If this completes your micro configuration, click **Apply Changes** now.

   Once you click the **Apply Changes** button, the micro reboots and applies the new address changes. The Integrated Configuration Tool shuts down and you will need to log back in if you need to continue working with the Integrated Configuration Tool.

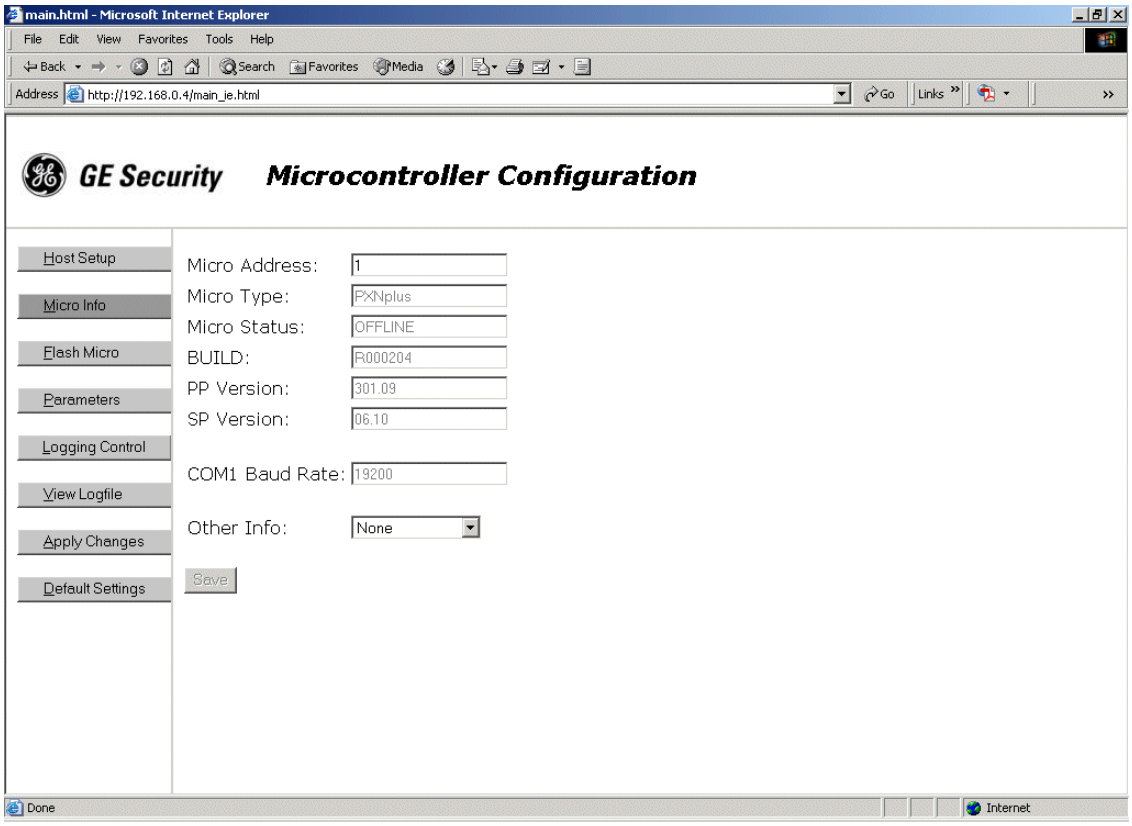
Dial-up fallback

The on-board modem MUST be installed on the PXNplus CPU board in order to use the dial-up fallback feature.



1. Click **Parameters**, then **Dialup**.
2. In the **Phone # 1** field, enter the phone number for the host computer. Use the format: aaa-nnn-nnnn (For example, 561-555-5555)
3. If there is an additional phone number to reach the host, enter it into the field **Phone # 2**, otherwise, leave the field blank.
4. The fields **Modem Init String** and **Modem Deinit String** require values only if you are NOT using the optional modem board or the GE qualified StarComm modem.
5. Click **Save**.
6. If this completes your micro configuration, click **Apply Changes** now.

Micro address



Note: If this is a Picture Perfect network micro only (dial-up fallback is NOT used), then you do not need to set the micro address.

1. Click **Micro Info.**
2. Enter the micro address in the **Micro Address** field.
3. Click **Save**.
4. If this completes your micro configuration, click **Apply Changes** now.

Dial-up micro configuration

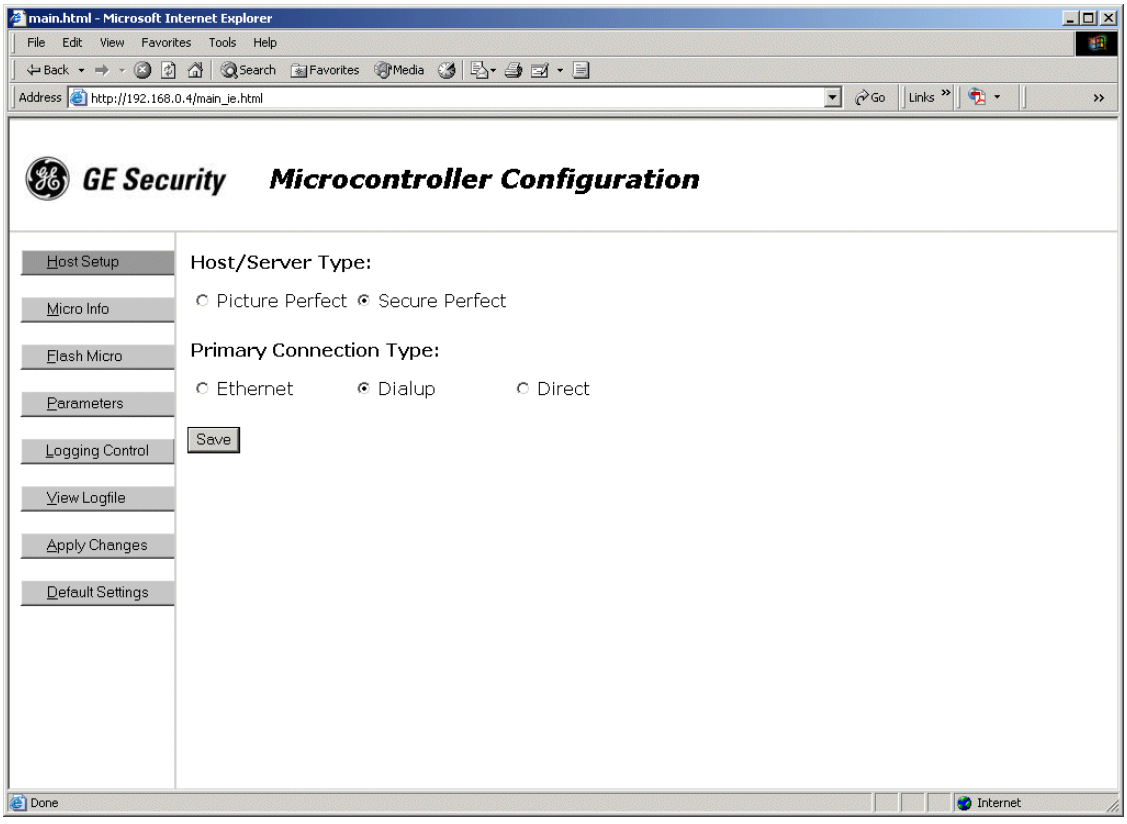
In order to configure the micro as dial-up, you must complete these screens (the steps are detailed in the sections that follow):

Note: If you start with the Host setup tab, the next recommended tab to configure displays in yellow.

- **Host setup:** Select the software package and Dialup.
- **Micro address:** Set the micro address.
- **Parameters/Dialup:** Set the dial-up options.

Note: The **Save** button saves the information for each screen in a configuration file in your micro. These changes are not used unless you click the **Apply Changes** button! The **Apply Changes** button performs a soft boot of the micro. The micro then reads the configuration file and applies any new changes found in the file. To remind you to click the **Apply Changes** button after you make configuration changes, the button turns to pink.

