DirecDoor

Installation Manual

Contents

Preface

This is the *DirecDoor Installation Manual*. This document includes an overview of the product and detailed instructions explaining how to:

- Mount the cabinet;
- Install and wire the controller; and
- Configure the controller.

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

Read these instructions and all supporting documentation entirely <u>before</u> installing or operating this product.

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

Conventions used in this document

The following conventions are used in this document:

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

Safety terms and symbols

These terms may appear in this manual:

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

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

Chapter 1 Introduction

This chapter provides an overview of your DirecDoor controller along with its technical specifications.

In this chapter:

Product overview

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

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

The DirecDoor consists of the following:

- Enclosure with DirecDoor PCA mounted
- Hardware kit
    - Ground terminal lug
    - SEMS screws
    - Protection diodes
    - Metal Oxide Varistors (MOVs) surge absorbers
    - Network cable ferrite
    - 1K end-of-line resistors
- Mounting hole template
- Installation screwdriver
- *DirecDoor Quick Installation*
- *DirecDoor Integrated Configuration Tool Quick Guide*
- Documentation CD, which includes the following manuals in PDF format:
    - DirecDoor Installation Manual (this document)
    - *DirecDoor Quick Installation Sheet*
    - *DirecDoor Integrated Configuration Tool Quick Guide*

    The Documentation CD also includes the *DirecDoor Wattage Calculator* in Microsoft Excel (XLS) format, that can be used to determine power requirements.

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

Specifications

For UL-compliant installations, refer to *UL compliance* on page 83.

Table 1.   Enclosure specifications

Enclosure specifications	
Physical dimensions	10.15 inches high x 9.15 inches wide x 3.04 inches deep (258 mm high x 232 mm wide x 77 mm deep)
Operating environment	+35°F to +122°F (+2°C to +50°C)
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	
Controller power input requirements	• IEEE802.3af 16 watt Class 0 Mode A and B Power over Ethernet Power Sourcing Equipment (PoE/PSE) on Standard Category 5 Ethernet Cable **Note:** By Ethernet standards, the maximum cable length is limited to 328 ft. (100 m) between the PoE source and the DirecDoor controller. -Or- • Auxiliary 24 VDC 1 A local supply (24 watts)
Cabling	
Host to controller	Network: Cat 5 Type A or B Dial fallback: modems
Controller to readers	Reader voltage: 12 VDC If the cable distance is: • Greater than 500 feet, but not greater/longer than 2000 ft, and/or current per reader greater than 150 mA: use 20-AWG shielded cable, see *Chapter 5, Reader Interface* on page 35. • Less than 500 feet: use 22-AWG shielded cable. We recommend using 20-AWG shielded cable for wiring reader, DOs, and DIs. Use plenum-rated cable for applications where cable is to be run above the false (suspended) ceiling in the air circulation space. Recommended: • Alpha Xtra Guard1® foil shield cable, non-plenum rated • Belden series security and alarm cable (commercial applications shielded), plenum-rated
Controller to DIs or DOs	Use any cable with the desired number of individually shielded pairs.
Devices	
Readers	Number supported: maximum of two (2) readers Reader technology supported: Wiegand, F/2F and Supervised F/2F Supports keypad only and keypad/reader technology Output devices maximum ratings: • Door DO (Reader LED) = 20.mA @ 12 VDC maximum • Door strike (DO) relay = 2 A @ 28 VDC or 30 VAC maximum

Table 1. Enclosure specifications (continued)

Strikes	Maximum current: 390 mA per strike output. See *Table 3, Device current* on page 4 for recommended strike models and associated power requirements.
DOs	Number supported: maximum 6 DOs Output devices maximum ratings: 6 DO outputs: 20 mA @ 7.5 to 12 VDC
Regulatory information	
Listings	FCC Class A UL 1076 UL 294 CE See *Chapter 9, Regulatory Information* on page 79 for more information.

Note: For output load capacity (watts) available for readers and strikes, refer to *Determining power requirements* on page 14.

Table 2. Maximum peripheral loads

Reader/strike	PoE		Auxiliary Power Supply	
Voltage DC	12	24	12	24
Total watts available	8	10	12	20

For readers not listed in the table below, refer to the applicable reader installation manual**.**

Table 3. Device current

Device	Operating Voltage	Avg. Measured Current (mA)	Watts
Model T100 reader	12	55	0.66
Model T200 reader	12	55	0.66
Model T500 reader	12	95	1.14
Model T520 reader	12	105	1.26
Model T525 reader	12	140	1.68
Model T700 reader	12	75	0.90
Model T720 reader	12	75	0.90
Model T725 reader	12	110	1.32
Securitron M62 Magnalock strike*	12	240	2.88
Securitron M62 Magnalock strike*	24	140	3.36
HES, Inc 5000-12/24D strike	12	230	2.76

Table 3.   Device current (continued)

Device	Operating Voltage	Avg. Measured Current (mA)	Watts
HES, Inc 5000-12/24D strike	24	115	2.76
Rutherford 4114x05x32D strike	12	190	2.28
Von Duprin 5100 3FP695 24 VDC	12	390	4.68
Von Duprin 5100 3FP695 24 VDC	24	195	4.68
RCR-REX	12	28	0.336
RCR-REX	24	17	0.408

*   When using magnetic strikes with auto-voltage select, additional power allowances must be considered due to auto-voltage circuitry operation.

Table 4.   CPU specifications

Communications interfaces		
Network	10/100 MB Ethernet, on-board Ethernet RJ-45 connection, TCP/IP; Supports Static IP, DNS, and DHCP.	
Dial fallback	Plug-in modem card (optional)	
CPU specifications	**Type 2 SIMM[1]**	**Type 3 SIMM[2]**
Operating system	uClinux 2.6	uClinux 2.6
Processor	Xilinx MicroBlaze	Xilinx MicroBlaze
RAM	32 MB	64 MB
FLASH memory	32 MB	32 MB
Applications supported and capacities		
Facility Commander 7.0 or later		
Badge capacity	100,000	
Offline badge history capacity	8,192[3]	
Offline alarm history capacity	8,192[3]	
Picture Perfect 4.0 or later		
Badge capacity	145,000	
Offline badge history capacity	5,000[3]	
Offline alarm history capacity	2,000[3]	

1.   The Type 2 SIMM supports only Mode B Power over Ethernet.
2.   The Type 3 SIMM supports Mode A and Mode B Power over Ethernet.
3.   This is a default allocation. The capacity can be re-allocated using the Integrated Configuration Tool.

Chapter 2 Installation Planning and Mounting

This chapter provides instructions for planning your installation and mounting your DirecDoor.

Note: We recommend that installers configure DirecDoor controllers BEFORE field deployment. This means you should define your network addressing scheme prior to installation, bench configure your DirecDoor controllers following the networking scheme, and identify the DirecDoor controller externally, then proceed with on site installation.

In this chapter:

Getting started roadmap

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

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

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

    During the installation, remember to:

    - Label all connections/cables for ease of maintenance.
    - Leave enough slack in the wiring so the cables can be "dressed." This minimizes interference during board removal or replacement.

2. Unpack your system. See *Product overview* on page 2.

3. Mount the enclosure. See *Mounting* on page 11.

4. If required, mount and install one of the following:

    - PoE power supply. See *Installing the PoE (Power over Ethernet)* on page 17.
    - Auxiliary power supply with battery backup. See *Installing the auxiliary power supply* on page 19.

5. Verify that your network is up and running.

6. Install and wire up the DirecDoor board. Be sure to configure and verify the jumpers. Plug in the network cable. Refer to *Chapter 4, DirecDoor Board* on page 21.

7. Wire the readers to the controller. Be sure to configure and verify the switch settings and jumpers. Refer to *Chapter 5, Reader Interface* on page 35.

8. If using digital outputs, wire the digital outputs to the board. See *Chapter 6, DO Interface* on page 47.

9. Test the wiring before you apply power. Refer to *Chapter 7, Testing* on page 51.

10. Configure your controller. Configure the controller using the Integrated Configuration Tool. Refer to *Chapter 8, Controller Firmware Tools* on page 53.

Safety

Radio interference

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

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

Electrostatic Discharge (ESD) precaution

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

General installation rules

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

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

The authorized installation contractor should comply with the following rules:

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

Observing noise prevention procedures

Signal transmission

- Where practical, keep cables well separated from each other. Separate power cables from signal cables.
- Keep the break-out at the ends of signal cables as short as possible.
- Ground all shield drain wire(s) at the DirecDoor controller using the grounding nuts provided outside the cabinet enclosure.

⚠ **CAUTION:**   Do not ground both cable ends.

Cable length

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

Cable routing

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

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

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

Mounting

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

Mounting and handling guidelines

Comply with the following guidelines:

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

Mounting instructions

Mount the controller cabinet using the following steps, the *Mounting Template* (see *Figure 1, DirecDoor mounting template* on page 12) and *Figure 2, DirecDoor controller and components in standard enclosure* on page 13.

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

1. Remove enclosure from shipping container and remove any packing material.
2. Using the template provided (part number 531002001), mark and then drill the four mounting holes.
3. Bolt the enclosure securely to the wall using four #8 thread lag bolts or equivalent.
4. The DirecDoor has standard cable knockouts on the sides, bottom and back of enclosure. These knockouts are to be used to install cabling. Use proper size and type of cable strain reliefs to secure cables to enclosure.

⚠️ **CAUTION:** The DirecDoor must be earth grounded.

Figure 1. DirecDoor mounting template

Figure 2. DirecDoor controller and components in standard enclosure

DIMENSIONS
INCHES [MM]

FRONT VIEW

SIDE VIEW
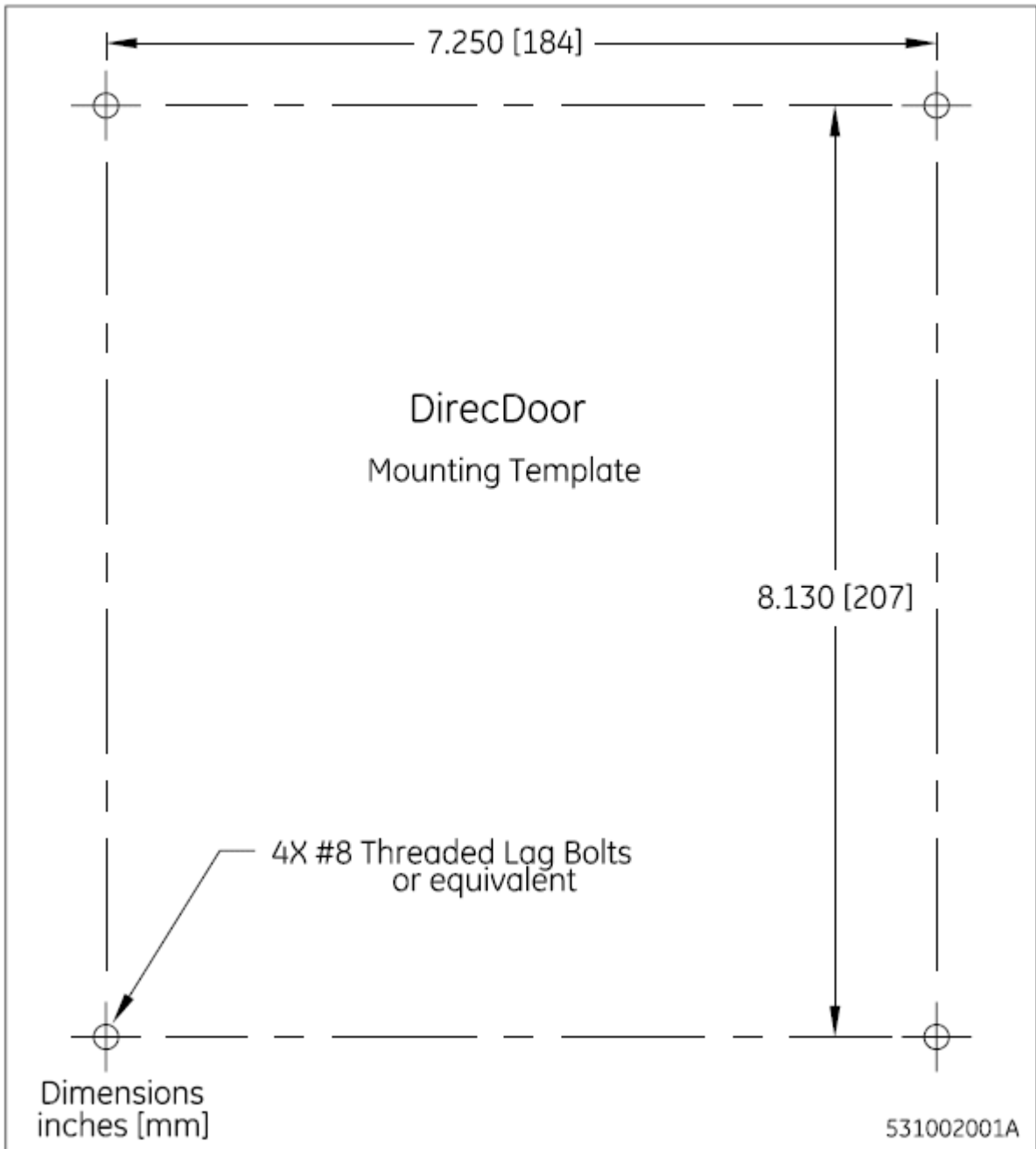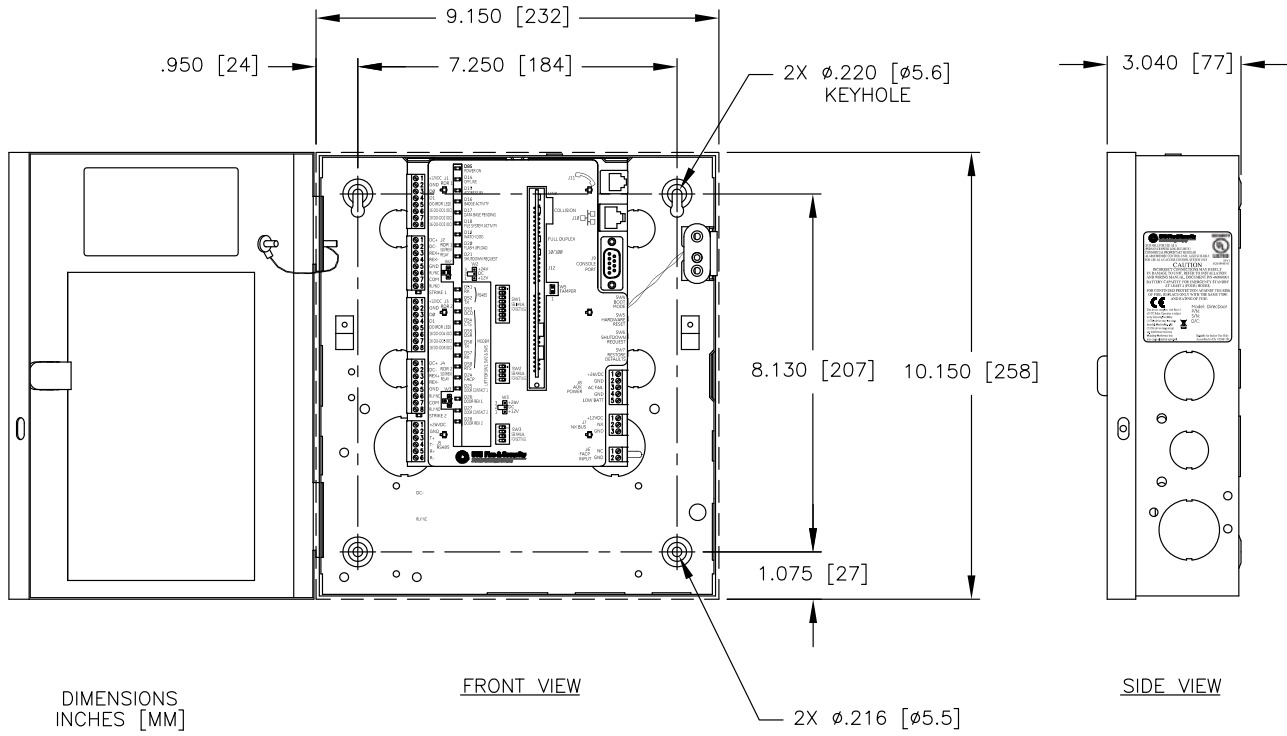
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Determining power requirements

Use the worksheet below to help plan your installation. An electronic version of the DirecDoor Wattage Calculator is available on the Documentation CD in Excel (XLS) format.

