

Micro/PX-2000, Micro/PXN-2000, and M2000PXNplus Installation Manual



Micro/PX-2000, Micro/PXN-2000, and M2000PXNplus
Installation Manual



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Document number/revision: **460419001K** (November 2005).

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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:

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Security

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F 561 998 6224

Asia
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F 852 2142 5063

Australia
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F 61 3 9259 4799

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Preface

This is the *GE Micro/PX-2000, Micro/PXN-2000, and M2000PXNplus 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; 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 130 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.
<i>Italic</i>	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.
<i>Blue italic</i>	(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: <i>Cautions</i> identify conditions or practices that may result in damage to the equipment or other property.
	WARNING: <i>Warnings</i> identify conditions or practices that could result in equipment damage or serious personal injury.

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Chapter 1 Overview

This chapter provides an overview of and the technical specifications for your Micro/PX-2000, Micro/PXN-2000, and M2000PXNplus controller.

In this chapter:

<i>Introduction</i>	2
<i>Specifications</i>	3
<i>Typical hardware configuration</i>	6

Introduction

The Micro/PX-2000, Micro/PXN-2000, and M2000PXNplus are cost-effective, single-board microcontrollers enclosed in a steel cabinet.

- Micro/PX-2000: direct or dial-up communications
- Micro/PXN-2000: network communications
- M2000PXNplus: direct, dial-up, or network communications

From this point on, the word Micro/PX-2000 or PX-2000 will be used when referring to the Micro/PX-2000, the Micro/PXN-2000, or the M2000PXNplus.

Note: If you possess a previous version of these instructions, you may notice changes since the last publication, marked by a change bar which is a vertical line in the margin that visually identifies significant new or revised material.

This product includes support for 10 Digital Inputs (DI), 8 Digital Outputs with Relays (DOR), 4 readers (regular F/2F and Supervised F/2F readers), and up to four Model 351 Time Displays. The micro communicates with host computers via network, direct connection (RS-232), or dial-up modems. The micro does not have to be online with a host system in order to control access since the badge database is stored in the micro's memory.

The Micro/PX-2000, Micro/PXN-2000, and M2000PXNplus consist of the following:

- Enclosure (all steel cabinet with key lock and tamper-switch-protected door)
- Power supply (110 or 230 VAC to 18 VAC transformer included)
- Battery backup (7AH jell-cell included)
- Integrated I/O board

Options include:

- CPU board: PX, PXN, or PXNplus

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

Enclosure specifications

Enclosure specifications	
Physical dimensions	14 inches x 14 inches x 3.5 inches 356mm x 356mm x 84mm
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	110 or 230 VAC to 18 VAC Transformer included. 7AH jell-cell battery for battery backup included.
Controller power requirements	Provided transformer meets all power requirements for this device.
Power dissipation	50 watts maximum
Cabling	
Host to micro	Network: Cat5 Serial: Dedicated Belden 8723 22-AWG, 2-pair twisted shielded wire recommended; however, 2-pair twisted shielded wire within the 18- 22-AWG range is acceptable. Grounding of the shield at the micro grounding studs is required. <ul style="list-style-type: none">• 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	Any 4-conductor shielded wire is acceptable. Cabling recommendations are provided with the reader.
Micro to DIs or DOs	Use any cable with the desired number of individually shielded pairs. Grounding of the shield at the micro grounding studs is required. Maximum distance is 1000 feet.
Optional devices	
Readers	Four readers supported: <ul style="list-style-type: none">• regular F/2F and supervised F/2F badge reader communication• combined keypad/reader technologies that have supervised F/2F outputs Maximum rating of each reader port power is 300mA with a total power output of 1.2 amps.
Digital input devices	Ten supervised DI points are included in the micro. Supervision resistors (20 each 1K ohms) are included.
Digital output devices	Ten output devices maximum ratings: <ul style="list-style-type: none">• 4 reader outputs: 0.10 amps @ 12 VDC maximum• 8DOR relays: 2 amps @ 40 VDC or 30 VAC maximum

Regulatory information

Listings	FCC Class A UL 1076 UL 294 CE See <i>Chapter 10 Regulatory information</i> for more information.
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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: <ul style="list-style-type: none"> 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

	PXNplus CPU board	PXN CPU board	PX CPU board
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

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

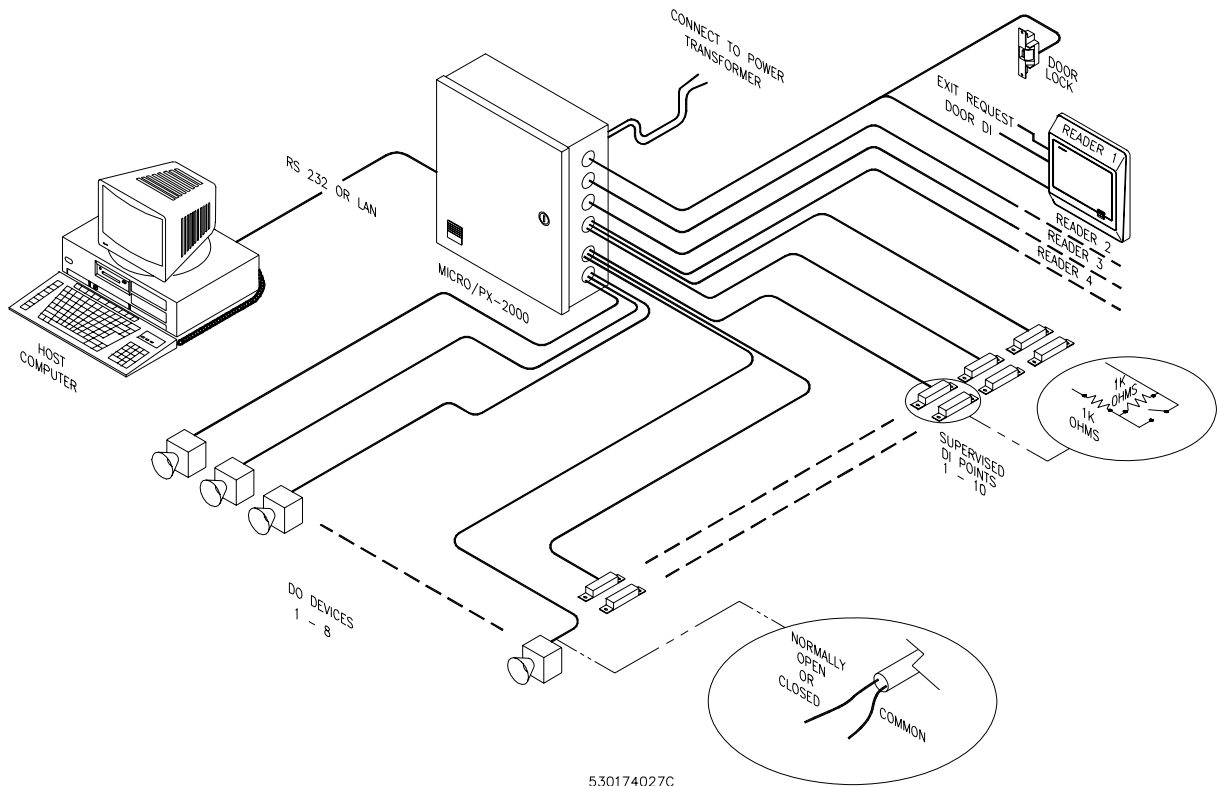
Badge capacity	145,000	90,000	90,000
Offline badge history capacity	5,000*	5,000	5,000
Offline alarm history capacity	2,000*	2,000	2,000

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

Typical hardware configuration

The following figures show a typical hardware configuration with and without a junction box.

Figure 1. Typical hardware configuration - Micro/PX-2000, Micro/PXN-2000, and M2000PXNplus



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Figure 2. Typical hardware configuration - Micro/PX-2000, Micro/PXN-2000, and M2000PXNplus with Micro/Reader Junction Box

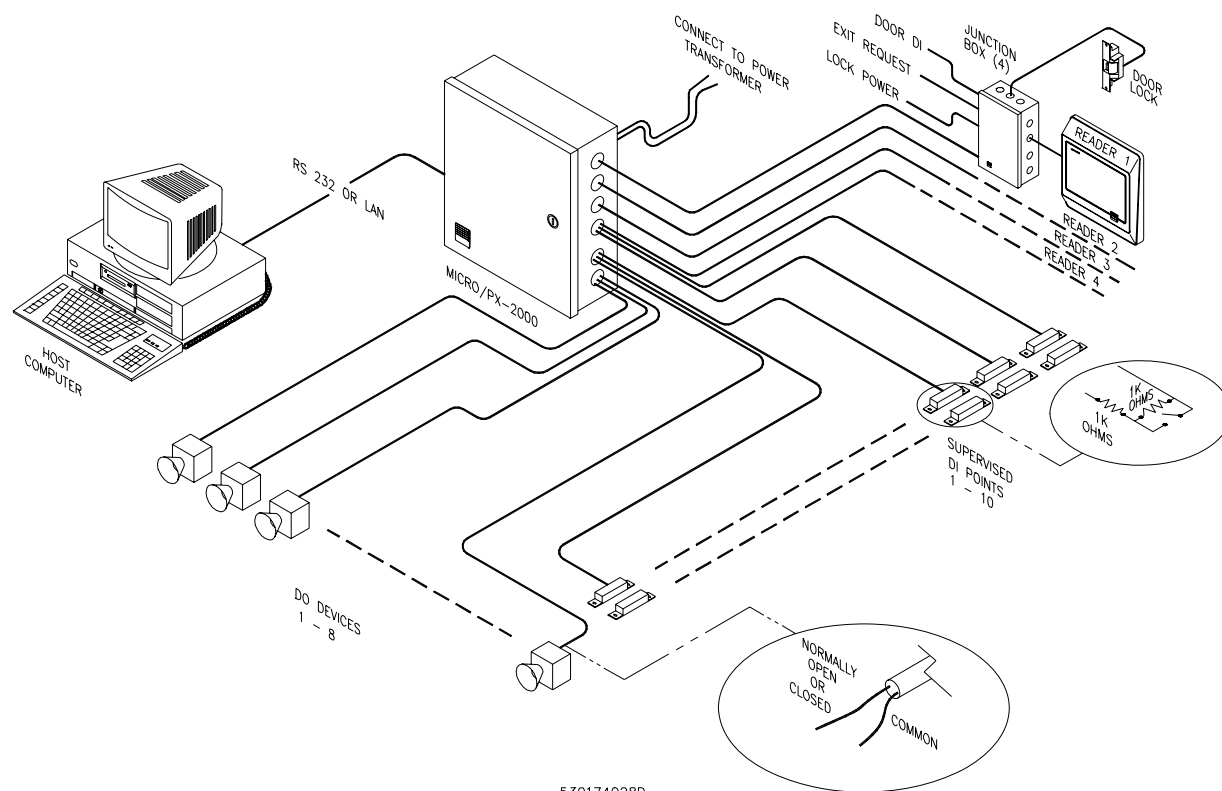
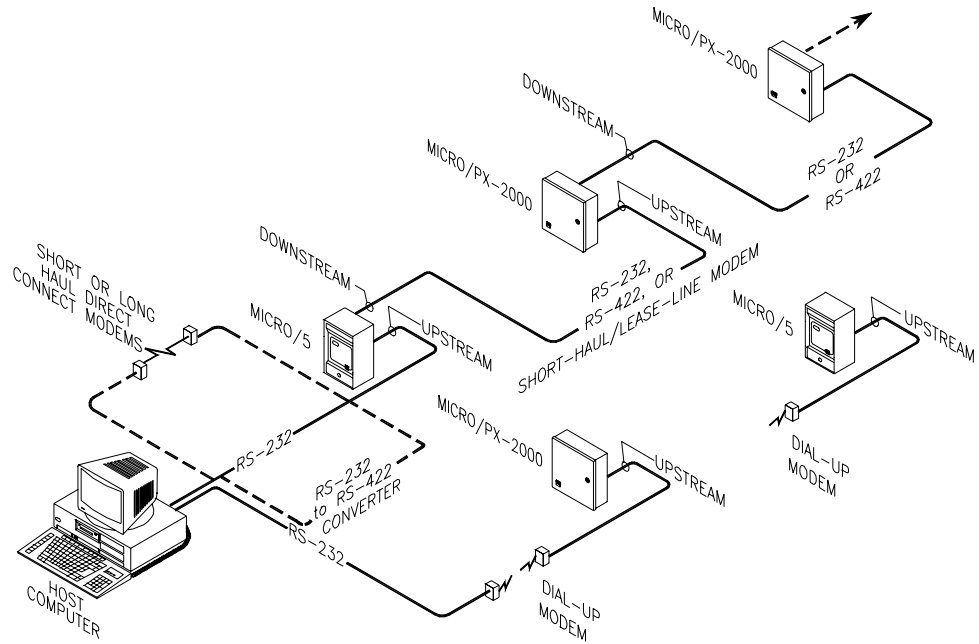


Figure 3 and *Figure 4* show how your host computer and micros are connected using a direct or dial-up configuration.

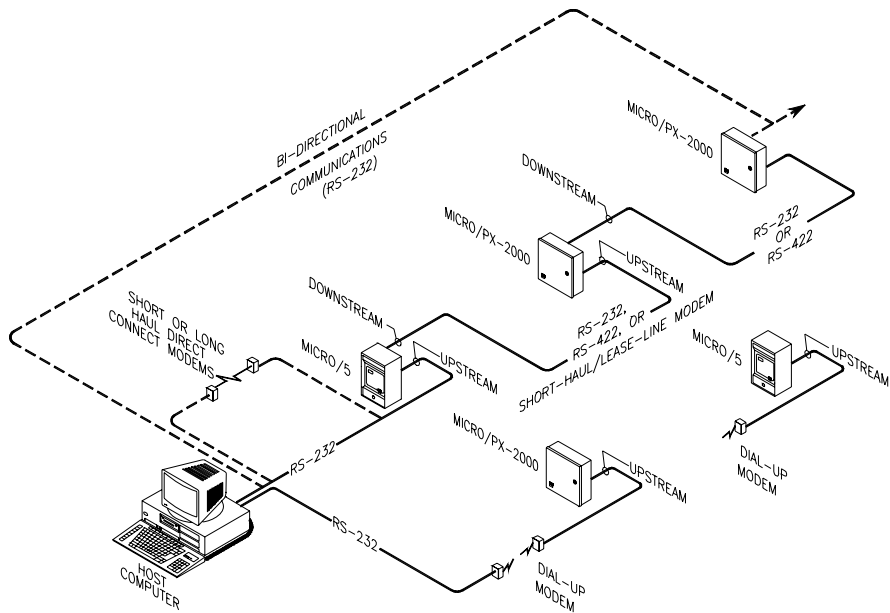
- Note:**
1. *Upstream* refers to communications wiring going toward the host and *downstream* refers to communications wiring going away from the host.
 2. Micro/5, Micro/PX-2000, and Micro/PXN-2000 micros can be interconnected in any order.

Figure 3. Secure Perfect Host to Micro/PX-2000 using direct and dial-up communications



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Figure 4. Picture Perfect Host to Micro/PX-2000 using direct and dial-up communications



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Chapter 2 Installation planning and mounting

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<i>Safety</i>	12
<i>General installation guidelines</i>	12
<i>Observing noise prevention procedures</i>	13
<i>Mounting</i>	14

Getting started roadmap

The following is a basic outline for installing and setting up your micro. 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.

1. Mount the micro on a vertical surface at a suitable location, adhering to all local electrical codes.
2. Install the transformer and connect the two AC wires.
3. Connect an earth-ground wire to the micro.
4. Apply power to the micro (power LED should come on).
5. Connect your PC or laptop to J8, the micro primary port.



CAUTION: The J16 IS NOT a standard RS-232 port. DO NOT USE the J16 connector for flashing application code. External equipment (such as your laptop) may be severely damaged. Use J16 only with the GE Modem Kit.

6. If you have a:
 - **M2000PXNplus** CPU board, run the Integrated Configuration Tool to set the connection type. Go to *step 7*.
 - **Micro/PX-2000 or Micro/PXN-2000** CPU board, run one of the GE micro firmware installation tools (refer to the FlashTool online help for additional information) and flash the micro with application code (firmware is supplied on the enclosed diskettes).

Verify that micro dip switch SW5 settings are as follows, before flashing:

SW5-1	ON
SW5-2	ON
SW5-3	Baud rate - refer to <i>Table 26</i> , <i>Switch 5 settings</i> on page 44.
SW5-4	Baud rate - refer to <i>Table 26</i> , <i>Switch 5 settings</i> on page 44.
SW5-5	ON
SW5-6	ON
SW5-7	ON
SW5-8	ON (Not used.)

Refer to *Table 26*, *Switch 5 settings* on page 44 for a more detailed description of SW5 settings.



CAUTION: If this micro is a dialup, verify that the DB-9 connector is detached from the J16 modem port.

7. Power down the micro.
8. If this is a:
 - **Network micro:** Connect the network cable to the micro.
 - **Dial-up micro:** Install the modem.
 - **External modem:** Refer to the *Star Comm Modem Kit For the Micro/PX-2000: Setup Instructions* for modem installation.

- **PXNplus on-board modem:** Refer to the *PXNplus Modem Board Installation Instructions*.
 - **Direct micro:** Connect the serial cable from the micro to the host.
9. **RESET** the dip switch settings and configure the micro. Refer to *Table 19, M2000PXNplus: Setting the micro address, telephone number, and initialization string* on page 33 or *Table 25, Micro/PX-2000 and Micro/PXN-2000: Setting the micro address, telephone number, and initialization string* on page 41.
 10. Install Digital Input (DI), Digital Output (DO), and reader connections.
Note: As of 05/04, connector J2 and J3 alarm points no longer require termination by attaching a 1K ohm, 1/4-watt resistor, in order to prevent false alarms. Previous documentation stipulated this requirement.
 11. Test the system using the procedure outlined in the next section, *Test sequence*.

Test sequence

Before powering up:

1. Unplug each reader connector (J4, J5, J6, and J7) 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.
2. Unplug all connectors.
3. Test with an ohmmeter each termination between other terminations on the connector and earth ground plug.
4. Replug all connectors except J11.
5. Use a voltmeter to measure AC input voltage across J11, Pin 1 and 2 = Ground.
Result: The voltmeter should read 14 to 18 VAC.
6. Measure the AC power supplied to the power supply (110V AC or 220V AC, 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.
7. Reconnect the J11 connector.
8. Connect the battery leads to the battery terminals. Refer to Figure 13, “Wiring the power supply” in the document, *Micro/PX-2000, Micro/PXN-2000, and M2000PXNplus Point-to-Point Wiring Diagrams*. Place the battery in the lower, right corner of the cabinet.
9. Power up the micro.

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 guidelines

The authorized installation contractor is required to abide by the following rules.

- Neatly label cables at both ends. This includes readers, digital inputs (alarms), and digital output devices including cables to amplifier cards, junction boxes, and the micro printed circuit boards to which they are wired.
(For example, the 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 marshall 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.



CAUTION: Do not run signal wiring in the same conduit with AC power wiring.

- Shield all cables and terminate properly.
- Ground cabinet to a good earth ground.

Observing noise prevention procedures

The authorized installation contractor must abide by the following guidelines to help prevent noise within the system.

Signal transmission

- When assigning wires, observe GE recommendations regarding pairing of shielded cable.
- 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) and all unused wire(s) at the microcontroller** using the grounding studs provided inside the cabinet. If there is more than one microcontroller, ground the shield of the communications line to the upstream microcontroller only.



CAUTION: Do not ground both cable ends.

Cabling routing and interference

Keep all 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 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; electro-magnetic equipment such as degaussers, magnetic chucks, etc.; control equipment (relays) for machinery and other switching devices that carry or switch relatively large currents.
- Radio and television receivers and transmitters. Signal generators and intercom systems. Radar transmitting equipment.
- Arc welders, electro-discharge machinery and related equipment.
- RF induction heaters.

Cable length

Before installing any micro or components, carefully plan their placement to minimize cable run lengths.

- 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 PX-2000 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 PX-2000 controller in areas secure from any disruption to data communications or tampering.
- Clean and clear all mounting areas of corrosive gases and airborne metallic particles. Avoid installing near photocopiers due to contamination from toner particles.
- Protect the PX-2000 from hazardous (high) voltages.
- Mount the PX-2000 on a vertical surface with at least six inches (15.2 centimeters) clearance on all four sides to support thermal air cooling.
- Locate the PX-2000 in a place that provides dedicated AC earth ground. The PX-2000 must be earth grounded.
- Keep interior and exterior housing of all PX-2000 enclosures and other components free of wire remnants.
- Avoid temperatures outside the range specified for the PX-2000 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.

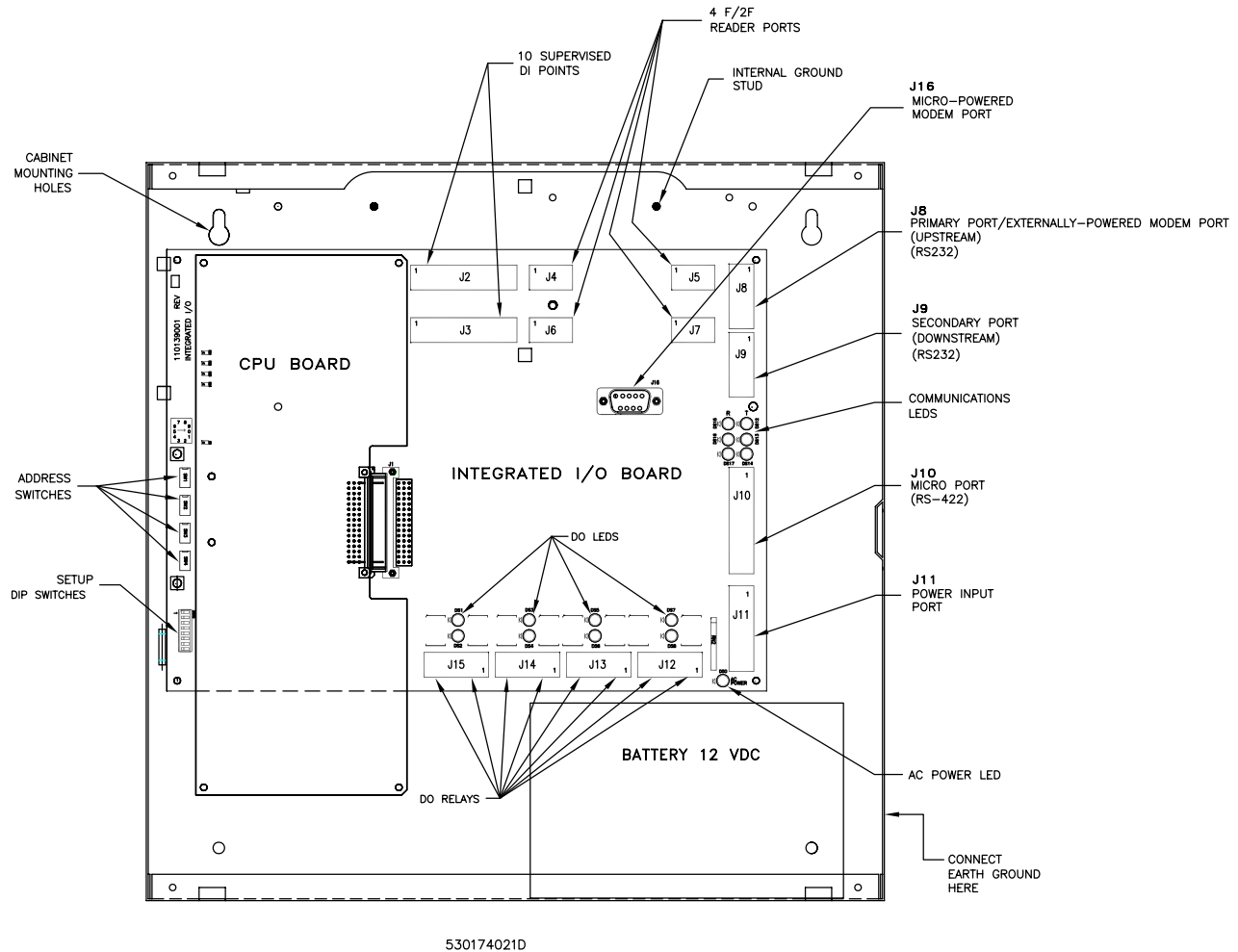
Mounting instructions



CAUTION: Do not apply power to any component during installation.

1. Measure and drill mounting holes, if necessary, placing four #10 lag bolts with screw heads and washers.
2. Remove the micro cabinet cover. Do not remove the CPU board or the integrated Input/Output board.
3. Lift and place the cabinet over the screw heads and washers. Secure to the wall.
4. Install the cable conduit to the micro cabinet knockout holes, if applicable.
5. There are knockout holes in four positions on the cabinet. The cable is pulled through these holes. To open the holes, strike the knockouts from the outside of the 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 or ground bus). Run 14- to 18-AWG wire from the cabinet ground terminal to the earth ground point.
Note: The micro must be tied to earth ground.
8. Mount the AC power supply on a 4 X 4 utility box.

Figure 5. Assembly drawing of Micro/PX-2000, Micro/PXN-2000, and M2000PXNplus with components



Chapter 3 Microcontroller boards

This chapter provides information about and instructions for using the CPU boards and the Integrated I/O board.