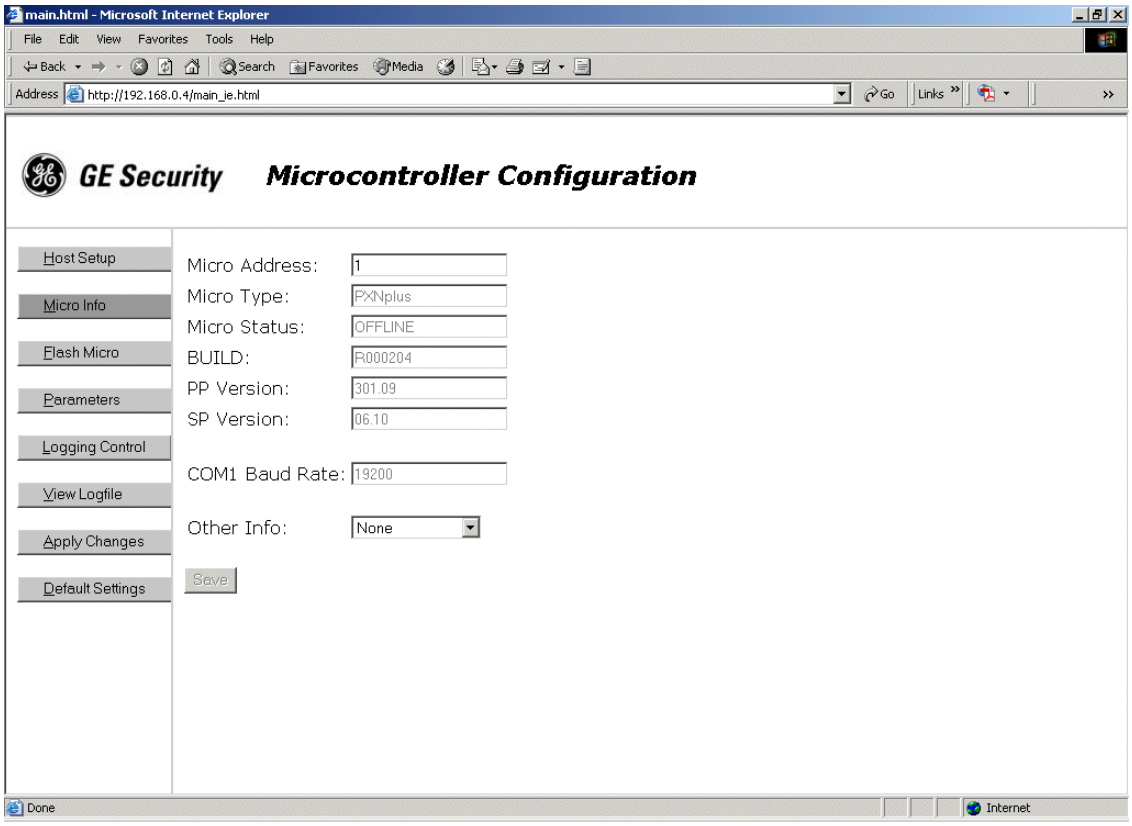
Host setup



1. If you have not already done so, log in to the Integrated Configuration Tool. See *Connecting and starting the tool* on page 119.
2. From the **Host Setup** screen, select the software package you are using in the **Host/Server Type** field.

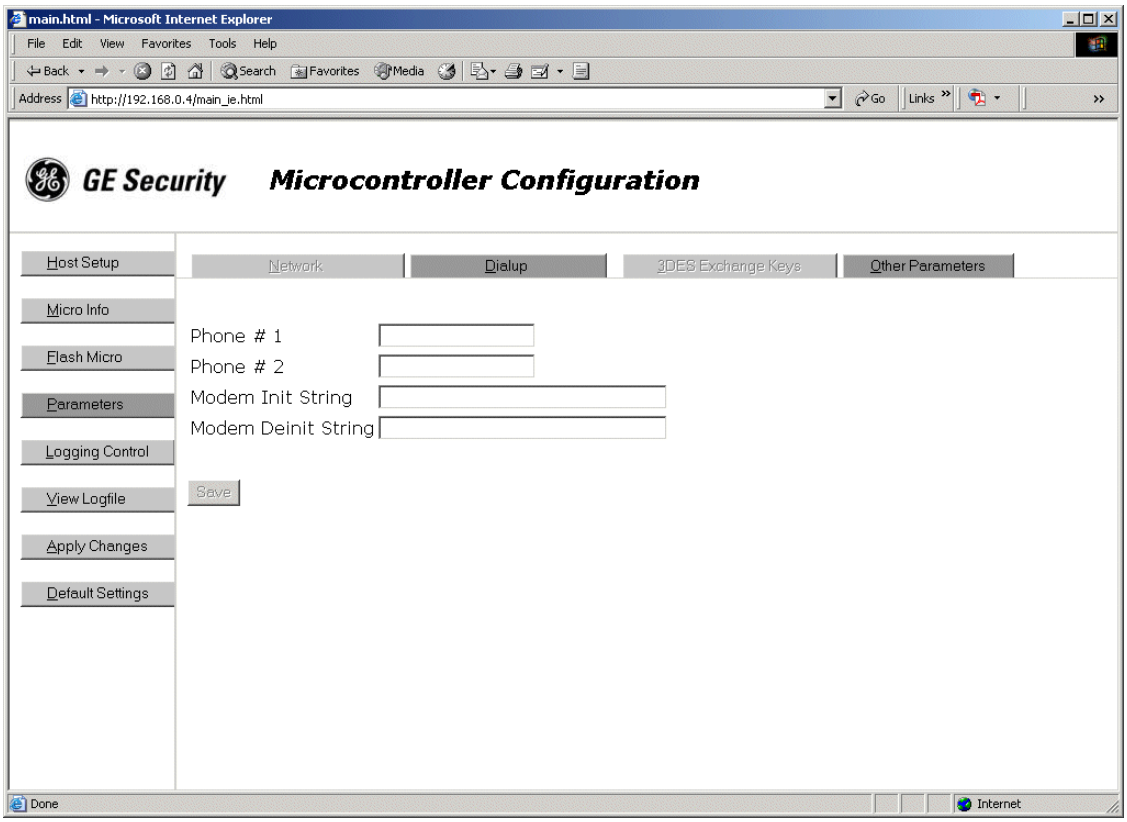
3. In the **Primary Connection Type** field, select **Dialup**.
4. Click **Save**.
5. If this completes your micro configuration, click **Apply Changes** now.

Micro address



1. Click **Micro Info**.
2. Enter the micro address in the **Micro Address** field.
3. Click **Save**.
4. If this completes your micro configuration, click **Apply Changes** now.

Dial-up parameters



1. Click **Parameters**, then **Dialup**.
2. In the **Phone # 1** field, enter the phone number for the host computer.
   Use the format: aaa-nnn-nnnn (For example, 561-555-5555)
3. If there is an additional phone number to reach the host, enter in the field **Phone # 2**, otherwise, leave the field blank.
4. The fields **Modem Init String** and **Modem Deinit String** require values only if you are NOT using the optional modem board or the GE qualified StarComm modem.
5. Click **Save**.
6. If this completes your micro configuration, click **Apply Changes** now.

Direct-connect micro configuration

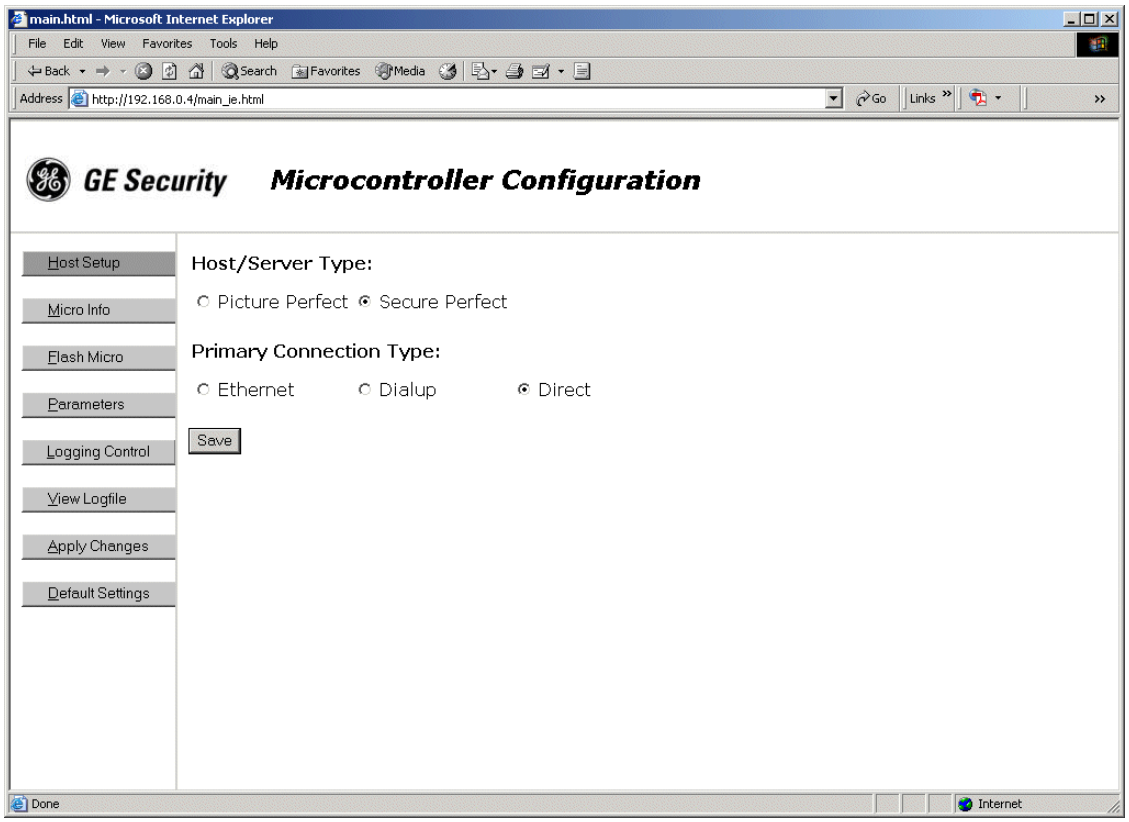
In order to configure the micro as direct, you must complete these screens (the steps are detailed in the sections that follow):

Note: If you start with the Host setup tab, the next recommended tab to configure displays in yellow.

- **Host setup:** Select the software package and Direct.
- **Micro address:** Set the micro address. (Secure Perfect only!)