If this is a UL Listed installation, refer to *Chapter 9, Regulatory Information* on page 79.

Instructions:
 1. Enter the Qty of each type of external device you want to power.
*2. Multiply the Qty and Wattage, and then enter the result in appropriate voltage column.
*3. Normalize the 12 VDC wattage to 24 VDC by multipling the total by 1.25.
*4. Add 24 VDC Device Total Wattage and Normalized 12 VDC Total Wattage for Total Wattage requirement.
   . Compare to Wattage Available.
 5. The results are provided for both PoE and External 24 VDC Power Supply.
*These calculations are performed automatically in this spreadsheet.

Note: This spreadsheet assumes usage of IEEE802.3af 16 watt Class 0 Mode A and B Power over Ethernet Power Sourcing Equipment (PoE/PSE). By Ethernet standards, the maximum cable length is limited to 328 ft. (100 m) between the PoE source and the DirecDoor controller.

Device	Operating Voltage (VDC)	Measured Current	Wattage	Qty	12 VDC Devices	24 VDC Devices	Wattage Surplus / Deficit
Optional Dialup Modem	24.00		0.50		na	-	
Optional DirecDoor I/O Expansion Board	12.00	90ma	1.08		-		
Model T100 reader	12.00	55ma	0.66		-		
Model T200 reader	12.00	55ma	0.66		-		
Model T500 reader	12.00	95ma	1.14		-		
Model T520 reader	12.00	105ma	1.26		-		
Model T525 reader	12.00	140ma	1.68		-		
Model T700 reader	12.00	75ma	0.90		-		
Model T720 reader	12.00	75ma	0.90		-		
Model T725 reader	12.00	110ma	1.32		-		
RCR-REX 12 VDC	12.00	28ma	0.34		-		
RCR-REX 24 VDC	24.00	17ma	0.41		na	-	
Securitron M62 Magnalock strike**	12.00	240ma	2.88		-		
Securitron M62 Magnalock strike**	24.00	140ma	3.36		na	-	
HES, Inc 5000-12/24D Strike	12.00	230ma	2.76		-		
HES, Inc 5000-12/24D Strike	24.00	115ma	2.76		na	-	
Rutherford Controls 4114x05x32D strike	12.00	190ma	2.28		-		
Von Duprin Inc 5100 24V	12.00	290ma	4.68		-		
Von Duprin Inc 5100 24V	24.00	195ma	4.68		na	-	
Total Wattage at each Voltage					-	-	
12 to 24 Wattage efficiency x1.25					x1.25→	-	
Total Wattage Requirement (Calc @ 24 VDC)						-	
Wattage available via PoE						10.00	10.00
Wattage available via External 24 VDC Supply						20.00	20.00

**When using magnetic strikes with auto-voltage select, additional power allowances must be considered due to the
   auto-voltage circuitry operation.

Chapter 3 Power

This chapter provides information about setting the power on the controller.

In this chapter:

Introduction

The DirecDoor provides two methods of connecting power:

1. Network Connector J10 as Power over Ethernet (PoE)
2. Auxiliary Power Connector J8 with 24 VDC supply and battery backup

Device addressing

Picture Perfect

Table 5.   Device addressing - Picture Perfect

	Board 0
A/C Power Fail	0
Tamper	1

Facility Commander Wnx

The following Facility Commander Wnx (also known as "FCWnx") device addresses are created for you by the Facility Commander Wnx software. This table is provided for your reference only. The device address is in the format `mmmm-b-pp` where `mmmm` represents the controller number, `b` represents the board number, and `pp` represents the point or device number.

Table 6.   Device addressing - Facility Commander Wnx

	Board 0
Tamper	*mmmm*-0-01
A/C Power Fail	*mmmm*-0-02
Low Battery	*mmmm*-0-03*
FACP	*mmmm*-0-04*

* Only available on Facility Commander Wnx.

Connector and LEDs

Connector pinouts

Table 7.   J8 - Power input port

Connector J8	
Pin	**Signal name**
1	+24 VDC Auxiliary Power In
2	Ground
3	AC power fail input
4	Chassis Ground (Factory Installed), Do Not Remove
5	Low battery input (Not used)

Power LED indicator

Table 8.   Power LED

LED number	State	Description
D85	On	Indicates +24 VDC is present.

Power setup

Installing the PoE (Power over Ethernet)

Note: PoE is not verified for UL installations.

This section describes wiring and using a PoE.

1. Install the PoE in accordance with manufacturer's instructions.

     Note: The PoE source must meet IEEE802.3af 16 watt Class 0 Mode A and B Power over Ethernet Power
     Sourcing Equipment (PoE/PSE) specifications.

2. Attach the supplied ferrite to the network cable as shown in *Figure 28, Installing ferrite* on
     page 81.

3. Connect the network cable to J10 on the DirecDoor board.

     Note: By Ethernet standards, the maximum cable length is limited to 328 ft. (100 m) between the PoE source
     and the DirecDoor controller.

4. Connect the other end of the network cable to the PoE per the manufacturer's instructions.

Figure 3. Installing the PoE (Power over Ethernet)
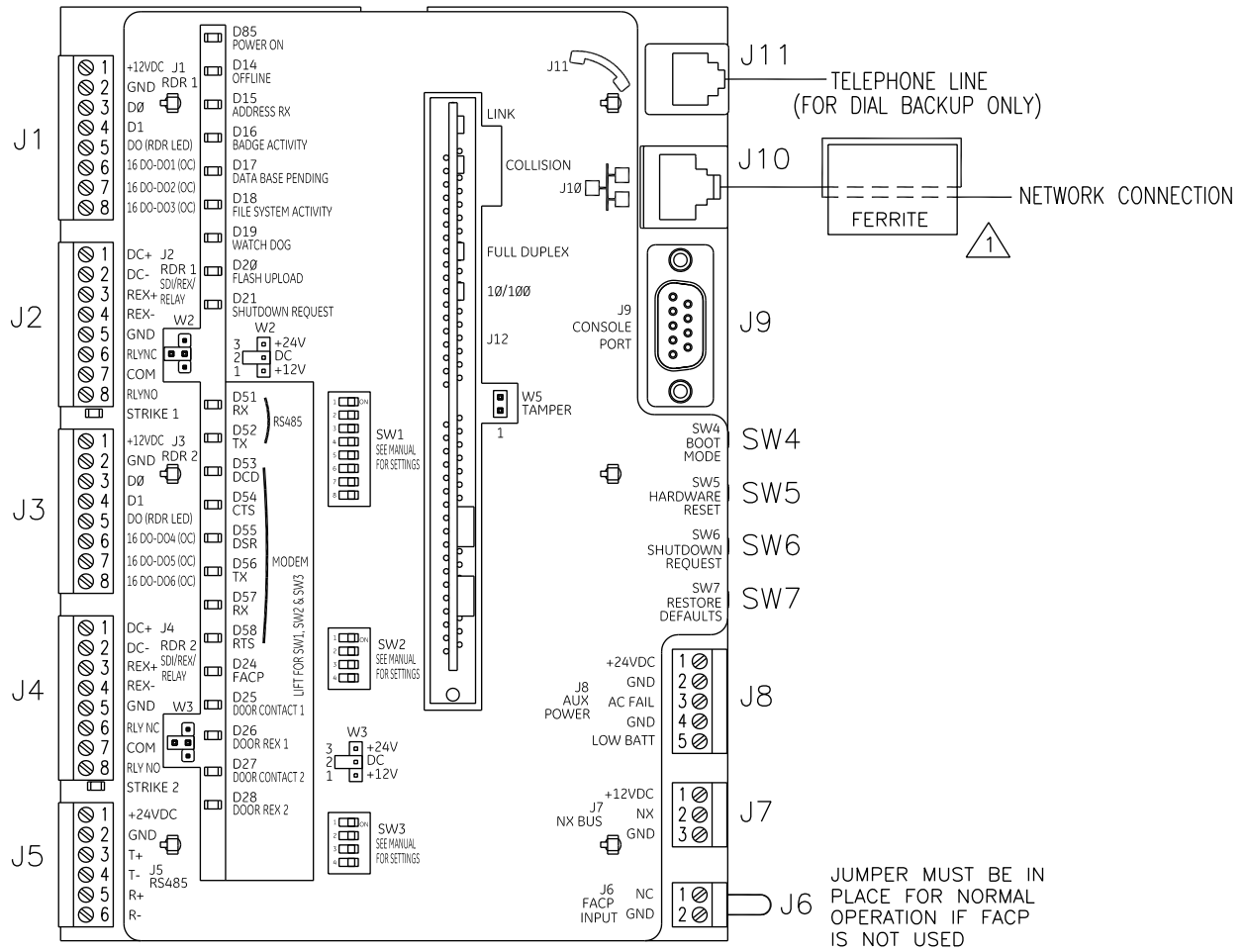
LOOP NETWORK CABLE THROUGH FERRITE AS SHOWN
BEFORE PLUGGING INTO CONNECTOR J10. SEE CHAPTER 9
FOR FCC & CE COMPLIANCE.

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Installing the auxiliary power supply

This section describes wiring and using an auxiliary power supply.

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

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

The DirecDoor requires a 24 VDC nominal, 1 amp power supply with battery backup. (Refer to *Specifications* on page 3.) All controllers, readers, and other devices should be referenced to the same ground.

For UL-listed installations, the auxiliary power supply used must be an approved UL 294 power-limited supply, such as the Altronix Corp. Model AL300ULM power supply.

1. Mount the power supply near the DirecDoor cabinet.

2. Run the wire through the knockout hole to J8 connector; pinouts are:

    -   Pin 1 = + 24 VDC
    -   Pin 2 = - Ground (24 VDC return)
    -   Pin 3 = AC fail

⚠ **CAUTION:**   Do not ground both cable ends.

Note: If the polarity is reversed, the fuse blows to prevent damage. If the fuse blows, it automatically resets within approximately 5 seconds.

3. Install the cabinet ground, complying with the following guidelines:

    -   A convenient earth ground, such as an electrical box or a ground bus, must be provided to the DirecDoor enclosure.
    -   The earth ground connection shall be made to the terminal lug provided. Mount terminal lug to PEM nut on bottom of enclosure using #8-32 SEMS screw provided. (See *Figure 4, Wiring earth ground* on page 20.) Use #14-18 AWG wire.

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

Figure 4. Wiring earth ground

INSTALL GROUND LUG AS SHOWN
TO BOTTOM OF ENCLOSURE,
USE #8-32 SEMS SCREW PROVIDED
ATTACH #14-18 AWG EARTH GROUND
WIRE TO LUG.

BOTTOM OF ENCLOSURE

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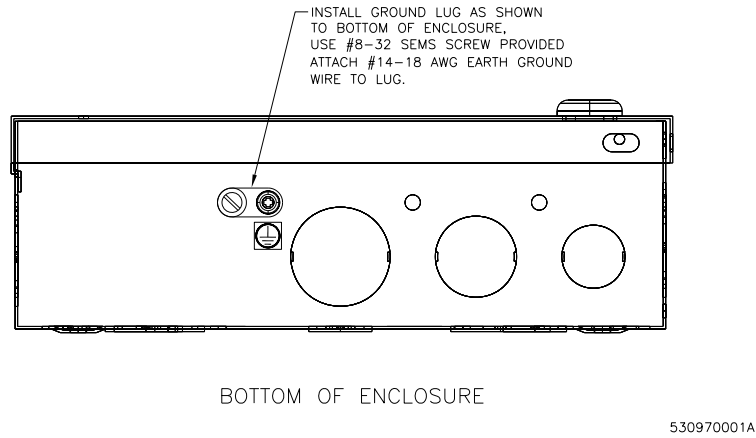
Installing the battery backup, AC fail and low battery

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

Note: The Low Battery option has not been evaluated by UL at this time.

Connect AC power fail input from a battery backup unit to connector J8 between pin 2 (Gnd) or pin 4 (Gnd) and pin 3 (AC fail). The battery backup unit must supply either normally closed dry contact or a sense line that is low (Gnd), meaning no AC power failure.

⚠️ **CAUTION:**   Make sure AC input and battery backup power is disconnected before installing controller, reader, DIs, and DOs.

Figure 5. Wiring auxiliary power supply with built-in relay for fault output (AC power fail)

Auxiliary Power Supply Wiring

DirecDoor J8	Inputs	Pin		Outputs	Auxiliary Power Supply 24 VDC 1 Amp (Installer Supplied)
	+24 VDC	1		+24 VDC	
	Ground	2		Ground	
	AC Fail	3		AC Fail	
	Ground	4			
	Low Battery (not used)	5			

Chassis Ground
Factory Wired
Do Not Remove

531001001A
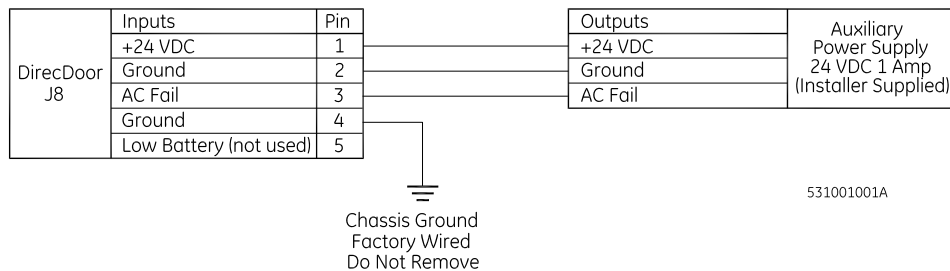
Wiring tamper switch

The tamper switch is factory wired to W5 on the DirecDoor board. If a tamper switch is not used, disconnect wiring from W5 and install mini-jumper across both terminals. The mini-jumper is installer supplied.

Chapter 4 DirecDoor Board

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

In this chapter:

Introduction

The DirecDoor board provides network and dial fallback 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 fallback.
- Provides nonvolatile storage referred to as persistent mode of operation. This means a faster reset recovery and allows for host-less operation.
- Utilizes a 32-bit platform which provides better response times and higher capacity.
- Allows for remote diagnostics.
- Provides a browser-based configuration tool. Refer to *Chapter 8, Controller Firmware Tools* on page 53.
- Works with:
    - Picture Perfect 4.0 or later
    - Facility Commander Wnx 7.0 or later

    Refer to the appropriate user manual for configuration of this board within the software.

- Provides a tunable offline history buffer.

A layout of the DirecDoor board is shown on the following page.