In this chapter:

<i>PXNplus CPU board</i>	18
<i>PXN CPU Board</i>	23
<i>PX CPU board</i>	28
<i>Integrated I/O board LEDs</i>	29

PXNplus CPU board

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

The following are some product highlights:

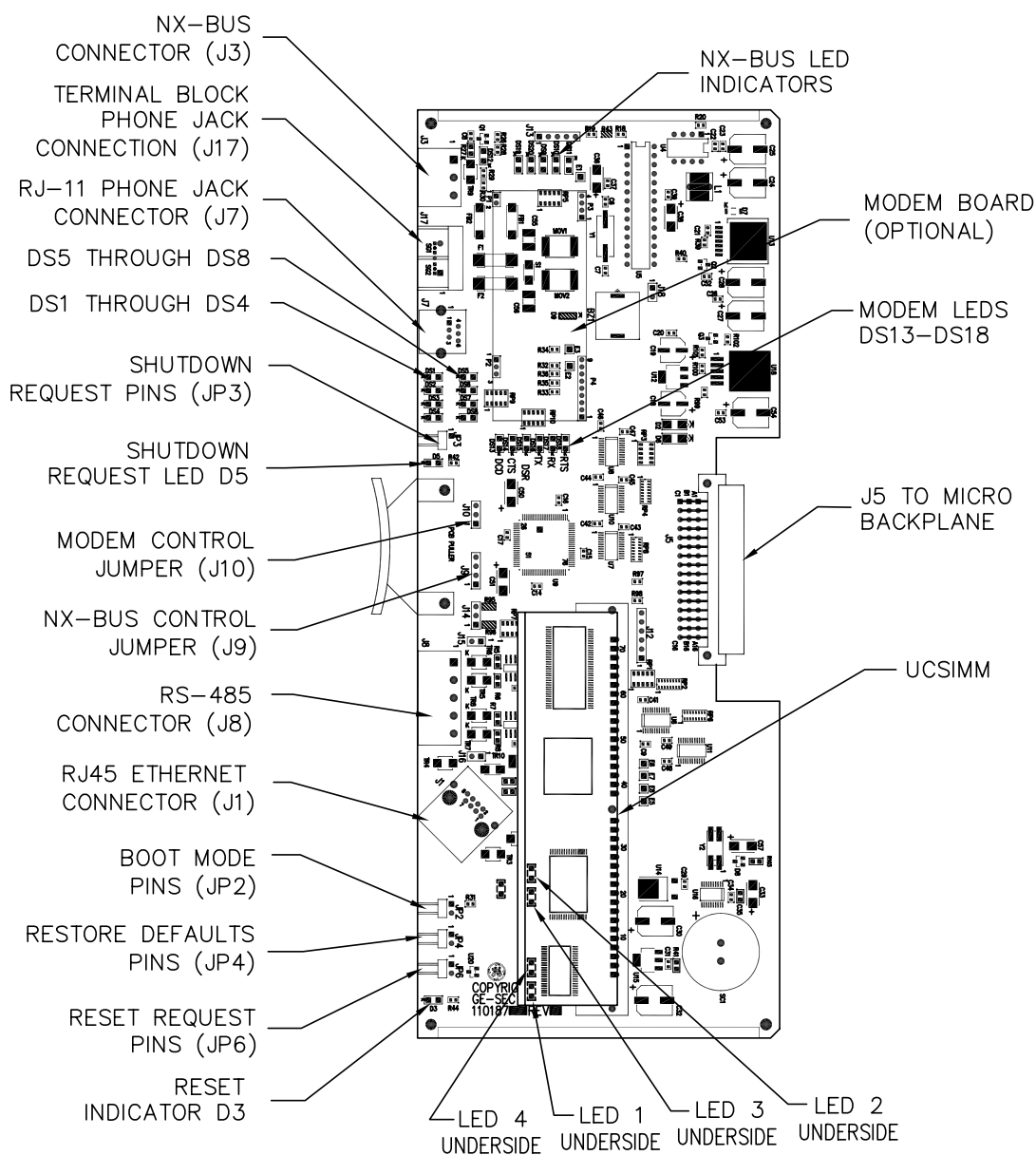
- Supports Ethernet networks.
- Supports the following network protocols: DHCP, TCP/IP, UDP, and DNS.
- Supports an optional, integrated modem board for dial-up connection or fallback dial-up.
- Provides nonvolatile storage which provides faster reset recovery and allows host-less operation.
- Utilizes 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 *Integrated Configuration Tool* on page 89.
- Works with either:
 - **Picture Perfect** Version 2.0 or later
 - **Secure Perfect** 6.1.1 or later.

Refer to the appropriate User Manual for configuration of this board within the software.

- Provides tunable offline history buffer.

Board layout

Figure 6. PXNplus CPU board layout



Pins and jumpers

General purpose pins

Table 1. 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.

Upstream configuration jumper - J10

Table 2. Upstream configuration jumper

J10	
Pins	Function
1 and 2 ¹	Upstream direct using connector J8 on the Integrated I/O board
	Externally-powered modem using connector J8 on the Integrated I/O board
	Micro-powered modem using connector J16 on the Integrated I/O board (Must use the GE modem kit!)
2 and 3	On-board modem on the PXNplus CPU board

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

Downstream configuration jumper - J9

Table 3. Downstream configuration jumper

J9	
Pins	Function
1 and 2 ¹	RS-232 using connector J9 on the Integrated I/O board
	RS-422 using connector J10 on the Integrated I/O 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.

LED indicators on the PXNplus CPU board

The LED state depends on the state of the micro. There are two micro 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 4 shows the LED state transitions.

Table 4. 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 mode			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

Table 5. 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 6. 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 7. 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.

PXN CPU board

The Micro/PXN-2000 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.

The following are some product highlights:

- Uses Dual-Socket PCMCIA controller to allow for a network and an optional dial-up connection.
- Minimum micro firmware is Picture Perfect Version 1.5.9 and Secure Perfect 3.0.
- Supports up to seven Micro/PX-2000 or Micro/5-PX downstream from the network micro using RS-232 or RS-422 serial connection.

Note: Only downstream RS-232 communication was verified by UL.

- 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 MICTOOL online help for additional information.
- This board is used with Picture Perfect Version 1.5.5 or later and SP3.0 or later.

LED indicators on the PXN CPU board

The tables below show the function of the LEDs on the Micro/PXN-2000 CPU board. If you are looking at the LEDs on an installed Micro/PXN-2000 CPU board, DS1 is the top LED.

Maintenance mode: The Micro/PXN-2000 is in maintenance mode before any application (personality) is downloaded to its flash EEPROM. The CPU will be in OS (Operating System) Maintenance Mode where DS2 and DS3 alternate On and Off.

Table 8. LEDs on the Micro/PXN-2000 CPU board

LED number	State in boot maintenance mode	State in operating system maintenance mode	State when application is running
DS1	OFF	OFF	ON = Micro Offline
DS2	OFF	Alternate ON and OFF	ON = Address Received
DS3	ON		ON = Badge Read OK
DS4	OFF	OFF	ON = CPU Failure Detected Flashing = Waiting for Database
D3	OFF	OFF	OFF = Normal Operation Flashes ON = Power On Reset

Table 9. Picture Perfect/Secure Perfect 3.0 or later LED configuration

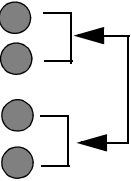
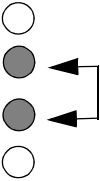
LED number	Secure Perfect 3.0 or later	Picture Perfect
DS1		
DS2		
DS3		
DS4		

Table 10. Diagnostic LEDs on the Micro/PXN-2000 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.

DIP switch settings for the Micro/PXN-2000 CPU board

While there are switches on the Integrated I/O Board, there are NO switch settings on the Micro/PXN-2000 CPU board. For Picture Perfect, the addressing is configured within the 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 addresses. For Secure Perfect, the addressing is configured using the MICTOOL utility.

Jumpers

There is one jumper on the Micro/PXN-2000 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 Table 11.

Table 11. 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 to accomplish the following:

- a 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 Micro/PXN-2000 CPU board ships in OS (Operating System) Maintenance Mode where DS2 and DS3 alternate On and Off. See *Table 8, LEDs on the Micro/PXN-2000 CPU board* on page 23.

There are two ways to download the application (see the MICTOOL 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.

See *Chapter 8 Micro firmware tools* for more information.

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 micro firmware installation tools and a serial connection. See the MICTOOL online help for additional information.

Table 12. Settings needed

M/PXN-2000	Ethernet CPU	Token-Ring CPU
On the same LAN as the host	<ul style="list-style-type: none">• Micro IP address• Host IP address (Picture Perfect only)• Network mask	<ul style="list-style-type: none">• Micro IP address• Host IP address (Picture Perfect only)• Network mask• Ring speed (4MB or 16MB)
On a different LAN than the host	Above parameters plus: <ul style="list-style-type: none">• Router/Gateway IP Address• Hop count (if not known, use maximum hop count on network)	Above parameters plus: <ul style="list-style-type: none">• Router/Gateway IP Address• Hop count (if not known, use maximum hop count on network)

If you wish to erase a Micro/PXN-2000 application code, refer to the MICTOOL 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.

Note: Communication through firewalls was not verified by UL.

Currently, the following ports have been designated for use:

Table 13. 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.

PCMCIA

The PXN CPU board support 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/PXN-2000 micro without a network PCMCIA card. In addition, you CANNOT have two network PCMCIA cards in the same Micro/PXN-2000 micro.

Secure Perfect does not have this restriction; it can be used with no cards plugged in. However, the Micro/PXN-2000 then acts like a serial micro.

The PCMCIA card plugs into the small card cage located at the bottom of the board. See [Figure 7](#) 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.

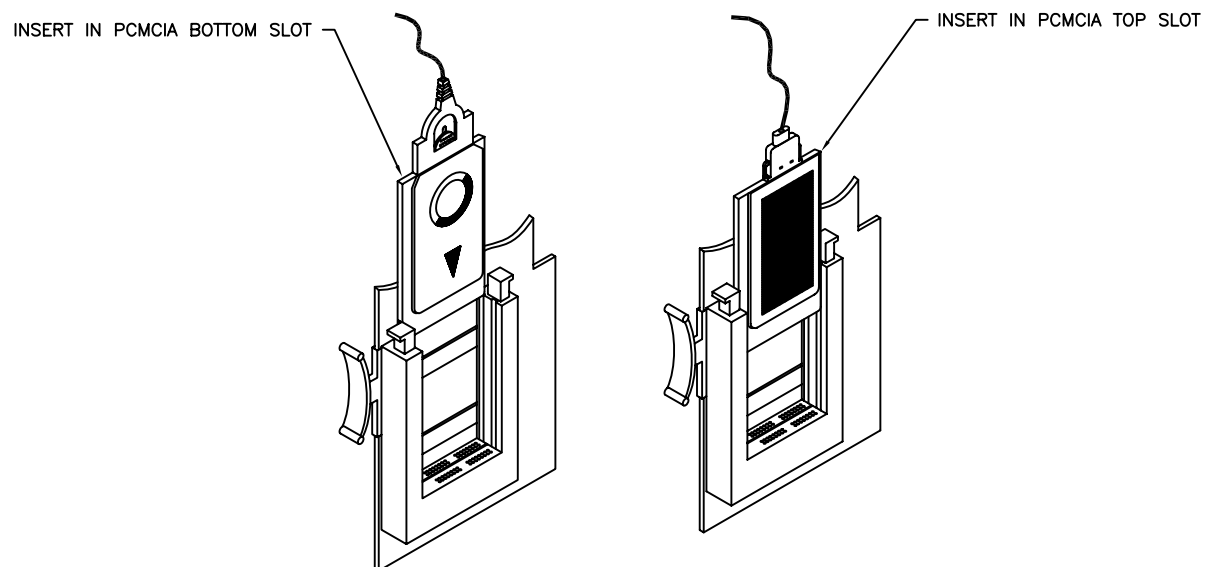
Note: If you are using the US Robotics 33.6 or 3COM 56K card, the firmware version of the Micro/PXN-2000 MUST be at Picture Perfect Version 1.5.9 or later and Secure Perfect Version 3.0 or later.

If communicating with a STAR Comm modem at the host, host initialization strings must be entered when using the 3COM 56K PCMCIA card at the micro. Use the table below.

Table 14. Initialization strings for STAR Comm modem at the host

Micro/Host	Initialization/Deinitialization string
Micro	See Table 21, Required micro modem initialization strings on page 38.
Picture Perfect host (for STAR Comm)	AT&FE0X3V1&C1&D2SO=1S7=60\N6&Q6&W
Secure Perfect host Initialization	Use modem driver provided on diskette shipped with the STAR Comm modem

Figure 7. Plugging in a PCMCIA card



530069038A

PX CPU board

LED indicators on the PX CPU board

The CPU board LED functions are stated in *Chapter 11 Troubleshooting, maintenance, support, Table 37, Micro/PX-2000 and Micro/PXN-2000 LED error codes* on page 128.

Jumpers

For reference purposes, there is one jumper on the Micro/PX-2000 CPU Board. J2 is the boot code jumper. The settings are detailed in the table below.

Table 15. Boot code jumper

Board	Jumper	Pins	Function
100124 001 = Micro/5-PX	J2	2 and 3	Program Boot
100124 002 = Micro/5-PXN		1 and 2	Run Application

Integrated I/O board LEDs

The integrated input/output board has 15 LEDs. The table below describes the function of these LEDs. See [Figure 5](#) on page 15 for the location of the LEDs.

Table 16. Function of the LEDs

Type of LED	LED number	State	Description
Communication	D17	Flashing	Data is being received from the device connected to the auxiliary (diagnostic or printer) port.
Communication	D16	Flashing	Data is being received from the downstream micro connected to the secondary/micro port.
Communication	D15	Flashing	Data is being received from the upstream host/micro connected to the primary/micro port (Receive RX).
Communication	D14	Flashing	Data is being transmitted to the device connected to the auxiliary (diagnostic or printer) port.
Communication	D13	Flashing	Data is being transmitted to the downstream micro connected to the secondary/micro port.
Communication	D12	Flashing	Data is being transmitted to the upstream host/micro connected to the primary/micro port (Transmit TX).
Power	D50	ON	Indicates that AC power is present. (Full intensity indicates AC power is direct; two-thirds intensity or less indicates battery backup.)
DOR Status	DS1	ON	Indicates the DOR 8 is activated.
DOR Status	DS2	ON	Indicates the DOR 7 is activated.
DOR Status	DS3	ON	Indicates the DOR 6 is activated.
DOR Status	DS4	ON	Indicates the DOR 5 is activated.
DOR Status	DS5	ON	Indicates the DOR 4 is activated.
DOR Status	DS6	ON	Indicates the DOR 3 is activated.
DOR Status	DS7	ON	Indicates the DOR 2 is activated.
DOR Status	DS8	ON	Indicates the DOR 1 is activated.

Chapter 4 Configuring the system

This chapter provides information about configuring the system.

In this chapter:

<i>Micro addressing</i>	32
<i>M2000PXNplus</i>	33
<i>Micro/PX-2000 and Micro/PXN-2000</i>	36
<i>Switch 5 settings</i>	44

Micro addressing

If using Secure Perfect 4.0, you now have the option to map the DO relays to the Reader ports which provides Door DO relays. The mapping is a one-to-one relationship which means DO relay 1 maps to Reader port 1 and so on. The mapping is accomplished by prepending the micro address with a 9. For example, addresses 9001 through 9998 represent micro addresses 1 through 998 AND map the DO relays. Addresses 0001 through 8999 represent micro addresses 1 through 999 and DO NOT map the DO relays.

There are 2 options for setting the micro address:

1. **Use the 4 rotary dip switches.** A small screwdriver is used to rotate the pointer in the middle of the switch, aiming it at the proper numbers.

Table 17. Valid address ranges

		Address
Picture Perfect		0000–4095
Secure Perfect	without relays	0001–8999
	with relays	9001–9998

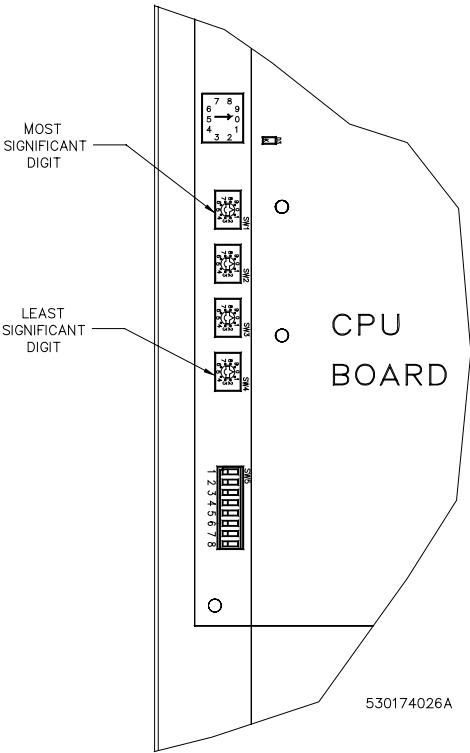
2. **Use one of the GE micro firmware installation tools from a PC or laptop.** If using this option, set the 4 rotary dip switches to one of the addresses listed in the table below.

Table 18. Address for using micro firmware installation tools

		Address
Picture Perfect		9999
Secure Perfect	without relays	9999
	with relays	9000

Note: Factory default address is set to 9999.

Figure 8. Micro address switch overview (Example micro address 4)



M2000PXNplus

Table 19. M2000PXNplus: Setting the micro address, telephone number, and initialization string

M2000PXNplus		
Application	Procedure	Dip switch settings
Secure Perfect Direct	Step 1: Set micro address	Set the 4 rotary dip switches to the desired address. If using relay output points for your door strikes, prepend the address with a 9. OR Set the 4 rotary dip switches to: <ul style="list-style-type: none">• 9999 if NOT using relays• 9000 if using relays Then, use the Integrated Configuration Tool to set the address in the parameter block. Refer to Integrated Configuration Tool on page 89.
	Step 2: Set direct	Set dip switch SW5-2 to OFF. Set dip switch SW5-5 to OFF. Jumper pins 1 and 2 on jumper J10 of the CPU board.
	Step 3: Set baud	Set dip switches SW5-3 and SW5-4 to desired baud rate. (See Table 26, Switch 5 settings on page 44.)
	Step 4: Set configuration	Set dip switch SW5-6 to OFF. Set dip switch SW5-7 to OFF.

Table 19. M2000PXNplus: Setting the micro address, telephone number, and initialization string (continued)

M2000PXNplus

Application	Procedure	Dip switch settings				
Secure Perfect Dialup	Step 1: Set micro address	Set the 4 rotary dip switches to the desired address. If using relay output points for your door strikes, prepend the address with a 9. OR Set the 4 rotary dip switches to: <ul style="list-style-type: none">• 9999 if NOT using relays• 9000 if using relays Then, use the Integrated Configuration Tool to set the address in the parameter block. Refer to Integrated Configuration Tool on page 89.				
	Step 2: Set dialup	If using the on-board modem , refer to the <i>PXNplus Modem Board Installation Instructions</i> for installation instructions. Refer to the table below for jumper and switch settings:				
		Configuration	PXNplus J10	Integrated I/O board SW5-2SW5-5		NOTES
		Externally-powered modem (J8)	1-2	ON	OFF	
		Micro-powered modem (J16)	1-2	ON	ON	Kit required from GE.
		On-board modem on PXNplus CPU board	2-3	ON	N/A	
	Step 3: Set baud	Set dip switches SW5-3 and SW5-4 to desired baud rate. (See Table 26, Switch 5 settings on page 44.)				
	Step 4: Set phone number	Set phone number and modem initialization string (optional) using the Integrated Configuration Tool.				
	Step 5: Set configuration	Set dip switch SW5-6 to OFF. Set dip switch SW5-7 to OFF.				
Secure Perfect Network	Step 1: Set micro address	Set the 4 rotary dip switches to the desired address. If using relay output points for your door strikes, prepend the address with a 9. OR Set the 4 rotary dip switches to: <ul style="list-style-type: none">• 9999 if NOT using relays• 9000 if using relays Then, use the Integrated Configuration Tool to set the address in the parameter block. Refer to Integrated Configuration Tool on page 89.				
	Step 2: Set IP address	Use the Integrated Configuration Tool to set the address in the parameter block. Refer to Integrated Configuration Tool on page 89.				
	Step 3: Set configuration	Set dip switch SW5-6 to OFF. Set dip switch SW5-7 to OFF.				
Note: Please refer to PXNplus CPU board on page 18 for additional information.						

Table 19. M2000PXNplus: Setting the micro address, telephone number, and initialization string (continued)

M2000PXNplus					
Application	Procedure	Dip switch settings			
Picture Perfect Direct	Step 1: Set micro address	Leave at ANY address - the application does not use this setting.			
	Step 2: Set direct	Set dip switch SW5-2 to OFF. Set dip switch SW5-5 to OFF. Jumper pins 1 and 2 on jumper J10 of the CPU board.			
	Step 3: Set baud	Set dip switches SW5-3 and SW5-4 to desired baud rate. (See Table 26, Switch 5 settings on page 44.)			
	Step 4: Set configuration	Set dip switch SW5-6 to OFF. Set dip switch SW5-7 to OFF.			
Picture Perfect Dialup	Step 1: Set micro address	Set the 4 rotary dip switches to the desired address. OR Set the 4 rotary dip switches to 9999; use the Integrated Configuration Tool to set the address in the parameter block. Refer to Integrated Configuration Tool on page 89.			
	Step 2: Set dialup	If using the on-board modem , refer to the <i>PXNplus Modem Board Installation Instructions</i> for installation instructions.			
Refer to the table below for jumper and switch settings:					
		Configuration	PXNplus J10	Integrated I/O board SW5-2SW5-5	NOTES
		Externally-powered modem (J8)	1-2	ONOFF	
		Micro-powered modem (J16)	1-2	ONON	Kit required from GE.
		On-board modem on PXNplus CPU board	2-3	ONN/A	
Step 3: Set baud		Set dip switches SW5-3 and SW5-4 to desired baud rate. (See Table 26, Switch 5 settings on page 44.)			
Step 4: Set phone number		Set phone number and modem initialization string (optional) using the Integrated Configuration Tool.			
Step 5: Set configuration		Set dip switch SW5-6 to OFF. Set dip switch SW5-7 to OFF.			
Picture Perfect Network	Step 1: Set micro address	Leave at ANY address - the application does not use this setting.			
	Step 2: Set IP address	Use the Integrated Configuration Tool to set address in the parameter block.			
	Step 3: Set configuration	Set dip switch SW5-6 to OFF. Set dip switch SW5-7 to OFF.			
Note: Please refer to PXNplus CPU board on page 18 for additional information.					

Micro/PX-2000 and Micro/PXN-2000

Telephone number

A telephone number must be entered into the micro parameter block, using one of the GE micro installation tools (running on a PC or laptop).

Direct micro without Secure Perfect application

To connect, flash, and transfer data to a micro without the Secure Perfect application code:

1. Connect directly to the micro.
2. Power down the micro and set the dip switches as follows:

SW5-1	ON
SW5-2	ON
SW5-6	ON
SW5-7	ON
3. Match the baud rate to the selected baud rate in the flash utility you are utilizing, then power on.
4. Run MCUTIL32 or MICTOOL.
5. If using MCUTIL32:
 - Select the communications port to which the micro is attached, then select the desired baud rate.
 - Select **Secure Perfect**, then **Next>**, **SMA**, **Next >**, then **Direct**.
 - Select **Finish** to poll for all micros (leave micro address fields blank). Select **Finish** to poll for micros in maintenance mode or one of the detected micros (enter the address of a detected micro in the **Old configuration** field).
 - Result:** The old configuration is shown.
 - Delete the old micro address and type in the desired new micro address in **both** old and new micro address fields.
 - Select **Finish** to update the old configuration.
 - Select **Finish** to exit **SMA**.
 - Flash the micro with the hex code provided.

If using MICTOOL (only one micro can be connected):

- Select the communications port to which the micro is attached, then select the desired baud rate.
- Exit out of the progress window (select **X** in top right corner of screen).
- From the MICTOOL menu, select **Flash/Param Setup**.
- Result:** The flash window opens and begins to search for the micro. MICTOOL must detect a micro to continue and the status must equal **Micro ready**.
- Select **Options - Parameters** to edit the micro parameter information.
- Select **Direct**.
- Type in the desired **Micro address**.

- Select **Save to Micro**.
 - Flash the micro with the hex code provided.
6. Power down the micro, then reconfigure the baud rate switches, if necessary.
 7. Connect to the host and power up.

Initialization strings

- If **NO** initialization string is specified in the micro parameter block, then the following default initialization strings will be utilized by the micro in its initialization.

Table 20. Micro modem default initialization/deinitialization strings

Application	Disposition	Baud rate	Initialization/Deinitialization
Picture Perfect	Default (Refer to Table 21 for required string.)	Initialization (Baud Rate 4800, and 9600)	AT&FE0Q0V1M1X4S0=1Y1&D0&Y0\N6&Q6&W
	Default	Deinitialization	AT&FE0Q0V1M1X4S0=1Y1&D0&Y0\N6&Q6&W
Secure Perfect (M5S2110.hex or later, Service Pack 2.1.10)	Default	Initialization/ Deinitialization (Baud Rate 2400)	AT&FEV1S0=1&C0&D0+MS=2,0,2400,2400\N0&W
	Default	Initialization/ Deinitialization (Baud Rate 4800)	AT&FEV1S0=1&C0&D0+MS=9,0,4800,4800\N0&W
	Default	Initialization/ Deinitialization (Baud Rate 9600)	AT&FEV1S0=1&C0&D0+MS=9,0,9600,9600\N0&W

- If your installation requires a **DIFFERENT** initialization string, then you must use a GE micro installation tool at a PC or laptop, to enter the desired initialization string in the parameter block.

Table 21. Required micro modem initialization strings¹

Application	Disposition	Baud rate	Initialization/Deinitialization
Picture Perfect	Required STAR Comm	(Baud Rate 4800 and 9600) Initialization Deinitialization	AT&FE0Q0V1M1X4S0=1Y1&D0&Y0\N6&Q6&W AT&FE0Q0V1M1X4S0=1Y1&D0&Y0\N6&Q6&W
	Required STAR Comm	(Baud Rate 2400) Initialization Deinitialization	ATE0Q0V1M1X4S0=1Y1+MS=2,0,2400,2400&D0&W ATE0Q0V1M1X4S0=1Y1+MS=2,0,2400,2400&D0&W

1. If no initialization/deinitialization strings are specified, the default strings are used.

- If the modem is being configured at the Picture Perfect host (micro firmware version must be 1.5.9 or later), the following must be utilized:

Table 22. Picture Perfect host modem configuration

Disposition	Baud Rate	Initialization/Deinitialization
Required (STAR Comm)	(Baud Rate 2400, 4800 and 9600) Initialization Deinitialization	AT&FE0X3V1&C1&D2S0=1S7=60\N6&Q6&W AT&FE0X3V1&C1&D2S0=1S7=60\N6&Q6&W
Default (Hayes)	(Baud Rate 2400, 4800 and 9600) Initialization Deinitialization	ATE0X3B1&C1&D2S0=1S7=18&W ATE0X3B1&C1&D2S0=1S7=18&W

Dial-up micro without Secure Perfect application

Note: Dial-up configuration not verified by UL.

To connect, flash, and transfer data to a micro without the Secure Perfect application code:

1. Connect directly to the micro.
2. Power down the micro and set the dip switches as follows:
 SW5-1 ON
 SW5-2 ON
 SW5-6 ON
 SW5-7 ON
3. Match the baud rate to the selected baud rate in the flash utility you are utilizing, then power on.
4. Run MCUTIL32 or MICTOOL.

If using MCUTIL32:

- Select the communications port to which the micro is attached, then select the desired baud rate.
- Select **Secure Perfect**, then **Next>**, **SMA**, **Next >**, **Dial-up**, **Next>**, and then **Change direct to dial-up**.
- Select **Finish** to poll for all micros (leave micro address fields blank). Select **Finish** to poll for micros in maintenance mode or one of the detected micros (enter the address of a detected micro in the **Old configuration** field).

Result: The old configuration is shown.

- Delete the old micro address and type in the desired new micro address in **both** old and new micro address fields.
- Type the micro-to-host phone number in **both** fields; both fields should have entries.
- If using SP3.1 or later, continue to the next step.