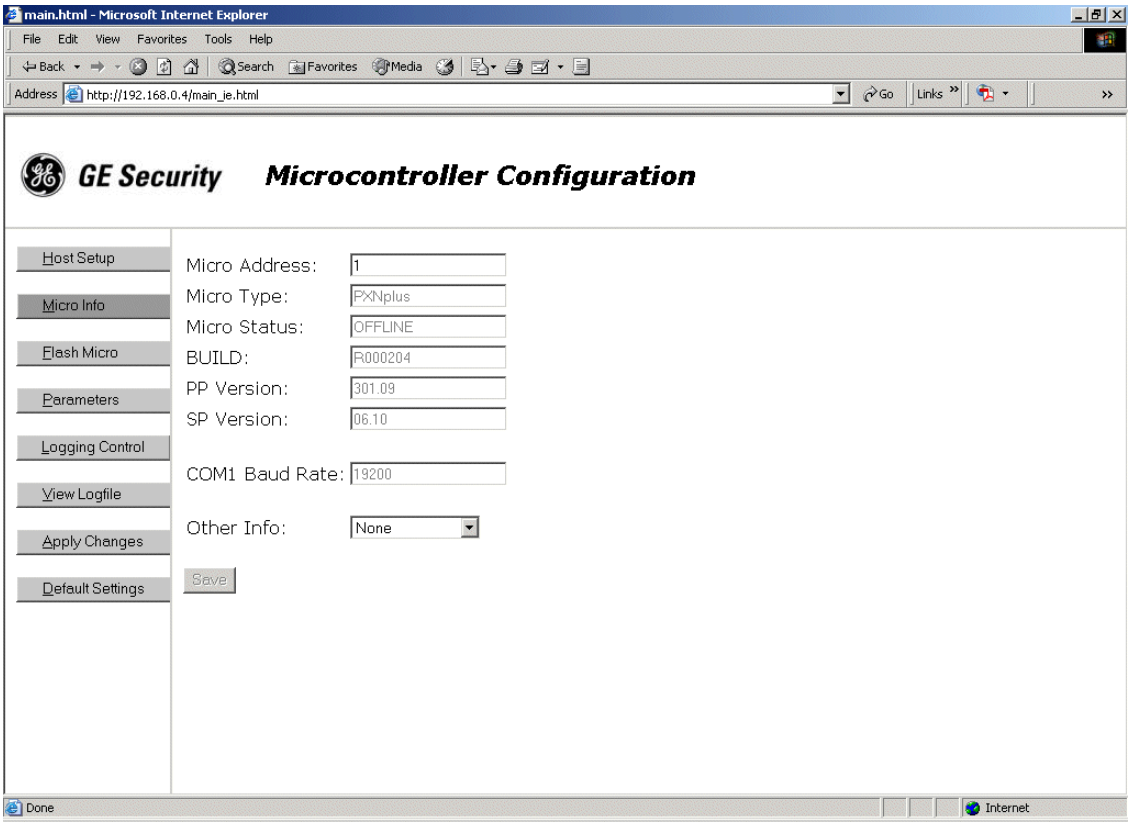
Note: The **Save** button saves the information for each screen in a configuration file in your micro. These changes are not used unless you click the **Apply Changes** button! The **Apply Changes** button performs a soft boot of the micro. The micro then reads the configuration file and applies any new changes found in the file. To remind you to click the **Apply Changes** button after you make configuration changes, the button turns to pink.

Host setup



1. If you have not already done so, log in to the Integrated Configuration Tool. See *Connecting and starting the tool* on page 119.
2. From the **Host Setup** screen, select the software package you are using in the **Host/Server Type** field.
3. In the **Primary Connection Type** field, select **Direct**.
4. Click **Save**.
5. If this completes your micro configuration, click **Apply Changes** now.

Micro address

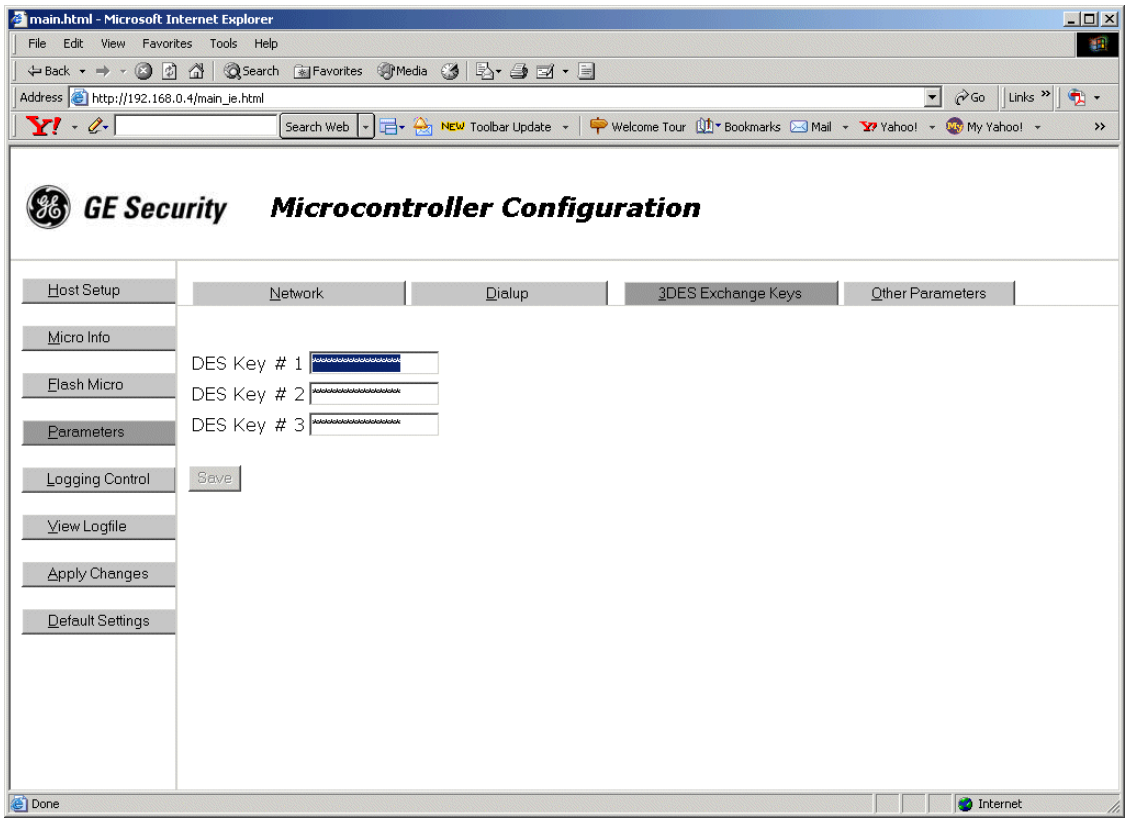


1. Click **Micro Info.**
2. Enter the micro address in the **Micro Address** field.
3. Click **Save**.
4. If this completes your micro configuration, click **Apply Changes** now.

DES encryption configuration

In order to secure transmissions between the micro and the host, the data is encrypted using triple DES (Data Encryption Standard) encryption. Use this screen to enter keys which will create an encryption pattern for transmission.

CAUTION: The host DES keys and the micro DES keys MUST match!



1. If you have not already done so, log in to the Integrated Configuration Tool. See *Connecting and starting the tool* on page 119.
2. Click **Parameters**, then **3DES Exchange Keys**.
3. Enter the DES encryption key in the DES key fields. For security reasons, all characters entered will display as an asterisk (*).

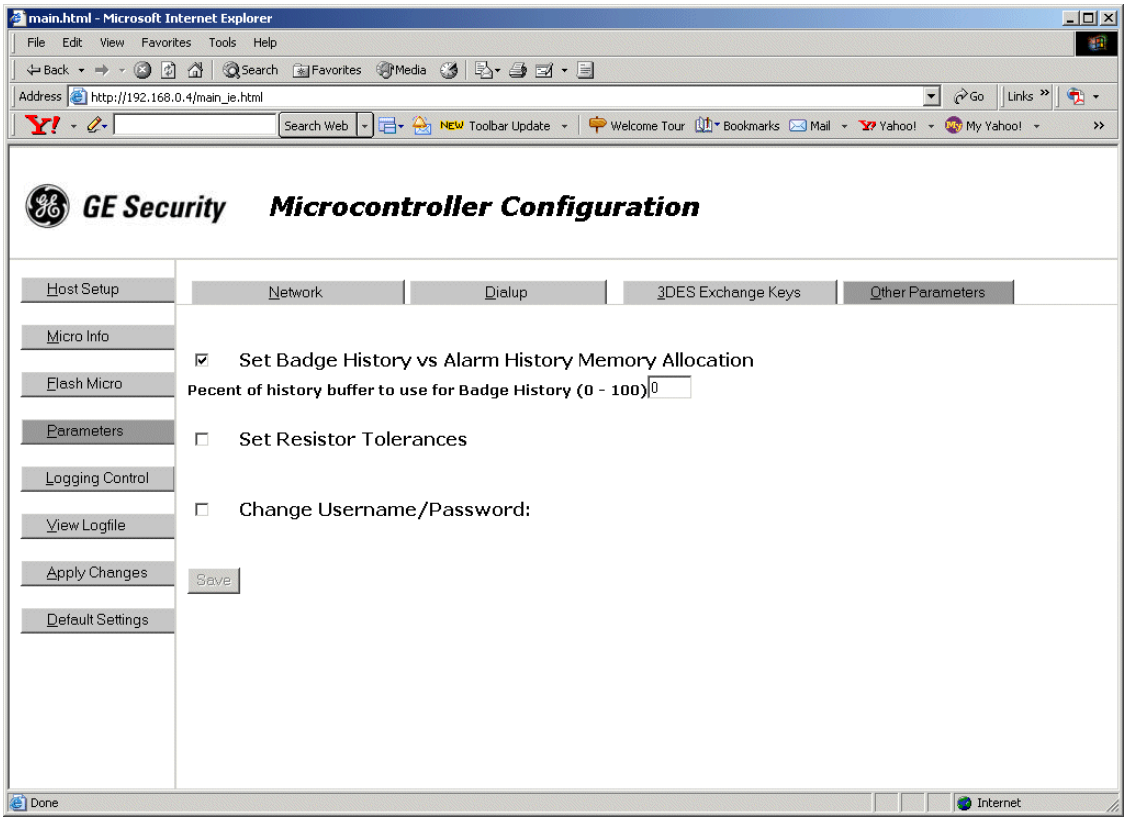
   Keep the following in mind:

   - DES keys must be exactly 16 characters.
   - DES keys must be valid hexadecimal characters (0 through 9, upper or lower case letters A through F).
   - No two or more DES keys can have the same value.