Board layout

Figure 6. DirecDoor board layout

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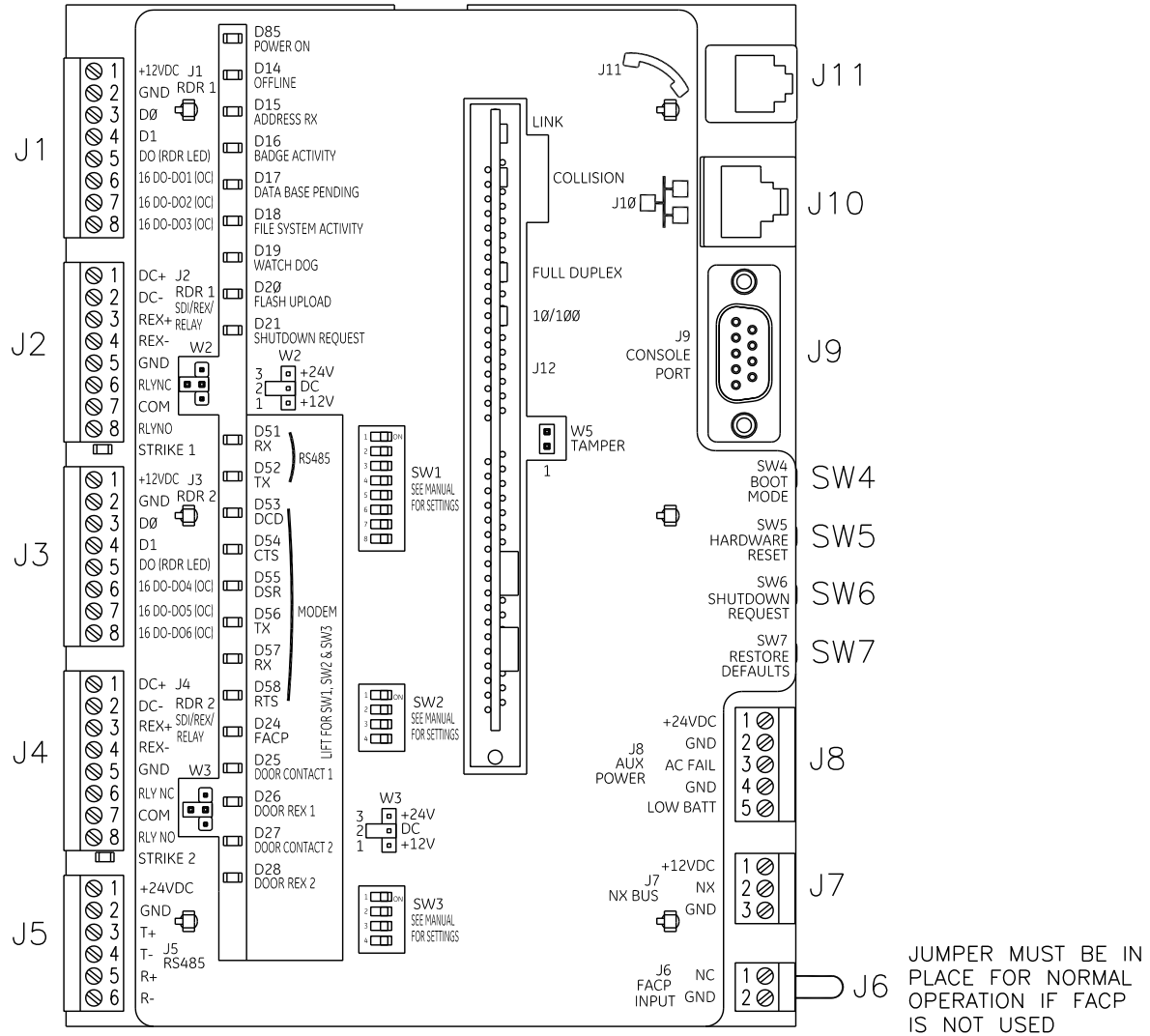
Switches and jumpers

Switches

Table 9.   Switches

Switch	Purpose
SW1 Reader Technology and Supervised DI/REX	Refer to *Table 26* on page 37 and *Table 27* on page 38.
SW2 4-position	Set all to OFF.
SW3 RS485 configuration	Refer to *Table 10* on page 25.
Switches SW4 through SW7 are right-angle momentary contact push buttons.	
SW4 Boot Mode	**This function manually enables the Integrated Configuration Tool.** To enable the Integrated Configuration Tool: • Press and hold SW4 until D19 (Watch dog LED) turns ON. Allow up to five seconds for D19 to turn ON. • Once D19 is ON, release SW4. D19 turns OFF once the Integrated Configuration Tool has been manually enabled.
SW6 Shutdown Request	See *Safe Shutdown Procedure for the DirecDoor Board* on page 33.
SW7 Restore Defaults	Returns the configuration to the factory defaults: • **Primary Connection Type:** Ethernet • **IP Address:** 192.168.6.6 • **Mask:** 255.255.255.0 • **Gateway:** 192.168.6.1 Press SW7 for a **minimum** of five seconds, then release.
SW5 Hardware Reset	Reboots the DirecDoor board. The switch should only be used when performing a controlled manual shutdown of the application as indicated below or if instructed to do so by Technical Support. **To properly restart the board use both SW6 and SW5.** First, press and release SW6 to stop the application, then press and release SW5 to restart (reset) the board.

Table 10. SW3

	SW3-	
120 ohms transmit pair termination	1	ON
No transmit pair termination (default)	1	OFF
120 ohms receive pair termination	2	ON
No receive pair termination (default)	2	OFF
RS485 - 4 wire (default)	3, 4	OFF
RS485 - 2 wire	3, 4	ON

Jumpers

J1 through J4

Connectors J1 through J4 are pluggable screw terminal blocks. For connectors J1 through J4 pinouts, refer to: *Table 30, J1/J3: Connecting T-5xx series reader* on page 39 and *Table 32, J2/J4: Door and exit DI wiring* on page 40.

J5

Not implemented: Connector J5 is a pluggable screw terminal block.

Not evaluated by UL at this time.

Table 11. J5 - RS485 Expansion Port

Pin	Signal Name
1	24 VDC Power Out
2	Ground
3	485T+
4	485T-
5	485R+
6	485R-

J6

Connector J6 is a pluggable screw terminal block.

For connector J6 pinouts, refer to: *Table 34, J6 - FACP Input, Normally Closed* on page 46.

J7

Not implemented: Connector J7 is a pluggable screw terminal block.

Not evaluated by UL at this time.

Table 12. J7 - NX Bus

Pin	Signal Name
1	12 VDC Power Out
2	NX Bus Data
3	Ground

J8

Connector J8 is a pluggable screw terminal block.

Refer to *Table 7, J8 - Power input port* on page 17. Not evaluated by UL at this time.

J9

Connector J9 is a 9 pin female D-sub receptacle which controls the console port.

Not evaluated by UL at this time.

Table 13. J9 - Console Port

Pin	Signal Name
1	No connection
2	Transmit
3	Receive
4	No connection
5	Ground
6	No connection
7	No connection
8	No connection
9	No connection

J10

Connector J10 is an RJ45 Standard Cat 5 jack which controls the RJ45 network connection.

Table 14. J10 - Network Connection, RJ45

Pin	Signal Name
1	T+
2	T-
3	R+
4	RC
5	RC
6	R-
7	TC
8	TC

J11

Connector J11 is an RJ11 standard telephone jack.

Note: Telephone connection must be dedicated to the DirecDoor controller.

Table 15. J11 - Telephone Line, RJ11

Pin	Signal Name
1	No connection
2	No connection
3	RING
4	TIP
5	No connection
6	No connection

W5

Table 16. W5 - Tamper

Function	W5 Pins
Tamper Input	1 and 2

LED indicators

LED indicators on the DirecDoor board

The LED state depends on which state the controller is in. There are two main modes with several substates:

- **Maintenance mode:** the state of the controller before any application is running. There are two maintenance mode states:
  - **Boot mode (D16 On)**- indicates the bootloader is running and loading, verifying and invoking the run-time images. This is a status LED only.
  - **OS (operating system) maintenance mode (D15 and D16 alternate On and D20 On) -** the controller enters this mode after boot mode when it first comes up and when it is never configured before. Holding SW6 (Shutdown request switch) will force the controller into this mode.
- **Normal operation mode:** the state of the controller after the application is downloaded. Use the Integrated Configuration Tool to select the application. During this mode, the following additional states can occur:
  - **Controller offline (D14 On):** the controller has lost communication with the host.
  - **Address received (D15 On):** the controller receives a message from the host.
  - **Badge read OK (D16 On):** the controller decoded a badge read and determined that it was a valid badge.
  - **Waiting for database (D17 Flashes):** the controller is waiting to receive database from host.
  - **Restore defaults requested (D17 and D20 On):** indicates SW7 (Restore defaults switch) was pressed which requests that the defaults be restored. Refer to *Restore Factory Defaults* on page 74.
  - **Shutdown requested (D17 and D21 On):** indicates SW6 (Shutdown Request switch) was pressed. This requests that the application shut down so that a hard reset can be done.
  - **eFlash image save (D20 and D21 alternates On):** indicates that the newly loaded image from the eFlash transfer is being saved into the FLASH. This is an activity indicator only.
  - **Persistence (D21 On):** indicates that the controller is operating without a host. In this mode, the controller is operating standalone until communication is re-established with the host. Items to note:
    - Upon restoration of communications with the host, the host automatically sets badge status for Anti-passback to neutral for all badges on the controller.
    - Unknown badges cannot be learned because the controller is not online with the host. The Unknown badge transactions are mislabeled in the history upload as transaction type Learn Timeout instead of Unknown Badge.

Table 17. Persistence mode times

Controller	Time (in minutes) for controller to go into persistence mode	
	Picture Perfect	**Facility Commander Wnx**
Network/direct	3	1
Modem only	10	4
Network + modem	13	4

- **Flash write (D19 Flashes):** indicates that the controller is storing database records into the Flash file system. This is an activity indicator only.
- **Manual ICT Enable (D19 On):** indicates SW4 (Boot mode switch) was pressed which manually enables the Integrated Configuration Tool.

Table 18 on page 30 and *Table 19* on page 31 show the LED state transitions. See *Table 37, DirecDoor board LED fault conditions* on page 89 for error conditions.

See *Figure 6, DirecDoor board layout* on page 23for the location of the LEDs.

Table 18. DirecDoor board LED normal state transitions (D14 through D18)

	D14	D15	D16	D17	D18
	Red	Red	Red	Red	Red
	Offline	**Address Rx**	**Badge Activity**	**DB Pending**	**File System Activity**
During power up					
Boot maintenance mode			ON		
OS (Operating system) maintenance mode		Alternates ON with D16	Alternates ON with D15		
Normal operation mode					
Controller offline	ON				
Address received		ON			
Badge read			ON		
Waiting for database				Flashes*	
Restore defaults requested				ON	
Shutdown requested				ON	
eFlash image save					
Persistence					
Flash write					
Manual ICT Enable					
Watch dog failure mode					ON

*.   For Picture Perfect systems: D17 blinks once per second.
     For Facility Commander Wnx systems: D17 blinks twice followed by a one-second delay before repeating.

▢ = OFF

Table 19. DirecDoor board LED normal state transitions (D19 through D21, D51 and D52)

	D19	D20	D21	D51	D52
	Red	Red	Red	Yellow	Green
	Watch Dog	Flash Upload	Shut down Request	RS485 RX	RS485 TX
During power up					
Boot maintenance mode					
OS (Operating system) maintenance mode		ON			
Normal operation mode				Flashes	Flashes
Controller offline					
Address received					
Badge read OK					
Waiting for database					
Restore defaults requested		ON			
Shutdown requested			ON		
eFlash image save		Alternates ON with D21	Alternates ON with D20		
Persistence			ON		
Flash write	Flashes				
Manual ICT Enable	ON				
Watch dog failure mode		ON			

▨ = OFF

Input LED indicators on the DirecDoor board

See *Figure 6, DirecDoor board layout* on page 23 for the location of the LEDs.

Table 20. Input LEDs on the DirecDoor board

LED number	Name	Description
D24	FACP	Fire Alarm Connection Point • **ON** - Open • **OFF** - Closed
D25	Door Contact 1	Indicates physical input state. • **ON** - Closed • **OFF** - Open • **Flashing** - Fault
D26	Door REX 1	Indicates physical input state. • **ON** - Closed • **OFF** - Open • **Flashing** - Fault
D27	Door Contact 2	Indicates physical input state. • **ON** - Closed • **OFF** - Open • **Flashing** - Fault
D28	Door REX 2	Indicates physical input state. • **ON** - Closed • **OFF** - Open • **Flashing** - Fault

Modem LED indicators on the DirecDoor board

See *Figure 6, DirecDoor board layout* on page 23 for the location of the LEDs.

Table 21. Modem LEDs on the DirecDoor board

LED number	Name	Description
D53	DCD - Data Carrier Detect	Modems are connected.
D54	CTS - Clear To Send	Modem is ready to send data.
D55	DSR - Data Set Ready	If a modem is present, this LED is always On.
D56	TX - Transmit	Modem is sending data.
D57	RX - Receive	Modem is receiving data.
D58	RTS - Request To Send	Controller is ready to send data.

UCSIMMPlus board LED indicators on the DirecDoor board

Table 22. UCSIMMPlus board LED indicators

	Color	Purpose (Type 2 SIMM and Type 3 SIMM)
DS1 and DS5	Green	**ON** - Link activity present.
		OFF - No link activity present.
		Flashing - Network activity detected.
DS2 and DS6	Yellow	**ON** - 100 Mbps
		OFF - 10 Mbps
DS3 and DS7	Red	**ON** - Full duplex
		OFF - Half duplex
DS4 and DS8	Red	**ON** – Collision

Safe Shutdown Procedure for the DirecDoor Board

The following procedure can be performed in maintenance mode or normal operation mode.

1. Press SW6 and hold SW6 for 3 seconds until D14 through D21 turn on and stay on.

2. Wait for about 5 seconds.

At this point power to the CPU board may be removed or reset via SW5.

Note: The halt state lasts for approximately 40 to 45 seconds, after which the system will autorestart.

Important information for firewall users

If your installation requires ANY controller 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 23. For firewall users

Port	Name	Description
6767	Application (Picture Perfect)	Normal operation data port between controller and host.
6700-6709	Application (Facility Commander Wnx)	Normal operation data port between controller 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: controller firmware installation tools, Picture Perfect, Facility Commander Wnx, DirecDoor, Micro/5-PXN, M5PXNplus, Micro/PXN-2000, M2000PXNplus, and M3000PXNplus.

Configuring upstream communications with the host

By network

1. Verify that you have a working network. If you need to configure before your network is running, skip to *step 4*.

2. Loop network cable through the ferrite provided. See *Figure 28, Installing ferrite* on page 81.

   Note: Ferrite must be installed inside of the enclosure.

3. Connect the network cable into J10, the Ethernet connector.

4. Use the Integrated Configuration Tool to set the board to network use. The default for this board is network so you may only need minimal set up. See *Chapter 8, Controller Firmware Tools* on page 53.

By network with dial fallback

Note: Dial fallback is available only using the on-board modem.

1. Install the modem board on the DirecDoor board. Refer to the document *DirecDoor Modem Board Installation Instructions*.

2. Verify that you have a working network. If you need to configure before your network is running, skip to *step 5*.

3. Loop network cable through the ferrite provided. See *Figure 28, Installing ferrite* on page 81.

   Note: Ferrite must be installed inside of the enclosure.

4. Connect the network cable into J10, the Ethernet connector.

5. Use the Integrated Configuration Tool to set the board to network use with dial fallback. See *Chapter 8, Controller Firmware Tools* on page 53.

Chapter 5 Reader Interface

This chapter provides information about and instructions for using the readers on DirecDoor.

In this chapter:

Introduction

The reader interface provides four supervised Device Inputs (DI) — two alarm DIs and two exit DIs), two reader LED outputs, and two door strike DO relays. Please note the following:

- The reader voltage is 12 VDC only.
- The reader interface is limited to only one type of reader technology: Wiegand, F/2F, and Supervised F/2F.
- The reader interface has built-in pull-up resistors to accommodate cable lengths over 500 feet (152.40 meters). External pull-up resistors are not required for the reader interface.
- In Supervised F/2F mode, the DI (alarm point) is available at the reader or at the controller on UTC Supervised F/2F readers that support DIs and Exit DIs.
- Each reader, DI point, and Exit DI on the reader interface is addressed differently depending on the host system you are using.

Device addressing

Picture Perfect

Table 24. Reader device addressing - Picture Perfect

	Board 1
Readers	0 and 1
Door DIs	0 and 1
Exit DIs	8 and 9
Door DOs	0 and 1

Facility Commander Wnx

The following device addresses are created for you by the Facility Commander Wnx software. This table is provided for your reference only. The device address is in the format $mmmm\text{-}b\text{-}pp$ where $mmmm$ represents the controller number, b represents the board number, and pp represents the point or device number.