If using SP3.0, then type the initialization and deinitialization strings as follows (**both** must be entered):

Table 23. Secure Perfect first-time flash with MCUTIL32

Baud rate	Secure Perfect first-time flash initialization/deinitialization strings with MCUTIL32
9600	Initialization:AT&FEV1S0=1&C0&D0+MS=9,0,9600,9600\N0&W0 Deinitialization:AT&FEV1S0=1&C0&D0+MS=9,0,9600,9600\N0&W1
4800	Initialization:AT&FEV1S0=1&C0&D0+MS=9,0,4800,4800\N0&W0 Deinitialization:AT&FEV1S0=1&C0&D0+MS=9,0,4800,4800\N0&W1
2400	Initialization:AT&FEV1S0=1&C0&D0+MS=2,0,2400,2400\N0&W0 Deinitialization:AT&FEV1S0=1&C0&D0+MS=2,0,2400,2400\N0&W1

- Select **Finish** to update the old configuration.
- Select **Finish** to exit SMA.
- Flash the micro with the hex code provided.

If using MICTOOL (only one micro can be connected):

- Select the communications port to which the micro is attached, then select desired baud rate.
- Exit out of the progress window (select **X** in top right corner of screen).
- From the MICTOOL menu, select **Flash/Param Setup**.

Result: The flash window opens and begins to search for the micro. MICTOOL must detect a micro to continue and the status must equal *Micro ready*.

- Select **Options - Parameters** to edit the micro parameter information.
- Select **Dial-up**.
- Type in the desired **Micro address**.
- Type the micro-to-host phone number in **both** fields; both fields should have entries.
- If using SP3.1 or later, continue to the next step.

If using SP3.0, then type the initialization and deinitialization strings as follows (**both** must be entered):

Table 24. Secure Perfect first-time flash with MICTOOL

Baud rate	Secure Perfect first-time flash initialization/deinitialization strings with MICTOOL
9600	Initialization:AT&FEV1S0=1&C0&D0+MS=9,0,9600,9600\N0&W0 Deinitialization:AT&FEV1S0=1&C0&D0+MS=9,0,9600,9600\N0&W1
4800	Initialization:AT&FEV1S0=1&C0&D0+MS=9,0,4800,4800\N0&W0 Deinitialization:AT&FEV1S0=1&C0&D0+MS=9,0,4800,4800\N0&W1
2400	Initialization:AT&FEV1S0=1&C0&D0+MS=2,0,2400,2400\N0&W0 Deinitialization:AT&FEV1S0=1&C0&D0+MS=2,0,2400,2400\N0&W1

- Select **Save to Micro**.
 - Flash the micro with the hex code provided.
5. Power down the micro, then set the dip switches for dial-up communications, the baud rate, and application code.
 6. Make modem connection to the micro, power on the modem, then power on the micro.
 7. The micro will make a dial-up connection to the host.

Table 25. Micro/PX-2000 and Micro/PXN-2000: Setting the micro address, telephone number, and initialization string

Micro/PX-2000 and Micro/PXN-2000																													
Application	Procedure	Dip switch settings																											
Secure Perfect Direct	Step 1: Set micro address	Set the 4 rotary dip switches to the desired address. If using relay output points for your door strikes, prepend the address with a 9. OR Set the 4 rotary dip switches to: <ul style="list-style-type: none">• 9999 if NOT using relays• 9000 if using relays Then, use one of the GE micro installation tools (running on a PC or laptop) to set the address in the parameter block.																											
	Step 2: Set direct	Set dip switch SW5-2 to OFF. Set dip switch SW5-5 to OFF.																											
	Step 3: Set baud	Set dip switches SW5-3 and SW5-4 to desired baud rate. (See Table 26, Switch 5 settings on page 44.)																											
	Step 4: Set configuration	Set dip switch SW5-6 to OFF. Set dip switch SW5-7 to OFF.																											
Secure Perfect Dialup	Step 1: Set micro address	Set the 4 rotary dip switches to the desired address. If using relay output points for your door strikes, prepend the address with a 9. OR Set the 4 rotary dip switches to: <ul style="list-style-type: none">• 9999 if NOT using relays• 9000 if using relays Then, use one of the GE micro installation tools (running on a PC or laptop) to set the address in the parameter block.																											
	Step 2: Set dialup	Refer to the table below for jumper and switch settings:																											
		<table><tr><th rowspan="2">Configuration</th><th colspan="2">Integrated I/O board</th><th rowspan="2">NOTES</th></tr><tr><th>SW5-2</th><th>SW5-5</th></tr><tr><td colspan="4">PX CPU board using external modem</td></tr><tr><td>Externally-powered modem (Modem connected to J8 on I/O board)</td><td>ON</td><td>OFF</td><td></td></tr><tr><td>Micro-powered modem (Modem connected to J16 on I/O board)</td><td>ON</td><td>ON</td><td>Kit required from GE.</td></tr><tr><td colspan="4">PXN CPU board using the PCMCIA modem card</td></tr><tr><td>PCMCIA modem card</td><td>ON</td><td>N/A</td><td></td></tr></table>		Configuration	Integrated I/O board		NOTES	SW5-2	SW5-5	PX CPU board using external modem				Externally-powered modem (Modem connected to J8 on I/O board)	ON	OFF		Micro-powered modem (Modem connected to J16 on I/O board)	ON	ON	Kit required from GE.	PXN CPU board using the PCMCIA modem card				PCMCIA modem card	ON	N/A	
Configuration	Integrated I/O board		NOTES																										
	SW5-2	SW5-5																											
PX CPU board using external modem																													
Externally-powered modem (Modem connected to J8 on I/O board)	ON	OFF																											
Micro-powered modem (Modem connected to J16 on I/O board)	ON	ON	Kit required from GE.																										
PXN CPU board using the PCMCIA modem card																													
PCMCIA modem card	ON	N/A																											
	Step 3: Set baud	Set dip switches SW5-3 and SW5-4 to desired baud rate. (See Table 26, Switch 5 settings on page 44.)																											
	Step 4: Set phone number	Set phone number and modem initialization string (optional) using a GE micro installation tool.																											
	Step 5: Set configuration	Set dip switch SW5-6 to OFF. Set dip switch SW5-7 to OFF.																											

Table 25. Micro/PX-2000 and Micro/PXN-2000: Setting the micro address, telephone number, and initialization string (continued)

Micro/PX-2000 and Micro/PXN-2000		
Application	Procedure	Dip switch settings
Secure Perfect Network	Step 1: Set micro address	Set the 4 rotary dip switches to the desired address. If using relay output points for your door strikes, prepend the address with a 9. OR Set the 4 rotary dip switches to: <ul style="list-style-type: none"> • 9999 if NOT using relays • 9000 if using relays Then, use one of the GE micro installation tools (running on a PC or laptop) to set the address in the parameter block.
	Step 2: Set IP address	Use one of the GE micro installation tools (running on a PC or laptop) to set the IP address in the parameter block.
	Step 3: Set configuration	Set dip switch SW5-6 to OFF. Set dip switch SW5-7 to OFF.
	Note: Please refer to PXN CPU board on page 23 for additional information.	
Picture Perfect Direct	Step 1: Set micro address	Leave at ANY address - the application does not use this setting.
	Step 2: Set direct	Set dip switch SW5-2 to OFF. Set dip switch SW5-5 to OFF.
	Step 3: Set baud	Set dip switches SW5-3 and SW5-4 to desired baud rate. (See Table 26, Switch 5 settings on page 44.)
	Step 4: Set configuration	Set dip switch SW5-6 to OFF. Set dip switch SW5-7 to OFF.

Table 25. Micro/PX-2000 and Micro/PXN-2000: Setting the micro address, telephone number, and initialization string (continued)

Micro/PX-2000 and Micro/PXN-2000																													
Application	Procedure	Dip switch settings																											
Picture Perfect Dialup	Step 1: Set micro address	Set the 4 rotary dip switches to the desired address. OR Set the 4 rotary dip switches to 9999; use one of the GE micro installation tools (running on a PC or laptop) to set the address in the parameter block.																											
	Step 2: Set dialup	Refer to the table below for jumper and switch settings:																											
		<table><tr><th rowspan="2">Configuration</th><th colspan="2">Integrated I/O board</th><th rowspan="2">NOTES</th></tr><tr><th>SW5-2</th><th>SW5-5</th></tr><tr><td colspan="4">PX CPU board using external modem</td></tr><tr><td>Externally-powered modem (Modem connected to J8 on I/O board)</td><td>ON</td><td>OFF</td><td></td></tr><tr><td>Micro-powered modem (Modem connected to J16 on I/O board)</td><td>ON</td><td>ON</td><td>Kit required from GE.</td></tr><tr><td colspan="4">PXN CPU board using the PCMCIA modem card</td></tr><tr><td>PCMCIA modem card</td><td>ON</td><td>N/A</td><td></td></tr></table>		Configuration	Integrated I/O board		NOTES	SW5-2	SW5-5	PX CPU board using external modem				Externally-powered modem (Modem connected to J8 on I/O board)	ON	OFF		Micro-powered modem (Modem connected to J16 on I/O board)	ON	ON	Kit required from GE.	PXN CPU board using the PCMCIA modem card				PCMCIA modem card	ON	N/A	
	Configuration	Integrated I/O board			NOTES																								
		SW5-2	SW5-5																										
	PX CPU board using external modem																												
	Externally-powered modem (Modem connected to J8 on I/O board)	ON	OFF																										
	Micro-powered modem (Modem connected to J16 on I/O board)	ON	ON	Kit required from GE.																									
	PXN CPU board using the PCMCIA modem card																												
	PCMCIA modem card	ON	N/A																										
Step 3: Set baud	Set dip switches SW5-3 and SW5-4 to desired baud rate. (See Table 26, Switch 5 settings on page 44.)																												
Step 4: Set phone number	Set phone number and modem initialization string (optional) using one of the GE micro installation tools.																												
Step 5: Set configuration	Set dip switch SW5-6 to OFF. Set dip switch SW5-7 to OFF.																												
Picture Perfect Network	Step 1: Set micro address	Leave at ANY address - the application does not use this setting.																											
	Step 2: Set IP address	Use one of the GE micro installation tools (running on a PC or laptop) to set address in the parameter block.																											
	Step 3: Set configuration	Set dip switch SW5-6 to OFF. Set dip switch SW5-7 to OFF.																											
Note: Please refer to PXN CPU board on page 23 for additional information.																													

Switch 5 settings

Table 26. Switch 5 settings

SW5	OFF	ON				
1	F/2F Readers	Supervised Readers				
2	Communication - Select	Refer to table at right	Communication type		SW5-2	SW5-5
5	Communication - Select	Refer to table at right	Direct Short-Haul/ Leased-Line		OFF	OFF
			Dialup	using J8 on I/O board	ON	OFF
				using J16 on I/O board	ON	ON
3	Baud Rate - Select	Refer to table at right	Baud rate		SW5-3	SW5-4
4	Baud Rate - Select	Refer to table at right	2400		ON	OFF
			4800		OFF	ON
			9600		ON	ON
			19200		OFF	OFF
*For Picture Perfect direct only.						
6	Micro Mode - Select	Refer to table at right	Micro mode		SW5-6	SW5-7
7	Micro Mode - Select	Refer to table at right	Application		OFF	OFF
			Maintenance		ON	ON
			N/A		OFF	ON
			N/A		ON	OFF
8	NOT USED					

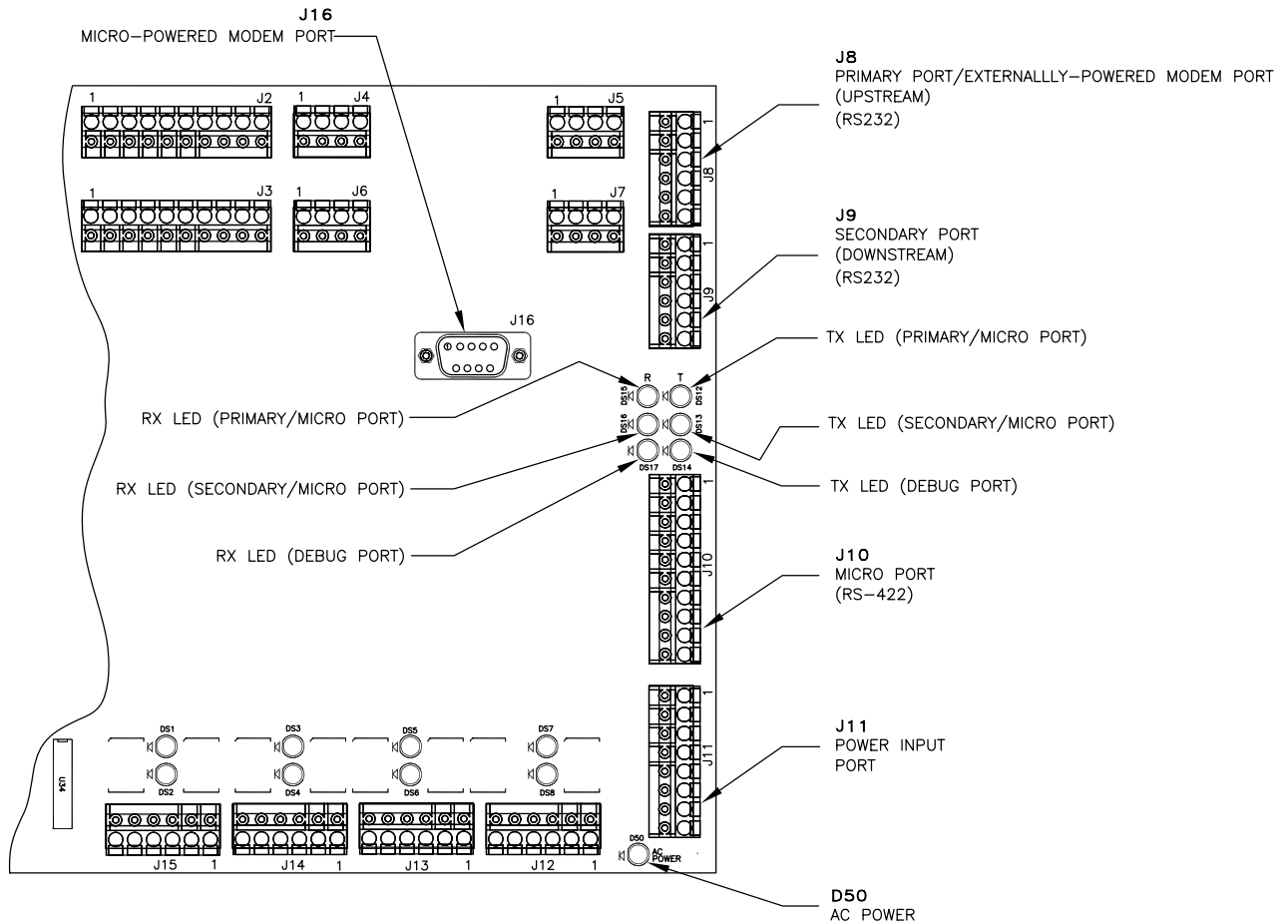
Chapter 5 Wiring power and communications

This chapter tells you how to set up power and communications, and wire the host, downstream/upstream microcontrollers, and power supply.

- Layout* 46
- Communication connectors* 47
- J16 modem power pinouts* 49
- Wiring the host computer* 51
- Wiring microcontrollers* 53
- Grounding the shield wire*..... 58
- Installing the power supply*..... 59
- Wiring the micro tamper and Integrated Input/Output board ground* .. 60

Layout

Figure 9. Layout of the Power/Communications connectors



Note: D50 LED will be at full intensity when AC power is connected. It will dim to two-third the intensity (or less) on battery power.

Communication connectors

Table 27. J8 – Primary port (RS-232)

PIN	Signal name
1	Receive (RX) Data
2	(Jumped to pin 4)
3	Transmit (TX) Data
4	Ground
5	RTS (Jumped to pin 6)
6	CTS (Jumped to pin 5)

Note: The above mentioned jumper must be installed on the RS-232 cable.

Table 28. J9 - Secondary port (RS-232)

PIN	Signal name
1	Receive (RX) Data
2	RTS (Jumped to pin 4)
3	Transmit (TX) Data
4	Ground
5	- TX 351 Time Display
6	+ TX 351 Time Display

Table 29. J10 - Micro port (RS-422)

PIN	Signal name	
1	RX+	Receive Data from upstream device (See Note *)
2	RX-	
3	RX2+	Receive secondary data from downstream micro (See Note †)
4	RX2-	
5	RX+	Receive data from downstream micro
6	RX-	
7	TX+	Transmit data to upstream device (See Note *.)
8	TX-	

Table 29. J10 - Micro port (RS-422) (continued)

PIN	Signal name	
9	TX+	Transmit Data to downstream micro.
10	TX-	

*. Device = Micro, Host or Modem

†. Receive Secondary used only with STAR RS-422 configuration

Table 30. J11- Power input port

PIN	Signal Name
1	18 VAC
2	18 VAC
3	Ground
4	+12 VDC
5	Ground
6	Micro Cabinet Tamper Input
7	Battery +
8	Battery -

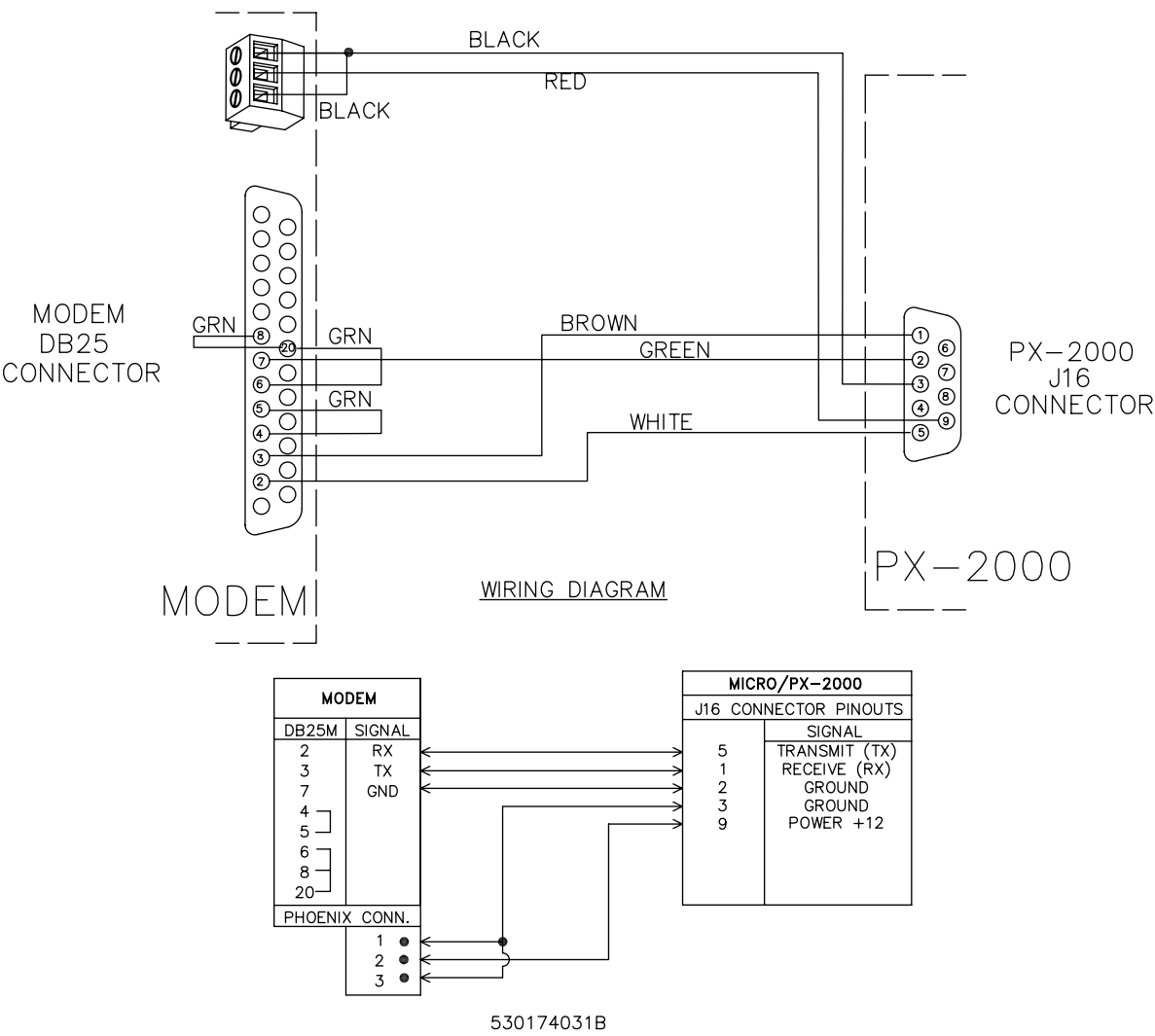
J16 modem power pinouts

The table and figure below show the modem power connection pinouts from the J16 port to the DB25 modem socket.

Table 31. J16 - Micro-powered modem port (RS-232)

PIN	Signal name
1	Optional Modem Rx
2	Ground
3	Ground
4	+5 VDC
5	Optional Modem Tx
6	Transmit (TX) Data
7	(Jumped to pin 2)
8	Receive (RX) Data
9	Optional Modem +12

Figure 10. J16 to DB25 modem power socket



Wiring the host computer

Connect the host computer or modem to Primary port J8 (RS-232) of the first microcontroller. The figures below show the connections for the various types of host connectors.

Figure 11. Host connection to first Micro/PX-2000

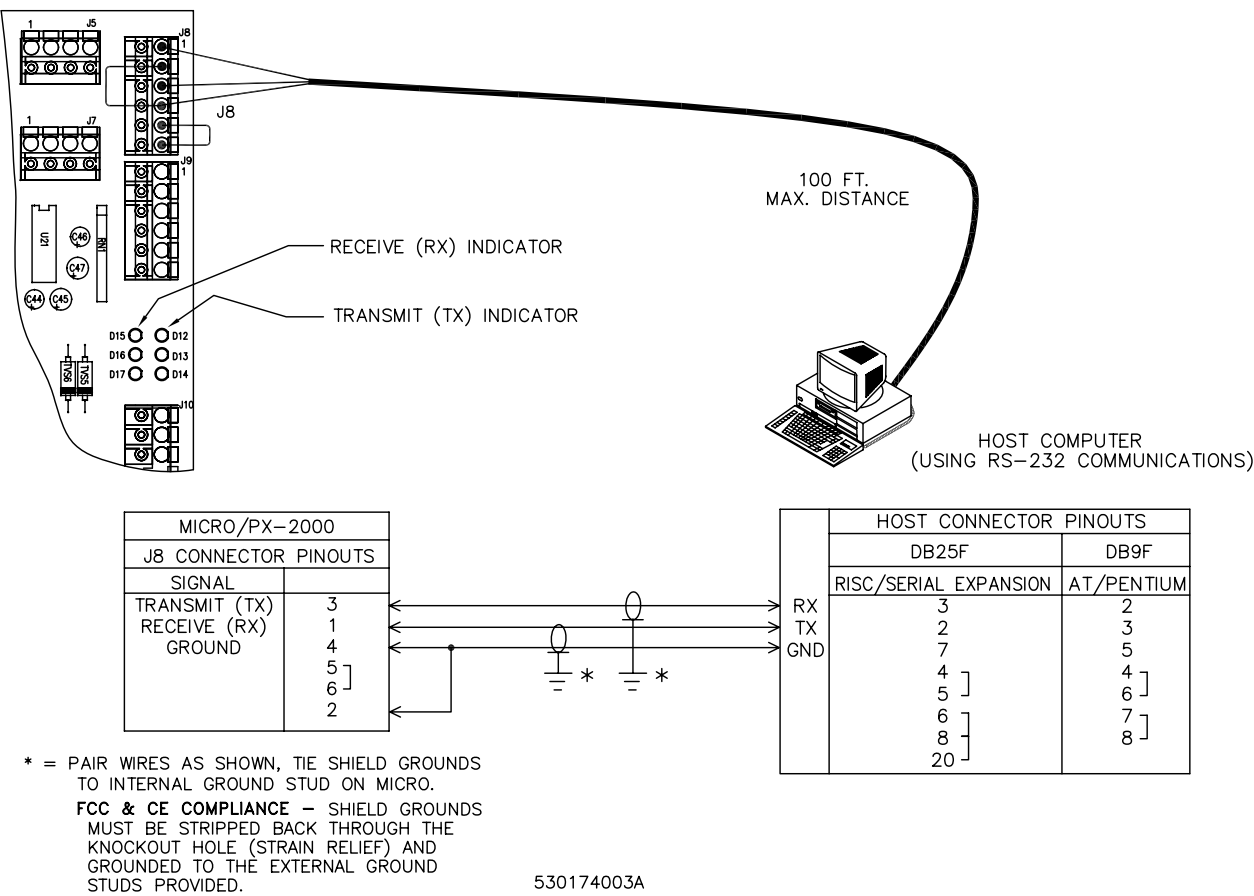
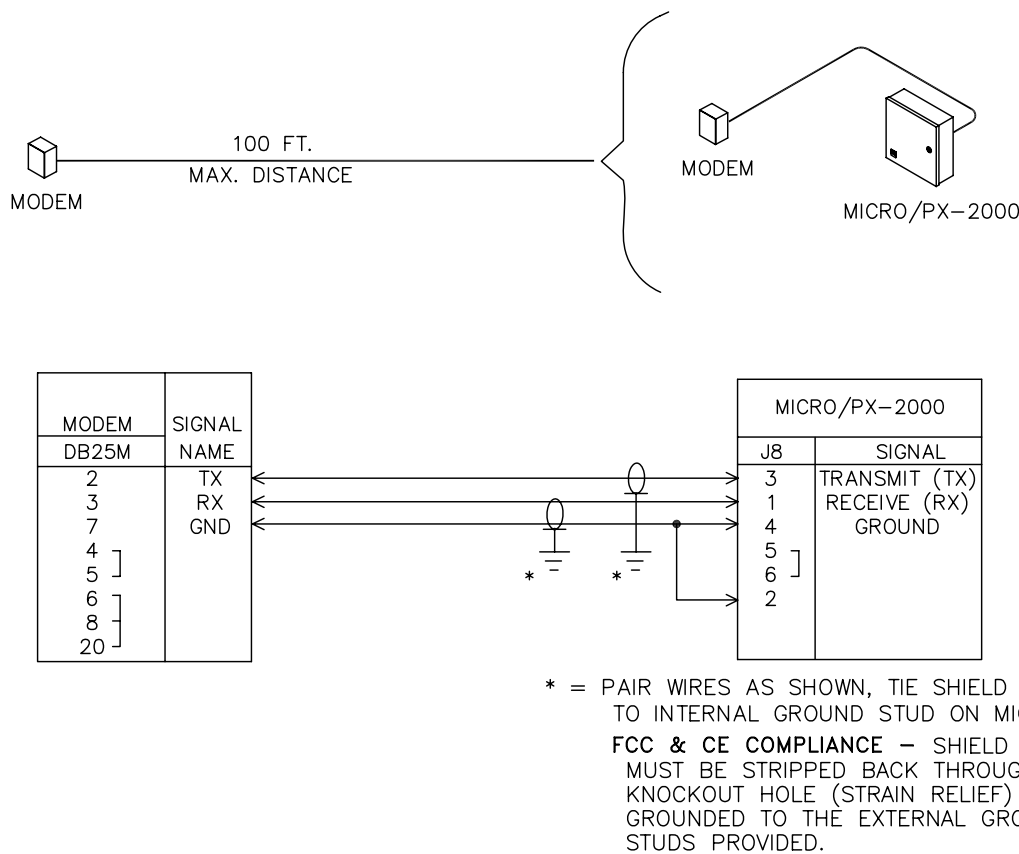


Figure 12. J8 external modem connection to Micro/PX-2000



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A cable is provided with the STAR Comm Modem Kit for the Micro/PX-2000 to be used when connecting to the J16 connector.