CAUTION: You cannot modify only one key! All must be changed or you will not be able to save.

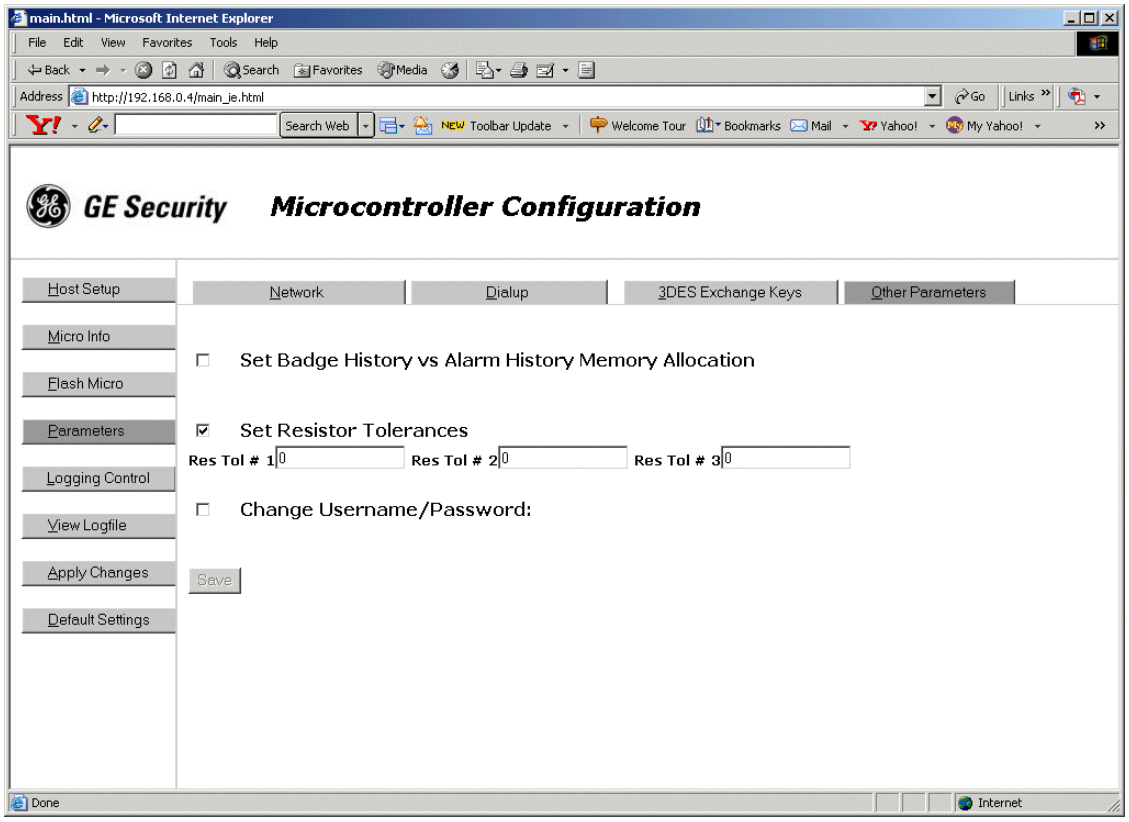
4. Click **Save**.
5. If this completes your micro configuration, click **Apply Changes** now.

Badge history and alarm history memory allocation



1. If you have not already done so, log in to the Integrated Configuration Tool. See *Connecting and starting the tool* on page 119.
2. Click **Parameters**, then **Other Parameters**.
3. Select the checkbox next to the **Set Badge History vs Alarm History Memory Allocation** field. The field **Percent of history buffer to use for Badge History (0 - 100)** displays.
4. Enter the percentage of history you would like to use for badge history. The remaining percentage of history is used for alarm history.
5. Click **Save**.
6. If this completes your micro configuration, click **Apply Changes** now.

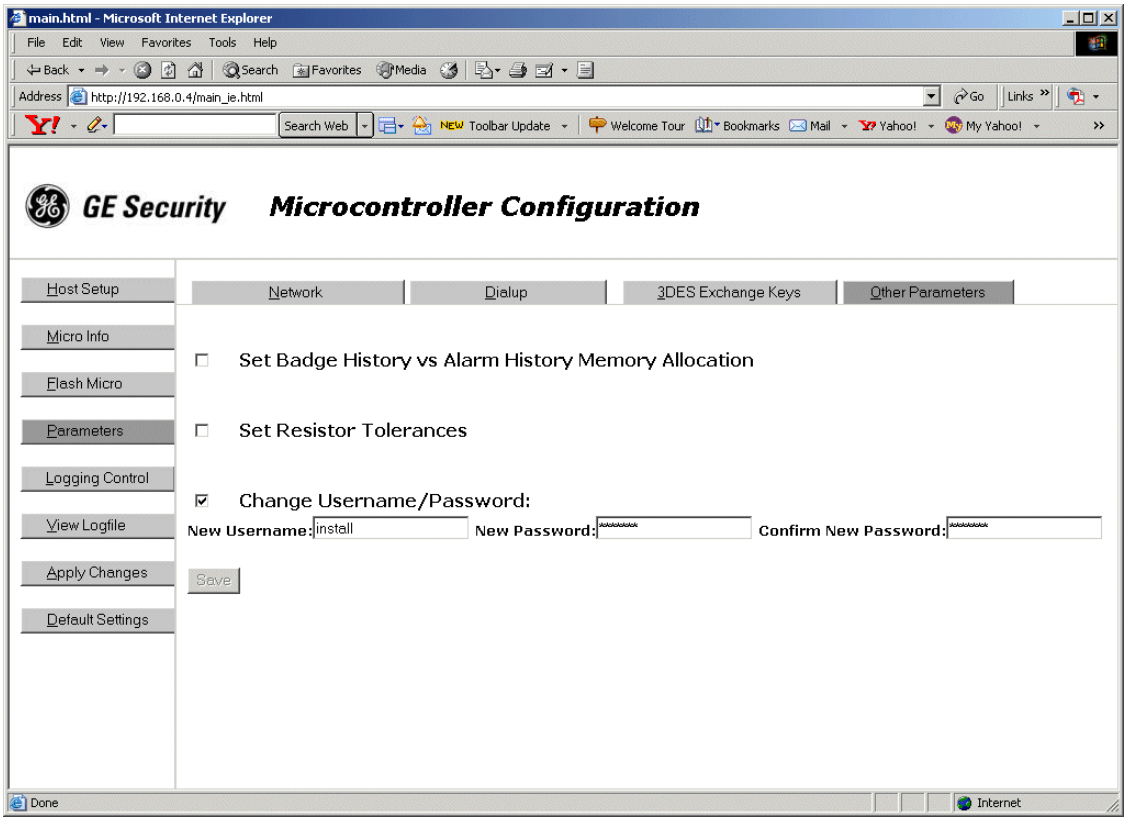
Setting resistor tolerances



1. If you have not already done so, log in to the Integrated Configuration Tool. See *Connecting and starting the tool* on page 119.
2. Click **Parameters,** then **Other Parameters**.
3. Select the checkbox next to the **Set Resistor Tolerances** field. The fields **Res Tol # 1, Res Tol # 2,** and **Res Tol # 3** display.
   - **Res Tol # 1:** Tightens the range the voltage changes before detecting a 4-state DI state change
   - **Res Tol # 2:** Delay value for the CK8RP board (Range 0 to 65535)
   - **Res Tol # 3:** Reserved
4. Enter the resistor tolerance needed in the appropriate field.
5. Click **Save**.
6. If this completes your micro configuration, click **Apply Changes** now.

Changing the password

For increased security, we recommend that you change the default username and password.



1. If you have not already done so, log in to the Integrated Configuration Tool. See *Connecting and starting the tool* on page 119.
2. Click **Parameters**, then **Other Parameters**.
3. Select the checkbox next to the **Change Username/Password** field. The fields **New Username** and **New Password** display.
4. Enter a new username and password.
5. Click **Save**.
6. If this completes your micro configuration, click **Apply Changes** now.

Logging control of the logfile

The system logger provides verification of micro operation independently from the host. The default logging control includes BDGAUTH (badge authorization) and IOMGR (input/output manager). This provides system administrators and installers with default settings to verify reader, IO, and communication activity. Other filtering can be applied to troubleshoot more complex problems; contact GE Security Customer Support for assistance.

To view the logfile, click **View Logfile**.

Restoring factory default settings

There are two methods to restoring the factory default settings: through the Integrated Configuration Tool and by jumper on the board. The table below explains when to use each method.

If you changed the factory default settings and ...	Restore the factory defaults by ...
did NOT click the Apply Changes button	clicking the Default Settings button
clicked the Apply Changes button	shorting JP4 on the PXNplus CPU board until DS3 turns on (See *M5PXNplus problems* on page 152.)

Checking operating system status of the PXNplus board

There are several status reports based on uClinux commands which are available for checking and monitoring the PXNplus board. Call GE Customer Support for assistance with these reports.

1. If you have not already done so, log in to the Integrated Configuration Tool. See *Connecting and starting the tool* on page 119.
2. Click **Micro Info**.
3. In the **Other Info** field, click the down arrow for a list of available reports.
4. Select the report you want. See *Table 63*, *Micro Info reports* for a brief explanation of each report.