Table 25. Reader device addressing

	Board 1
Readers/Door DOs	*mmmm*-1-01 *mmmm*-1-02
Door DIs	*mmmm*-1-01 *mmmm*-1-02
Exit DIs	*mmmm*-1-01 *mmmm*-1-02

Setting the DIP switches

Set DIP switches as described in the tables below before installing and wiring readers.

Table 26. Reader technology and format (SW1-1 through SW1-4)

Reader technology and format		SW1-1	SW1-2	SW1-3	SW1-4
Not Valid					
Reserved		ON			
Reserved			ON		
Magstripe - Reversed Strobed		ON	ON		
Magstripe - Water-Mark				ON	
Magstripe - UTC Supervised F/2F (default)		ON		ON	
Magstripe - Strobed			ON	ON	
Magstripe - F/2F		ON	ON	ON	
Wiegand -	3701				ON
	3702[1]				ON
	3201	ON			ON
	34 bit KSC	ON			ON
	38 bit ADT	ON			ON
	3601	ON			ON
	3202		ON		ON
	4001		ON		ON
	4401		ON		ON
	64 bit BCD		ON		ON
	2802	ON	ON		ON
	2804	ON	ON		ON
	3600	ON	ON		ON
	2700			ON	ON
	2801			ON	ON
	32 bit Motorola Indala			ON	ON
	75 bit PIV			ON	ON
	2800	ON		ON	ON
	35/37 bit Hughes	ON		ON	ON

Table 26. Reader technology and format (SW1-1 through SW1-4) (continued)

Reader technology and format		SW1-1	SW1-2	SW1-3	SW1-4
Wiegand -	26 bit		ON	ON	ON
	34 bit CardKey				
	35 bit Hughes				
	4002				
	2500	ON	ON	ON	ON
	2804				
	3400				
	3703				

1.   Facility Commander Wnx uses this switch setting as Custom Wiegand.

▨ = OFF

Note: On DirecDoor controllers, the reader board address is internally set to Address 1.

Table 27. Supervised DI/REX

	SW1-7
Supervised DI/REX 1, 4-state	ON
Supervised DI/REX 1, 2- state (default)	
	SW1-8
Supervised DI/REX 2, 4-state	ON
Supervised DI/REX 2, 2-state (default)	

▨ = OFF

Setting the jumpers

Table 28. W2 - Reader 1, Relay Power

Function	W2 Pins
+12 VDC	1 and 2
+24 VDC	2 and 3
Dry contact (default)	2

Table 29. W3 - Reader 2, Relay Power

Function	W3 Pins
+12 VDC	1 and 2
+24 VDC	2 and 3

Table 29. W3 - Reader 2, Relay Power

Function	W3 Pins
Dry contact (default)	2

Wiring the readers

1. Mount the reader. Refer to the manual that came with your reader for specific mounting instructions.

2. Run cable from the reader to the controller. Bring each reader cable through the appropriate knockout hole in the controller enclosure. Allow some slack (service loop) wire for servicing the cables and for plugging cable into an adjacent connector for troubleshooting. See *Figure 7, Dressing the Reader/DO/DI wiring inside of the DirecDoor enclosure* on page 41.

3. Remove eight inches of insulating material from the cable. Unwrap shielding and tie all shields together. Connect the shield wire to the grounding nuts provided outside the controller enclosure. See *Figure 8, Wiring to Wiegand readers, door contacts and exit request* on page 41.

4. Place the appropriate wires to the appropriate screw terminal on the reader interface connectors. Refer to the reader wiring diagrams in this section.

    Note: The reader interface has built-in pull-up resistors. Do not install any external pull-up resistors.

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

    We recommend using 20-AWG shielded cable for wiring reader, DOs, and DIs. Use plenum-rated cable for applications where cable is to be run above the false (suspended) ceiling in the air circulation space.

    Recommended:

    -   Alpha Xtra Guard1® foil shield cable, non-plenum rated
    -   Belden series security and alarm cable (commercial applications shielded), plenum-rated

For readers not listed in the table below, refer to the applicable reader installation manual.

Table 30. J1/J3: Connecting T-5xx series reader

J1/J3 Pin	Signal name	Reader pigtail colors
1	+12 VDC	Red
2	Ground	Black
3	Reader Data 0	Green
4	Reader Data 1	White
5	Door DO (Reader LED)	Orange

See *Figure 8, Wiring to Wiegand readers, door contacts and exit request* on page 41 and *Figure 9, Wiring to F/2F readers, door contacts and exit request* on page 42.

Table 31. J1/J3: Connecting the DO outputs

J1/J3 Pin	Signal name	Cable color
6	16DO - DO (Open Collector)	Blue
7	16DO - DO (Open Collector)	Brown
8	16DO - DO (Open Collector)	Yellow

See *Figure 13, Wiring output device to DO interface* on page 49.

Table 32. J2/J4: Door and exit DI wiring

Pin	Signal name	Cable color
1	Supervised Door DI (Alarm Point) (1K/1K)	Red
2	Supervised Door DI Return	Green
3	Supervised Exit DI (Exit Request) (1K/1K)	Orange
4	Supervised Exit DI Return	White

See *Figure 8, Wiring to Wiegand readers, door contacts and exit request* on page 41.

Table 33. J2/J4: Door strike relay wiring

Pin	Signal name	Cable color
5	Ground	Black
6	Door Strike Relay – Normally Closed (NC)	Blue
7	Door Strike Relay – Common (Com)	Brown
8	Door Strike Relay – Normally Open (NO)	Yellow

See *Figure 10, Wiring door strikes - internal relay/power* on page 44 and *Figure 11, Wiring door strikes - external relay/power* on page 45.

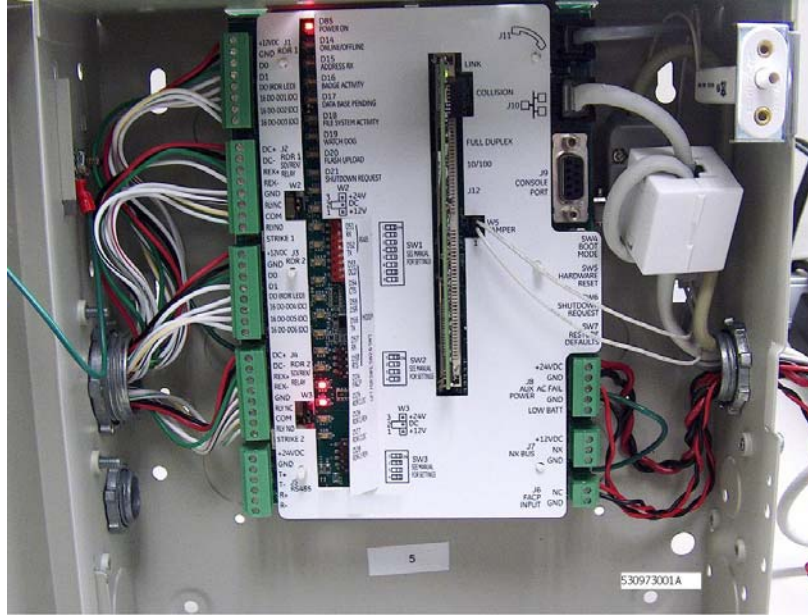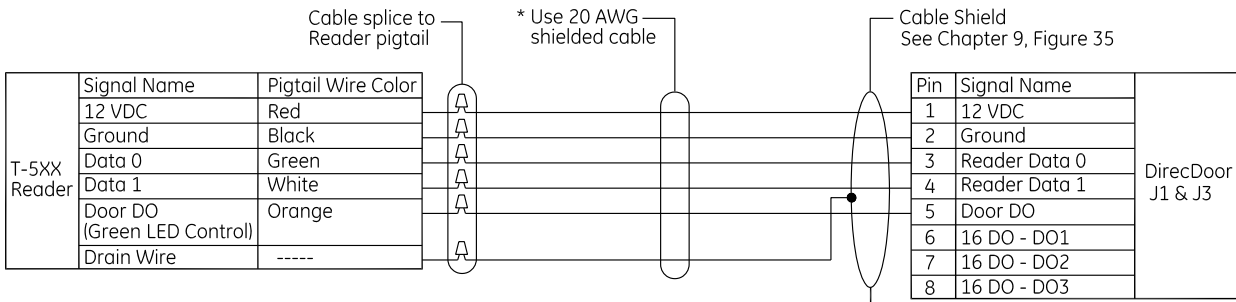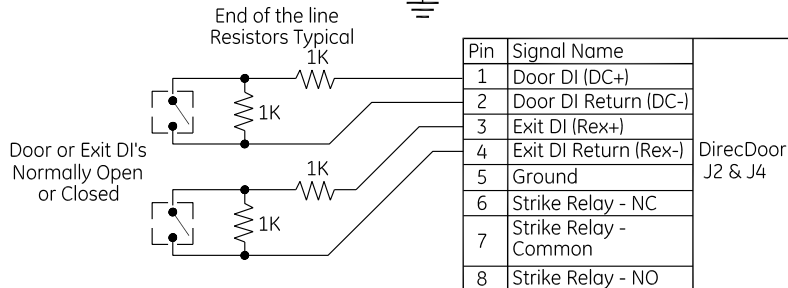*Figure 7. Dressing the Reader/DO/DI wiring inside of the DirecDoor enclosure*

Figure 8. Wiring to Wiegand readers, door contacts and exit request

Wiegand Wiring - 4 State
for 2 State omit 1K resistors

Cable splice to Reader pigtail

* Use 20 AWG shielded cable

Cable Shield
See Chapter 9, Figure 35

	Signal Name	Pigtail Wire Color
	12 VDC	Red
	Ground	Black
T-5XX Reader	Data 0	Green
	Data 1	White
	Door DO (Green LED Control)	Orange
	Drain Wire	-----

Pin	Signal Name	
1	12 VDC	
2	Ground	
3	Reader Data 0	DirecDoor J1 & J3
4	Reader Data 1	
5	Door DO	
6	16 DO - DO1	
7	16 DO - DO2	
8	16 DO - DO3	

Switch	Mode	Setting	
1	Select Reader Technologies See Table 24		
2			
3			
4			
5	N/A		
6	N/A		DirecDoor SW1-
7	Supervised DI/Rex 1, 4-State	ON	
	Supervised DI/Rex 1, 2-State (Default)	OFF	
8	Supervised DI/Rex 2, 4-State	ON	
	Supervised DI/Rex 2, 2-State (Default)	OFF	

End of the line Resistors Typical
1K

Door or Exit DI's Normally Open or Closed

Pin	Signal Name	
1	Door DI (DC+)	
2	Door DI Return (DC-)	
3	Exit DI (Rex+)	
4	Exit DI Return (Rex-)	DirecDoor J2 & J4
5	Ground	
6	Strike Relay - NC	
7	Strike Relay - Common	
8	Strike Relay - NO	

* Use plenum rated cable for applications where cable is to be run above the false (suspended ceiling) in the air circulation space.

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Figure 9. Wiring to F/2F readers, door contacts and exit request

F2F Wiring - 4 State
for 2 State omit 1K resistors

Cable splice to Reader pigtail

* Use 20 AWG shielded cable

Cable Shield See Chapter 9, Figure 35

	Signal Name	Pigtail Wire Color
	12 VDC	Red
	Ground	Black
	Data 0	Green
T-5XX Reader	Data 1	White
	Door DO (Green LED Control)	Orange
	Door DI	Gray
	Exit DI (Rex)	Pink
	Drain Wire	-----

Pin	Signal Name	
1	12 VDC	
2	Ground	
3	Reader Data 0	DirecDoor J1 & J3
4	Reader Data 1	
5	Door DO	
6	16 DO - DO1	
7	16 DO - DO2	
8	16 DO - DO3	

End of the line Resistors Typical

1K   1K
1K   1K

Door or Exit DI's Normally Open or Closed

Switch	Mode	Setting	
1	Select Reader Technologies See Table 24		
2			
3			
4			
5	N/A		
6	N/A		
7	Supervised DI/Rex 1, 4-State	ON	DirecDoor SW1-
	Supervised DI/Rex 1, 2-State (Default)	OFF	
8	Supervised DI/Rex 2, 4-State	ON	
	Supervised DI/Rex 2, 2-State (Default)	OFF	

Pin	Signal Name	
1	Door DI (DC+)	
2	Door DI Return (DC-)	
3	Exit DI (Rex+)	
4	Exit DI Return (Rex-)	DirecDoor J2 & J4
5	Ground	
6	Strike Relay - NC	
7	Strike Relay - Common	
8	Strike Relay - NO	

* Use plenum rated cable for applications where cable is to be run above the false (suspended ceiling) in the air circulation space.

530989002A
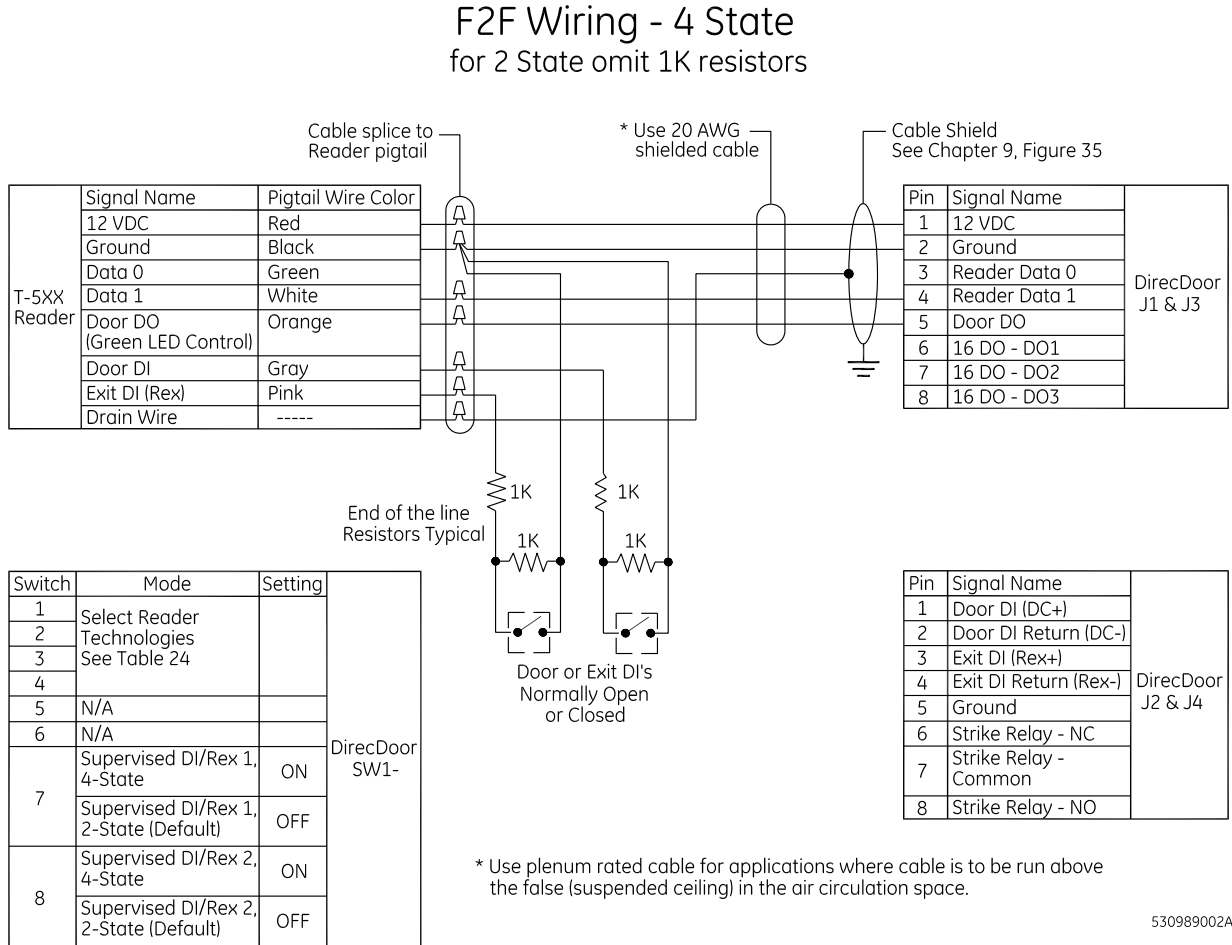
Wiring the Digital Inputs (DIs)

Each reader DI port (J2/J4) has two digital inputs which are used for door status devices (door contacts and exit request input). The inputs can be configured as supervised or non-supervised digital inputs. When the inputs are configured as supervised digital inputs, they require end-of-line resistors. See *Table 27, Supervised DI/REX* on page 38.

