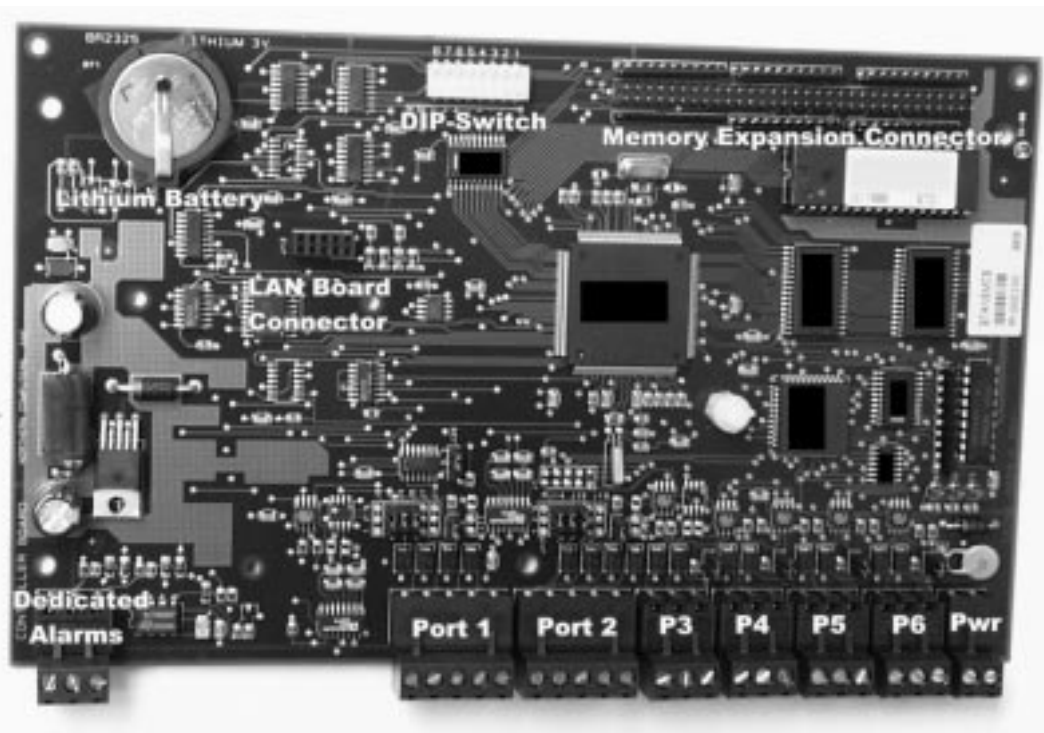

PW-5000 Intelligent Controller Installation Manual

Part Number: PW5KxIC



TD1115 rev0100

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Warnings and Cautions

WARNING



Before installation, **TURN OFF** the external circuit breaker which supplies power to the system.

Before connecting the device to the power supply, verify that the output voltage is within specifications of the power supply.

Do not apply power to the system until **after** the installation has been completed. Personal injury or death could occur, and the equipment could be damaged beyond repair, if this precaution is not observed!

WARNING



Fire Safety and Liability Notice

Never connect card readers to any critical entry, exit door, barrier, elevator or gate without providing **an alternative exit** in accordance with all fire and life safety codes pertinent to the installation. These fire and safety codes vary from city to city and you must get approval from local fire officials whenever using an electronic product to control a door or other barrier. Use of egress buttons, for example, may be illegal in some cities. In most applications, single action exit without prior knowledge of what to do is a life safety requirement. Always make certain that any required approvals are obtained in writing. **DO NOT ACCEPT VERBAL APPROVALS, AS THEY ARE NOT VALID.**

Northern never recommends using the N-1000, N-800, N-500, PW-2000, PW-5000, EV-2000 or related products for use as a primary warning or monitoring system. Primary warning or monitoring systems should always meet local fire and safety code requirements. The installer must also test the system on a regular basis by instructing the end user in appropriate daily testing procedures. Failure to test a system regularly could make installer liable for damages to the end user if a problem occurs.

WARNING



EARTH ground all enclosures, for proper installation.

WARNING



Use suppressors on all door strikes. Use S-4 suppressors for installation. Northern Computers recommends only DC strikes.