Table 63. Micro Info reports

Report	Description
Memory Usage	displays amount of memory available, both used and free
Process State	lists which processes are running
Board Info	displays hardware related information, such as boot and board version
OS Info	displays information related to the linux operating system on the micro
Uptime	Time since the last reboot
DB File Info	lists persistence-related database files
Message Info	lists data on the micro's message queues

Ping Host	pings the host from the micro (based on the current host IP or name)
	Successful ping result:
	`2 packets transmitted, 2 packets received, 0% packet loss`
	Unsuccessful ping result:
	`2 packets transmitted, 0 packets received, 100% packet loss`

Check Route	checks route information from the micro
Thread Status	lists the application firmware components and whether they are currently running
DMA Info	status of the DMA IO interface

Configuration checklist for Integrated Configuration Tool

In order to complete micro configuration using the Integrated Configuration Tool, you will need the following information:

Secure Perfect			
Communication type		**Information needed**	**Write your answer here**
Direct		Micro address:	
Dial-up		Micro address:	
		Phone number to reach host:	
		Secondary phone number to reach host:	
Ethernet	Use DHCP: NO Use DNS: NO	Micro IP:	
		Gateway:	
		Subnet:	
		Host IP: (Optional)	
	Use DHCP: YES Use DNS: YES	Micro Name or Micro MAC which is provided for you:	
		Host Name: (Optional)	
	Use DHCP: NO Use DNS: YES	Micro IP:	
		Gateway:	
		Subnet:	
		Host Name: (Optional)	
		Domain: (Optional)	
		DNS IP: (Optional)	
	Use DHCP: YES Use DNS: NO	Micro Name or Micro MAC which is provided for you:	
		Host IP: (Optional)	

Picture Perfect			
Communication type		**Information needed**	**Write your answer here**
Direct		No further configuration needed.	
Dial-up		Micro address:	
		Phone number to reach host:	
		Secondary phone number to reach host:	
Ethernet	Use DHCP: NO Use DNS: NO	Micro IP:	
		Gateway:	
		Subnet:	
		Host IP:	
		Backup Host IP (Redundant system):	
	Use DHCP: YES Use DNS: YES	Micro Name or Micro MAC which is provided for you:	
		Host Name:	
		Backup Host Name (Redundant system):	
	Use DHCP: NO Use DNS: YES	Micro IP:	
		Gateway:	
		Subnet:	
		Host Name:	
		Backup Host Name (Redundant system):	
		Domain	
		DNS IP	
	Use DHCP: YES Use DNS: NO	Micro Name or Micro MAC which is provided for you:	
		Host IP:	
		Backup Host IP (Redundant system):	

Chapter 8 Regulatory information

This chapter lists the regulatory information for CE, FCC, and UL compliance.

In this chapter:

CE (European) and FCC compliance

As of January 1, 1996, all new European Union member installations MUST be CE compliant.

To make the Micro/5 installation CE and FCC compliant, the following conditions must be met:

- All cables connected to the Micro/5 must be shielded with shield terminated as shown in *Figure 55* or *Figure 56*.
- The Power/Communications board must be in the far right slot of the Micro/5 card cage and grounded with a factory-installed braided wire as shown in *Figure 57* on page 142.
- The CPU board must be in the second slot from the right of the Micro/5 card cage and grounded with a factory-installed braided wire as shown in *Figure 57* on page 142.
- The Micro/5 enclosure must be connected to the nearest earth ground.

Figure 55. Typical installation using shielded cable/drain wire - outside and inside the enclosure

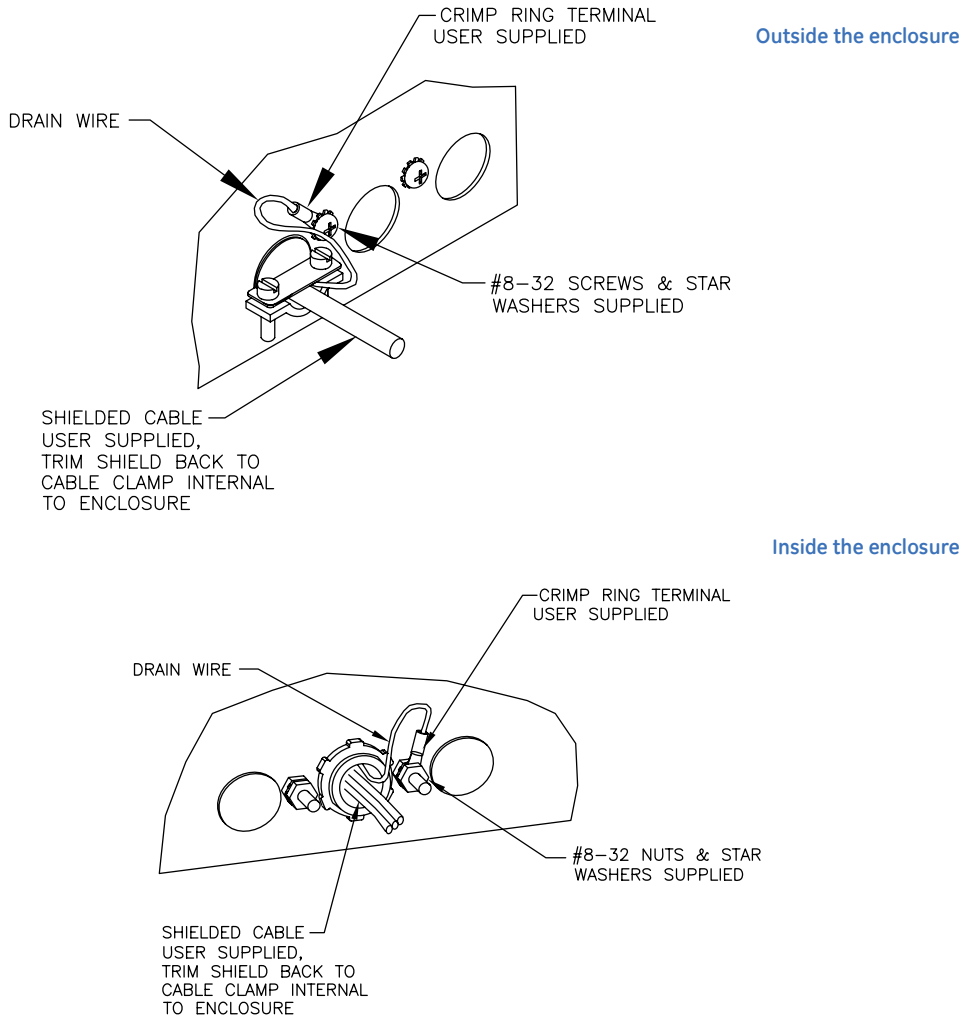


Figure 56. Typical network installation for Micro/5-PXN only

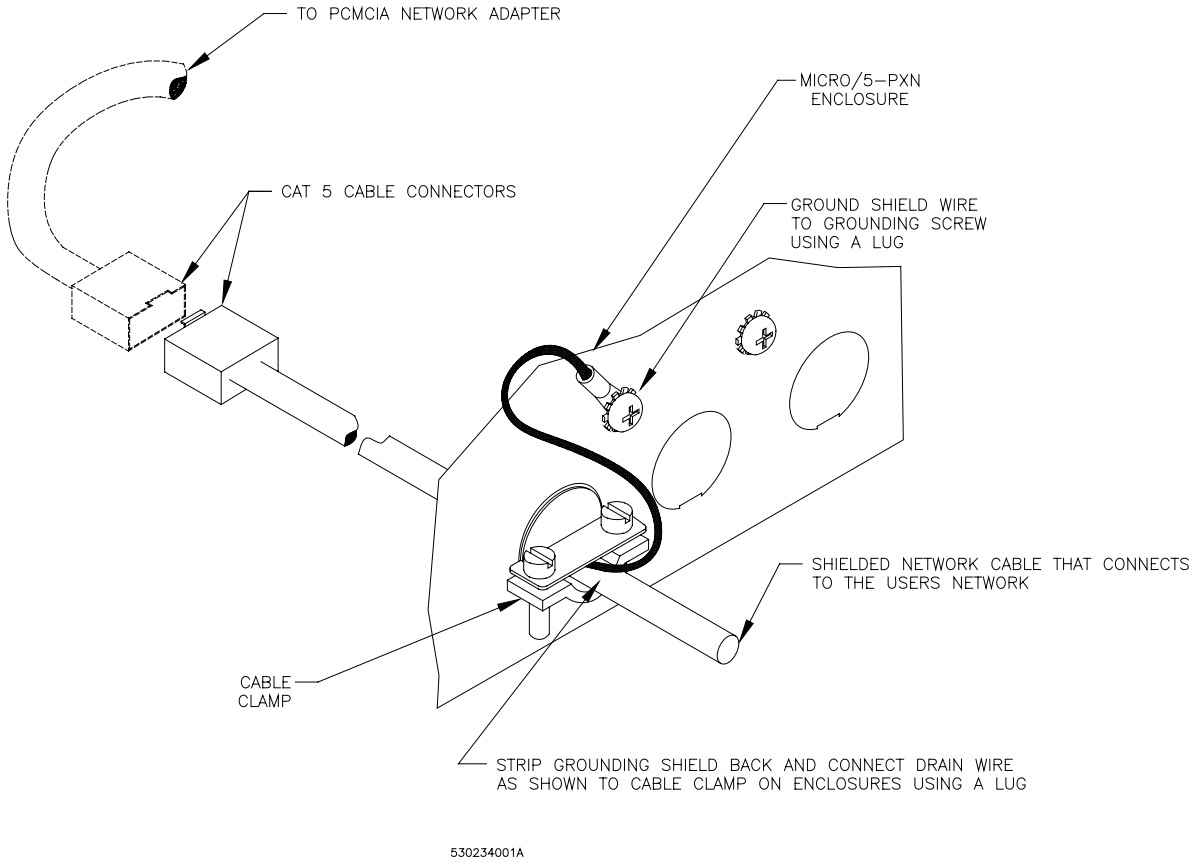
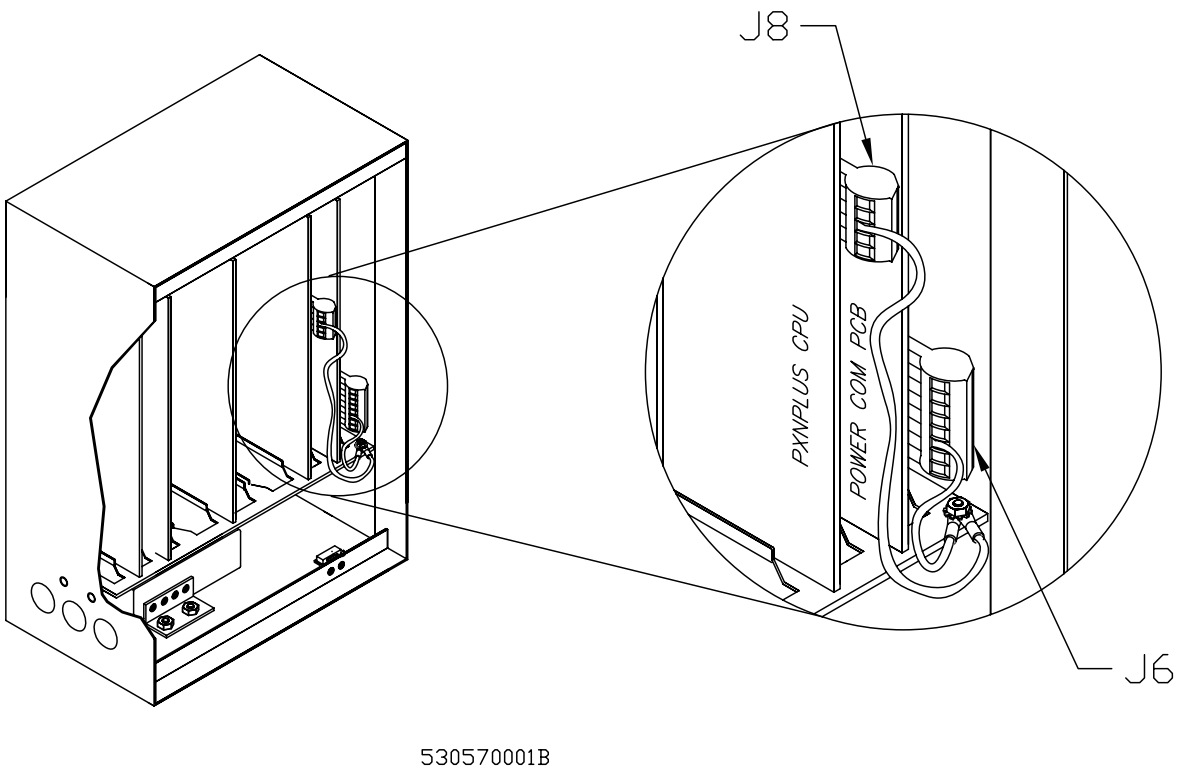