1. Follow the installation specifications for the device. Mount the device according to the manufacturer's specifications. The alarm device (door contact) should have a dry contact which can have a normally open or normally closed type switch. A normally closed contact is in its normal or resting position when it is closed. For example, the contact is closed when the door is closed. The opposite is true for a normally open contact. In this case, the contact is open when the door is closed.

2. Select the appropriate digital input for each alarm input device.

3. Configure the appropriate digital input for required operation. See *Table 27, Supervised DI/ REX* on page 38.

4. Ground the shields of the cable at the DirecDoor enclosure grounding studs. Insulate the shield (with tape or shrink tubing) at the DI device end to avoid electrical noise.

5. For 4-state operation, install two end-of-line resistors. Install each resistor as close to the door status contact as possible.

   We recommend the standard 1,000 (1K) ohm, 1/4 watt, 1% tolerance, high-quality end-of-line resistors.

   - See *Figure 8* on page 41 and *Figure 9* on page 42 for the location of the resistors.
   - See *Table 27, Supervised DI/REX* on page 38 for the appropriate switch settings.

6. Wire the supervised door DI between pin 1 (Door DI) and pin 2 (Door DI Return).

7. Wire the supervised exit DI between pin 3 (Exit DI) and pin 4 (Exit DI Return).

8. The contact can be normally open or normally closed.

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

9. Insulate resistors with tape or heat shrink tubing

10. Document how you wired the alarm input devices. Future expansion of the system and its maintenance depend upon accurate documentation.

Wiring the door strikes

One door DO relay is dedicated to each reader port (J2/J4). The door DO is used for strike control, and may implement an external relay if necessary.

1. Install the door strike (12/24 VDC) as required.

2. Wire the door strike to the door DO (internal) relay. Normally open or normally closed dry contacts are available (pin 6 = normally closed, pin 7 = common, pin 8 = normally open).

3. Position jumper headers on W2 and W3 to select 12 VDC or 24 VDC as needed. If an external power supply is intended to be used for powering the strike, leave the jumper off completely. See *Table 28* and *Table 29* on page 38.

4. Install a protection diode. Use 1N4002, 1N4003, or 1N4004 diodes for DC door strikes and Metal Oxide Varistors (MOV) for AC door strikes.

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

Figure 10.Wiring door strikes - internal relay/power
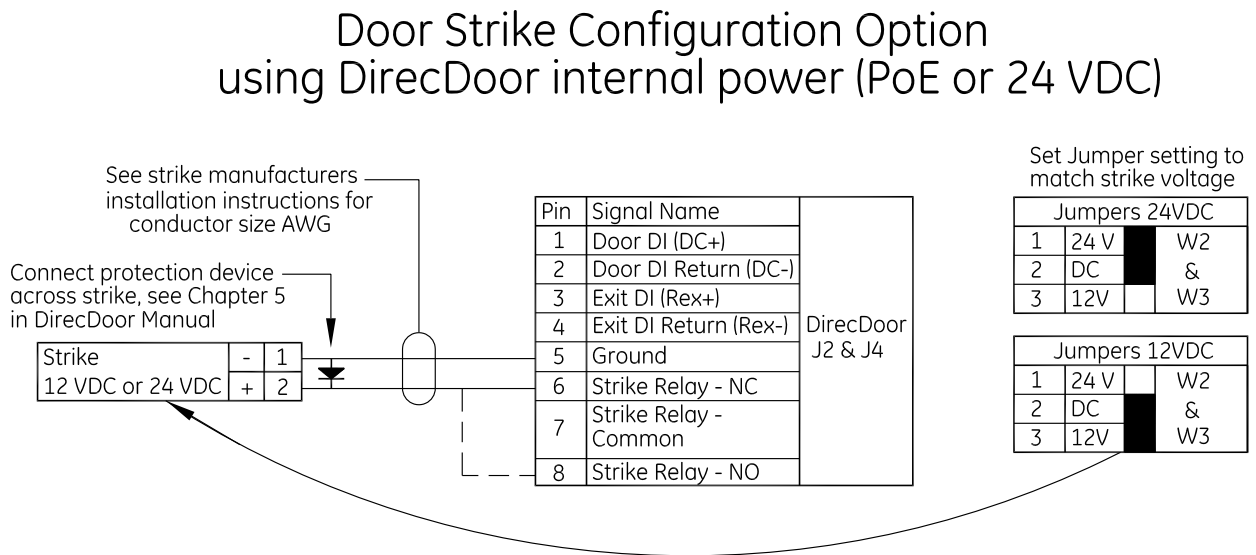
Door Strike Configuration Option
using DirecDoor internal power (PoE or 24 VDC)

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Figure 11. Wiring door strikes - external relay/power

Door Strike Configuration Option
using external strike power

See strike manufacturers installation instructions for conductor size AWG

Connect protection device across strike, see Chapter 5 in DirecDoor Manual

Pin	Signal Name	
1	Door DI (DC+)	
2	Door DI Return (DC-)	
3	Exit DI (Rex+)	
4	Exit DI Return (Rex-)	DirecDoor
5	Ground	J2 & J4
6	Strike Relay - NC	
7	Strike Relay - Common	
8	Strike Relay - NO	

Strike	+	1
	-	2

Set Jumper to Neutral (no connection) position for external strike power

Jumpers		
1	24 V	W2
2	DC	&
3	12V	W3

Strike Power Supply	-	1
	+	2

530992001A

Provide current restriction device, less than 2 Amps through DirecDoor Relay

Wiring the Fire Alarm Control Panel (FACP)

Note: If a Fire Alarm Control Panel (FACP) is NOT used, the Jumper on J6 FACP Input MUST remain in place for correct operation.

Table 34. J6 - FACP Input, Normally Closed

Pin	Signal Name
1	FACP Input
2	Ground

Figure 12.Wiring the Fire Alarm Control Panel (FACP)

FACP (Fire Alarm Control Panel) Wiring

Wiring if FACP is used

DirecDoor J6 *	Signal Name	Pin
	FACP Input, NC	1
	Ground	2

	Signal Name	Fire Alarm Control Panel
	FACP Output, NC	
	Ground	
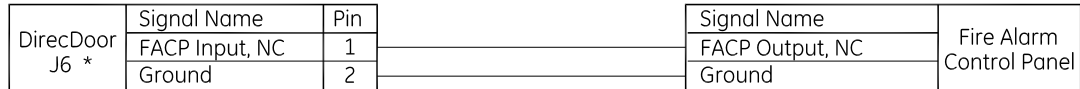
* Remove factory installed jumper on J6

Wiring if FACP is not used

DirecDoor J6	Signal Name	Pin
	FACP Input, NC	1
	Ground	2

Note:
For proper operation, jumper must remain in place if FACP is not used.

530999001A
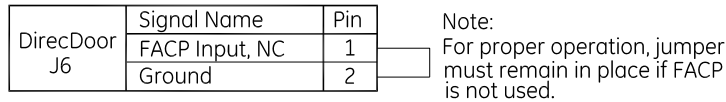
Chapter 6 DO Interface

This chapter provides information about and instructions for using the digital outputs on DirecDoor.

In this chapter:

Introduction

The DO interface provides 6 digital outputs rated at 20 mA @ 12 VDC maximum per output point.

Note the following:

- The maximum allowable distance from the DirecDoor DO interface and the output device is 1,000 feet (304.80 meters).
- Two-conductor, 20-AWG shielded, stranded wire is recommended for the DO interface.
- Each DO point is addressed differently depending on the host software you are using.

Device addressing

Picture Perfect

One board can be configured with DO points from 16 to 21. Picture Perfect addresses DOs by board number; therefore, the DO numbers are the same as the DO interface.

FCWnx

One board can be configured with DO points from 1 to 6. Addressing of DO boards follows the format: `mmmm-b-pp` where `mmmm` represents the controller number to which this DO is associated, `b` represents the board number, and `pp` represents the point or device number. For example:

0001-1-01 = DO on controller 1, DO board 1, DO 1
0001-1-02 = DO on controller 1, DO board 1, DO 2

Wiring Digital Outputs (DOs)

Digital DOs are obtained by using unassigned reader outputs. When used as DOs, these outputs require pull up resistors.

1. Mount the digital output device according to the manufacturer's specifications.

2. Complete the wiring. If the DO is used to energize a relay, install a diode in parallel with the relay coil to absorb transients when the relay is de-energized. A transient protection diode (user supplied) is necessary on the DO interface.

Figure 13.Wiring output device to DO interface

Digital Output Wiring

Connect protection device, current through relay coil must be limited to less than 20mA

* Use 20 AWG shielded cable

Cable Shield
See Chapter 9, Figure 35

Relay 12 VDC — + — — NC — COM — NO

Pin	Signal Name	
1	12 VDC	
2	Ground	
3	Reader Data 0	DirecDoor
4	Reader Data 1	J1 & J3
5	Door DO	
6	16 DO - DO1	
7	16 DO - DO2	
8	16 DO - DO3	

DO Point
DO Point
DO Point

Power Supply — + — — + — Output Device

* Use plenum rated cable for applications where cable is to be run above the false (suspended ceiling) in the air circulation space.

Connect protection device, use Diode 1N4002, 1N4003 or 1N4004

530998002A

Chapter 7 Testing

This chapter provides instructions for testing your DirecDoor installation.

In this chapter:

Testing

For UL-Listed installations, refer to *Chapter 9, Regulatory Information* on page 79.

Follow the steps below before powering up the controller.

1. If using:

    PoE supply:

    Verify that the PoE power input plug at J10 is disconnected.

    Auxiliary power supply:

    1a. Verify that the auxiliary power input plug at J8 is disconnected.

    1b. Measure the AC power being supplied to the power supply (110 VAC or 220 VAC, depending on the power supply installed). The power supply must have a dedicated circuit breaker. Do NOT plug into an outlet that is controlled by an on/off switch.

    1c. Measure the auxiliary power supply output. The output voltage should be 24 VDC nominal.

    1d. Use a voltmeter to measure the input voltage across J8 at pin 1 and pin 2. Verify proper polarity and voltage. (Pin 1 Power, pin 2 or pin 4 Ground). Reverse the wiring, if necessary.

2. Test the reader/DO wiring to determine if a short circuit exists.

3. Disconnect the Reader/DO plug at position J1.

    Verify the wiring going to the Reader/DO by using an ohmmeter to check the resistance between pin 2 and all other pins.

    Repeat for the Reader/DO plug at position J3.

    Result: A measurement of less than 100 ohms indicates a short circuit. Correct this condition before powering up.

4. Test the DI/strike wiring to determine if a short circuit exists.

    Disconnect the DI/strike plug at position J2.

    Verify the wiring going to the DI/strike by using an ohmmeter to check the resistance between pin 5 and all other pins.

    Repeat for the DI/strike plug at position J4.

    Result: A measurement of 100 ohms indicates a short circuit. Correct this condition before powering up.

5. Reconnect all disconnected plugs. DirecDoor powers up and begins its initialization sequence.

Chapter 8 Controller Firmware Tools

This chapter provides information about and instructions for using controller firmware tools.

In this chapter:

Integrated Configuration Tool

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

Requirements

Software requirements

One of the following Internet browsers:

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

Hardware requirements

One of the following cables:

- Cat 5 cable for direct connection to a controller (see *Figure 14* on page 54)
- Cat 5 cable for direct connection to a controller using Power over Ethernet (PoE) (see *Figure 15* on page 55)
- Cat 5 standard cable with network hub (see *Figure 16* on page 55)

Figure 14.Connecting directly using Cat 5 cable

24VDC POWER SUPPLY
(INSTALLER SUPPLIED)
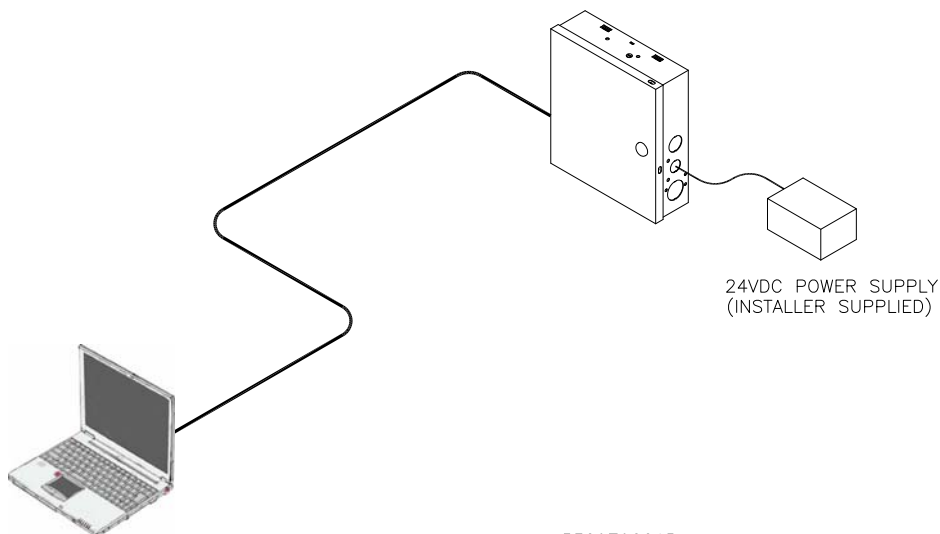
530979001B

Figure 15.Connecting through network hub using PoE or auxiliary supply
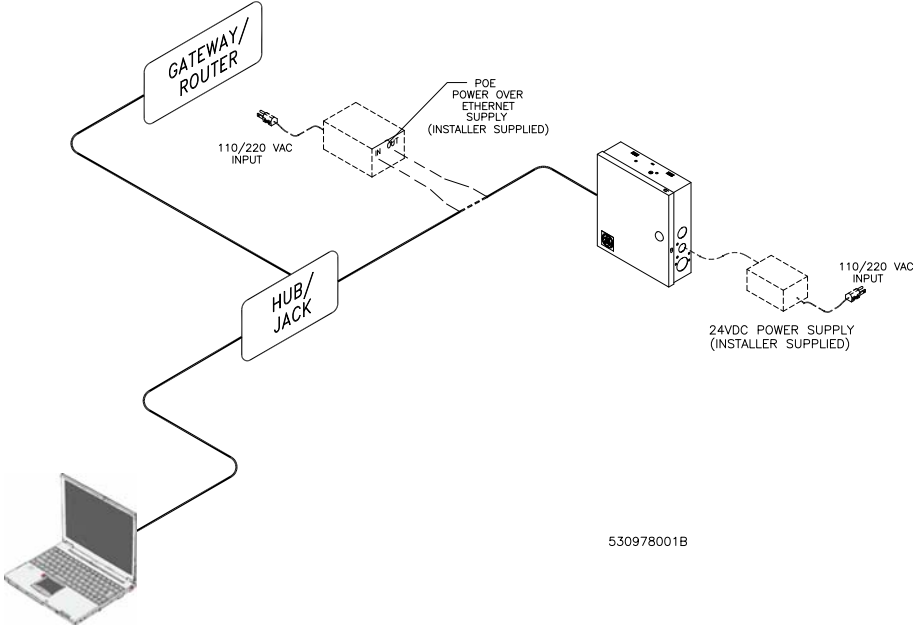
Figure 16.Connecting through PoE hub
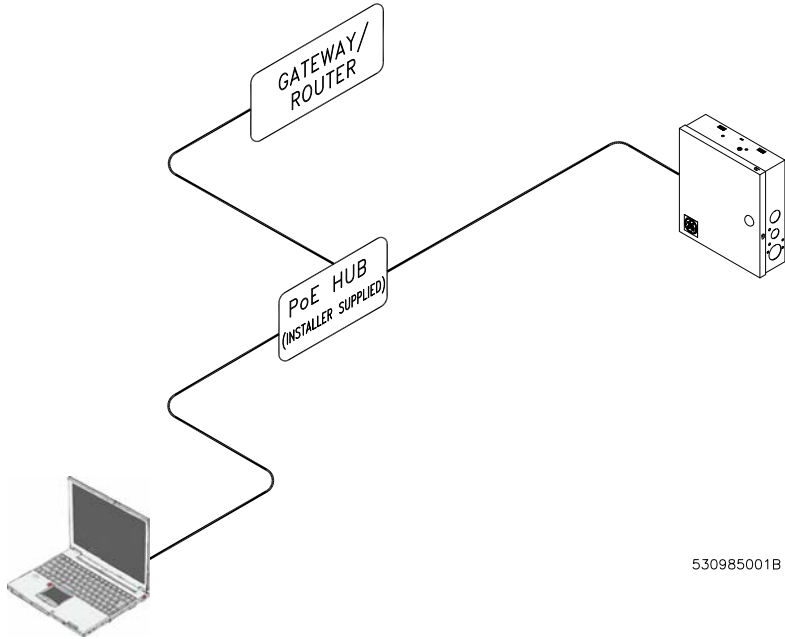
Before you continue

Answer these questions before continuing:

Is there a firewall on the computer you are using to access the Integrated Configuration Tool? If yes, you will need to disable it in order to use the Integrated Configuration Tool.