CAUTION: The J16 IS NOT a standard RS-232 port. DO NOT USE the J16 connector for flashing application code. External equipment (such as your laptop) may be severely damaged.

Wiring microcontrollers

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. In a daisy chain configuration, devices are connected one after the other. Signals transmitted to the devices go to the first device, and from the first to the second and so on down the line. The maximum cabling distance is 100 feet for RS-232 and 2,000 feet for RS-422. Details on how to connect the microcontrollers upstream and downstream are given in the sections below.

Note: Refer to *Chapter 1 Overview* for a description of upstream and downstream.

RS-232 connection

The RS-232 ports J8 and J9 on the Integrated I/O Board can be used to connect microcontrollers together. Connect the host, modem, or upstream microcontroller to port J8. Connect downstream microcontrollers to port J9. *Figure 13* and *Figure 14* show how to connect microcontrollers upstream and downstream using the RS-232 ports.

Figure 13. Wiring upstream (toward the host) using RS-232

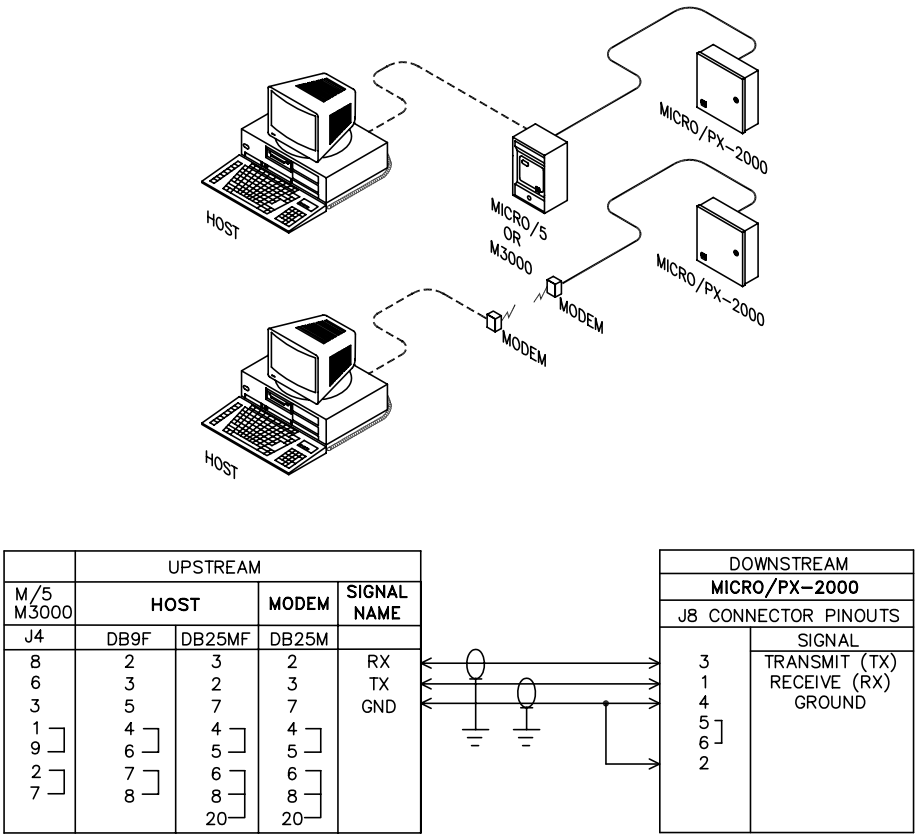
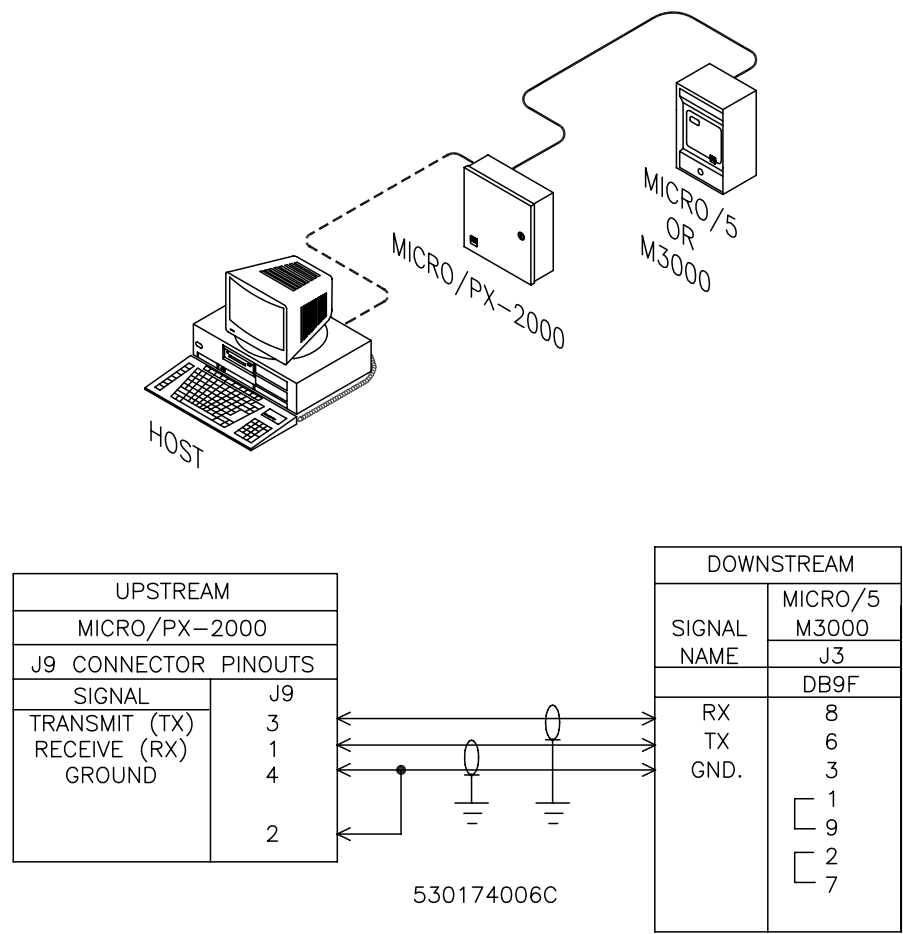


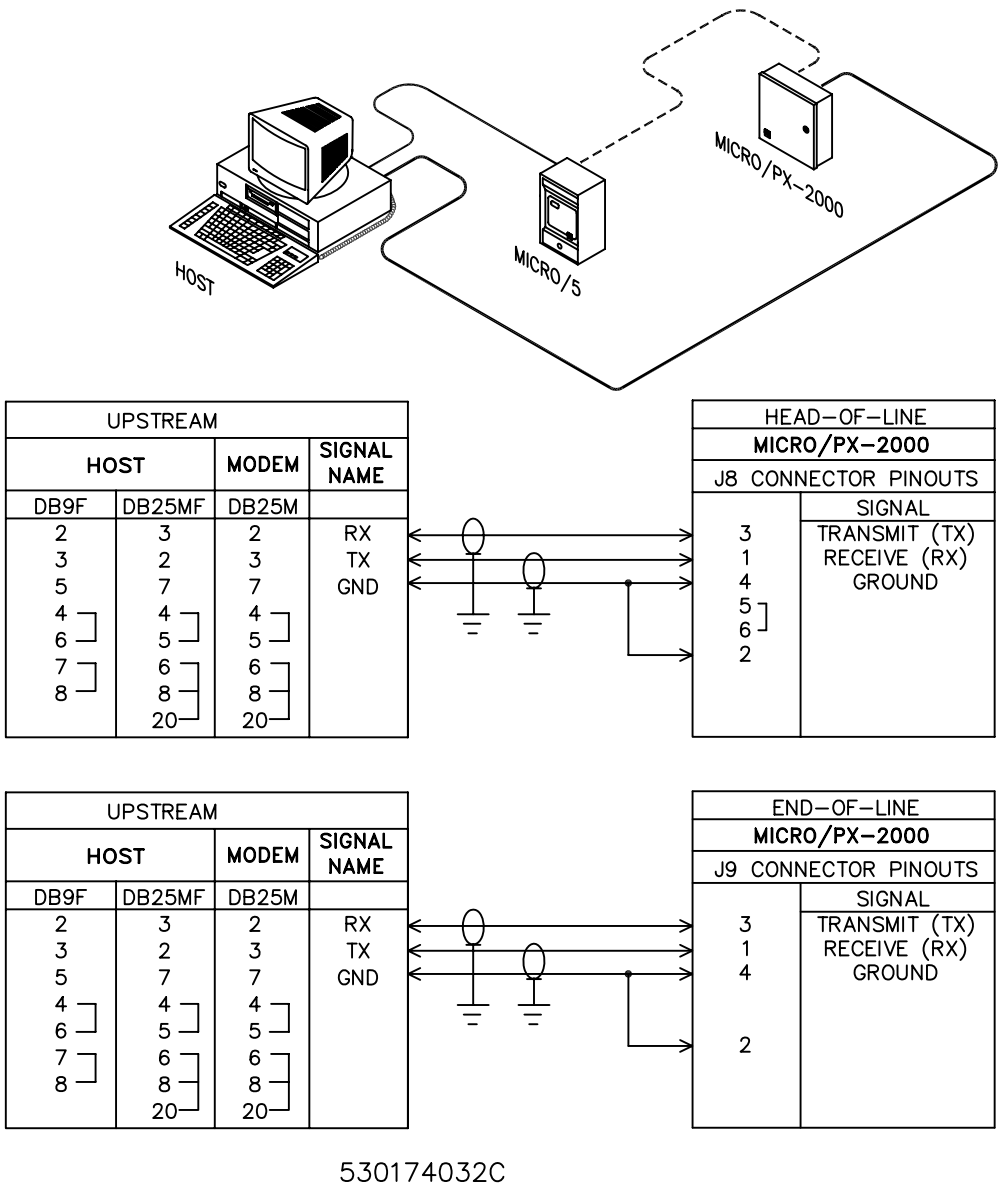
Figure 14. Wiring downstream (away from the host) using RS-232



RS-232 connection - bidirectional (Picture Perfect only)

The RS-232 ports J8 and J9 on the Integrated I/O Board can be used for bidirectional communications. Connect the host to the J8 port, head-of-line microcontroller. Connect the host to the J9, end-of-line microcontroller. *Figure 15* shows how to connect microcontrollers upstream and downstream using the RS-232 ports.

Figure 15. Wiring bidirectional using RS-232



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The RS-232 port J8 is used for a head-of-line micro. Port J9 is used for an end-of-line micro. Micro/5s can also be used with micros in a bidirectional configuration. On the Micro/5 Power/Communications board, port J3 is used for primary (upstream RS-232) and port J4 is used for secondary (downstream RS-232).

To set up the Picture Perfect host for bidirectional communication:

1. Make sure that your port is defined and available in the operating system.
2. In Picture Perfect using the **Ports** form, define a new RS-232 port.

Note: Make sure that you select the same baud rate as the setting of the head-of-line micro primary port.

3.

Then using the **Devices** form, search for the head-of-line micro and select the **Secondary Port** (the one that you just created). Continue to configure each micro in the line until you have configured the end-of-line micro.
4.

On the end-of-line micro, you must change the downstream communication from **None** to **Host**, and then click **Save**.
5.

Reset all of the micros on that line.

RS-422 connection

The RS-422 port J10 on the Integrated I/O board can be used to connect microcontrollers together. *Figure 16* and *Figure 17* show how to connect a microcontroller upstream and downstream using the RS-422 port.

Figure 16. Wiring Micro/PX-2000 to Micro/5 using RS-422

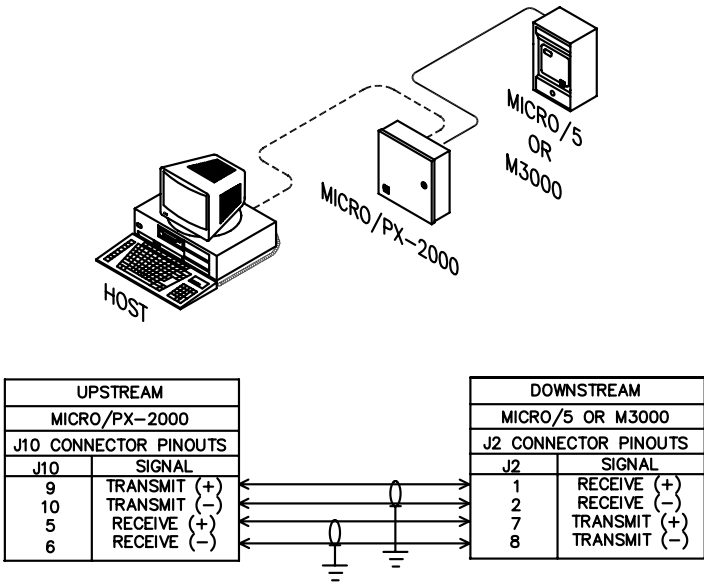


Figure 17. Wiring Micro/5 to Micro/PX-2000 using RS-422

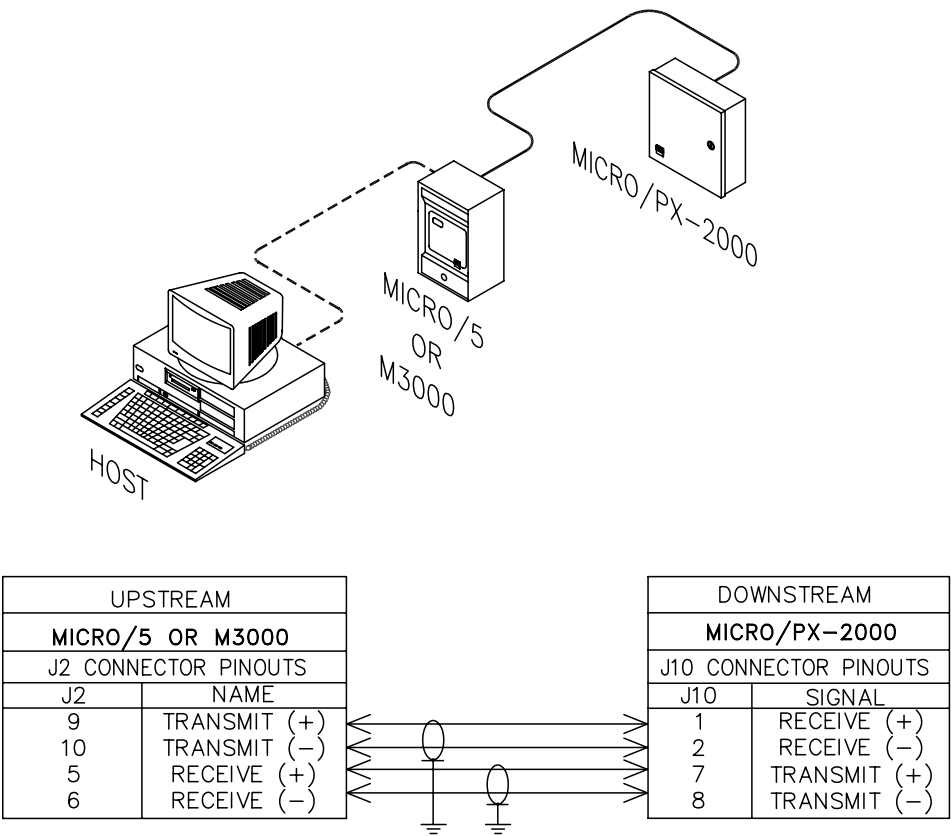
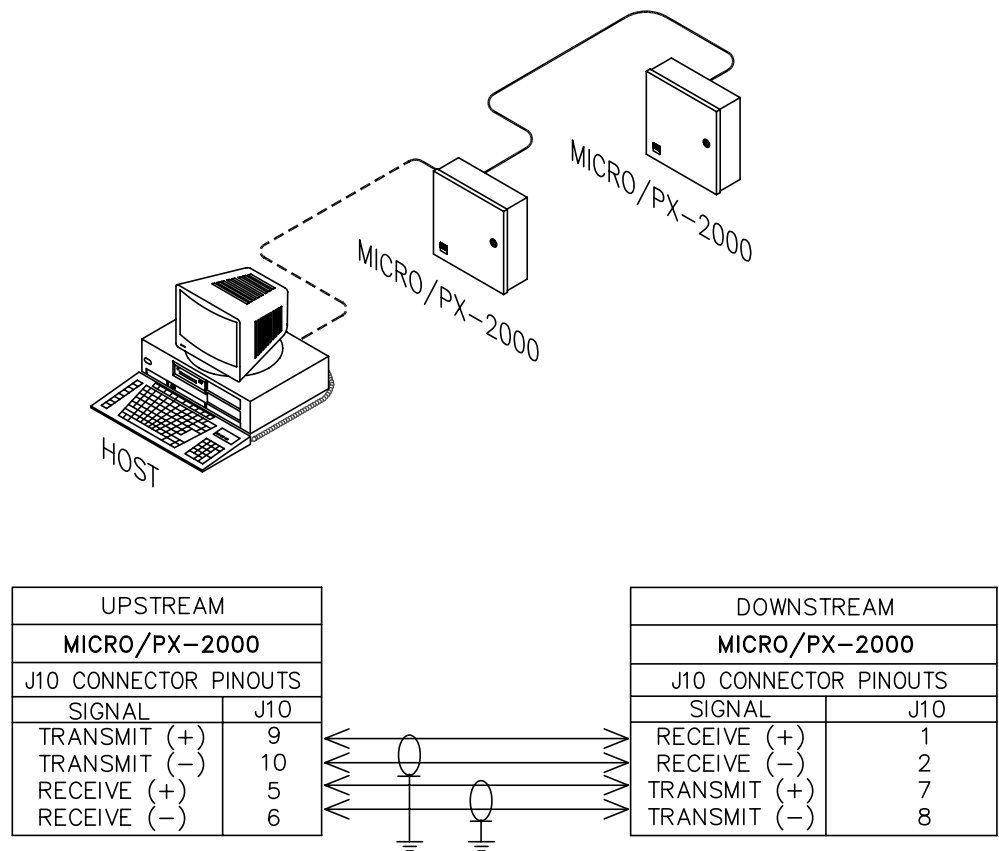


Figure 18. Wiring Micro/PX-2000 to Micro/PX-2000 using RS-422



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Grounding the shield wire

Refer to [Figure 42](#) on page 116 and [Figure 43](#) on page 117.

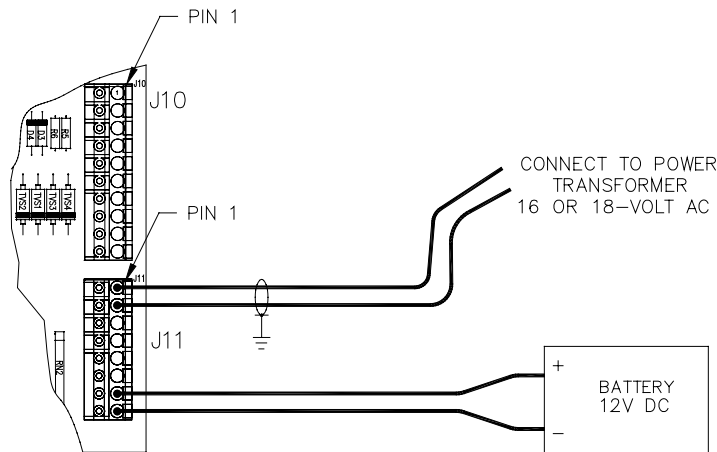
To ground the shield wire:

1. Connect the communications cable shield wire to the ground stud at the bottom left of the cabinet.
2. For host-to-micro connection, ground the shield wire at the micro. For micro-to-micro connection, ground the shield wire at the upstream micro. Do not ground both ends of a cable.

Installing the power supply

The micro power supply depends on the configuration. A transformer is included.

Figure 19. Wiring the power supply



NOTE : THE MICRO/PX-2000 ENCLOSURE MUST BE CONNECTED TO EARTH GROUND TO MEET SAFETY AND EMISSIONS REQUIREMENTS (UL, FCC, AND CE COMPLIANT).

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Backup battery

The backup battery power acts as a temporary source of power to the micro when AC power is lost. This allows the micro to continue granting or denying access rather than either locking or unlocking each door until the power is restored.

Figure 19 shows the wiring between the battery and the integrated input/output board. Room is provided in the cabinet for the battery.

Note: Battery should not be used to provide back-up power to the door strikes.

Install the cabinet ground.

- Provide a dedicated AC ground for each microcontroller.
- Find the nearest earth ground (electrical box, ground bus, etc.).
- Run 14-18 AWG wire from the microcontroller cabinet ground stud to the earth ground stud.

Note: Earth grounding (AC grounding) of the microcontroller is a critical element for proper operation. The AC power ground should be tested to ensure proper earth grounding. Using an ohmmeter, measure the resistance between the micro ground stud and a known earth ground (metal water pipe or structural steel frame of the building). If the resistance is greater than 50 ohms, it indicates poor AC ground. Proper correction must be made before installation can be completed.

Wiring the micro tamper and Integrated Input/Output board ground

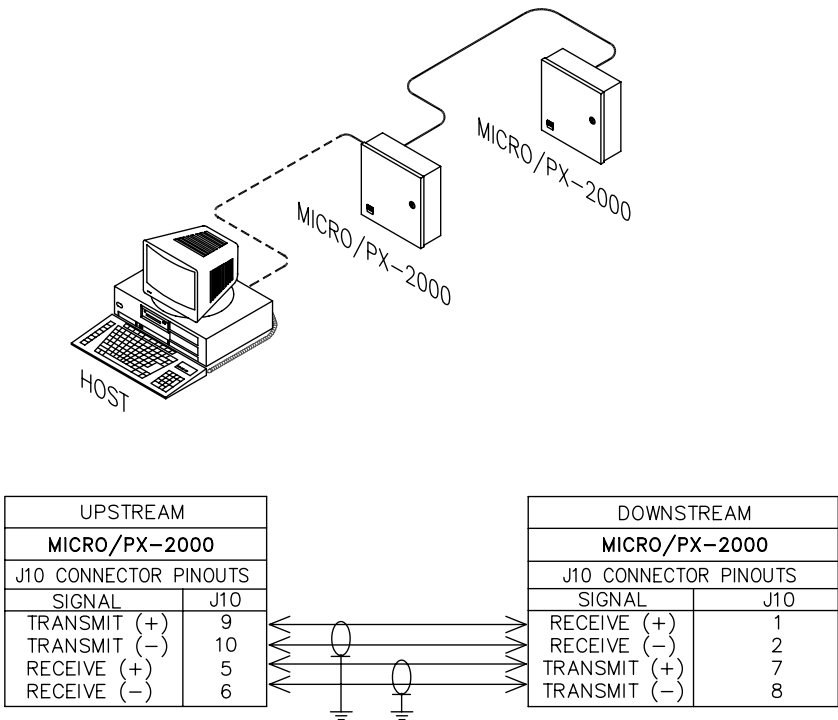
1. Connect the tamper switch to the power input connector J11 between pin 5 (Gnd) and pin 6 (Tamper Input). Use a normally closed contact only. See [Figure 20](#).

Secure Perfect: The default alarm description is in the format: **mmmm-b-pp** where **mmmm** represents the micro number to which this alarm is associated, **b** represents the board number, and **pp** represents the point or device number. For example:

- 0001-0-01 Tamper**= Tamper on micro 1, board 0, alarm 1
- 0001-0-02 Power**= Power on micro 1, board 0, alarm 2
- 0002-0-01 Tamper**= Tamper on micro 2, board 0, alarm 1
- 0002-0-02 Power**= Power on micro 2, board 0, alarm 2

Picture Perfect: Board 0 Address 1 is set for tamper and Board 0 Address 0 is set for AC power fail.

Figure 20. Wiring the micro tamper input



Chapter 6 Wiring readers

<i>Overview of the Integrated Input/Output board</i>	62
<i>Wiring the readers</i>	64
<i>Wiring the door strike</i>	66
<i>Wiring a Model 351 Time Display</i>	68

Overview of the Integrated Input/Output board

The Integrated Input/Output board supports 4 readers.

- The Integrated Input/Output board has been designed to work with 12-volt readers only.
- The Integrated Input/Output board reader section is limited to two types of reader technology: F/2F or Supervised F/2F. This election is made at the time of adding and defining your micro at the host and the switch SW1 will be positioned when installing the micros and readers.
- The Integrated Input/Output board has built-in pull-up resistors to accommodate cable lengths up to 500 feet for 12-volt readers.
- Door contacts and REX (request to exit) are to be wired through the supervised readers.
- If keypad readers are needed, use ONLY GE Supervised F/2F keypad readers.
- Each reader, DI (input) point, and Exit DI on the Integrated Input/Output board is addressed differently depending on the host system you are using. Refer to *Table 32, Integrated Input/Output device addressing* on page 62.
- The Integrated Input/Output board provides 1 digital output (reader LED) per reader port, 0.10 amps @ 12 VDC maximum per output point.

Note: Picture Perfect uses a 2RP board number and address scheme to address readers, DIs, and DOs on the 8RP board; therefore, in Picture Perfect:

Reader ports 1 and 2 are configured as Board 1, reader address 0 and 1.

Reader ports 3 and 4 are configured as Board 2, reader address 0 and 1.