Figure 57. Location and grounding of the Power/Communications and CPU board for M5PXNplus only



UL compliance

Failure to install and program the Micro/5, **Secure Perfect** system, and **Picture Perfect** (UnixWare or Linux) system in accordance with these instructions voids the listing mark of Underwriters' Laboratories, Inc.

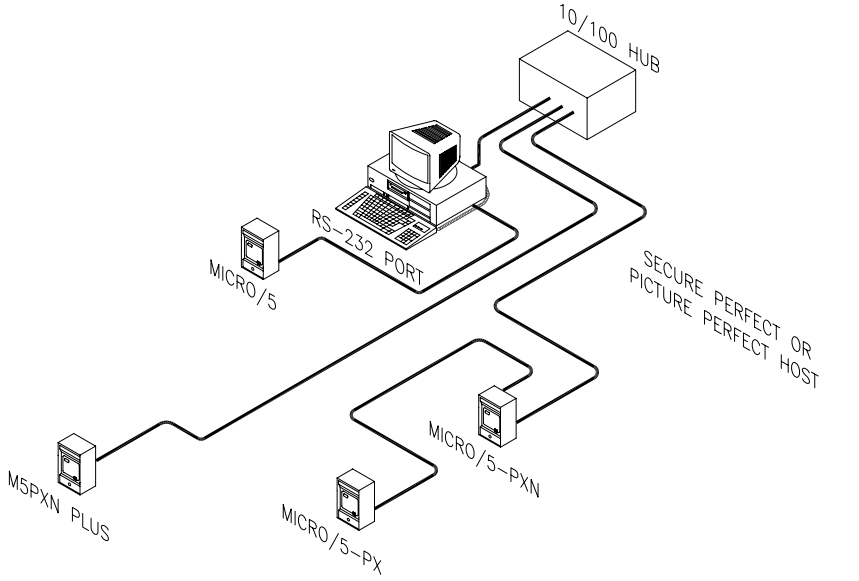
A clearly marked redundant system with the same configuration as the primary machine must be available as a backup.

The monitoring equipment must be protected by a Listed Transient Voltage Surge Suppressor with a maximum rating of 330V Listed under UL1449. The communication circuit must be protected with a Secondary Protector for Communication Circuits Listed under UL497A.

The monitoring equipment must be installed in a temperature controlled environment with 24 hours of standby power for the HVAC and computer system. In addition to the 24 hours of standby power, a minimum of 15 minutes of standby power must be available to the computer system via a UPS system. The UPS system must be Listed to UL1778 or UL1481 and must be provided with a maintenance bypass switch.

An Altronix 3 amp battery backup unit model AL400UL must be used.

Figure 58. UL-Approved System Configuration



- The Micro/5 is UL Listed as an access control unit and a grade A proprietary burglar alarm control unit (UL1076 and UL294). It should be used with the listed GE **Secure Perfect** 2.0 or later and **Picture Perfect**-UnixWare 1.5x or later system. The minimum configuration for either application consists of the Micro/5 enclosure, Power/Communications board, and Micro/5 CPU board. The 20 DI board must be used for proprietary burglar alarm applications. The 2RP or 8RP board must be used for access control applications.

- The Micro/5 must be used with the listed Altronix Corporation Model AL400UL Power Supply/ Charger. Refer to the instructions provided with the power supply for installation requirements. The power supply's AC power fail contacts must be wired to the Micro/5 as shown in *Figure 12, Wiring micro tamper and AC power fail inputs* on page 30.
- Grounding must be in accordance with Article 250 of the National Electrical Code.
- The Micro/5 must be used with listed card readers.
- The exit request input circuit and initiating device must be contained within the secured area. The exit device circuit must be connected to listed switches or exit devices.
- The Micro/5 must be mounted inside the secured area.
- The door strike power must be provided from a listed burglar alarm system power supply. If the door strike circuit is arranged as fail secure (door remains locked upon loss of power), listed emergency panic hardware must be provided to allow exit from the secured area. A fail-safe configuration results in the door strike circuit unlocking in case of a power loss.
- The audible signal appliance circuit drawings in *Figure 27* on page 64, *Figure 28* on page 65, *Figure 51* on page 113, and *Figure 52* on page 114 are for supplementary use only.
- The number of separate signals on a single channel shall be limited to 1000.
- The Micro/5 tamper switch must be wired to the Power/Communications board as shown in *Figure 12, Wiring micro tamper and AC power fail inputs* on page 30.
- Alarms on **Picture Perfect** and **Secure Perfect** should be set using the following priority list with 1 being the highest priority and 7 being the lowest:

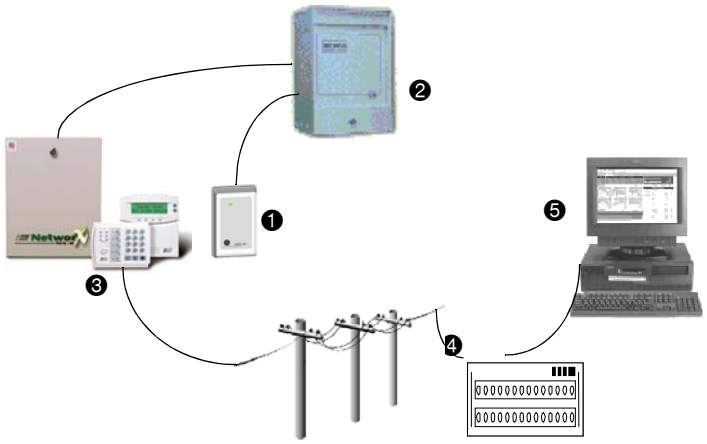
  1. Fire alarm and industrial supervision
  2. Hold-up or panic alarm
  3. Burglar alarm
  4. Watchman or guard tour
  5. Fire-alarm supervision
  6. Burglar-alarm supervision
  7. Industrial supervision

- A clearly marked redundant system with the same configuration as the primary machine should be available as a backup.
- In order for this product to be UL compliant, the Picture Perfect firmware level must be 1.7 or later when the following CPU boards are installed: 110124005, 110124006, or 110187001.

Note: 1. Removing all alarms from the Alarm Monitor should not be available to operators on UL listed systems.
2. Encryption is NOT investigated by UL.

- The Micro/5, used in conjunction with the Model 940, Picture Perfect, and an OH Receiver, can be used as a Proprietary Burglar Alarm Unit Accessory when configured as shown in *Figure 59*.

Figure 59. Proprietary Burglar Alarm Unit Accessory configuration



❶ Model 940 Reader: See the Model 940 Proximity Reader Installation Manual for wiring the Model 940 to the Micro/5.