Is your network using a proxy? If yes, you will need to disable the proxy or bypass it.

Complete the *Configuration checklist for Integrated Configuration Tool* on page 76 for each controller that you will be setting up.

Connecting and starting the tool

If this is a new controller, there are special first-time configuration instructions. Refer to *First-time configuration* on page 56.

Starting the tool

1. Connect the PC to the RJ45 connector on the DirecDoor board using a network hub or "crossover" cable.

2. In the browser Address field, enter the IP address of the controller.

3. At the password screen, enter your username and password. The default is `install`, `install`. We recommend that you change this default. See *Change Username/Password* on page 72.

If you need to flash the controller, see *Flash controller menu/Flash controller* on page 74.

First-time configuration

1. By default, the controller's IP address is `192.168.6.6`. To have your laptop/computer communicate with the controller, 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 according to which version of Windows you are using. 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 controller 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`.

Note: You do not need to change the gateway.

i.   Click **OK** until all open windows are closed.

j.   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 controller 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`.

Note: 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 the **Start** button, **Control Panel**, **Network and Internet**, and then **Network and Sharing Center**.

b. In the "View your active networks" section of the form, click the **Local Area Connection** link.

Note: If you are not currently connected to a network, restore the connection before continuing. Use the Windows Network Diagnostics tools, or contact your Network Administrator for assistance.

c. In the Local Area Connection dialog box, click **Properties**.

d. In the Local Area Connection Properties dialog box, select either **Internet Protocol Version 4 (TCP/IPv4)** or **Internet Protocol Version 6 (TCP/IPv6)**.

e. Click Properties.

   • If **Obtain an IPvx /Address Automatically** is already checked, select **Use the Following IPvx Address**, where *x* is the Internet Protocol Version you are using (4 or 6).

   • If the connection is static, write down the IP address and Subnet mask number. You will need to reset your computer back to these numbers once the controller configuration is complete.

f. 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).

g. Change the Subnet Prefix Length value to `255.255.255.0`.

Note: You do not need to change the default gateway.

h. Click **OK** and **Close** until all open windows are closed.

i. Go to *step 2*.

2. Connect the Cat 5 crossover cable from the Ethernet port on your laptop or computer directly to the controller Ethernet port (no hub or switch).

3. If your controller is not yet powered up, do so now.

4. Open an Internet browser window on your computer.

5. In the browser's Address field, enter the default static IP address of the controller: `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. Refer to *Change Username/Password* on page 72.

Controller setup overview

In order to set up the controller, you must complete these screens:

- **Controller Configuration menu->Host/Connection type:** Select the software package and network. See *Controller Configuration menu -> Host/Connection type* on page 60.
- **Controller Information menu->Controller Information:** Set the controller address. (Required for Picture Perfect network controllers using dial fallback and all Facility Commander Wnx controllers.) See *Controller Information menu -> Controller Information* on page 61.
- **Controller Parameters menu->Network Configuration:** The setup depends on whether the IP address is static or dynamic. See *Network configuration* on page 63.
- **Controller Parameters menu->Dial Configuration:** If using the optional dial fallback feature, you must complete the Dial configuration page also. See *Dial configuration* on page 65.

Saving configuration changes

Before using the Integrated Configuration Tool, note the following details about saving your changes:

- If you change any options on a form, you must click the **Save** button at the bottom of the form to save your changes before switching to another form. This action saves your latest changes to a temporary file.
- Select Apply Changes from the Administration menu after you have made all necessary changes in the Integrated Configuration Tool. You will be prompted to restart either the application or the controller and changes will be saved to the controller's `config` file.
- If you click **Save** on each form, you do not need to apply changes or restart the application until you are finished making all necessary changes.

After completing all the screens, click **Apply Changes** under the Administration menu and then click **Restart Application** for the changes to take effect. See *Table 35* on page 59 for a list of buttons available and when to use them.

Table 35. Buttons available and when to use them

Button	Usage	Result
Save	After making changes on any form	Saves the changes to the shadow *config.txt* file located in the */var/tmp* directory.
Apply Changes	After all the changes are complete	Saves the changes from the shadow *config.txt* file to the real config.txt file located in the */opt/config* directory.
Restart Application	After selecting Apply Changes from the Administration menu	The application picks up the latest changes from the *config.txt* file and starts again.
Restart Controller	After selecting Apply Changes from the Administration menu	The operating system picks up the latest changes and starts again.

Controller Configuration menu -> Host/Connection type

Use the Host/Connection type form to select the software package and connection type used by the computer for which you are configuring the controller.

Figure 17.Host/Connection type form
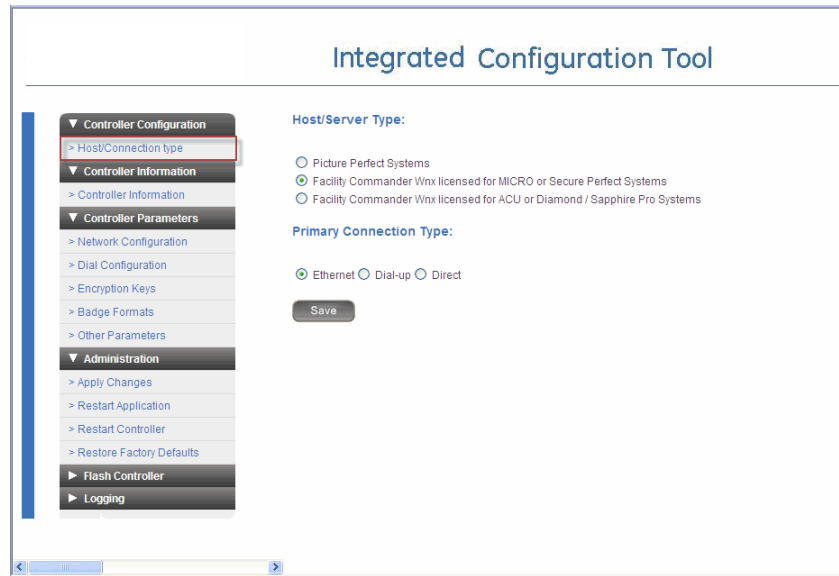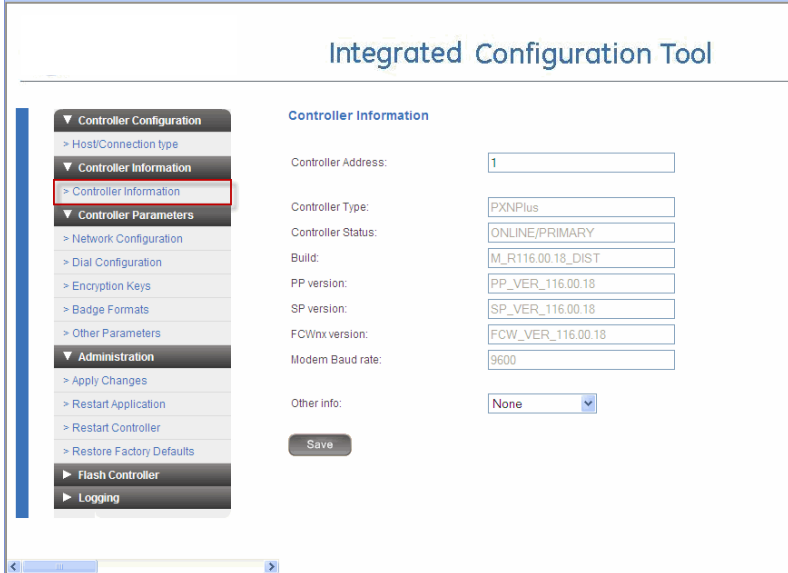
1. If you have not already done so, log on to the Integrated Configuration Tool. See *Starting the tool* on page 56.

2. From the Controller Configuration menu, select Host/Connection type.

3. In the Host/Server Type field, select the software package you are using.

4. In the Primary Connection Type field, select Ethernet.

5. Click **Save**.

6. If this completes your controller configuration, click **Apply Changes** then **Restart Application** now.

Controller Information menu -> Controller Information

Use the Controller Information form to set the controller's address. This form also provides the controller online/offline status, build and application versions, and modem baud rate.

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

*Figure 18.*Controller Information form

1. From the Controller Information menu, select Controller Information.

2. To set the controller address, enter the number in the Controller Address field.

3. To use the status reports in the Other Info field, see *Using the Other Info field* below.

4. Click **Save**.

5. If this completes your controller configuration, click **Apply Changes** then **Restart Application** now.

Using the Other Info field

The Controller Information form provides access to several status reports based on uClinux commands which are available for checking and monitoring the DirecDoor board. Call Technical Support for assistance with these reports.

1. In the Other Info field, click the down arrow for a list of available reports.

2. Select the report you want. See *Table 36* below for a brief explanation of each report.

Table 36. Controller Info reports

Report	Description
Memory Usage	Displays amount of memory available, both used and free.
Process Status	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 controller.
Update History	Lists all updates to the firmware for the selected controller.
Runtime Logs	Provides daily critical runtime information.
Uptime	Shows the time since the last reboot.
DB File Info	Lists persistence-related database files.
Message Info	Lists data on the controller's message queues.
Ping Host	Pings the host from the controller (based on the current host IP or name). Successful ping result: `a.2 packets transmitted, 2 packets received, 0% packet loss` Unsuccessful ping result: `b.2 packets transmitted, 0 packets received, 100% packet loss`
Check Route	Checks route information from the controller.
Thread Status	Lists the application firmware components and whether they are currently running.
DMA Info	Shows the status of the DMA IO interface.

Controller Parameters menu

The menu contains the following options:

- **Network configuration:** configure the network settings.
- **Dial configuration:** configure dial-up settings. See page 65.
- **Encryption Keys:** set data encryption. See page 66.
- **Badge Formats:** set Wiegand and Magnetic Stripe formats. See page 67.
- **Other Parameters:** set parameters such as setting badge history and alarm history memory allocation and changing username and password. See page 71.

Network configuration

Use this form to configure the network settings for the controller. A static or dynamic IP address can be used.

Figure 19.Controller Parameters/Network configuration screen

1. From the **Controller Parameters** menu, select **Network configuration**.

2. In the Controller Information area of the form, set the controller name (DHCP) or address (Static). Refer to the appropriate section that follows.

   DHCP:

   - For a dynamic controller IP address, select Use DHCP.

   To name the controller, perform one of the following:

   - Enter a fully qualified, unique domain name in the Controller name field. For example:

     `micro.utctest.utc.com`

   - Select the checkbox *Use MAC address* and the controller name is generated from the Controller MAC address. (A Media Access Control (MAC) address is a unique identifier

attached to most forms of networking equipment.) The MAC address for your DirecDoor board can be found in the Controller MAC field. This option disables the Controller name field.

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

Static:

- For a static controller IP address, enter the IP address of the controller given to you by your Network Administrator in the Controller IP field.
- If using a gateway, you may accept the gateway IP generated based on the controller IP or you may enter a gateway IP address in the Gateway IP field.
- If using a subnet mask, you may accept the subnet mask generated based on the controller IP or you may enter a subnet mask in the Subnet field.

3. If using FCWnx, skip to . If using Picture Perfect, you must set the host name (DNS) or address (Static). Refer to the appropriate section that follows.

DNS:

- For a dynamic host IP address, select the Use DNS checkbox and enter the host name in the Host Name field.

Note: Due to the limitation on the Picture Perfect host, the DNS/DDNS server needs to be manually updated with the Picture Perfect host name and IP address.

If you set up a static IP address in the Controller Information section, you 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.

- Enter the backup host name in the Backup Host Name field.

Static:

- For a static host IP address, enter the IP address in the Host IP field.
- Enter the IP address in the Backup Host IP field.

4. Click **Save**.

5. If this completes your controller configuration, click **Apply Changes** then **Restart Application** now.

Dial configuration

Use this form to set up the dial fallback feature.

Note: The on-board modem MUST be installed on the DirecDoor board in order to use the dial fallback feature.

*Figure 20.*Controller Parameters/Dial Configuration form

1. From the Controller Parameters menu, then Dial configuration.

2. In the Host Phone # 1 field, enter the phone number for the host computer. Use the format: nnn-nnn-nnnn (For example, 561-555-5555).

3. If there is an additional phone number to reach the host, enter it into the field Host Phone # 2, otherwise, leave the field blank.

   Note: The Modem Init String and Modem Deinit String fields require values only if you are experiencing difficulties with the optional modem board.

4. Click **Save**.

5. If this completes your controller configuration, click **Apply Changes** then **Restart Application** now.

Encryption keys

In order to secure transmissions between the controller and the host, the data is encrypted using triple DES (Data Encryption Standard) encryption. Use this form to enter keys which will create an encryption pattern for transmission.
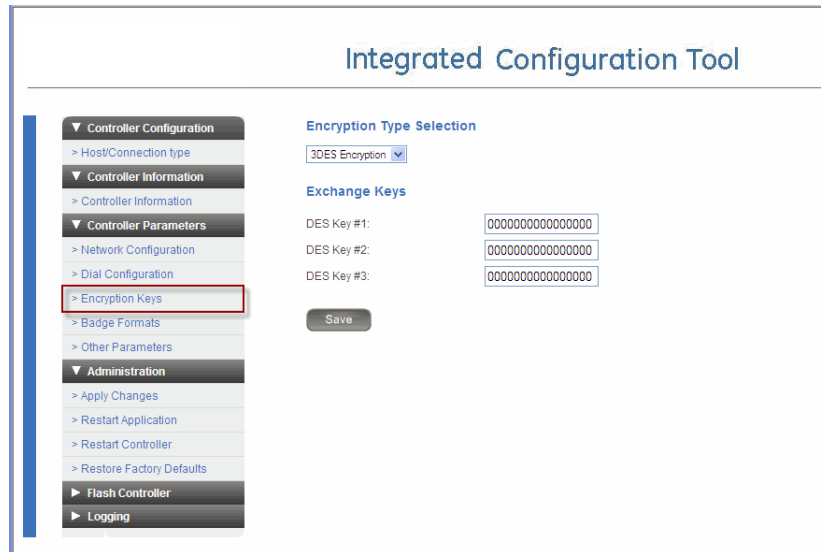
⚠️ **CAUTION:** The host DES keys and the controller DES keys MUST match!