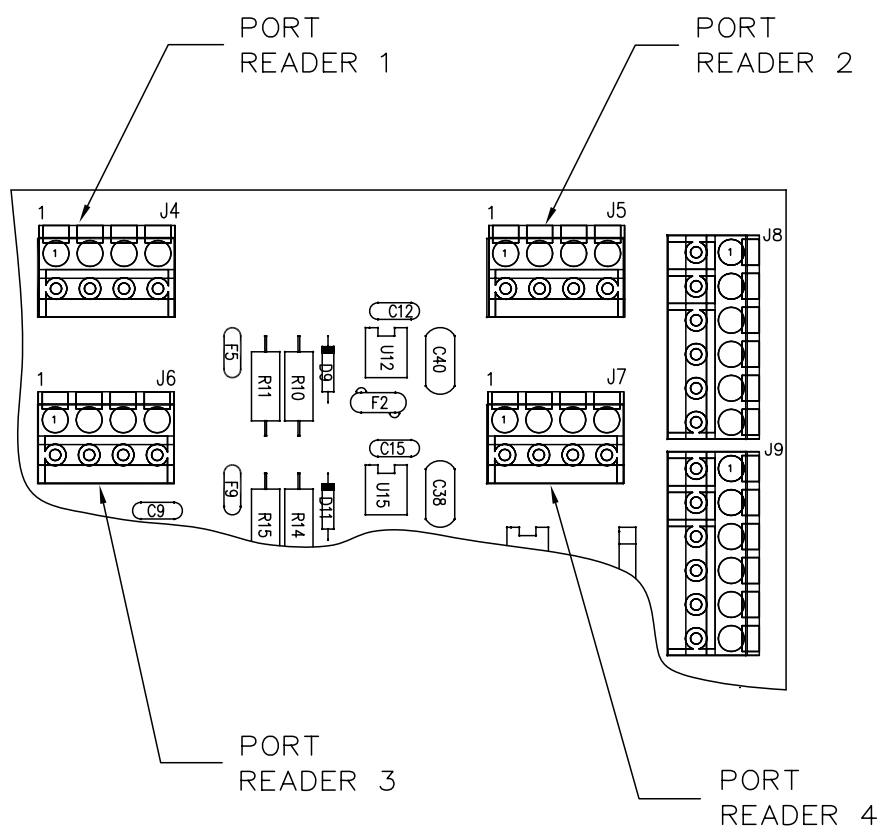
Table 32. Integrated Input/Output device addressing

Description	Connector	Secure Perfect	Picture Perfect		
			Board	Port	Description
Reader 1	J4	mmmm-1-01 Reader	1	0	mm-1-0
Door DI 1	J4	mmmm-1-01 Reader	1	0	mm-1-0
Exit DI 1	J4	Fixed	1	8	mm-1-8
Door DO 1	J4	Fixed	1	0	mm-1-0
Aux DO 1	J4	mmmm-1-01 DO	1	8	mm-1-8
Reader 2	J5	mmmm-1-02 Reader	1	1	mm-1-1
Door DI 2	J5	mmmm-1-02 Reader	1	1	mm-1-1
Exit DI 2	J5	Fixed	1	9	mm-1-9
Door DO 2	J5	Fixed	1	1	mm-1-1
Aux DO 2	J5	mmmm-1-02 DO	1	9	mm-1-9
Reader 3	J6	mmmm-1-03 Reader	2	0	mm-2-0
Door DI 3	J6	mmmm-1-03 Reader	2	0	mm-2-0
Exit DI 3	J6	Fixed	2	8	mm-2-8

Table 32. Integrated Input/Output device addressing (continued)

Description	Connector	Secure Perfect	Picture Perfect		
			Board	Port	Description
Door DO 3	J6	Fixed	2	0	mm-2-0
Aux DO 3	J6	mmmm-1-03 DO	2	8	mm-2-8
Reader 4	J7	mmmm-1-04 Reader	2	1	mm-2-1
Door DI 4	J7	mmmm-1-04 Reader	2	1	mm-2-1
Exit DI 4	J7	Fixed	2	9	mm-2-9
Door DO 4	J7	Fixed	2	1	mm-2-1
Aux DO 4	J7	mmmm-1-04 DO	2	9	mm-2-9

Figure 21. Layout of the Integrated Input/Output reader ports



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Wiring the readers

1. Mount the reader.
2. Run cable from the reader to the microcontroller. Bring each reader cable through the appropriate knockout hole in the micro cabinet. 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 top of the microcontroller cabinet.
4. Place the appropriate wires to the appropriate screw terminal on the reader port. Refer to the reader wiring diagrams in this section.



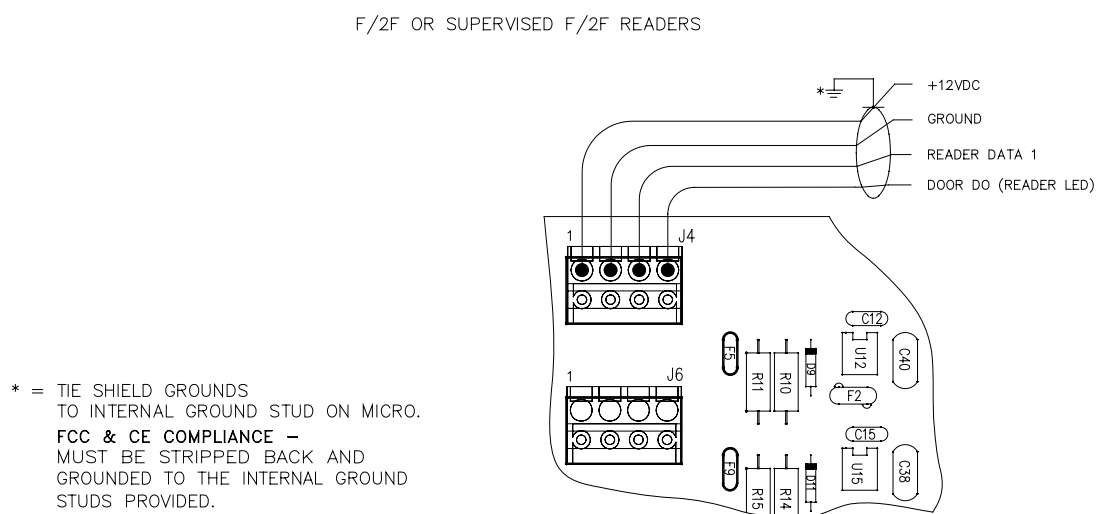
CAUTION: The Integrated Input/Output board has built-in pull-up resistors. Do not install the external pull-up resistors supplied with the GE Proximity Readers.

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

Table 33. J4/J5/J6/J7 reader connector pinouts

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

Figure 22. Wiring Integrated Input/Output to F/2F or Supervised F/2F Readers



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Wiring the door strike

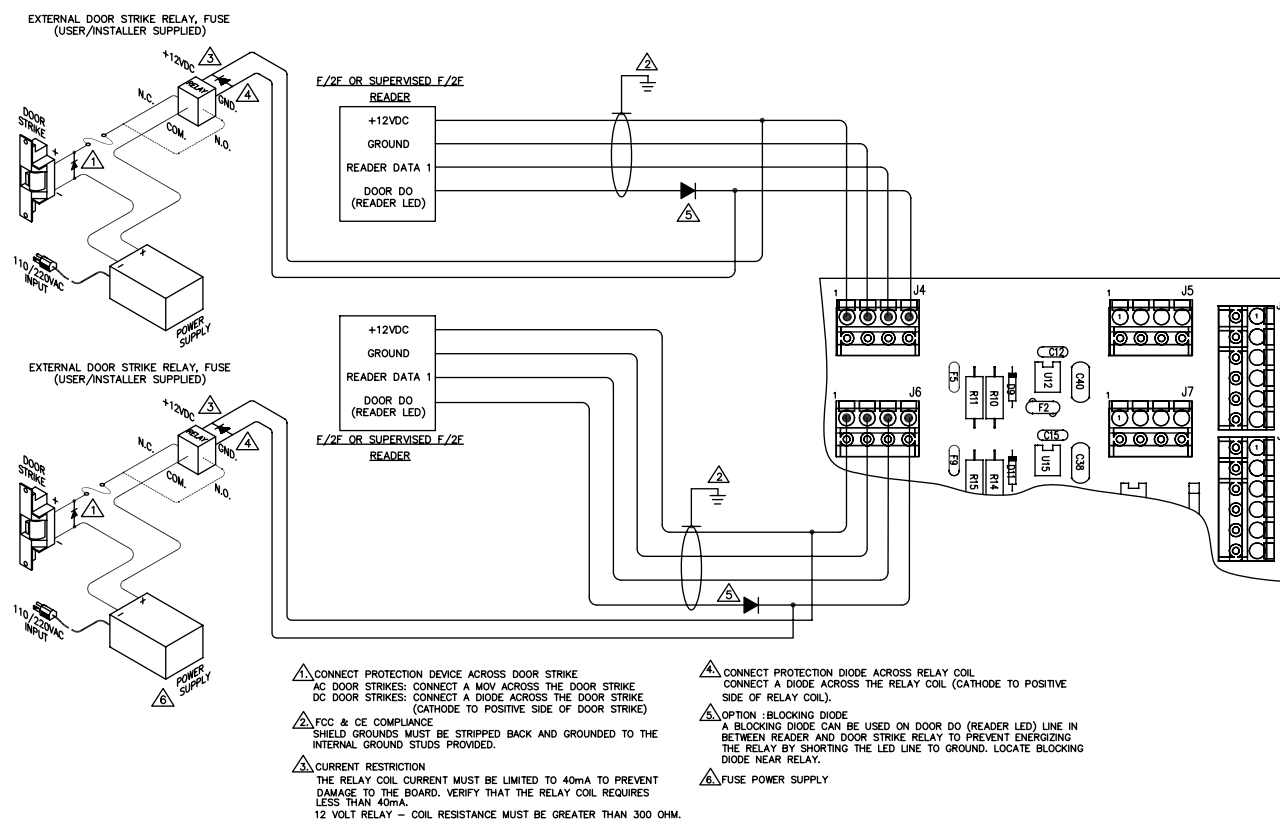
Option 1: Wiring the door strike without a micro/reader junction box

One reader LED (door DO) is dedicated to each reader. The reader LED (door DO) is used for the LED on the reader 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 +5 VDC or +12 VDC (pin 1) and door DO (pin 4).
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 1 and Note 4 in *Figure 23, Wiring Integrated Input/Output Door Strike - External Relay* on page 66.
4. Install a **blocking diode** on the door DO (Reader LED) line between the reader and the door strike relay. Use 1N4002, 1N4003, 1N4004 or equivalent diodes. See Note 5 in *Figure 23, Wiring Integrated Input/Output Door Strike - External Relay* on page 66.

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

Figure 23. Wiring Integrated Input/Output Door Strike - External Relay

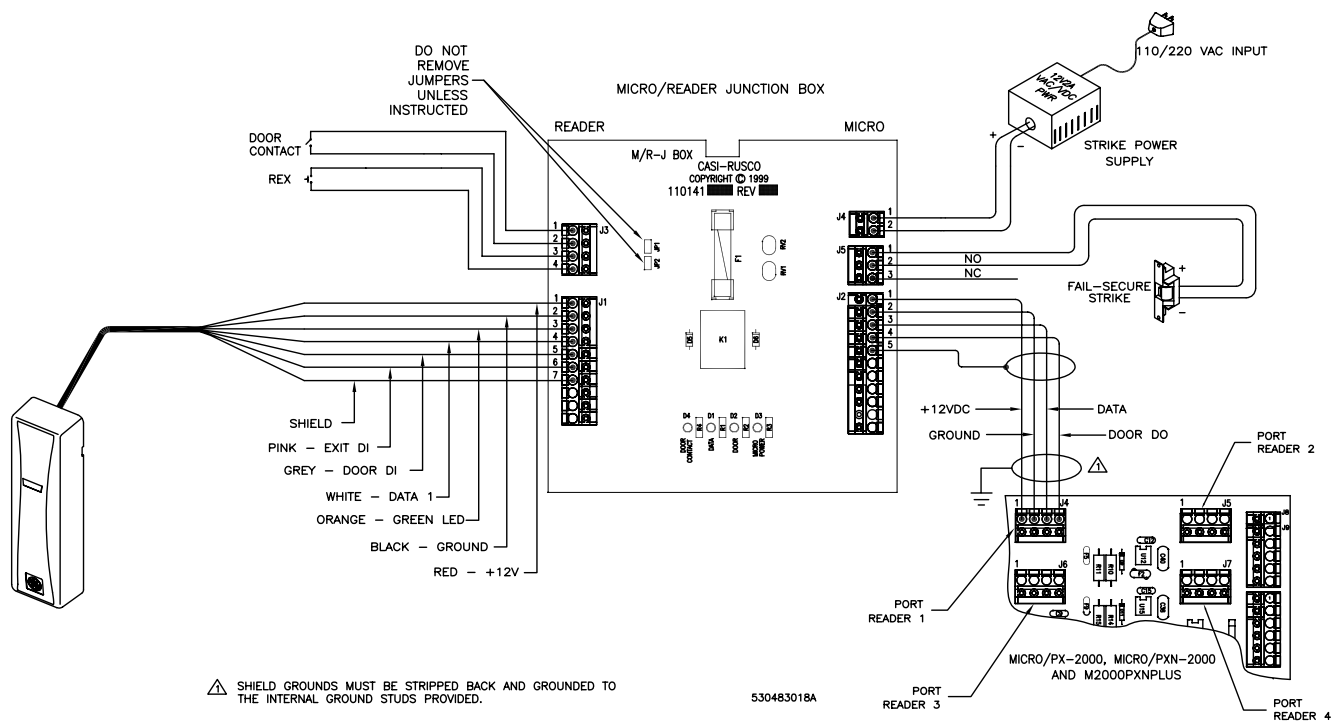


Option 2: Wiring the Door Strike using a Micro/Reader Junction Box

Follow the figure below to wire a micro/reader junction box.

Note: When using relays as dry contacts, short pins 1 and 2 on J4.

Figure 24. Overview - Transition Reader, Micro/Reader Junction Box, and Micro

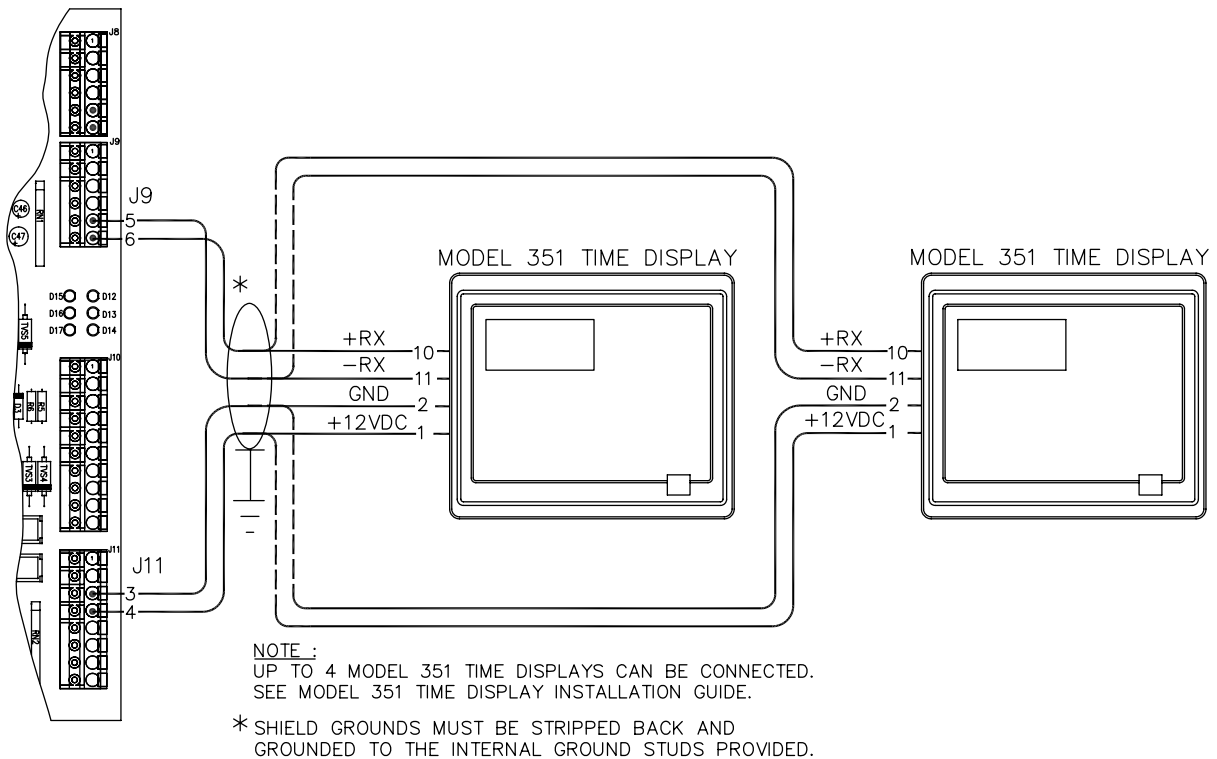


Note: The Micro/Reader Junction Box supports the Transition Series Readers, the Model 94X/97X Proximity Perfect™, and the Model 950/960 Proximity Perfect readers only.

Wiring a Model 351 Time Display

Follow the figure below to wire an optional Model 351 Time Display:

Figure 25. Overview - Wiring a Model 351 Time Display



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Chapter 7 Wiring DI and DO points

The micro supports 10 supervised digital input and 8 digital output relays. Wiring details for the DI and DO points and relays are covered here.

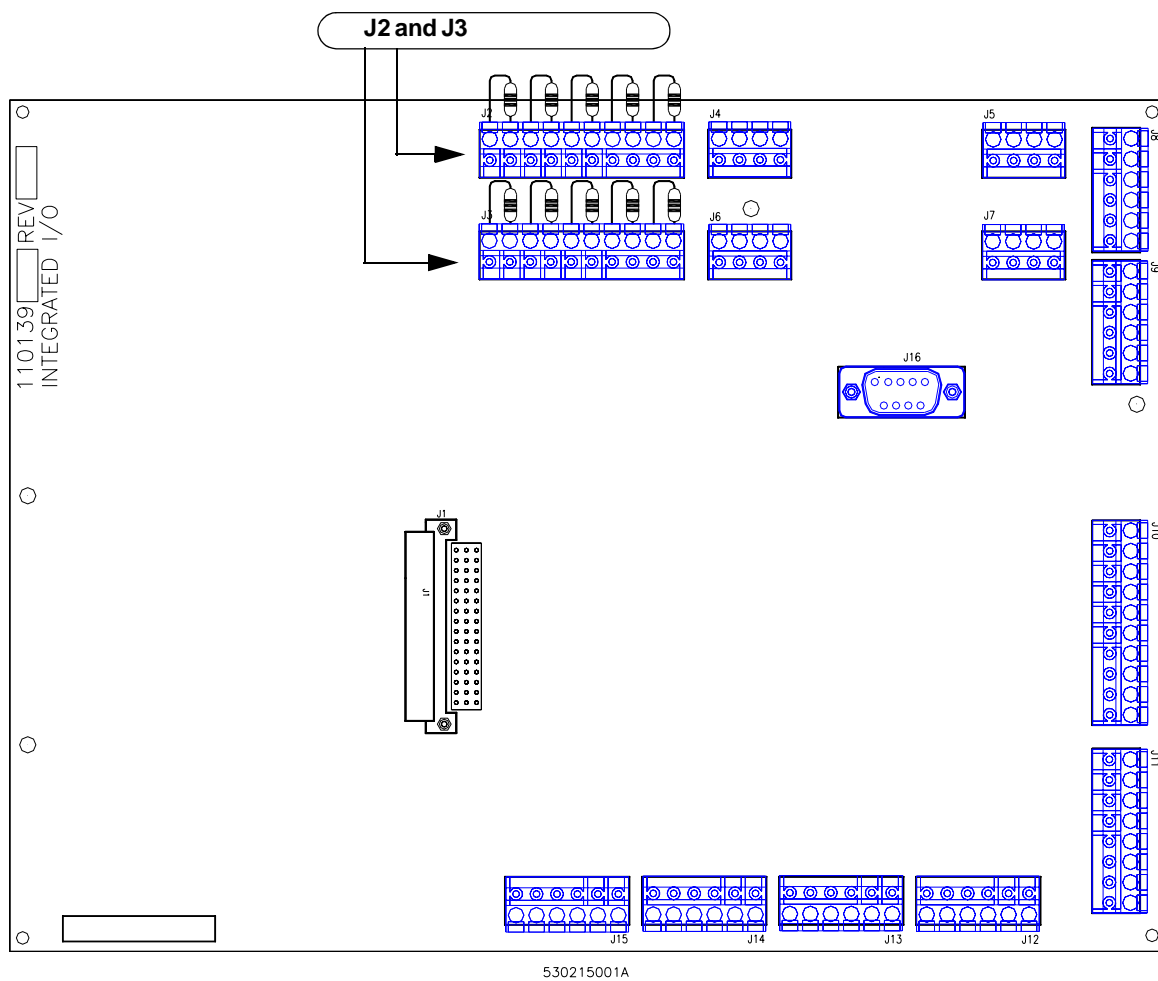
<i>DI termination</i>	70
<i>DI points</i>	71
<i>Relays</i>	74

DI termination

In order to prevent false alarms, alarm points on the Integrated Input/Output board have been terminated with a 1K ohm, 1/4-watt resistor. The resistors are attached to connectors J2 and J3, as shown in [Figure 26](#) on page 70. For normal operations, when alarm points are not used, 1K ohm resistors must be present. If the resistors are not present, the customer may experience reader malfunctions as well as false alarms.

When installing an alarm point, remove the appropriate resistor for J2 or J3 prior to terminating field wiring. Refer to the installation manual for wiring details when installing alarm points.

Figure 26. Integrated Input/Output board with resistors



DI points

The Integrated Input/Output board provides 10 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 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.

Addressing of DI points follows the format: **mm-b-pp** where **mm** represents the micro number to which this DI is associated, **b** represents the boards number for micro, and **pp** represents the point or device number.

Secure Perfect 2.1 or later: DI 1 through 10.

For example:

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

0001-1-06 = DI on micro 1, DI board 1, DI 6

Picture Perfect: Ten DI points - DIs 16 to 25.

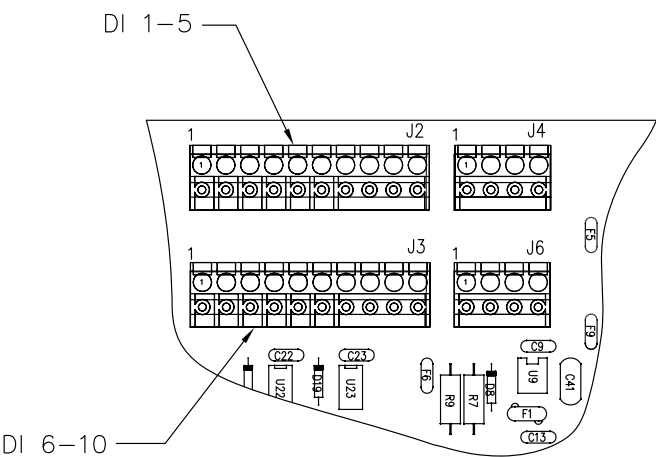
For example:

01-1-16 = DI on micro 1, DI board 1, DI 16

03-1-23 = DI on micro 3, DI board 1, DI 23

Refer to *Table 34, Supervised digital input and digital output relay addressing* on page 76 for addressing of all DI points.

Figure 27. Layout of the DI section of the Integrated Input/Output board



NOTE: PINOUTS FOR J2 AND J3

PIN #	POINT-J2	POINT-J3
1	1	6
2		
3	2	7
4		
5	3	8
6		
7	4	9
8		
9	5	10
10		

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Wiring the Digital Input devices

To wire the alarm input devices to the DI board:

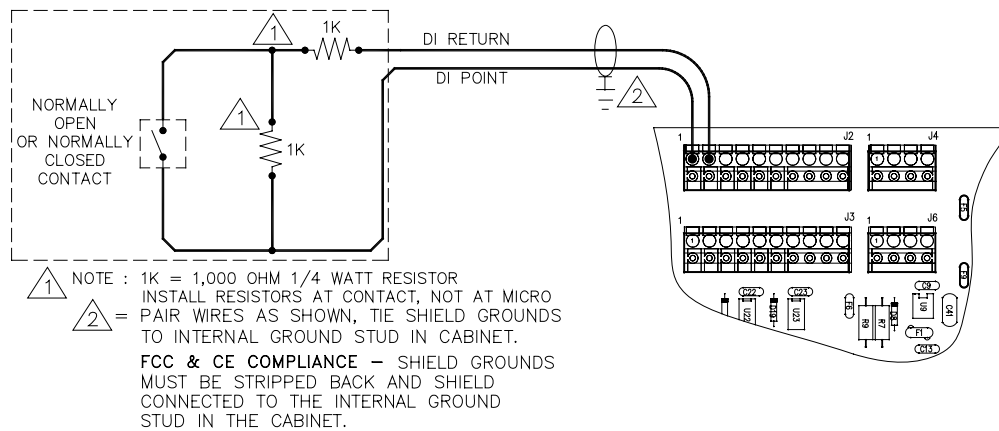
1. Follow the installation specifications for the device. Mount the device according to the manufacturer's specifications. The alarm device (door contact) should have a dry contact which can have a normally open or normally closed type switch. A normally closed contact is in its normal position when 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 cabinet grounding studs. Float the shield (with tape or shrink tubing) at the DI device end to avoid electrical noise.
4. Install the two end-of-line resistors. 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 the 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 28. Wiring a DI point



Relays

The Integrated Input/Output board has 8 relay output points rated at 2 amps @ 40V DC or 30V AC maximum per output point. All 8 relays on each J connector can be wired as normally open or normally closed.

If using Secure Perfect 4.0, you now have the option to map the DO relays to the reader ports which provides Door DO relays. The mapping is a one-to-one relationship which means DO relay 1 maps to Reader port 1 and so on. The mapping is accomplished by prepending the micro address with a 9. Refer to [Micro addressing](#) on page 32 for valid address settings.

Note the following guidelines:

- The 4 rotary dip switches **MUST** be set correctly. Refer to [Micro addressing](#) on page 32 for valid address settings.
- The maximum allowable distance from the micro Integrated Input/Output board and the output device is 1,000 feet.
- Two conductor 12- to 22-AWG shielded, stranded wire is recommended for the 8 DOR relays 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.

Addressing of DO boards follows the format: **mm-b-pp** where **mm** represents the micro number to which this DO is associated, **b** represents the boards number (always **1** for the micro), and **pp** represents the point or device number.

Secure Perfect 2.1 or later:

Micro can have DO 1 through 8.

For example:

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

0001-1-08 = DO on micro 1, DO board 1, DO 8

Picture Perfect: Eight DO points - DOs 16 to 23.