❷ Micro/5: See the Micro/5 Installation Manual and the NX-8E Control Panel Installation and Startup Manual for wiring the Micro/5 to the NX-8E keypad.

❸ NX-8E panel: Connect to the OH2000E Receiver using a dial-up connection.

Note: The NX-8E keypad must be installed adjacent to the Model 940 reader in order to be UL compliant.

❹ OH2000E Receiver: Connect to the Picture Perfect server, using a serial line RS-232 connection. **Note: The OH2000 E receiver must be installed adjacent to the Picture Perfect host in order to be UL compliant.**

❺ Picture Perfect Server running one or more instances of the oh_receiver interface

CE regulatory notice

CE

Manufacturers Declaration of Conformity

For

Product Identification:

Model/type: M5PXNPLUS:M5PRMPP:M5PRMSP BOM revision level: A
:

Category (description): Microcontroller

Brand: GE Security/CASI

Manufacturer: GE Security, CASI
Suite 100
791 Park of Commerce Blvd.
Boca Raton, Florida 33487
USA

EU Representative: GE Security B.V.
Kelvinstraat 7
6003 DH Weert
The Netherlands

Concerning	**R&TTE**		
	EMC	**Immunity**	**Safety**
A sample of the product has been tested by:	PSE 12955 Bellamy Brothers Blvd. Dade City, FL 33525	PSE 12955 Bellamy Brothers Blvd. Dade City, FL 33525	PSE 12955 Bellamy Brothers Blvd. Dade City, FL 33525
Test report reference	05F142C	05F142I	05P178
Applied standards	EN55022: 1998	EN50130-4(1996) +A1(1998)+ A2(2003)	EN60950-1:2001

Equipment class identifier (*RF products falling under the scope of R&TTE*)

☐ **Not Applicable** ☒ **None (class 1 product)** ☐ **(class 2 product)**

Means of Conformity:

We declare under our sole responsibility that this product is in conformity with Directive 93/68/EEC (Marking) and/or complies with the essential requirements and all other relevant provisions of the 1999/5/EC (R&TTE) based on test results using harmonized standards in accordance with the Directives mentioned.

Chapter 9 Troubleshooting, maintenance, support

This chapter provides information to help you troubleshoot problems and contact technical support in case you need assistance with your GE equipment.

In this chapter:

Troubleshooting

This section provides information to help you diagnose and solve various problems that may arise while configuring or using your GE product and offers technical support contacts in case you need assistance. (See *Contacting technical support* on page 158.)

Refer to the appropriate section:

- power: See *Power problems* on page 148.
- communications: See *Communications problems* on page 149.
- readers: See *Reader problems* on page 149.
- door strikes: See *Door strike problems* on page 151.
- PXNplus CPU board: See *M5PXNplus problems* on page 152.

Power problems

Problem: The Micro/5 does not power up correctly.

Resolution: Verify that the +5V and +12V LEDs on the Power/Communications board are on. See *Figure 2, Power/Communications board layout* on page 16 If these LEDs are NOT on, do the following:

1. Use a voltmeter to check the power supply output. It should read 12 to 15 VDC. If there is no output, make sure the power supply is not on a switched outlet. Be sure the circuit breaker where the power supply is connected, is not tripped.
2. Be sure connector J6 is properly seated in the board.
3. Make sure the Power/Communications board is seated properly into the backplane and that no pins have been bent on J1, the 48-pin connector.
4. Remove the Power/Communications board and inspect the fuse. If the fuse is blown, replace it.

CAUTION: Replace the fuse with one of the same type and rating. Do not power the unit back on until you locate and correct the problem. Follow the steps below.

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   a. Make sure that the wiring connections from the power supply to the Power/Communications board are not reversed. If these connections are OK, go to step b.

   b. Disconnect connector J6 from the Power/Communications board. Use an ohmmeter to check the resistance between pins 3 and 4. If the resistance is less than 200 ohms, there is a short from power to ground. Isolate the fault by doing the following:

      - Remove all boards from the backplane except the Power/Communications and CPU boards. Add each board while measuring the resistance on J6 pins 3 and 4. When the resistance falls below 200 ohms while a board is plugged in, isolate the board. Continue checking the remaining boards for other ground faults.
      - Remove connectors one by one on the faulty boards until the fault condition disappears (resistance goes above 200 ohms). Trace out wiring on these connectors to find and correct the problem.

Communications problems

Problem: The unit is properly powered, but it does not communicate with the host's upstream micro.

Resolution: Check the Receive RX LED DS1 and Transmit TX LED DS2 on the Power/Communications board.

If the **Receive RX LED is flashing**, do the following:

1. Look at the LEDs on the CPU board. If the LEDs indicate that the microcontroller is in maintenance mode, the application code was not downloaded to the CPU. See the section covering LED function under the appropriate board section in *Chapter 4*, *The CPU Board* on page 33 to determine if the microcontroller is in maintenance mode.
2. Check the Power/Communications switch settings for proper baud rate and local or dial-up settings. See *DIP switch settings* on page 17

If the **Receive RX LED is NOT flashing**, do the following:

1. Check the host configuration (refer to your related software installation manual).
2. Be sure that the cable on the back of the host is connected to the proper host port.
3. Check the wiring between the host and the micro. See *Host computer wiring* on page 20.

If the **Transmit TX LED is flashing**, check the wiring between the host and the micro. See *Host computer wiring* on page 20.

Reader problems

Consult your reader installation manual for potential problems which are not related to the Micro/5.

If using the:

- 2RP board: See *Using the 2RP board* on page 149.
- 2SRP board: See *Using the 2SRP board* on page 150.
- 8RP board: See *Using the 8RP board* on page 151.
- CK8RP board: See *Using the CK8RP board* on page 151.

Using the 2RP board

Problem: The reader does not power up.

Resolution:

1. Be sure that W1 on the 2RP board is set in the proper voltage selection location. See *Setting reader voltage* on page 57.

CAUTION: Do not set W1 to 12V for a 5V reader. Permanent damage may result to the reader.

2. Be sure that the proper resistor packs are installed in the 2RP board. See *Installing resistor packs* on page 58.

3. Check the wiring between the 2RP board and the reader. See *2RP board* on page 54 and the reader installation manual.
4. Be sure the connector is firmly seated in the 2RP board.

Problem: The reader has power, but the Badge Read OK LED on the CPU board does not light up when a badge is presented.

Resolution:

1. Be sure the resistor packs are installed and are the correct value for the reader type being used.
2. Be sure that the switch settings on the 2RP board for address and reader technology/format are correct. See *Setting DIP switches* on page 56.
3. Check the wiring between the reader and the 2RP board. See *2RP board* on page 54 and the reader installation manual.

Using the 2SRP board

Problem: The reader does not power up.

Resolution:

1. Be sure that JP1 on the 2SRP board is set in the proper voltage selection location. See *Setting reader voltage* on page 72.

CAUTION: Do not set JP1 to 12V for a 5V reader. Permanent damage may result to the reader.

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2. Be sure that the proper resistor packs are installed in the 2SRP board. See *Installing resistor packs* on page 73.
3. Check the wiring between the 2SRP board and the reader. See *2SRP board* on page 68 and the reader installation manual.
4. Be sure the connector is firmly seated in the 2SRP board.

Problem: The reader has power, but the Badge Read OK LED on the CPU board does not light up when a badge is presented.

Resolution:

1. Be sure the resistor packs are installed and are the correct value for the reader type being used.
2. Be sure that the switch settings on the 2SRP board for address and reader technology/format are correct. See *Setting the DIP switches* on page 70.
3. Check the wiring between the reader and the 2SRP board. See *2SRP board* on page 68 and the reader installation manual.

Using the 8RP board

Problem: The reader does not power up.

Resolution:

1. Check the wiring between the 8RP board and the reader. See *8RP board* on page 84 and the reader installation manual.
2. Be sure the connector is firmly seated in the 8RP board.

Problem: The reader has power, but the Badge Read OK LED on the CPU board does not light up when a badge is presented.

Resolution:

1. Be sure that the switch settings on the 8RP board for address and reader technology/format are correct. See *Setting DIP switches* on page 86.
2. Check the wiring between the reader and the 8RP board. See *8RP board* on page 84 and the reader installation manual.

Using the CK8RP board

Consult the *Secure Terminal Interface (STI) Installation Guide* for potential problems which are not related to the Micro/5.

Problem: The CK8RP board is not recognized.

Resolution:

1. If two CK8RP boards are used in the same Micro/5, make sure that JP1 is open on one and shorted on the other.
2. If only one CK8RP board is used, make sure JP1 is open. The Micro/5 will not look for a second CK8RP (JP1 Shorted) unless the first CK8RP (JP1 Open) is present.
3. Check the wiring between the STI unit and the CK8RP board. Refer to *Wiring STI adapters and the CK8RP board* on page 101.

Door strike problems

Problem: The Badge Read OK LED lights on the CPU board and the door reader LED lights on the reader, but the door strike does not operate.

Resolution:

1. Check the wiring from the door strike to the reader board. In the chapter of the appropriate reader board, see the section that covers wiring the door strike. Also refer to the door strike manufacturer's installation instructions.
2. Be sure the door strike power supply is operating properly.

M5PXNplus problems

If the problem is not caused by incorrect hardware wirings or settings, check the software settings of the M5PXNplus using the Integrated Configuration Tool.

Problem: I need to restore the factory default settings.