*Figure 21.*Controller Parameters/Encryption Keys form

1. If you have not already done so, log on to the Integrated Configuration Tool. See *Starting the tool* on page 56.

2. Click Controller Parameters, then Encryption keys.

3. In the Encryption Type Selection field, select the type of encryption you want to use.

4. Enter a value in each DES Key field that appears, after noting the following details:

   - DES keys must be exactly 16 characters.
   - DES keys must be valid hexadecimal characters (digits 0—9; upper or lowercase letters A — F).
   - For security reasons, each characters entered in a DES Key field will appear as an asterisk (*).
   - No two or more DES keys can have the same value.

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

5. Click **Save**.

6. If this completes your controller configuration, click **Apply Changes** then **Restart Application** now.

Badge Formats

Note: This section is intended for Picture Perfect users with a working knowledge of universal badge formats. FCWnx users should use the Other Parameters form to configure badge formats.

If you are running Picture Perfect, you can use the Badge Formats form (*Figure 22*) to:

- Create a badge format, as described below.
- Edit a badge format (page 70)
- Delete a badge format (page 70)
- Load a badge format (page 71)

Note: Due to the complexity involved in creating a Wiegand badge format, we recommend that you contact Technical Support for assistance before beginning those steps.

Figure 22. *Controller Parameters/Badge Formats — Create badge format*
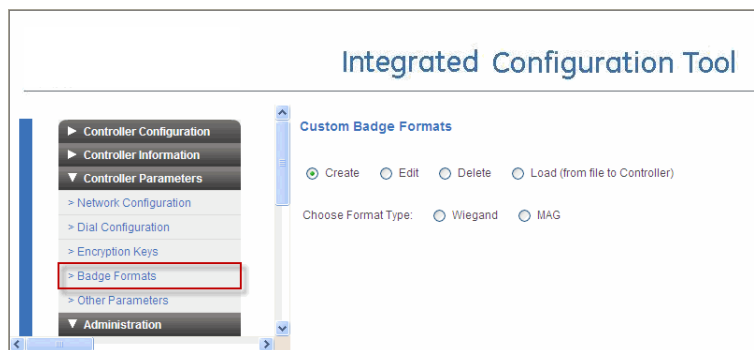
Create a badge format

This section describes how to create a new badge format using either Wiegand or MAG (i.e., magnetic) format.

1. If you have not already done so, log on to the Integrated Configuration Tool.

2. From the Controller Parameters menu, select Badge Formats.

3. Select Create.

4. In the Choose Format Type field, select the format type:

   - If you select *Wiegand* as the format type, you will need to specify how many total bits are in the format, how many characters are in the actual badge data used to represent facility bits, and how many characters will be used to encode the badge number. Continue to step 5.

   Note: Before creating a Wiegand badge format, contact Technical Support for assistance.

   - If you select *MAG* as the format type, skip ahead to *MAG badge format options* on page 69.

Wiegand badge format options

5. In the Format Name field, enter a unique ID for the type of badge format you are creating.

6. In the Total Bit Length field, select the number of bits required to encode and decode badge data.

7. In the Facility Characters field, enter the number of characters required for the facility data.

8. In the Badge Characters field, enter the number of characters required for the badge data.

9. Click each button to select the role of that bit in the badge data, using any of the following Wiegand-format options:

   - B - badge
   - F - facility
   - 1 or 0 - fixed data
   - P - parity
   -      - undefined (blank)

Figure 23.Controller Parameters/Badge Formats — Create Wiegand badge format (Example)
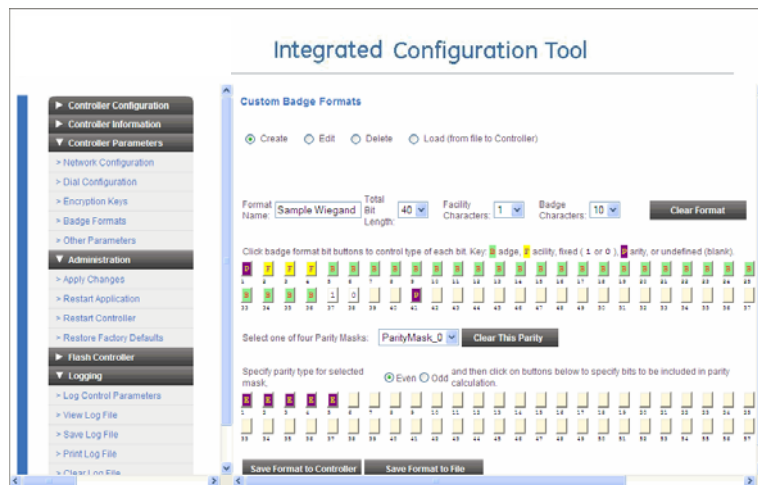
10. If you wish to select a parity mask:

    a. Use the Select One of Four Parity Masks drop-down box to select a parity mask.

    b. Select either the Even or the Odd radio button.

    c. Click on the bits that you wish to check the parity.

11. You have two Save options for saving a Wiegand badge format:

    - Click **Save Format to Controller**. If any errors are encountered, an alert dialog box pops up.
    - Click **Save Format to File**. This saves the badge format file to your local computer.

      a. A confirmation message appears. Click **OK** to continue.

      b. A screen displays with the name of your format and the option to save it on your computer. This is actually an HTML page with your format embedded in it.

   c.   Click **Save format to my computer**. A Save dialog box displays.

   d.   Click **Save**.

Note: If you are using a Netscape or Mozilla browser, you will not be able to access the Save dialog box due to security constraints imposed by those browsers. Instead, use the following steps as a workaround:

   •   Hover the mouse cursor over the Format frame, and then click the right mouse button.

   •   From the popup menu, select *This Frame*.

   •   From the submenu, select *Save Frame As*.

   •   A Save As dialog box displays the default file name, `wiegand.html`. Replace the file name with one appropriate for your site and navigate to the directory where you to save the file.

12. If you are finished configuring the controller, select Apply Changes from the Administration menu, and then select Restart Application.

MAG badge format options

If you selected *MAG* as the custom badge format in step 4, continue to step 5 (below) to specify the start character, badge and/or facility characters, constant characters, and blank characters to be used for the format.

5. In the Mag Format field, enter the mag badge file format you want using the following characters:

   -   `B` = start character

   -   `N` = badge or facility/site character

   -   `0 - 9, A, C, D, E` = valid values for constant characters

   -     = blank character

For example: `BNNNNN99ACDE`

This represents a badge number with one start character, five badge or facility/site characters, and six constant characters of "`99ACDE`".

Figure 24.Other Parameters/Badge Formats — Create MAG badge format
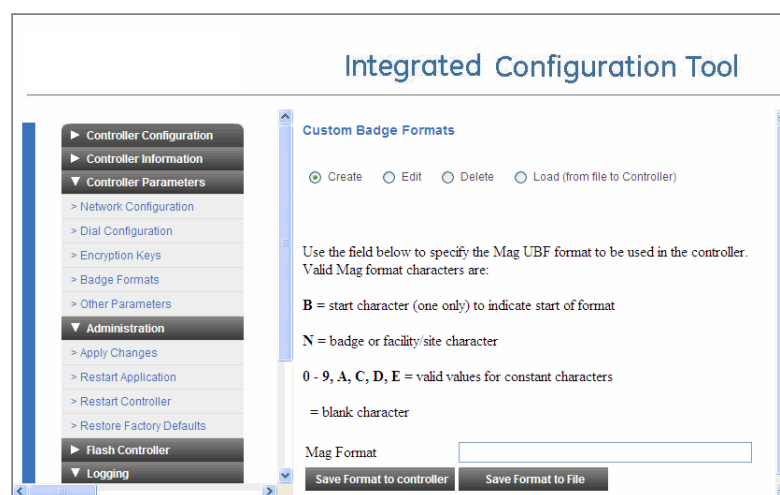
6. You have two options for saving a MAG badge format.

- Click **Save Format to Controller**. If any errors are encountered, an alert dialog box pops up.

- Click **Save Format to File**. This saves the badge format file to your local computer.

   a. A confirmation message appears. Click **OK** to continue.

   b. A screen displays with the name of your format and the option to save it on your computer. This is actually an HTML page with your format embedded in it.

   c. Click **Save format to my computer**. A Save window displays.

   d. Click **Save**.

   Note: If you are using a Netscape or Mozilla browser, you will not be able to access the Save dialog box due to security constraints imposed by those browsers. Instead, use the following steps as a workaround:

   • Hover the mouse cursor over the Format frame, and then click the right mouse button.
   • From the popup menu, select *This Frame*.
   • From the submenu, select *Save Frame As*.
   • A Save As dialog box displays the default file name, `mag.html.` Replace the file name with one appropriate for your site and navigate to the directory where you want to save the file.

7. If you are finished configuring the controller, select Apply Changes from the Administration menu, and then select Restart Application.

Edit a badge format

1. Select Badge Formats from the Controller Parameters menu of the Integrated Configuration Tool.

2. Select Edit.

3. In the Choose Format Type field, select a format type.

4. Edit the existing format type.

- If you selected *Wiegand* in step 4, select the file you want to edit then click **OK**. See page 68 for details about the Wiegand format options.

- If you selected *MAG* in step 4, the existing MAG format options appear. See "MAG badge format options" on page .69 for details about the MAG format options.

   Note: You can create multiple Wiegand format files, but only one type of MAG format file. Any changes you make to a MAG file will overwrite the existing MAG format file.

5. Click **Save Format to Controller**.

6. If you are finished configuring the controller, select Apply Changes from the Administration menu, and then select Restart Application.

Delete a badge format

1. Select Badge Formats from the Controller Parameters menu of the Integrated Configuration Tool.

2. Select Delete.

3. In the Choose Format Type field, select the format type.

- If you select *Wiegand*, select the file you want to delete and then click **OK** to confirm the deletion.
- If you select *MAG,* the single MAG format file is deleted. (Only one MAG file can exist.)

Load a badge format

You can also use the Badge Formats form to search your file system for a badge format file to send to the controller.

1. Select Badge Formats from the Controller Parameters menu of the Integrated Configuration Tool.

2. Select Load (from file to Controller).

3. In the Choose Format Type field, select either *Wiegand* or *MAG*.

4. Click **Browse**.

5. Navigate to and select the badge format file you want.

6. Click **Save**.

7. If you are finished configuring the controller, select Apply Changes from the Administration menu, and then select Restart Application.

Other Parameters

Depending on the Host/Connection type being used, some or all of the following fields appear on the Other Parameters form, which is shown in *Figure 25*.

Figure 25.Parameters/Other Parameters form (Example)

Note: Be sure to click **Save** at the bottom of the Parameters/Other Parameters form before switching to another form. If you are finished configuring the controller, select Apply Changes and then Restart Application from the Administration menu.

The various fields that appear on the Other Parameters form are described in the following sections.

Change Username/Password

Set the username and/or the password used to log on to the Integrated Configuration Tool. By default, these values are set to "install, install". For increased security, we recommend that you change the default values.

Enable/Disable Integrated Configuration Tool

Control access to the Integrated Configuration Tool by selecting one of two options:

- Temporary allows access to the Tool until the controller resets.
- Permanent allows access until you manually disable the Tool again.

Note: Before you begin, you MUST have physical access to the controller.

To enable the Integrated Configuration Tool *temporarily*:

1. Verify that the controller has completed the power-up boot cycle by checking that DS7 is no longer in the constant ON state.

2. Verify that DS6 turns ON. Allow up to five seconds for DS6 to turn ON. Once DS6 is ON, remove the jumper and DS6 turns OFF.

3. The Integrated Configuration Tool is now enabled until the controller reboots.

To enable the Integrated Configuration Tool *permanently*:

1. Complete the steps to enable the tool temporarily, as listed above.

2. Log on to the Integrated Configuration Tool.

3. From the Controller Parameters menu, select Other Parameters.

4. Select *Enable Integrated Configuration Tool*, then click **OK**.

5. To make this selection permanent, click **Save**, **Apply Changes,** then **Restart Controller**. The controller performs a system reboot automatically and the Integrated Configuration Tool is permanently enabled.

To disable the Integrated Configuration Tool:

1. Log on to the Integrated Configuration Tool.

2. From the Controller Parameters menu, select Other Parameters.

3. Select *Disable Integrated Configuration Tool*, then click **OK**.

4. To make this selection permanent, click **Save**, **Apply Changes,** then **Restart Controller**. The controller performs a system reboot automatically and the Integrated Configuration Tool is permanently disabled.

WIU default badge format, 4001/4002

Set the default bit format used for a Wiegand Interface Unit (WIU).

F/2F Reader DOOR CONTACT/REX input source

Determine the edge of the door contact that will be read.

End-of-Line resistor values

Set the values used to terminate protective loops or zones.

Set Badge History vs Alarm History Memory Allocation

Determine the percentage of memory allocated for badge and alarm history, from 10 to 90 percent.

Note: This option is available for Picture Perfect only. For FCWnx, this value is fixed at 50% and is not user configurable.

Set Resistor Tolerances

Set the range in which voltage can change before a 4-state DI state is detected. After you check the Set Resistor Tolerances check box, enter a Res Tol # 1 value.

Note: Res Tol # 2 and Res Tol # 3 are both reserved, read-only fields.

Enable/Disable Idle Poll Timer

Control network activity between the controller and the host. The poll timer guarantees that the network connection between the controller and the host is not shut down by the network administrator, firewall, or other device due to network inactivity.

Note: This option is available for Picture Perfect only.

Enable/Disable Lock on Duress

Control if a door will lock and signal a threatening situation when a duress PIN code is entered at a reader.

Note: This option is available for Picture Perfect only.

Enable/Disable Passive Time & Attendance

Determine if a door will unlock regardless of a credential's IN/OUT status.

Note: This option is available for Picture Perfect only.

Enable/Disable taped badge suspend

Control how credentials are handled when an invalid PIN is entered in multiple access attempts.

Note: This option is available for Picture Perfect only.

Administration menu

The menu contains the following options:

- **Apply Changes:** applies new changes. See below.
- **Restart Application:** makes changes permanent. See below.
- **Restart Controller:** reboots the controller. See below.
- **Restore Factory Defaults:** restores factory defaults. See page 74.

Apply Changes

Click this menu item to apply any new changes made to the controller's configuration.

Restart Application

Click this menu item to make the changes to the controller permanent.

Restart Controller

Click this menu item to shut down and restart the controller.

Restore Factory Defaults

The DirecDoor board is shipped 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

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

If you restore factory defaults by...	Then...
Selecting Restore Factory Defaults from the Administration menu.	Settings are restored to factory defaults except for the network configuration.
Pressing SW7 (Restore Defaults switch) on the DirecDoor board until D17 and D20 turn on. (See *DirecDoor problems* on page 87.)	All settings are restored to the factory defaults.

Flash controller menu/Flash controller

The DirecDoor board uses a single flash file capable of supporting both Picture Perfect and FCWnx hosts. The file is in the format: `DDvvvv.efl`, where *vvvv* is the four digit version number of the firmware.

Note: Do not use the Integrated Configuration Tool to flash a controller if the controller version is less than DD_DIST_R115, RC2. Instead, use the eFlash utility, as described in the DirecDoor Release Notes.

Figure 26.Flash Controller form
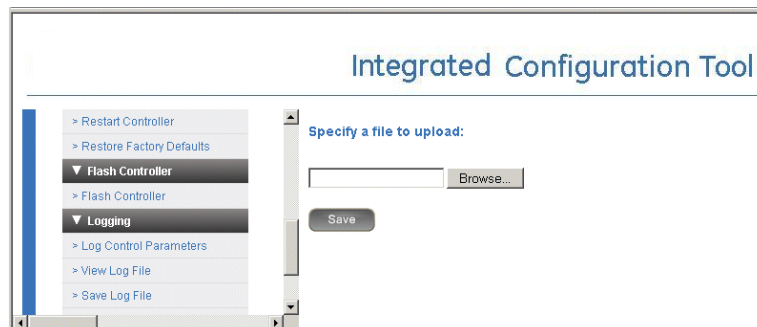
1. If you have not already done so, log on to the Integrated Configuration Tool. See *Starting the tool* on page 56.