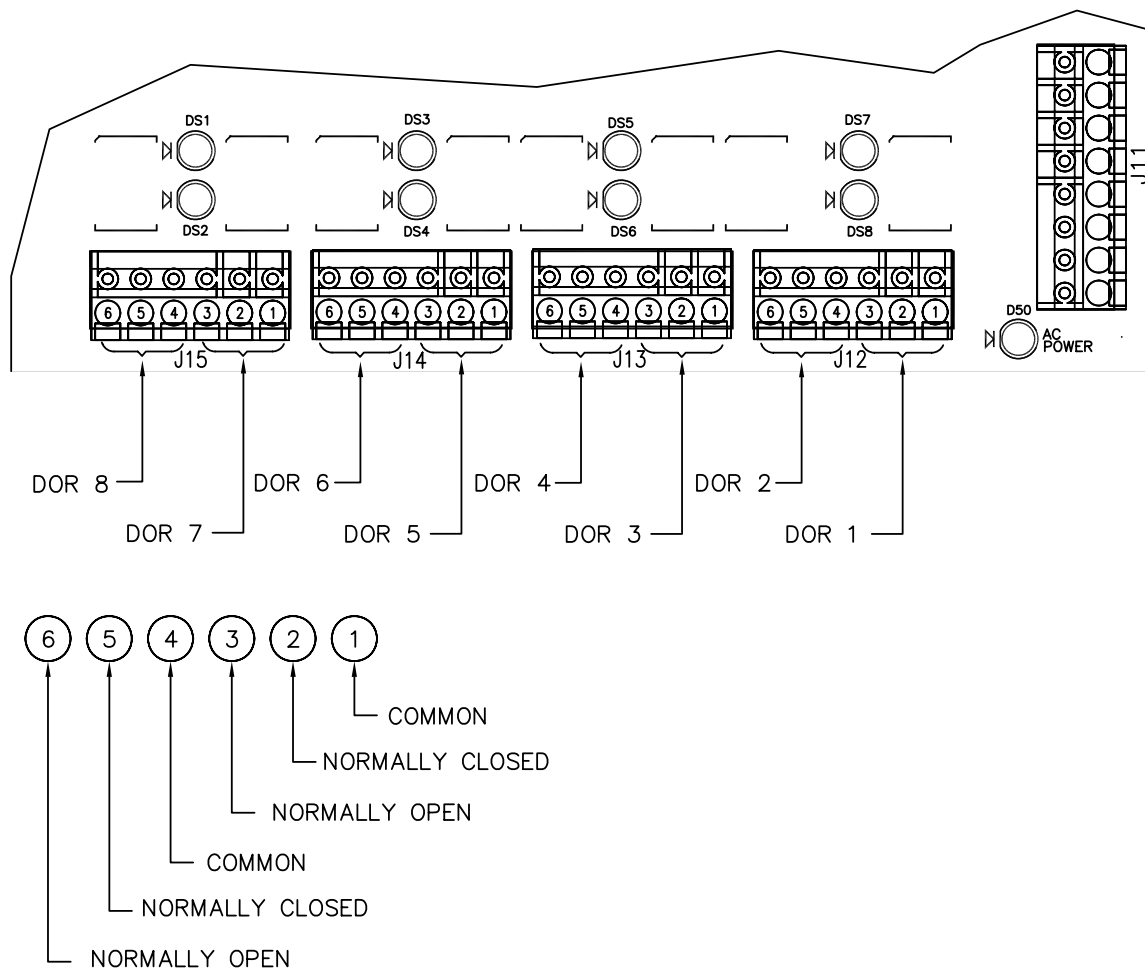
For example:

01-1-16 = DO on micro 1, DO board 1, DO 16

01-1-23 = DO on micro 1, DO board 1, DO 23

Refer to [Table 34, Supervised digital input and digital output relay addressing](#) on page 76 for addressing of all DO points.

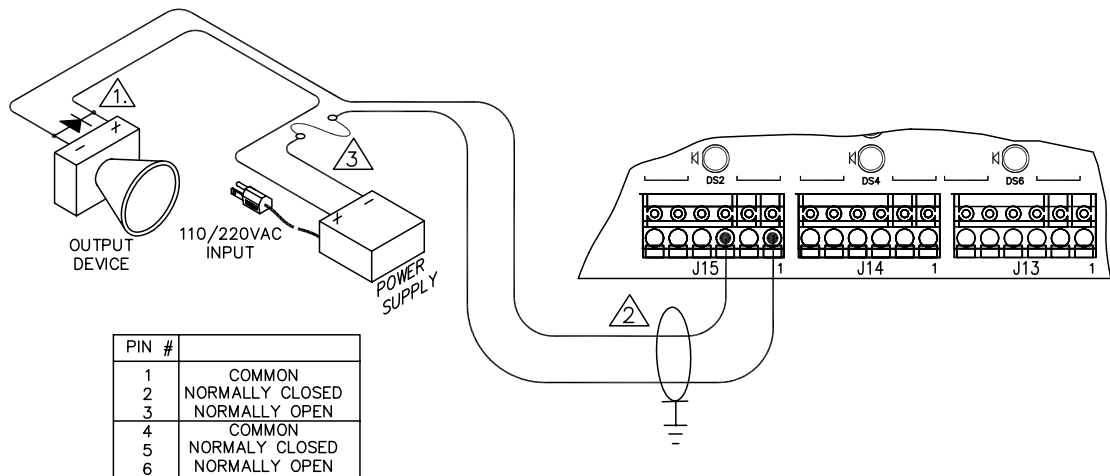
Figure 29. Layout of the 8 DOR connectors



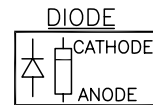
NOTE: PIN 1 POSITION IS TO THE RIGHT OF CONNECTOR.

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Figure 30. Wiring an output device to the 8 DOR board



1. CONNECT PROTECTION DEVICE ACROSS OUTPUT DEVICE
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 INTERNAL GROUND STUDS PROVIDED.
3. CURRENT RESTRICTION
CURRENT THROUGH THE RELAY CONTACTS MUST BE LIMITED TO LESS THAN 2 AMPS AT 40 VOLTS DC OR 30 VOLTS AC MAXIMUM TO PREVENT DAMAGE TO THE BOARD. THE CURRENT LIMITING MAY BE ACHIEVED EITHER BY USING A POWER SUPPLY THAT HAS BUILT IN CURRENT LIMITING OR BY WIRING IN AN EXTERNAL FUSE AS SHOWN.



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Table 34. Supervised digital input and digital output relay addressing

Point number	Connector number	Pin number	Secure Perfect	Picture Perfect
			Naming convention	Naming convention
DI 1	J2	1 2	mmmm-1-01 DI	mm-1-16
DI 2	J2	3 4	mmmm-1-02 DI	mm-1-17
DI 3	J2	5 6	mmmm-1-03 DI	mm-1-18
DI 4	J2	7 8	mmmm-1-04 DI	mm-1-19

Table 34. Supervised digital input and digital output relay addressing (continued)

Point number	Connector number	Pin number	Secure Perfect	Picture Perfect
			Naming convention	Naming convention
DI 5	J2	9 10	<i>mm-1-05 DI</i>	<i>mm-1-20</i>
DI 6	J3	1 2	<i>mm-1-06 DI</i>	<i>mm-1-21</i>
DI 7	J3	3 4	<i>mm-1-07 DI</i>	<i>mm-1-22</i>
DI 8	J3	5 6	<i>mm-1-08 DI</i>	<i>mm-1-23</i>
DI 9	J3	7 8	<i>mm-1-09 DI</i>	<i>mm-1-24</i>
DI 10	J3	9 10	<i>mm-1-10 DI</i>	<i>mm-1-25</i>
DO 1	J12	1 Common 2 Normally Closed 3 Normally Open	<i>mm-1-01 DO</i>	<i>mm-1-16</i>
DO 2	J12	4 Common 5 Normally Closed 6 Normally Open	<i>mm-1-02 DO</i>	<i>mm-1-17</i>
DO 3	J13	1 Common 2 Normally Closed 3 Normally Open	<i>mm-1-03 DO</i>	<i>mm-1-18</i>
DO 4	J13	4 Common 5 Normally Closed 6 Normally Open	<i>mm-1-04 DO</i>	<i>mm-1-19</i>
DO 5	J14	1 Common 2 Normally Closed 3 Normally Open	<i>mm-1-05 DO</i>	<i>mm-1-20</i>
DO 6	J14	4 Common 5 Normally Closed 6 Normally Open	<i>mm-1-06 DO</i>	<i>mm-1-21</i>
DO 7	J15	1 Common 2 Normally Closed 3 Normally Open	<i>mm-1-07 DO</i>	<i>mm-1-22</i>
DO 8	J15	4 Common 5 Normally Closed 6 Normally Open	<i>mm-1-08 DO</i>	<i>mm-1-23</i>

Chapter 8 Micro firmware tools

The Micro contains a Flash EEPROM (Electrically Erasable Programmable Read Only Memory). A personality (that is, application code) must be downloaded at the time of installation. This same procedure is used to upgrade the EEPROM when necessary. The procedures are outlined in this chapter.

- Micro firmware installation tools overview* 80
- MICTOOL-FLASH* 81
- Picture Perfect Flash Utility*..... 84
- Integrated Configuration Tool* 89

Micro firmware installation tools overview

Note: The Micro/PX-2000 and the Micro/PXN-2000 are shipped with no personality installed. Therefore, when the board receives power, it will stay in maintenance mode for 30 seconds, reset and then enter maintenance mode again. Downloading the firmware should be started immediately after the reset to prevent time-out errors.

You may use one of the following GE micro firmware installation tools in order to flash application code to a micro:

1. MICTOOL-FLASH (Win95, Win98, and Win2000)
2. Picture Perfect Flash Utility (AIX and UnixWare)
3. Integrated Configuration Tool (PXNplus CPU board only!)

Each of these methods will be discussed in more detail on the following pages.

Note: The Micro/PX-2000 and Micro/PXN-2000 will appear in micro picklists as M/5PX and M/5PXN when utilizing these tools.

MICTOOL-FLASH

Downloading with MICTOOL-FLASH

The MICTOOL-FLASH utility for use with Win 95, Win98, and Win2000 is distributed on CD-ROM (for FREE) and available on the GE Web site for download.

Features:

- Flashes all GE micros (Secure Perfect **and** Picture Perfect firmware)
- Edits micro parameter settings such as phone numbers
- Checks syntax of parameter settings (that is, dial-up micro must have an address)
- Provides online help

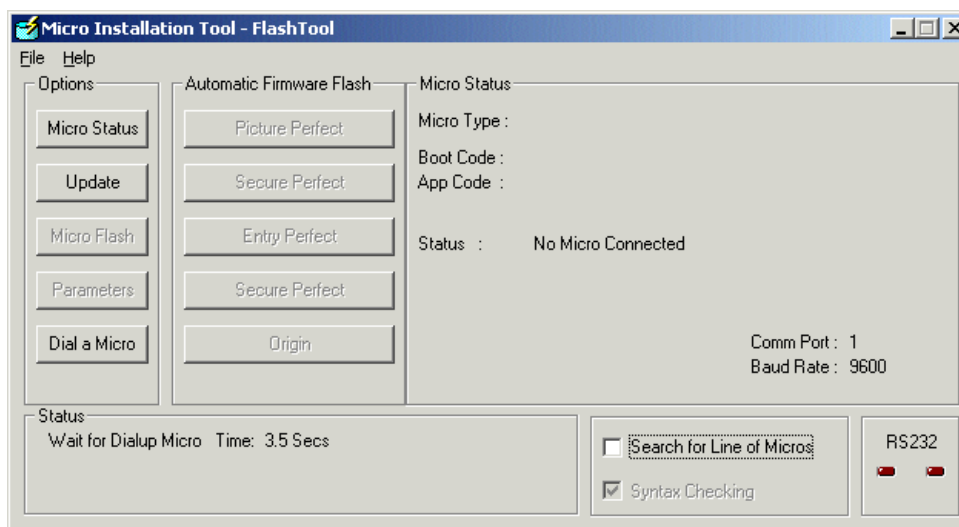
Limitations:

- Cannot flash downstream micros

The FLASH utility is part of the MICTOOL program; thus, it can be accessed from the MICTOOL main screen or a shortcut can be made to the **flash.exe** if you want to access the flash utility directly.

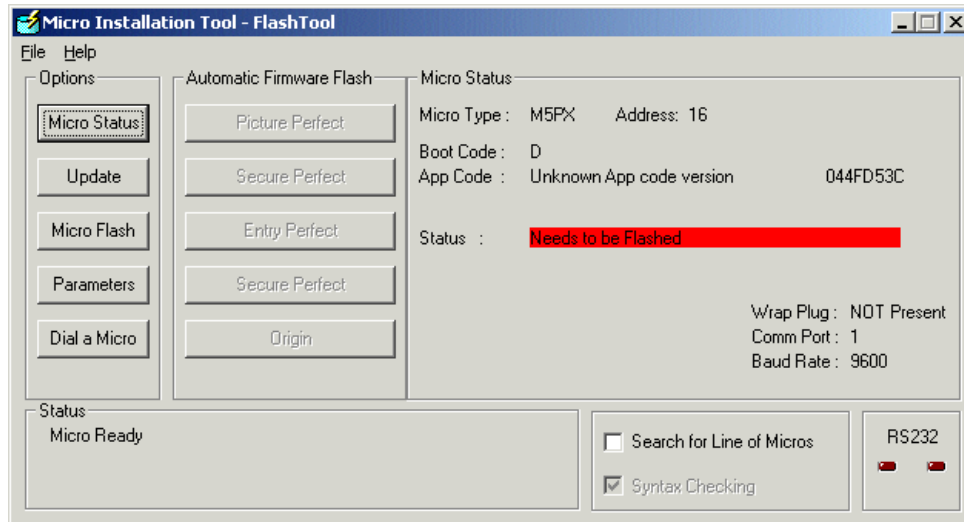
The utility automatically searches for micros and will usually find a micro within 30 seconds. If no micro is connected, the screen appears as follows:

Figure 31. Micro Installation Tool - Flash Screen



When a micro is connected and found, the screen will display the **Micro Type** and firmware information. Review the following display window.

Figure 32. Micro Status



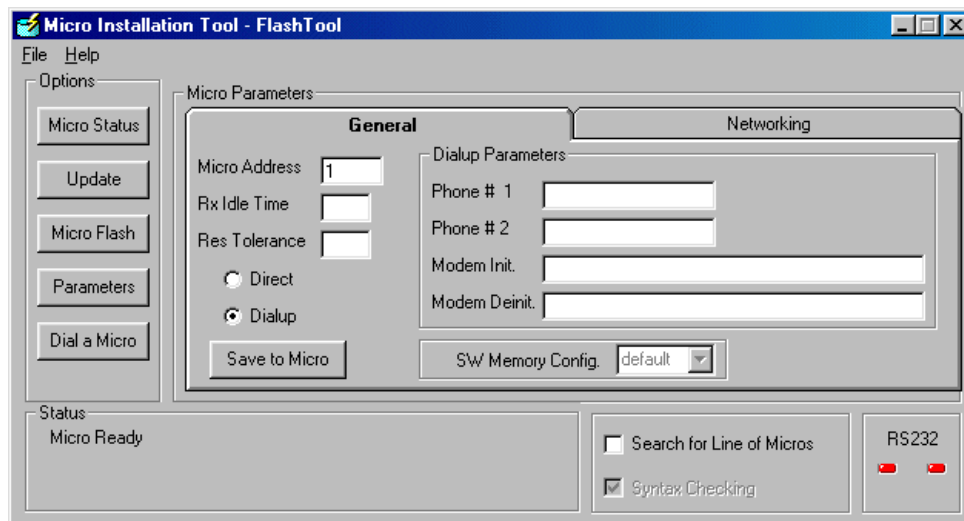
A micro can be flashed with application firmware in two ways:

1. The easiest way is to use **Automatic Firmware Flash** in the middle of the screen. Press the button that corresponds to the firmware you want. (The buttons will display the latest firmware release on your PC.)
2. Alternatively, you may press **Micro Flash** and select firmware from a pick list.

Updating the micro parameter block with MICTOOL

When a micro has been detected by the program, the **Parameters** button is enabled. Press the **Parameters** button and the program will read the parameters from the micro and present them on the screen. An example is shown below.

Figure 33. Example of Micro Parameters



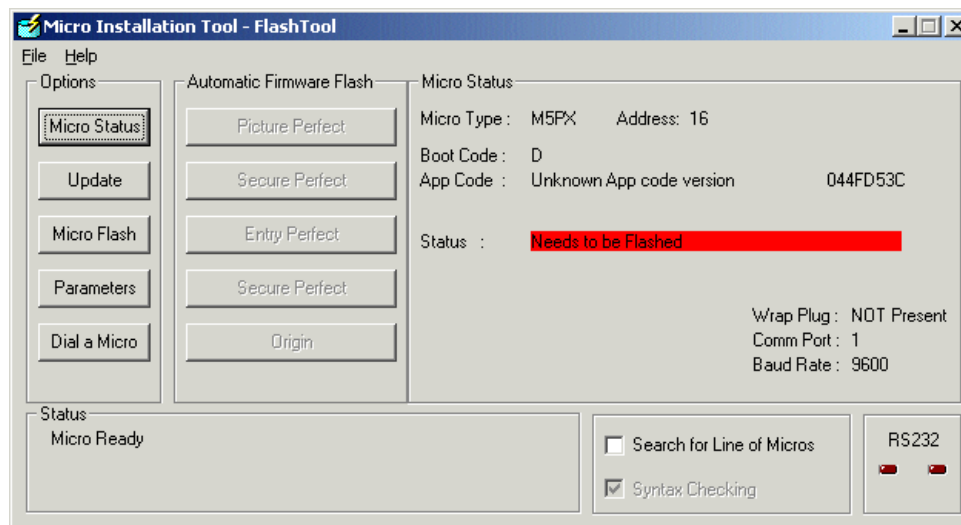
After you change any parameter, press **Save to Micro** to save the new settings in the micro.

Erasing the Application Firmware with MICTOOL

Individual circumstances may require the erasure of the application firmware. The following procedures indicate the process.

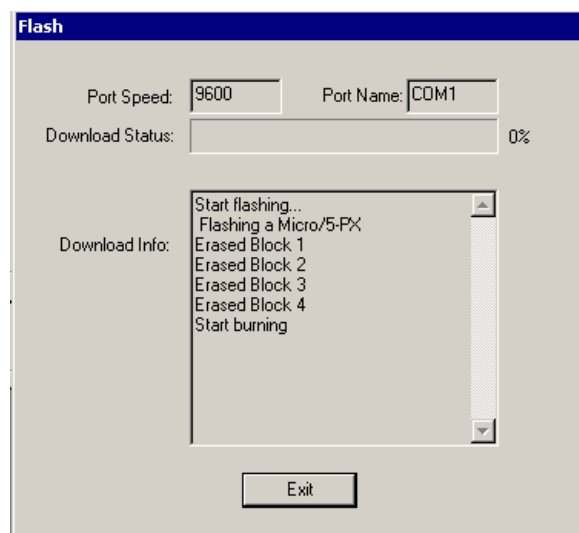
- When a micro is connected and found, the screen will display the **Micro Type** and firmware information.

Figure 34. Micro Status



- Under **Automatic Firmware Flash** in the middle of the screen, press any button.
- During the flash process, the screen will appear as follows:

Figure 35. Example of Flash Process



- Wait approximately five seconds (the **Download Status** will indicate 1% and the last item in the **Download Info** block must be **Start burning**), then press **Exit**.

The application code is now erased.

Picture Perfect Flash Utility

Downloading with Picture Perfect Flash Utility (AIX and UnixWare)

Features:

- Flashes Micro/PX-2000, Micro/PXN-2000, Micro/5-PXN, Micro/5-PX, MicroProx, and Micro/5-P micros
- Flashes downstream micros

Limitations:

- Cannot edit micro parameter settings such as phone numbers or a micro IP address (Only the Micro/PXN has this feature. Refer to *Network micro parameter block configuration (PXN only)* on page 112.)
- Does not provide online help

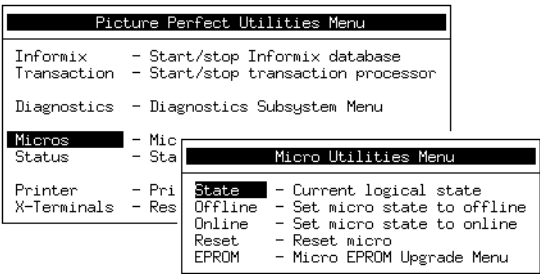
This download procedure can be used only with Picture Perfect Version 1.3 host systems or later. The flash download program to upgrade the EPROMs of a Micro/5 is accessed through the **CMENU** utility of Picture Perfect or through the flash utility using the command line.

Using the CMENU Utility

You must be logged on as **root** at the console in order to run this program. Press **(F1)** for onscreen Help.

1. Log in as **root** at the console.
2. To display the *Utilities Menu*, type **cmenu** at the command-line prompt and press **(Enter)**.
3. From the *Utilities Menu*, select **Micros** to display the *Micro Utilities Menu*.

Figure 36. Utilities Menu and Micro Utilities Menu



4. From the *Micro Utilities Menu*, select **EPROM** to display the *Micro Flash Eprom Upgrade* menu. Refer to *Micro Flash EPROM Upgrade* on page 85.

Using the FLASH Utility

You must be logged on as **root** at the console in order to run this program. Press **F1** for onscreen Help.

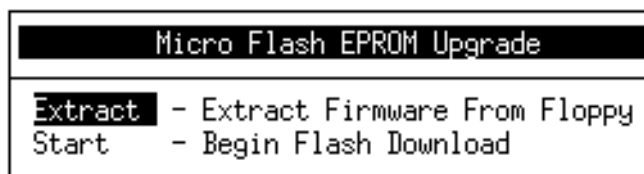
To use the FLASH Utility:

1. Log in as **root** at the console.
2. Type **flash** at the command-line prompt and press **Enter** to display the **Micro Flash EPROM Upgrade** menu. Refer to *Micro Flash EPROM Upgrade* on page 85.

Micro Flash EPROM Upgrade

This menu enables flash downloading to Micro/5 EPROMs. The **Extract** option transfers new EPROM data from a floppy disk to the hard drive. The **Start** option allows the new EPROM files to be flash-downloaded to any or all of the Micro/5s on the system, regardless of whether the micros are dial-up, direct, or network.

Figure 37. Micro Flash EPROM Upgrade Menu



Extract

To extract the upgrade data from the floppy disk:

1. Insert the firmware-upgrade floppy into the disk drive.
2. From the **Micro Flash EPROM Upgrade** menu, select **Extract**.
3. The floppy-drive device path will be displayed. Press **Enter** to start the extract. The new EPROM information will be transferred to the hard drive.
4. When the extract is complete, a summary of the information appears, similar to the following:

```
Floppy drive      /dev/fd0

Directory...../cas/flash/m5p140
Version Info.....M/5P Ver 1.40 Direct
Optimized.....454784 bytes
Non-Optimized.....620099 bytes
```

Note: If this is for UnixWare, the floppy drive field will display A:.

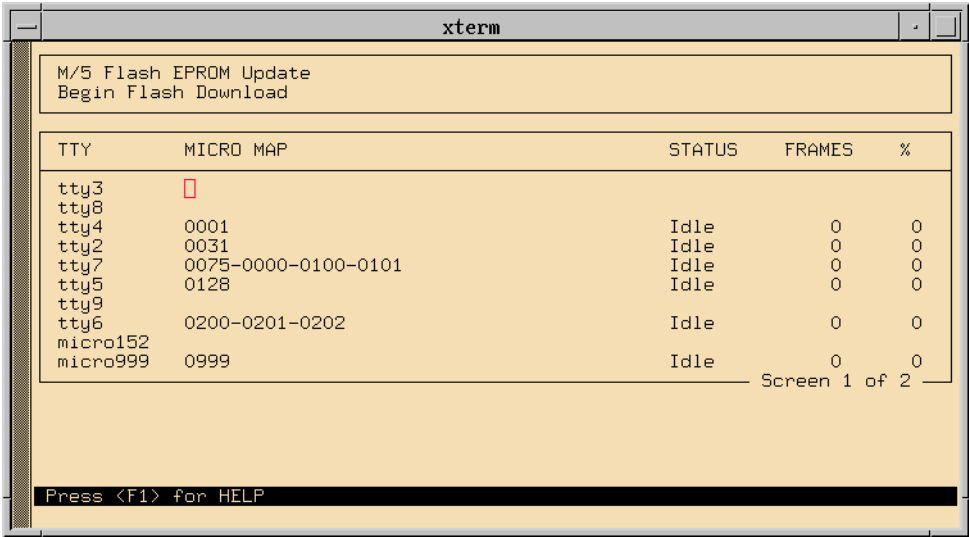
5. Press any key to return to the **Micro Flash EPROM Upgrade** menu.

Start

To select and download to Micro EPROMs:

1. Once the new **EPROM** information is transferred to the hard drive, select **Start** from the **Micro Flash EPROM Upgrade** menu. The **Begin Flash Download** form appears.

Figure 38. Begin Flash Download Form



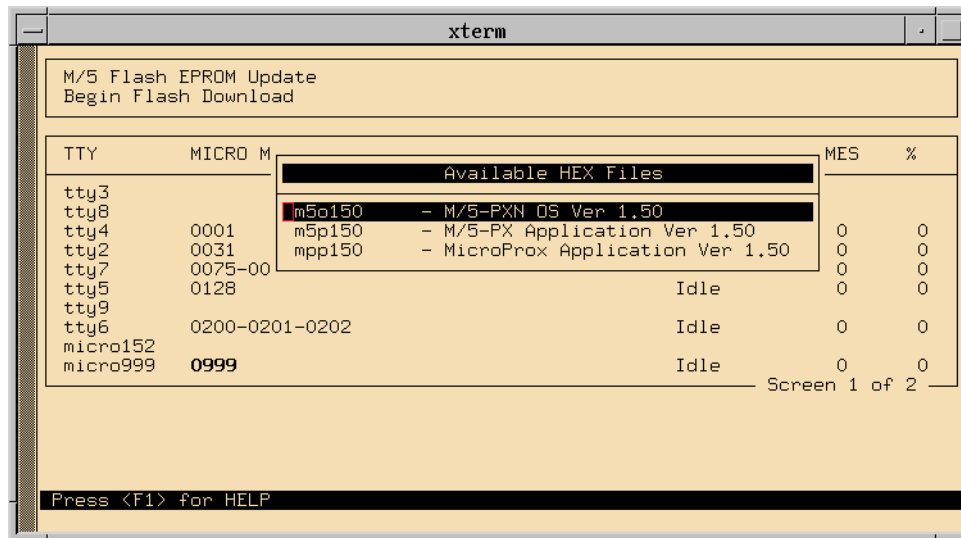
All system micros (Micro/4 and Micro/5) are displayed under the **Micro Map** column and all micro types can be selected, however the flash download will only execute on the Micro/5s. Selecting Micro/4s will not affect the downloading process to the selected Micro/5s.

2. Use the arrow keys to move to the desired micros for flash download. Press (F2) or (T) to select or de-select a micro. All micros in a micro line must be selected individually (use the left and right arrows to reach them).

When a micro is selected it appears in boldface. The system determines whether the micro is direct, dial-up or network, so no communication specification needs to be made.

3. When all desired micros have been selected, press (Esc) to display a listing of hex files available for download.

Figure 39. List of HEX Files



4. Cursor to the desired hex file, then press **Enter** to select it and start the download. If you need to manually enter the hex file and path name, do not select a file from the list. Instead, press **Esc** again, type the path name, then press **Enter** to start the download.

The **Status** column indicates the action taking place on the highlighted micro of each micro line selected. The status messages include *maint*, *polling*, *erase*, *sending*, *connecting*, *connect*, *restore*, and *ignoring*. An asterisk (*) beside the *sending* status message indicates that the file being downloaded is the optimized version of the hex file (determined by the micro's boot prom), and will complete its download more quickly (in approximately 10 minutes).