Resolution:

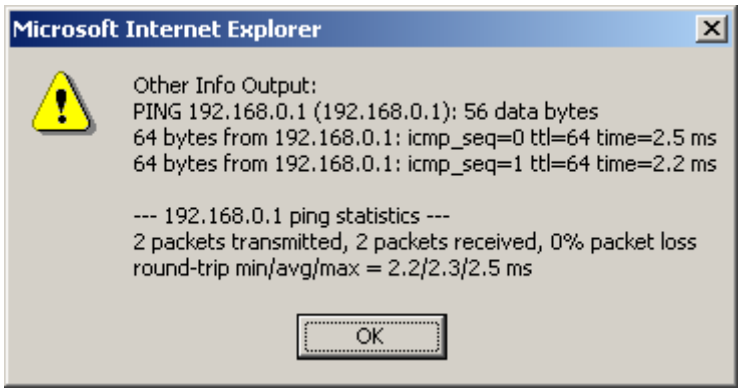
1. Short the Restore Defaults pins (JP4) until DS3 turns on.
2. The micro is now offline from the host and the factory defaults have been restored. The factory defaults are as follows:
   - **Host Server/Type:** Picture Perfect
   - **Primary Connection Type:** Ethernet
   - **IP Address:** 192.168.6.6
   - **Mask:** 255.255.255.0
   - **Gateway:** 192.168.6.1
3. If necessary, reconfigure the micro using the appropriate instructions:
   - *Network micro configuration* on page 121
   - *Dial-up micro configuration* on page 127
   - *Direct-connect micro configuration* on page 130

Problem: The network micro does not connect.

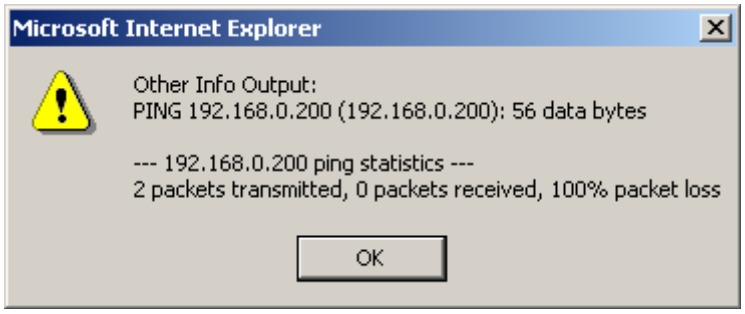
Resolution:

1. Verify your network settings:
   - host IP address (Picture Perfect systems)
   - micro IP address and micro address (Secure Perfect systems)
   - network mask
   - gateway IP
   - DHCP/DNS server
2. Check the connectivity by using the ping command. Use the Ping Host option in the Integrated Configuration Tool. See *Checking operating system status of the PXNplus board* on page 137 for more details.
   a. In the Integrated Configuration Tool, select **Micro Info**.
   b. From the **Other Info** drop-down list, select **Ping Host**.

Successful ping example:



Unsuccessful ping example:



Problem: The dial-up micro does not connect.

Resolution:

1. Verify your settings:
   - micro address
   - modem strings
   - baud rate settings
   - cabling
2. Verify J10 jumper setting on the PXNplus CPU board:
   - external modem: 1 and 2
   - on-board modem: 2 and 3
3. Verify modem LED activity. See *Table 12, Modem LEDs on the PXNplus CPU board* on page 39.

Diagnostic LED display

Built-in diagnostics enable you to quickly determine why a micro may not be working correctly. The CPU board LEDs DS1, DS2, DS3, and DS4 are used for displaying error codes. The LED state and error code condition will vary depending on the type of CPU board:

Micro/5-PX and Micro/5-PXN

Table 64. Micro/5-PX and Micro/5-PXN CPU board LED error codes

Application	Type	LED state	Error code/error condition
Secure Perfect 3.0 and Picture Perfect	Dial-up/ Direct	Flash all four; PAUSE, then DS1 one time.	1000 ERROR - RAM test failure @ A30 or B30. Error code repeated continuously. (Application WILL NOT run.)
Secure Perfect 3.0 and Picture Perfect	Dial-up/ Direct	Flash all four; PAUSE, then DS2 one time.	1000 ERROR - RAM test failure @ B30. Error code repeated continuously. (Application WILL NOT run.)
Secure Perfect 3.0	Dial-up	Flash all four; PAUSE, then DS4 one time.	0001 WARNING - No phone number in parameter block. Pattern will repeat for approximately 10 seconds; then micro proceeds in application mode.
Secure Perfect 3.0	Dial-up	Flash all four, PAUSE, then DS4 two times.	0002 WARNING - No modem initialization string in parameter block. Pattern will repeat for approximately 10 seconds; then micro proceeds in application mode.
Secure Perfect 3.0	Dial-up	Flash all four, PAUSE, then DS4 three times.	0003 ERROR - Illegal addressing. Pattern will repeat three times; stay in maintenance mode for 30 seconds; then micro resets and pattern repeats. (Application WILL NOT run.)
Secure Perfect 3.0	Direct	Flash all four, PAUSE, then DS4 four times.	0004 ERROR - Illegal addressing. Pattern will repeat three times; stay in maintenance mode for 30 seconds; then, micro resets and pattern repeats. (Application WILL NOT run.)
Secure Perfect 3.0	Dial-up	Flash all four, PAUSE, then DS4 five times.	0005 ERROR - Invalid baud rate. Pattern will repeat three times; go to maintenance mode for 30 seconds; then micro resets and pattern repeats.
Picture Perfect Micro/5-PX	Dialup	Flash all four, PAUSE, then DS3 and DS4 three times.	0033 ERROR - Illegal addressing. Pattern will repeat three times; proceeds in maintenance mode; then micro resets and pattern repeats. (Application WILL NOT run.)
Picture Perfect Micro/5-PX Firmware 1.59 or later.	Direct	Flash all four, PAUSE, then DS3 and DS4 four times.	0044 WARNING - Illegal addressing; unknown address will be assumed. Pattern will repeat 3 times; then micro proceeds in application mode.

M5PXNplus

Table 65. PXNplus CPU board LED fault conditions

	DS1	DS2	DS3	DS4	DS5	DS6	DS7	DS8	Resolution or Definition
Boot maintenance mode									
Corrupted boot					Flashing				Contact GE Customer Support.
Boot mode						Flashing			
Boot failure						Flashing	Flashing	Flashing	
Boot failure code							Flashing	Flashing	
OS (Operating System) maintenance mode									
OS maintenance		Alternates ON with DS3	Alternates ON with DS2				ON		
Operation state									
Application failure				ON	ON				Verify that the proper application (Secure Perfect or Picture Perfect) was selected in the Integrated Configuration Tool.
Monitor failure				ON		ON			The micro is configured incorrectly in the Integrated Configuration Tool.
Restore defaults requested				ON			ON		Factory default settings have been restored to the board.
Shutdown requested				ON				ON	The board has been properly shutdown and may be removed.

Table 66. LED error codes

Application	Type	LED state	Error code/error condition
Picture Perfect	Dialup	Flash all four, PAUSE, then DS3 and DS4 three times.	0033 ERROR - Illegal addressing. Pattern will repeat three times; proceeds in maintenance mode; then micro resets and pattern repeats. (Application WILL NOT run.)
	Direct/ Network	Flash all four, PAUSE, then DS3 and DS4 four times.	0044 WARNING - Illegal addressing; unknown address will be assumed. Pattern will repeat 3 times; then micro proceeds in application mode.
Secure Perfect	Dial-up	Flash all four; PAUSE, then DS4 one time.	0001 WARNING - No phone number in parameter block. Pattern will repeat for approximately 10 seconds; then micro proceeds in application mode.
		Flash all four, PAUSE, then DS4 two times.	0002 WARNING - No modem initialization string in parameter block. Pattern will repeat for approximately 10 seconds; then micro proceeds in application mode.
		Flash all four, PAUSE, then DS4 five times.	0005 ERROR - Invalid baud rate. Pattern will repeat three times; go to maintenance mode for 30 seconds; then micro resets and pattern repeats.
	Direct	Flash all four, PAUSE, then DS4 four times.	0004 ERROR - Illegal addressing. Pattern will repeat three times; stay in maintenance mode for 30 seconds; then, micro resets and pattern repeats. (Application WILL NOT run.)

Maintenance

Inserting and removing the UCSIMM board on the PXNplus CPU board

CAUTION: Do NOT remove the UCSIMM board unless instructed to do so by GE Customer Support.

1. To safely shut down the micro operating system, short JP3 on the PXNplus CPU board for approximately 5 seconds until DS8 turns on. DS2 and DS3 then alternate On.
2. Disconnect power and battery backup power.

CAUTION: Follow standard static prevention procedures. See *Electrostatic Discharge (ESD) precaution* on page 10.

3. Locate the clips on the right and left sides of the UCSIMM board. Press both clips out.
4. Pull out the UCSIMM board.
5. The board fits in with the small cutout in the right corner. Insert the board at a 45 degree angle.
6. Press down on the board until the clips engage.

Contacting technical support

For assistance installing, operating, maintaining, and troubleshooting this product, refer to this document and any other documentation provided. If you still have questions, you may contact technical support during normal business hours (Monday through Friday, excluding holidays, between 8 a.m. and 7 p.m. Eastern Time).

Table 67. Sales and support contact information

	Pre-sales	Technical support
Phone:	1 800 428 2733	1 888 GE SECURITY (437 3287)
Fax:	561 998 6160	561 998 6244
E-mail:	None	rs-bctsupport@ge.com

Note: Be ready at the equipment before calling for technical support.

Online publication library

Another great resource for assistance with your GE product is our online publication library, available to all of our customers. To access the library, go to our website at the following location:

`http://www.gesecurity.com`

In the **Tools** area at the top, click the *Publication Library* link. After you register and log on, you may search through our online library for the documentation you need.[1]

1. Many GE documents are provided as PDFs (portable document format). To read these documents, you will need Adobe Acrobat Reader, which can be downloaded free from Adobe's website at `www.adobe.com`.

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