2. From the Flash Controller menu, select Flash Controller.

3. Click **Browse** and locate the new flash file.

4. Click **Save**. The controller reboots automatically.

    If the controller flash is successful, you will be prompted to restart the controller by selecting Restart Controller from the Administration menu. A single reboot will occur. Wait 8 to 10 minutes for the controller to complete its boot sequence and install updates, then verify that the build version is correct. (The build version appears on the Controller Information form.)

    Note: If you wish to continue configuration changes, you will need to restart the Integrated Configuration tool again.

Logging menu

The menu contains the following options:

*   **Log Control Parameters:** select the items to track and send to the log file.
*   **View Log File:** displays the log file.
*   **Save Log File:** saves the log to a file.
*   **Print Log File:** prints the log file.
*   **Clear Log File:** clears the contents of the log file.

Log Control Parameters

Use this option to turn diagnostics on/off on different parts of the controller. The system logger provides verification of controller operation independently from the host. Other filtering can be applied to troubleshoot problems; **contact Technical Support for assistance**.

View Log File

Click this menu item to view the log file.

Save Log File

Click this menu item to save the log file.

Print Log File

Click this menu item to print the log file.

Clear Log File

Click this menu item to clear the contents of the log file.

Configuration checklist for Integrated Configuration Tool

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

Facility Commander Wnx			
Communication type		**Information needed**	**Write your answer here**
Dial fallback		Controller address:	
		Phone number to reach host:	
		Secondary phone number to reach host:	
Ethernet	Use DHCP: NO Use DNS: NO	Controller IP:	
		Gateway:	
		Subnet:	
		Host IP: (Optional)	
	Use DHCP: YES Use DNS: YES	Controller Name or Controller MAC which is provided for you:	
		Host Name: (Optional)	
	Use DHCP: NO Use DNS: YES	Controller IP:	
		Gateway:	
		Subnet:	
		Host Name: (Optional)	
		Domain: (Optional)	
		DNS IP: (Optional)	
	Use DHCP: YES Use DNS: NO	Controller Name or Controller MAC which is provided for you:	
		Host IP: (Optional)	

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

Setting up the DirecDoor controller in the host application

This section describes how to configure the DirecDoor controller in your Facility Commander Wnx.

Facility Commander Wnx

You must have FCWnx 7.0 with Service Pack 2 or later to use with the DirecDoor controllers. Set up this controller as you would any other controller by using the **Controller Form** and selecting DirecDoor from the drop-down list in the **Controller type** field. Complete this tab and the remaining tabs as applicable for your site.

Chapter 9 Regulatory Information

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

In this chapter:

CE (European) and FCC compliance

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

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

- All cables connected to the DirecDoor must be shielded with shield terminated as shown in *Figure 27* on page 80. Use #8-32 SEMS screws provided.
- The DirecDoor enclosure must be connected to the nearest earth ground. See *Figure 4, Wiring earth ground* on page 20.
- Prior to connecting the network cable to connector J10, loop the cable through Ferrite provided as shown in *Figure 28* on page 81.

  Note: Ferrite must be installed inside of the enclosure.

Figure 27.Typical installation using shielded cable/drain wire
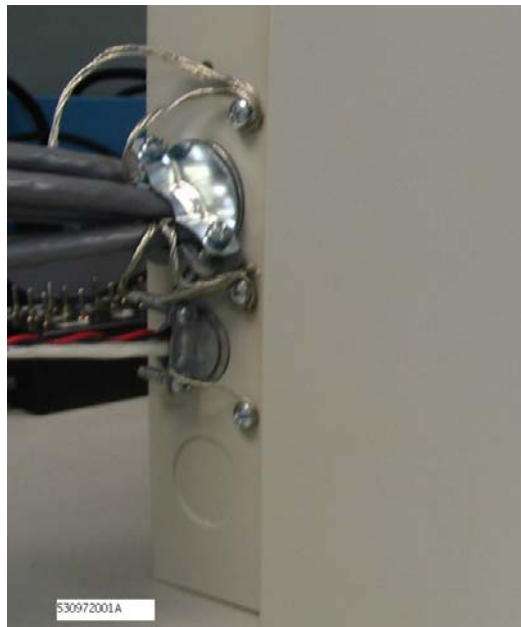
Figure 28.Installing ferrite
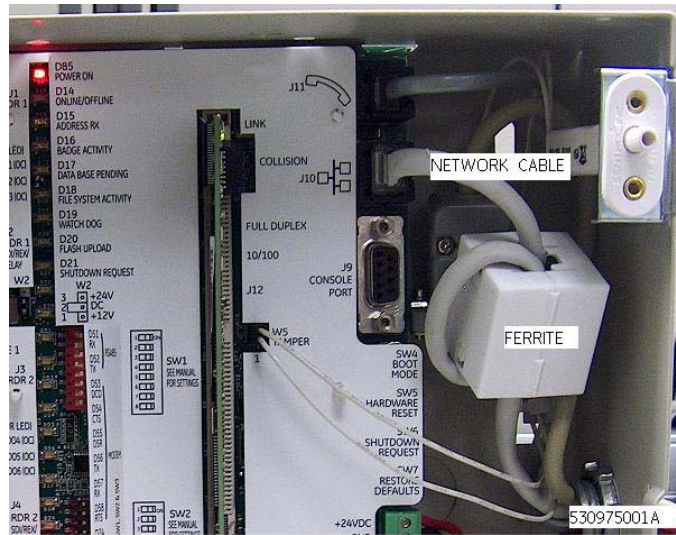
CE regulatory notice

$$\mathsf{C}\,\mathsf{E}$$

Manufacturers
Declaration of Conformity

For

Product Identification:

Model/type: DirecDoor   BOM revision level:A
:

Category (description): Microcontroller

Brand: UTC Fire & Security/CASI

Manufacturer: UTC Fire & Security, Americas Corp., Inc.
3211 Progress Dr.
Lincolnton, NC 28092
USA

EU Representative: UTC Fire & 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	06F338C	06F338I	06P338
Applied standards	EN55022: 1998 A2:2003	EN50130-4(1995) +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.

UL compliance

Failure to install and program the DirecDoor, Picture Perfect (Unix or Linux) and Facility Commander Wnx system in accordance with these instructions voids the listing mark of Underwriters' Laboratories, Inc.

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

The monitoring equipment must be protected by a Listed Transient Voltage Surge Suppressor with a maximum rating of 330V Listed under UL 1449. The communication circuit must be protected with a Secondary Protector for Communication Circuits Listed under UL 497A.

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 UL 1778 or UL 1481 and must be provided with a maintenance bypass switch.

For UL Listed installations:

- Operating environment: 32°-120°F (0°- 49°C)
- Humidity range: 85%
- PoE is not verified for UL installations.
- Auxiliary power supplied must be an approved UL 294 power-limited supply, such as the Altronix Corp. Model AL300ULM.
- Connections to J5 (RS485), J7 (NX BUS), J9 (Console Port), and J8 (LOW BATT circuit) have not been verified for UL installations.
- RDR 1 SDI/REX/RELAY (terminal block J2), RDR 2 SDI/REX/RELAY (terminal block J4), and FACP INPUT (terminal block J6) terminals all need to be stated as being connected within the protected area. These terminals include DC+, DC-, REX+, REX-, GND, RLYNC, COM, and RLYNO since faults can cause unauthorized access.
- The DirecDoor is not intended to be installed as a stand-alone unit as neither it nor the compatible UL Listed Altronix Corp. Model AL300ULM power supply does not incorporate a designated AC power-on indicator visible after installation.
- PSDN (Ethernet) communication between the premise unit and monitoring station equipment must be primary and DACT (telco) communication secondary in UL installations.

Figure 29.UL-Approved System Configuration
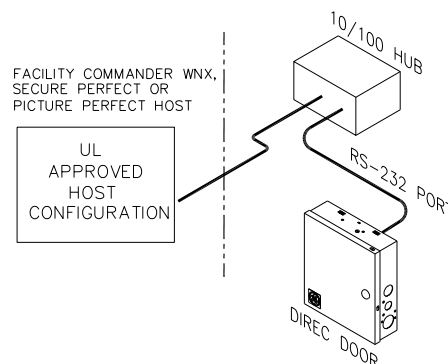
- The DirecDoor is UL Listed as an access control unit and a proprietary burglar alarm control unit (UL 1076 and UL 294). It should be used with the listed Picture Perfect-Linux 4.0 or later, or Facility Commander Wnx 7.0 or later system.
- The power supply's AC power fail contacts must be wired to the DirecDoor as shown in *Figure 5, Wiring auxiliary power supply with built-in relay for fault output (AC power fail)* on page 20.
- Grounding must be in accordance with Article 250 of the National Electrical Code.
- The DirecDoor 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 DirecDoor must be mounted inside the secured area.
- The door strike power must be provided from a listed burglar alarm system power supply. If the door strike circuit is arranged as fail secure (door remains locked upon loss of power), listed emergency panic hardware must be provided to allow exit from the secured area. A fail-safe configuration results in the door strike circuit unlocking in case of a power loss.
- The number of separate signals on a single channel shall be limited to 1000.
- The DirecDoor tamper switch must be wired to the Power/Communications board as shown in *Figure 5, Wiring auxiliary power supply with built-in relay for fault output (AC power fail)* on page 20.
- Alarms on Picture Perfect and Facility Commander Wnx should be set using the following priority list with 1 being the highest priority and 7 being the lowest:

  1. Fire alarm and industrial supervision

  2. Hold-up or panic alarm

  3. Burglar alarm

  4. Watchman or guard tour

  5. Fire-alarm supervision

  6. Burglar-alarm supervision

  7. Industrial supervision

- A clearly marked redundant system with the same configuration as the primary machine should be available as a backup.
- In order for this product to be UL-compliant, the firmware level must be R1.05 or later.

Note: Removing all alarms from the Alarm Monitor should not be available to operators on UL Listed systems.

Chapter 10 Troubleshooting, Maintenance, and Support

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

In this chapter:

Troubleshooting

This section provides information to help you diagnose and solve various problems that may arise while configuring or using your UTC Fire & Security product and offers technical support contacts in case you need assistance. (See *Contacting technical support* on page 90.)

Refer to the appropriate section:

- Power: See *Power problems* on page 86.
- Readers: See *Reader problems* on page 86.
- Door strikes: See *Door strike problems* on page 87.
- DirecDoor: See *DirecDoor problems* on page 87.

Power problems

Problem: The DirecDoor does not power up correctly.

Resolution: Verify that D85 (Power LED) is on. See *Figure 5, Wiring auxiliary power supply with built-in relay for fault output (AC power fail)* on page 20*.* If the LED is NOT on, do the following:

1. Use a voltmeter to check the power supply output. It should read 24 VDC nominal. If there is no output, make sure the power supply is not on a switched outlet. Be sure the circuit breaker where the power supply is connected, is not tripped.

2. Be sure connector J8 is properly seated in the board.

3. Make sure that the wiring connections from the power supply to the board are not reversed.

4. Disconnect connector J8 from the board. Use an ohmmeter to check the resistance between pins 1 and 2. If the resistance is less than 10K ohms, there is a short from power to ground. Isolate the fault by removing the connectors one-by-one until the fault condition disappears. Trace out the wiring on these connectors to find and correct the problem.

Reader problems

Consult your reader installation manual for potential problems that are not related to the DirecDoor.

Using the reader interface

Problem: The reader does not power up.

Resolution:

1. Check the wiring between the reader interface and the reader. See *Chapter 5, Reader Interface* on page 35 and the reader installation manual.

2. Be sure the connector is firmly seated in the board.

Problem: The reader has power, but D16 (Badge Activity LED) on the board does not light up when a badge is presented.

Resolution:

1. Be sure that the switch settings on the board for address and reader technology/format are correct. See *Setting the DIP switches* on page 37.

2. Check the wiring between the reader and the reader interface. See *Chapter 5, Reader Interface* on page 35 and the reader installation manual.

Door strike problems

Problem: D16 (Badge Activity LED) lights on the board and the door reader LED lights on the reader, but the door strike does not operate.

Resolution:

1. Check the wiring from the door strike to the reader interface. In the chapter of the appropriate reader interface, see the section that covers wiring the door strike. Also refer to the door strike manufacturer's installation instructions.

2. Be sure the door strike power supply is operating properly.

DirecDoor problems

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

Problem: I need to restore the factory default settings.

Resolution:

1. Press SW7 (Restore Defaults switch) until D16 (Badge Activity LED) turns on.

2. The controller 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 controller. See *Controller setup overview* on page 59.

Problem: The network controller does not connect.

Resolution:

1. Verify your network settings:

   - host IP address (Picture Perfect systems)
   - controller IP address and controller address (Facility Commander Wnx 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 *Using the Other Info field* on page 62 for more details.

   a. In the Integrated Configuration Tool, select **Controller Info**.

   b. From the **Other Info** drop-down list, select **Ping Host**.

   Successful ping example:

   ```
   Microsoft Internet Explorer                              ×

   ⚠   Other Info Output:
        PING 192.168.0.1 (192.168.0.1): 56 data bytes
        64 bytes from 192.168.0.1: icmp_seq=0 ttl=64 time=2.5 ms
        64 bytes from 192.168.0.1: icmp_seq=1 ttl=64 time=2.2 ms

        --- 192.168.0.1 ping statistics ---
        2 packets transmitted, 2 packets received, 0% packet loss
        round-trip min/avg/max = 2.2/2.3/2.5 ms

                         [     OK     ]
   ```

   Unsuccessful ping example:

   ```
   Microsoft Internet Explorer                              ×

   ⚠   Other Info Output:
        PING 192.168.0.200 (192.168.0.200): 56 data bytes

        --- 192.168.0.200 ping statistics ---
        2 packets transmitted, 0 packets received, 100% packet loss

                         [     OK     ]
   ```

Problem: The dial fallback controller does not connect.

Resolution:

1. Verify your settings:

   - controller address
   - modem strings
   - baud rate settings
   - cabling

2. Verify modem LED activity. See *Table 21, Modem LEDs on the DirecDoor board* on page 32.

Diagnostic LED display

Built-in diagnostics enable you to quickly determine why a controller may not be working correctly. The board LEDs D18 (File Sys. Activity LED), D19 (Watch dog LED), D20 (Flash Upload LED), and D21 (Shut down Request LED) are used for displaying error codes.

Table 37. DirecDoor board LED fault conditions

	D14	D15	D16	D17	D18	D19	D20	D21	Resolution/ Definition
Boot maintenance mode									
Corrupted boot					Flashes				Contact Tech Support.
Boot mode						Flashes			
Boot failure						Flashes	Flashes	Flashes	
Boot failure code							Flashes	Flashes	
OS (Operating System) maintenance mode									
OS mainten-ance		Alternates ON with D16	Alternates ON with D15				ON		
Operation state									
Restore defaults requested				ON			ON		Factory default settings were restored to the board.
Shutdown requested				ON				ON	The board properly shut-down and may be removed.
Watchdog failure mode					ON		ON		An internal thread failed.[1]

1.The failure was logged accord-ing to the log settings. The controller performs a complete reboot after this failure

Maintenance

Inserting and removing the UCSIMMPlus board on the DirecDoor board

⚠️ **CAUTION:** Do NOT remove the UCSIMMPlus board unless instructed to do so by Technical Support.

1. To safely shut down the controller operating system, press SW6 (Shutdown Request switch) on the DirecDoor board for approximately 5 seconds until D20 (Flash Upload LED) turns on. D15 (Address Rx LED) and D16 (Badge Activity LED) then alternate On.

2. Disconnect power and battery backup power.

⚠️ **CAUTION:** Follow standard static prevention procedures. See *Electrostatic Discharge (ESD) precaution* on page 9.

3. Locate the clips on the right and left sides of the UCSIMMPlus board. Press both clips out.

4. Pull out the UCSIMMPlus 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	1 855 536 3573
Fax:	1 561 998 6160	1 561 998 6224
E-mail:	None	rs-bctsupport@fs.utc.com
Website	www.utcfireandsecurity.com	

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

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