The **Frames** column indicates the number of data blocks downloaded to the highlighted micro. The **%** column indicates the percentage of the download completed to the highlighted micro.

When the download for a micro is complete, that micro will no longer appear in boldface. If the download for a micro is unsuccessful, that micro will remain in boldface. At this point, it takes about 60 seconds for the flash program to terminate. If the micros were defined as online in the database, the micros will reset and receive their database and come online.

Hex files

There is a separate directory for each type of micro’s hex file. For example, the directory **m5p170o** contains the hex file for the Direct-Connect Micro/5-PX.

The following is an example of hex file directories and the type of hex file each contains.

total 336									
drwxr-xr-x	8	root	sys	512	Mar 31 16:34	./			
drwxr-xr-x	16	root	sys	512	Mar 27 09:14	../			
-rw-r--r--	1	root	system	133276	Mar 31 16:33	flash.dat			
drwxr-xr-x	2	root	system	512	Mar 13 16:43	m5o150s/			
drwxr-xr-x	2	root	system	512	Mar 14 11:02	m5p150o/			
drwxr-xr-x	2	root	system	512	Mar 14 18:32	m5p150p/			
drwxr-xr-x	2	root	system	512	Mar 19 15:44	m5p150s/			
-rw-r--r--	1	root	system	556	Mar 28 17:33	tty7.log			

Micro/5-PX Network
Operating
System (OS)

Micro/5-PX Direct

Micro/5-PX Dial-Up

Micro/5-PX Network
Application

Integrated Configuration Tool

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 40](#) and [Figure 41](#)):

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

Figure 40. Connecting directly using crossover cable

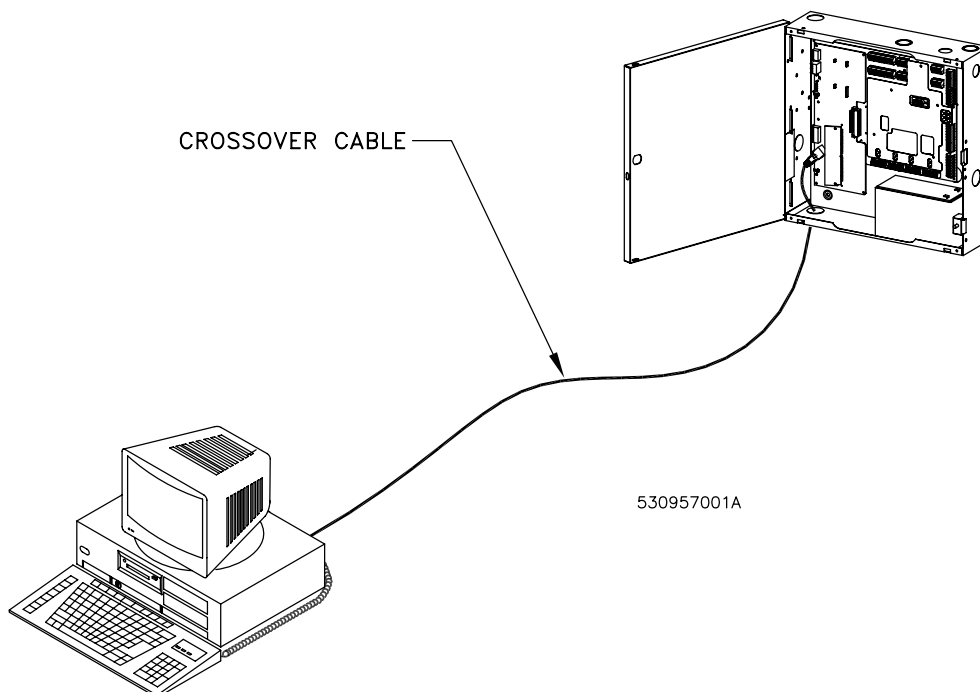
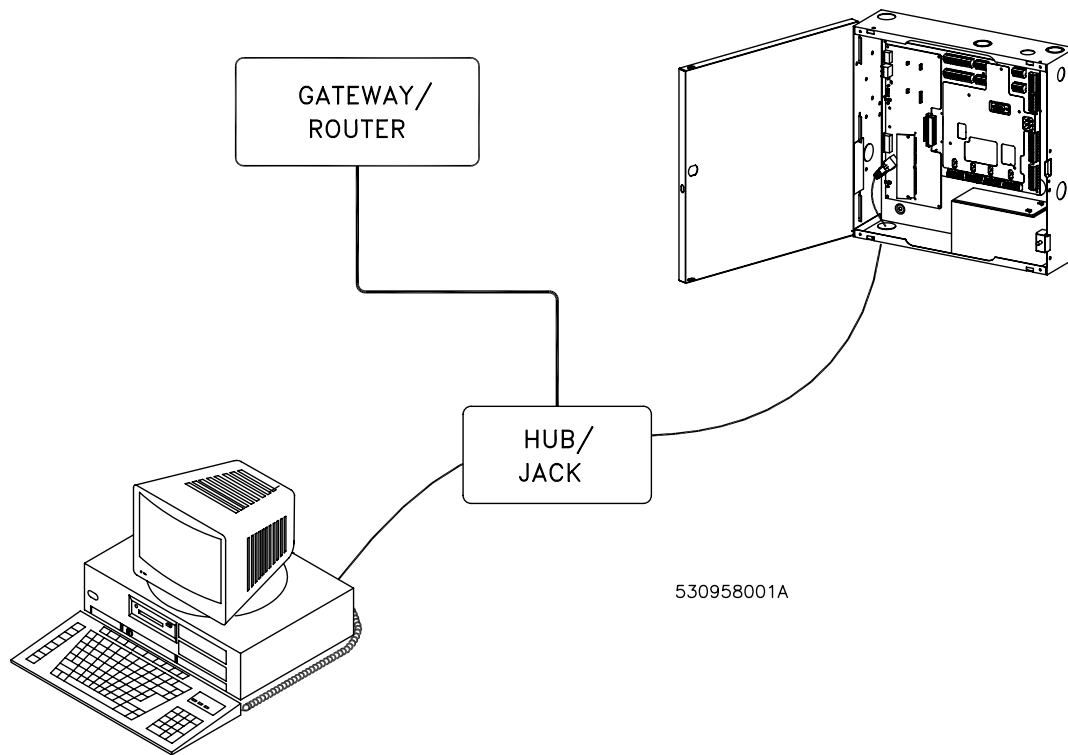


Figure 41. Connecting through network hub



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 the Integrated Configuration Tool](#) on page 110 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 93.
- dial-up configuration, go to [Dial-up micro configuration](#) on page 99.
- direct configuration, go to [Direct-connect micro configuration](#) on page 102.

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 93.

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

- [Network micro configuration](#) on page 93
- [Dial-up micro configuration](#) on page 99
- [Direct-connect micro configuration](#) on page 102

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 92.
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

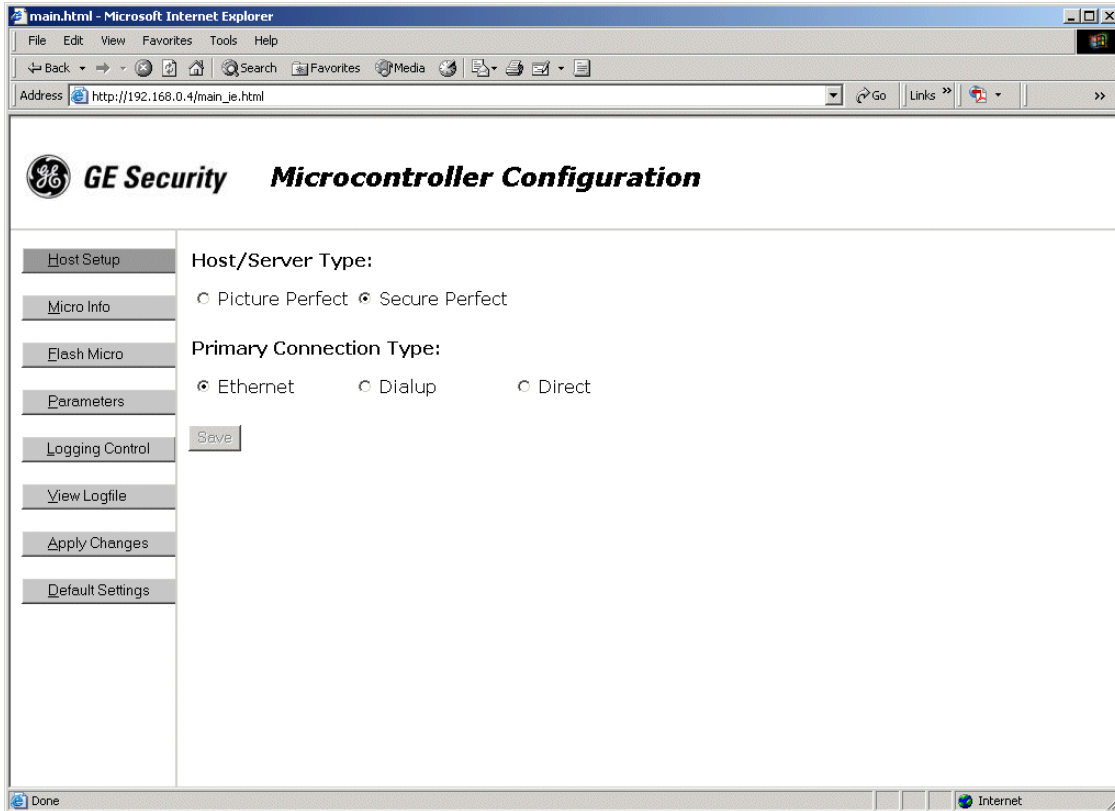
In order to configure the micro as networked, you must complete these screens (the steps are detailed in the sections that follow):

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 92.
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.

main.html - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Media Print

Address http://192.168.0.4/main_ie.html Go Links

GE Security Microcontroller Configuration

Host Setup Network **Dialup** 3DES Exchange Keys Other Parameters

Micro Info

Flash Micro

Parameters

Logging Control

View Logfile

Apply Changes

Default Settings

Phone # 1

Phone # 2

Modem Init String

Modem Deinit String

Save

Done Internet

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

GE Security Microcontroller Configuration

Host Setup	Micro Address:	<input type="text" value="1"/>
Micro Info	Micro Type:	<input type="text" value="PXNplus"/>
Flash Micro	Micro Status:	<input type="text" value="OFFLINE"/>
Parameters	BUILD:	<input type="text" value="R000204"/>
Logging Control	PP Version:	<input type="text" value="301.09"/>
View Logfile	SP Version:	<input type="text" value="06.10"/>
Apply Changes	COM1 Baud Rate:	<input type="text" value="19200"/>
Default Settings	Other Info:	<input type="text" value="None"/>
		<input type="button" value="Save"/>

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

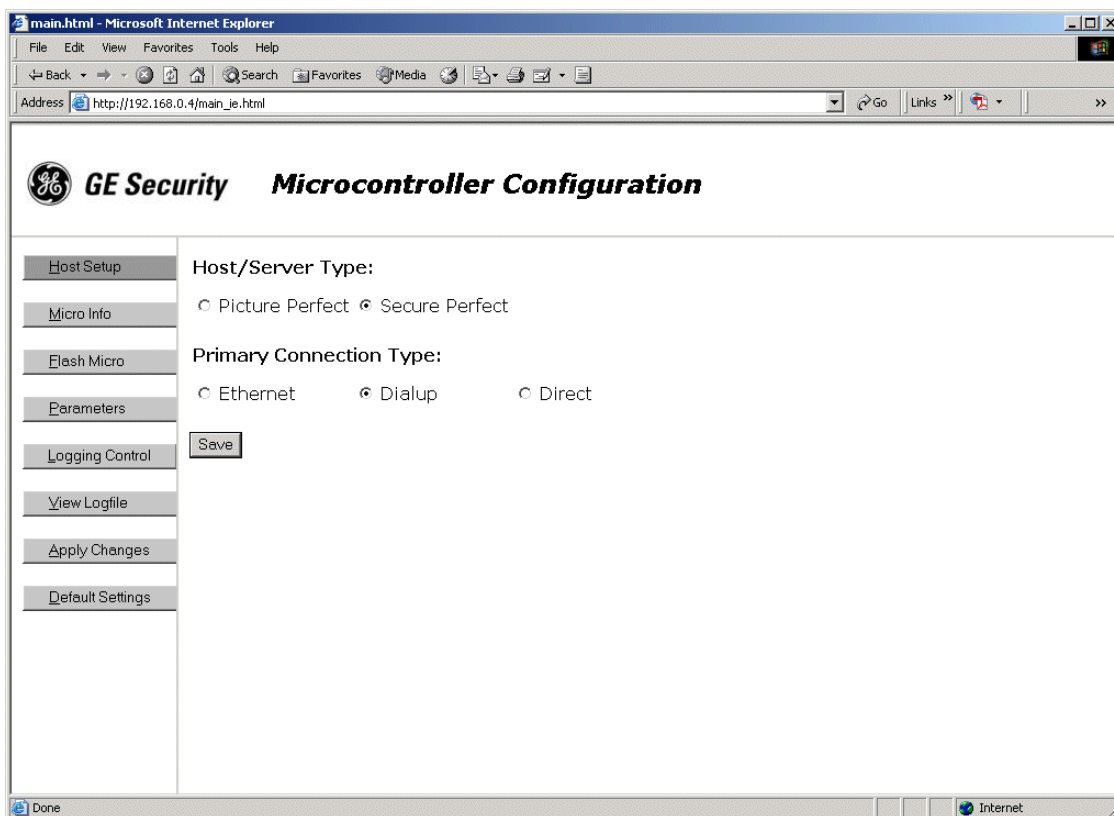
In order to configure the micro as dial-up, you must complete these screens (the steps are detailed in the sections that follow):

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 92.
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

main.html - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Media Print Mail

Address http://192.168.0.4/main_ie.html Go Links

GE Security Microcontroller Configuration

Host Setup

Micro Address: 1

Micro Info

Micro Type: PXNplus

Micro Status: OFFLINE

Flash Micro

BUILD: R000204

Parameters

PP Version: 301.09

SP Version: 06.10

Logging Control

COM1 Baud Rate: 19200

View Logfile

Apply Changes

Other Info: None

Default Settings

Save

Done Internet

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

main.html - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Media Print

Address http://192.168.0.4/main_ie.html Go Links

GE Security Microcontroller Configuration

Host Setup Network **Dialup** 3DES Exchange Keys Other Parameters

Micro Info

Flash Micro

Parameters

Logging Control

View Logfile

Apply Changes

Default Settings

Phone # 1

Phone # 2

Modem Init String

Modem Deinit String

Save

Done Internet

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

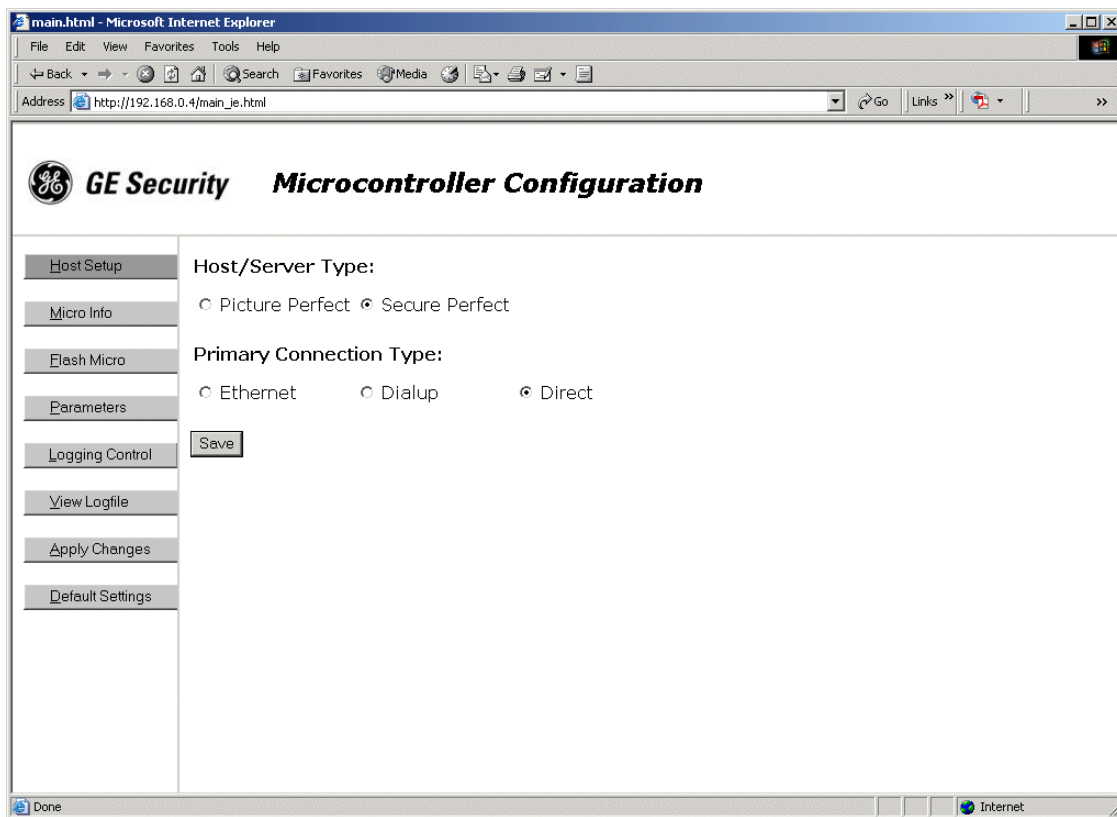
In order to configure the micro as direct, you must complete these screens (the steps are detailed in the sections that follow):

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 92.
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

The screenshot shows a web browser window titled "main.html - Microsoft Internet Explorer". The address bar displays "http://192.168.0.4/main_ie.html". The page content is titled "GE Security Microcontroller Configuration". On the left, there is a vertical menu with buttons: "Host Setup", "Micro Info", "Flash Micro", "Parameters", "Logging Control", "View Logfile", "Apply Changes", and "Default Settings". The "Micro Info" section is active, showing the following fields and values:

Micro Address:	1
Micro Type:	PXNplus
Micro Status:	OFFLINE
BUILD:	R000204
PP Version:	301.09
SP Version:	06.10
COM1 Baud Rate:	19200
Other Info:	None

At the bottom of the "Micro Info" section, there is a "Save" button. The browser's status bar at the bottom shows "Done" and "Internet".

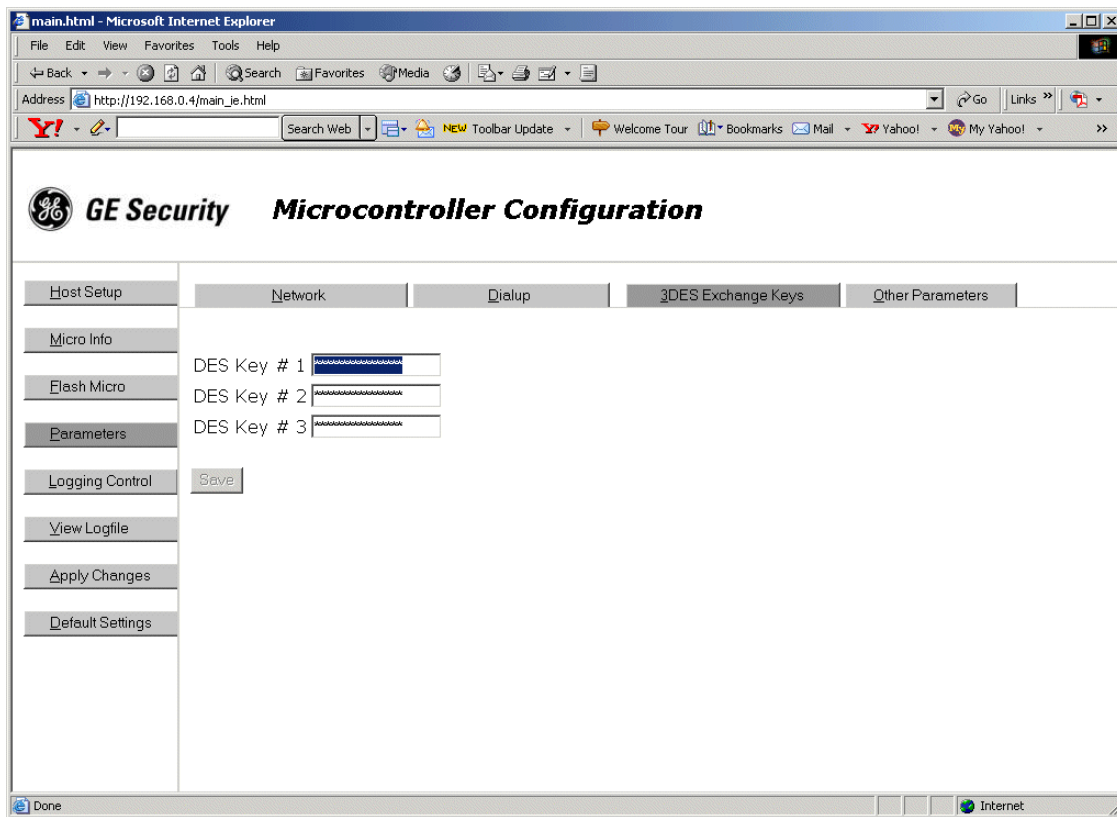
1. Click **Micro Info**.
2. Enter the micro address in the **Micro Address** field.
3. Click **Save**.
4. If this completes your micro configuration, click **Apply Changes** now.

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 92.
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:

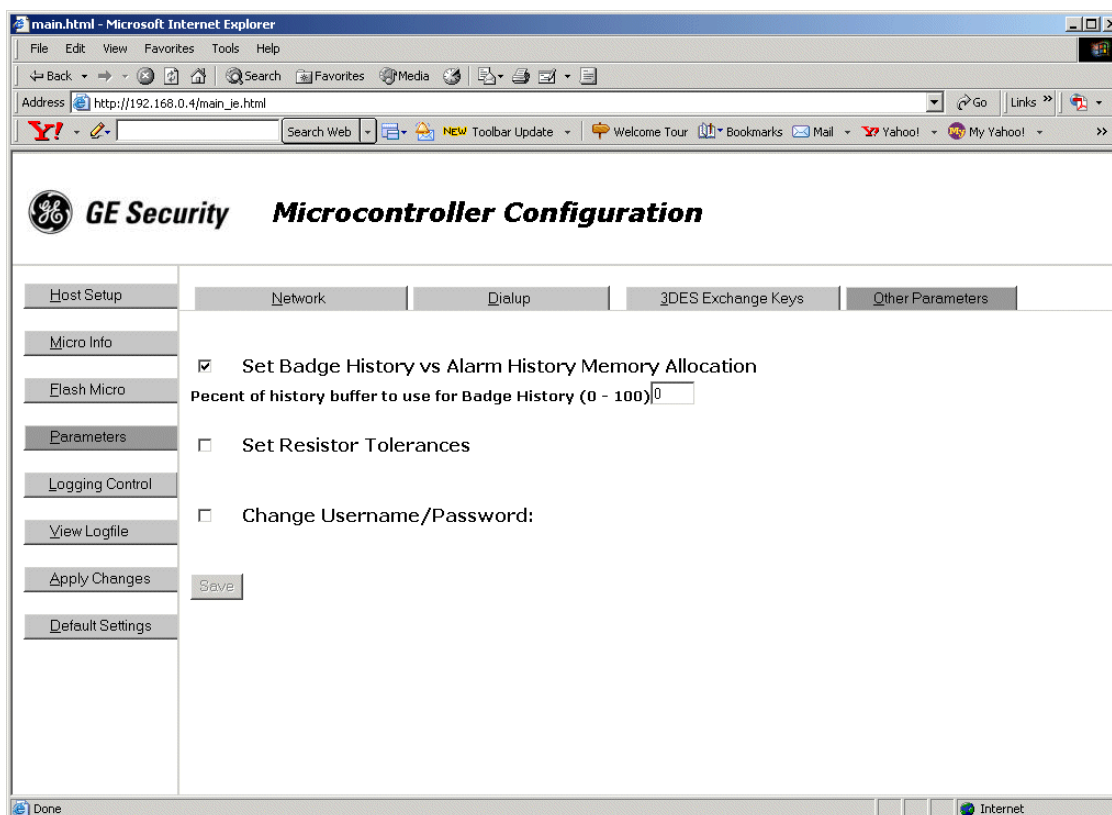
- DES keys must be exactly 16 characters.
- DES keys must be valid hexadecimal characters (0 through 9, upper or lower case letters A through F).
- No two or more DES keys can have the same value.



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

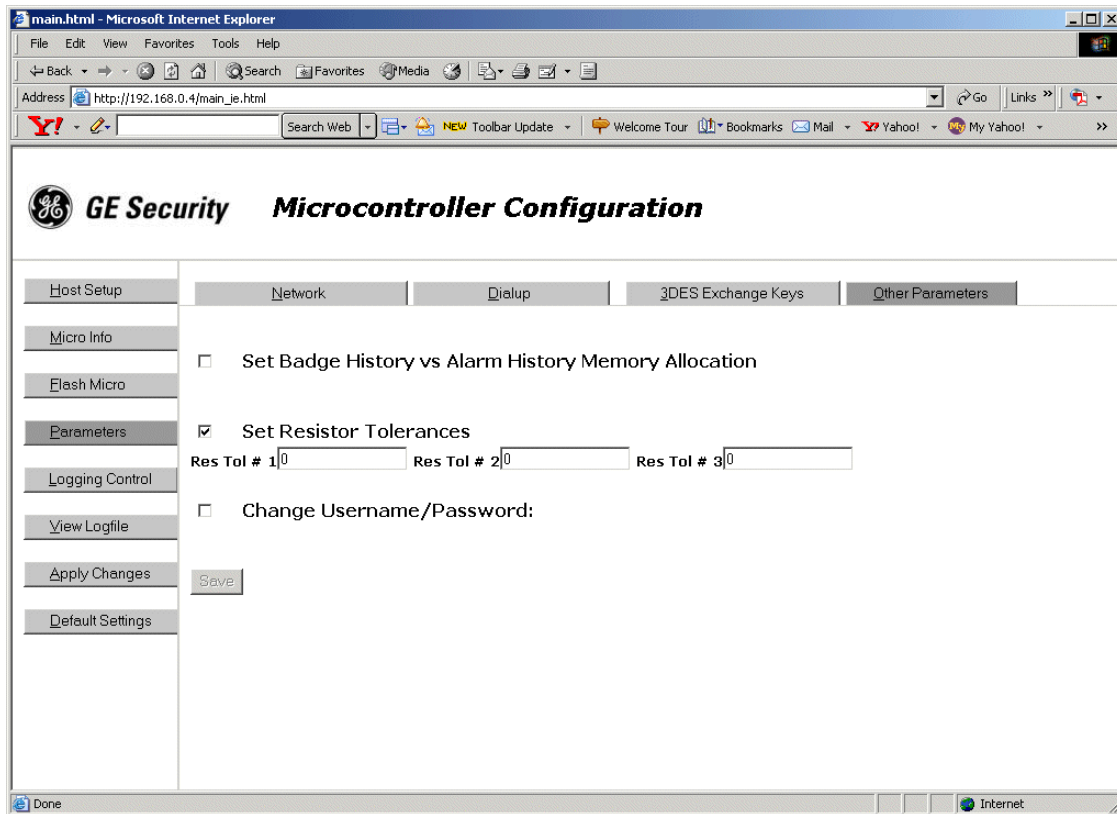
4. Click **Save**.
5. If this completes your micro configuration, click **Apply Changes** now.

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 92.
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.

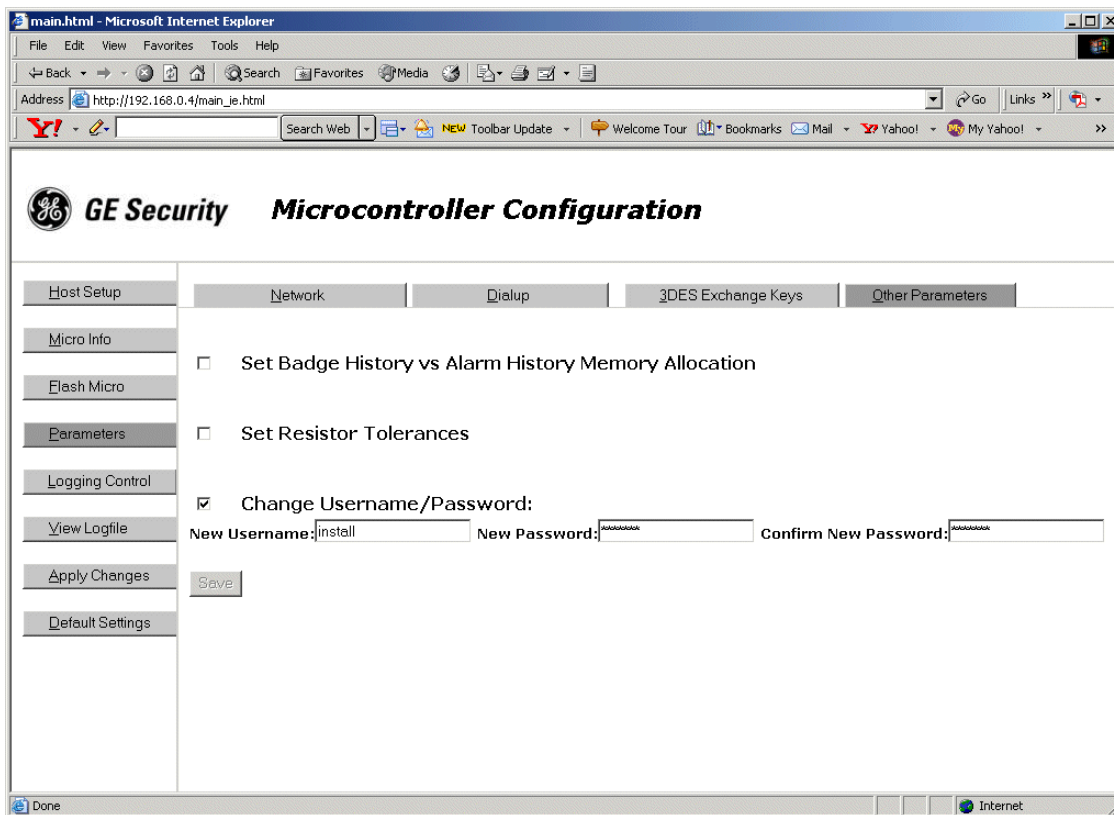
Setting resistor tolerances



1. If you have not already done so, log in to the Integrated Configuration Tool. See [Connecting and starting the tool](#) on page 92.
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 92.
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

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 92.
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 35, Micro Info reports](#) for a brief explanation of each report.

Table 35. 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 the Integrated Configuration Tool

To complete micro configuration using the Integrated Configuration Tool, compile the following information:

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

Picture Perfect		
Communication type	Information needed	Write your setting 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	Micro IP:
	Use DNS: NO	Gateway:
		Subnet:
		Host IP:
		Backup Host IP (Redundant system):
	Use DHCP: YES	Micro Name or Micro MAC which is provided for you:
	Use DNS: YES	Host Name:
		Backup Host Name (Redundant system):
	Use DHCP: NO	Micro IP:
	Use DNS: YES	Gateway:
		Subnet:
		Host Name:
		Backup Host Name (Redundant system):
		Domain
		DNS IP
	Use DHCP: YES	Micro Name or Micro MAC which is provided for you:
	Use DNS: NO	Host IP:
		Backup Host IP (Redundant system):

Chapter 9 Updating micro parameter block

When using Picture Perfect, there are various commands available to update the parameter block of the network micro.

Note: Refer to *Chapter 8 [Micro firmware tools](#)* for a detailed discussion of the available firmware installation tools for updating micro parameter blocks during the process of downloading firmware to the micro.

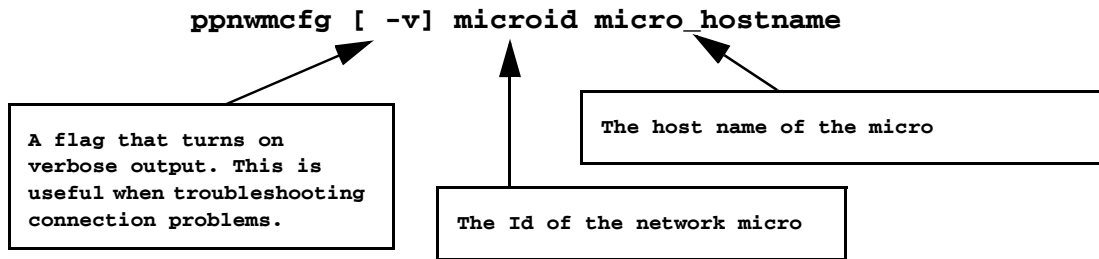
This chapter includes the following sections to assist you in updating the micro parameter block information:

<i>Network micro parameter block configuration (PXN only)</i>	112
<i>Menu options</i>	113
<i>Parameters</i>	114

Network micro parameter block configuration (PXN only)

Only the Micro/PXN-2000 uses the `ppnwmcfg` command. This command allows the root user to configure a network micro's parameter block from the host by connecting to the network micro. Once connected, the `ppnwmcfg` utility will put the network micro in maintenance mode and display the current settings.

To display the `ppnwmcfg` utility, log in to Picture Perfect as **root** and type the following:



Menu options

The **ppnwmcfg** utility displays the following menu options:

S...Show parameter block

Displays the contents of the network micro's parameter block

C...Clear parameter

Clears a specific value

U...Update parameter block

Writes the current values to the parameter block

1 - n...Modify parameter

Selecting a number will prompt you for a new value

E...Edit all

Prompts you for each parameter block value

Q...Quit

Exits out of **ppnwmcfg**. Once you have quit the **ppnwmcfg** utility, the network micro will require about 30 seconds of idle communication before it resets.

Parameters

The fields shown below may vary depending on the version of your firmware.

address

The micro id which is not necessary unless you are configuring a network dial-up micro

phone1

Primary host number for a network dial-up micro to call

phone2

Secondary host number for a network dial-up micro to call

mmdmm_init

Modem initialization string

mdmm_dinit

Modem de-initialization string

rx_idle_time

The minimum number of characters (20 - 254) to process a buffer

hop_count

The number of hops (network boards that must be crossed) between the network micro and host

ring_speed

Specifies ring speed for token ring networks only

source_ip

The network micro IP address

destination_ip

The Picture Perfect hosts IP address

Note: The network micro will accept connections only from the host that is configured in this field. If this field is updated incorrectly, the network micro can only be configured from a laptop computer.

alternate_ip

The backup machine IP address in a Picture Perfect redundant system

gateway_ip

The network micro gateway IP address to reach the **destination_ip**

subnet_ip_mask

The network micro subnet mask

alt_gateway_ip

The network micro gateway IP address to reach the **alternate_ip**

Chapter 10 Regulatory information

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

<i>CE and FCC compliance</i>	116
<i>UL compliance</i>	119
<i>CE regulatory notice</i>	121

CE and FCC compliance

Note: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case, the user will be required to correct the interference at his/her own expense.

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

To make the micro installation CE and FCC compliant, the following conditions must be met:

- All cables connected to the micro must be shielded.
- The micro enclosure must be connected to the earth ground.
- The CPU board must be grounded with a factory-installed braided wire as shown in [Figure 44](#) on page 118.

Figure 42. Micro/PX-2000 Typical Installation - Earth/Cabinet Ground- Inside

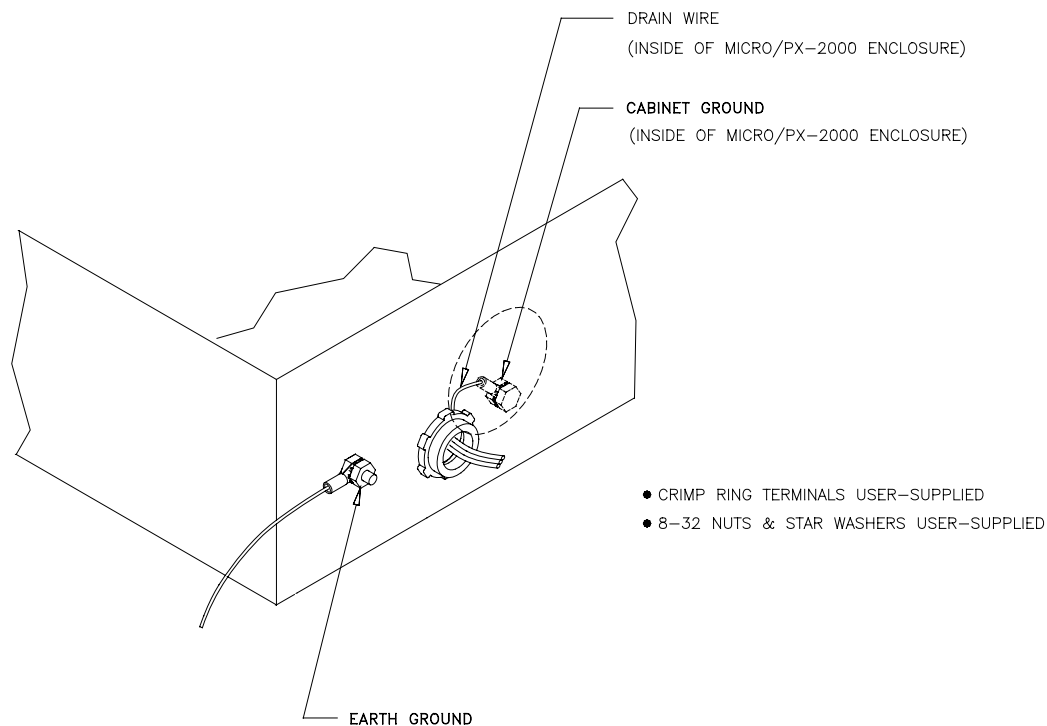


Figure 43. Micro/PXN-2000 Typical Installation - Earth/Cabinet Ground- Inside

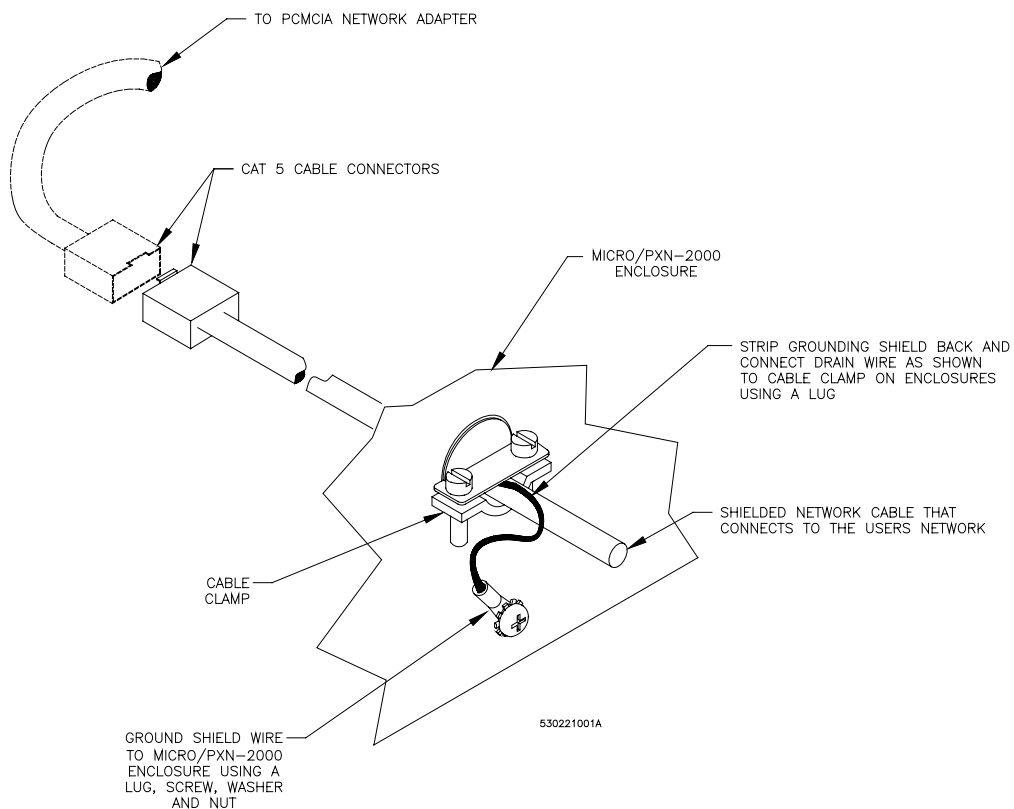
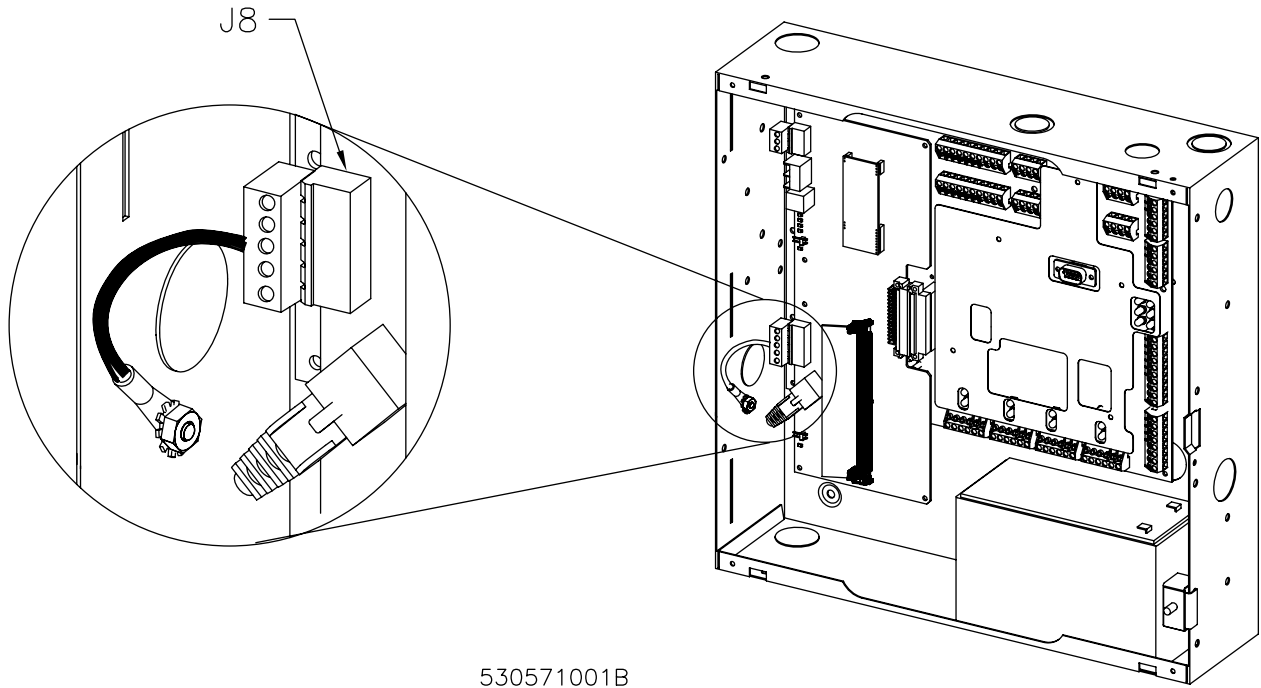


Figure 44. Grounding of the CPU board



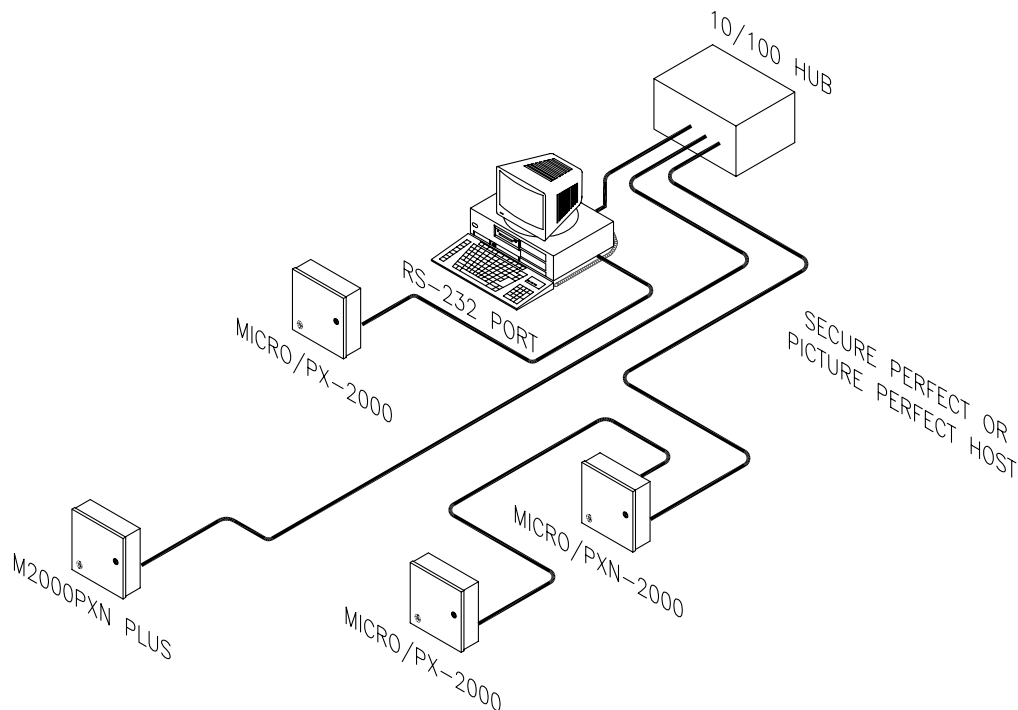
UL compliance

Failure to install and program the Micro/PX-2000, Micro/PXN-2000, M2000PXNplus, Secure Perfect system and Picture Perfect system in accordance with these instructions voids the listing mark of Underwriter's Laboratories, Inc.

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.

Figure 45. UL approved system configuration



NOTE :

1. ALL MICROS MUST BE CONNECTED TO THE HOST (DIRECTLY OR VIA DEDICATED NETWORK).
2. THE PRIMARY POINT FOR ACKNOWLEDGING ALARMS MUST BE AT THE HOST.

- The Micro/PX-2000, the Micro/PXN-2000, and the M2000PXNplus are UL Listed as access control units and grade A proprietary burglar alarm control units (UL1076 and UL294). They should be used with the listed **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/PX-2000, Micro/PXN-2000, or M2000PXNplus powered under the conditions indicated on *Chapter 1 Overview*.
- Grounding must be in accordance with Article 250 of the National Electrical Code.
- The Micro/PX-2000, the Micro/PXN-2000, and the M2000PXNplus 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/PX-2000, the Micro/PXN-2000, and the M2000PXNplus 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 failsafe configuration results in the door strike circuit unlocking in case of a power loss.
- The micro tamper switch must be wired to the micro as shown in *Figure 20, Wiring the micro tamper input* on page 60.
- 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.

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.

CE regulatory notice



Manufacturers Declaration of Conformity

For


Product Identification:

Model/type: PXN2000PLUS:M2PMPP2:M2PMSP2 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	05F143C	05F143I	05P179
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 11 Troubleshooting, maintenance, support

This chapter provides troubleshooting information and details of built-in diagnostics.

<i>Troubleshooting your Micro/PX-2000</i>	124
<i>Maintenance</i>	129
<i>Contacting technical support</i>	130

Troubleshooting your Micro/PX-2000

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 130.)

Refer to the appropriate section:

- power: See [Power problems](#) on page 124.
- communications: See [Communications problems](#) on page 124.
- readers: See [Reader problems](#) on page 125.
- M2000PXNplus CPU board: See [M2000PXNplus problems](#) on page 125.

Power problems

Problem: The Micro/PX-2000, Micro/PXN-2000, and M2000PXNplus does not power up correctly.

Resolution: Verify that LED D50 and one or more LEDs on the CPU board are on. Refer to [Integrated I/O board LEDs](#) on page 29. **If these LEDs are NOT on:**

1. Using a voltmeter, verify that there is 14 to 18 VAC between pins 1 and 2 of J11.
2. If not, then check the circuit breaker or fuse on the external power transformer; check the wiring from the external power transformer to the micro; check that there is AC power going to the external transformer.

Problem: The reader does not power up correctly.

Resolution: Using a voltmeter, verify that there is from +14.0 to +14.6 VDC between pins 1 and 2 of the reader connectors J4, J5, J6, and J7. If the voltage goes below 14.0 VDC, check the reader to determine if it is defective or there are shorts in the wiring.

Communications problems

Problem: The unit is properly powered, but it does not communicate.

Resolution: Check the Receive RX LED D15 and Transmit TX LED D12 on the Integrated I/O board.

If the Receive RX LED is flashing:

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 appropriate CPU board LED section in [Chapter 3 Microcontroller boards](#) to determine if the controller is in maintenance mode. See [Chapter 8 Micro firmware tools](#) for instructions on downloading the application code.
2. Check the SW5 switch settings on the Integrated I/O board for proper baud rate and local or dial-up settings. Refer to [Chapter 4 Configuring the system](#) for additional information.
3. Check for proper address. Refer to [Chapter 4 Configuring the system](#) for additional information regarding switch settings.

If the Receive RX LED is NOT flashing:

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 *Chapter 5 Wiring power and communications*.

If the Transmit TX LED is flashing:

Check the wiring between the host and the micro. See *Chapter 5 Wiring power and communications*.

Reader problems

Consult your reader installation manual for potential problems which are not related to the micro.

M2000PXNplus problems

If the problem is not caused by incorrect hardware wirings or settings, check the software settings of the M3000PXNplus using the Integrated Configuration Tool.

Problem: I need to restore the factory default settings.

Resolution:

1. Connect the jumper block to the Restore Defaults pins (JP4).
2. When DS3 turns on, remove the jumper. 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 93
 - *Dial-up micro configuration* on page 99
 - *Direct-connect micro configuration* on page 102

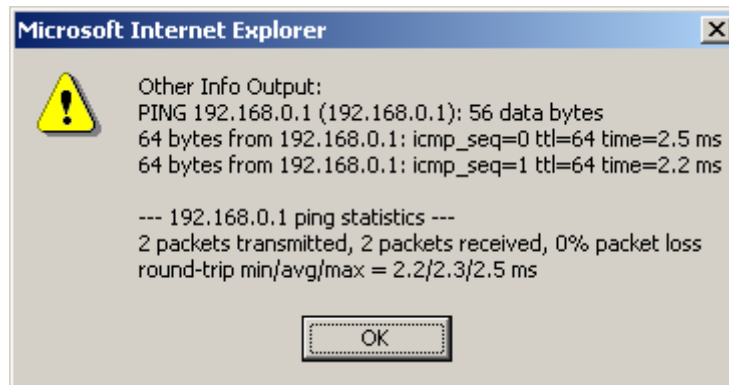
Problem: The network micro does not connect.

Resolution:

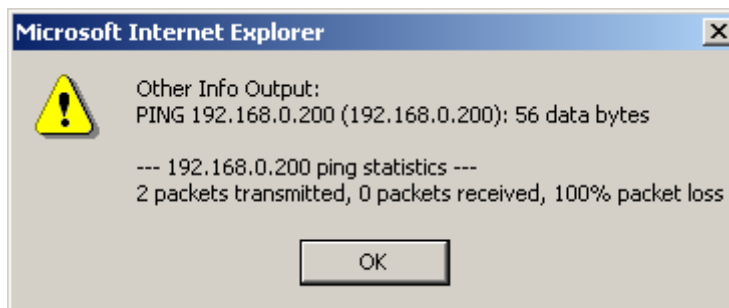
1. Verify your network settings:
 - host IP address (Picture Perfect systems)
 - micro IP address and micro address (Secure Perfect systems)
 - network mask
 - gateway IP
 - DHCP/DNS server
2. Check the connectivity by using the ping command. Use the Ping Host option in the Integrated Configuration Tool. See *Checking operating system status of the PXNplus board* on page 109 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 5, Modem LEDs on the PXNplus CPU board* on page 22.

Diagnostic LED display

The micro CPU board LEDs DS1, DS2, DS3, and DS4 are used for displaying error codes.

Table 36. 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 37. Micro/PX-2000 and Micro/PXN-2000 LED error codes

Application	Type	LED State	Error Code/Error Condition
Secure Perfect 3.0 or later 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 or later 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 or later	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 or later	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 or later	Dial-up	Flash all four, PAUSE, then DS4 three times.	0003 ERROR - Illegal addressing. Pattern will repeat 3 times; stay in maintenance mode for 30 seconds; then micro resets and pattern repeats. (Application WILL NOT run.)
Secure Perfect 3.0 or later	Direct	Flash all four, PAUSE, then DS4 four times.	0004 ERROR - Illegal addressing. Pattern will repeat 3 times; stay in maintenance mode for 30 seconds; then, micro resets and pattern repeats. (Application WILL NOT run.)
Secure Perfect 3.0 or later	Dial-up	Flash all four, PAUSE, then DS4 five times.	0005 ERROR - Invalid baud rate. Pattern will repeat 3 times; go to maintenance mode for 30 seconds; then micro resets and pattern repeats.
Picture Perfect Micro/5-PX	Dial-up	Flash all four, PAUSE, then DS3 and DS4 three times.	0033 ERROR - Illegal addressing. Pattern will repeat 3 times; proceeds in maintenance mode; then micro resets and pattern repeats. (Application WILL NOT run.)
Picture Perfect Micro/5-PX Firmware 1.5.9 or higher.	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.

Maintenance

Reseating or replacing 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 12.

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 38. 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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