CAUTION

IF ANY DAMAGE TO THE SHIPMENT IS NOTICED, A CLAIM MUST BE FILED WITH THE COMMERCIAL CARRIER RESPONSIBLE.

CAUTION

Electro-static discharge can damage CMOS integrated circuits and modules.

To prevent damage always follow these procedures:

Use static shield packaging and containers to transport all electronic components, including completed reader assemblies.

Handle all ESD sensitive components at an approved static controlled workstation. These workstations consist of a desk mat, floor mat and an ESD wrist strap. Workstations are available from various vendors.

NOTICE

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

NOTICE

This document and the data in it shall not be duplicated, used or disclosed to others for procurement or manufacture, except as authorized by and with the written permission of, Northern Computers, Inc. The information contained in this document or in the product itself is considered the exclusive property and trade secrets of Northern Computers, Inc. Copyright laws of the United States protect all information in this document or in the software product itself.

NOTICE

Any use of this product is subject to the terms and acceptance of the Northern Computers, Inc. Software Agreement. Please request a copy from Northern Computers, Inc., and review the agreement carefully.

Disclaimer

Product Liability; Mutual Indemnification

In the event that a Customer receives a claim that a Product or any component thereof has caused personal injury or damage to property of others, Customer shall immediately notify Northern in writing of all such claims. Northern shall defend or settle such claims and shall indemnify and hold Customer harmless for any costs or damages including reasonable attorneys' fees which Customer may be required to pay as a result of the defective Product or the negligence of Northern, its agents, or its employees.

Customer shall hold harmless and indemnify Northern from and against all claims, demands, losses and liability arising out of damage to property or injury to persons occasioned by or in connection with the acts or omissions of Customer and its agents and employees, and from and against all claims, demands, losses and liability for costs of fees, including reasonable attorneys' fees, in connection therewith.

Unpacking Procedure

CAUTION

If any damage to the shipment is noticed before unpacking, a claim must be filed with the commercial carrier.

All containers should be opened and unpacked carefully in order to prevent damage to the contents.

The following steps are used to unpack equipment in preparation for installation:

1. Open the container and remove the unit(s) and all packing material. Retain the container and all packing materials. They may be used again for reshipment of the equipment, if needed.
2. Inspect the contents for shortage. If items are missing items, contact the order entry department.
3. Visually check contents. If damage is discovered, perform the following:

If shipping caused damage to the unit, a claim must be filed with the commercial carrier.

If any other defect is apparent, call for a return authorization.

Shipping Instructions

To ship equipment back to Northern Computers, Inc.:

1. Contact the customer service department before returning equipment.
When you call please have available:
 - A description of the problem or reason you are returning the equipment.
 - Your original purchase order number, invoice number and if the unit is still under warranty.
 - A new purchase order number if the unit is not under warranty
2. Obtain the Return Authorization Number (RMA) from the customer service department.
3. Show the RMA number on all packages shipped. Packages, which are not marked with an RMA number will be refused at the factory and returned to you **COD**.
4. Carefully pack the equipment for shipment. Use the original packing material whenever possible

Limited Warranty

All Products sold or licensed by Northern include a warranty registration card which must be completed and returned to Northern by or on behalf of the end user in order for Northern to provide warranty service, repair, credit or exchange. All warranty work shall be handled through Customer which shall notify Northern and apply for a Return Merchandise Authorization (RMA) number prior to returning any Product for service, repair, credit or exchange. Northern warrants that its Products shall be free from defects in materials and workmanship for a period of two years from date of shipment of the Product to Customer. The warranty on Terminals, Printers, Communications Products and Upgrade kits is 90 days from date of shipment. Satisfaction of this warranty shall be limited to repair or replacement of Products which are defective or defective under normal use. Northern's warranty shall not extend to any Product which, upon examination, is determined to be defective as a result of misuse, improper storage, incorrect installation, operation or maintenance, alteration, modification, accident or unusual deterioration of the Product due to physical environments in excess of the limits set forth in Product manuals. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THIS PROVISION. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. NO REPRESENTATION OR WARRANTY OF THE DISTRIBUTOR SHALL EXTEND THE LIABILITY OR RESPONSIBILITY OF THE MANUFACTURER BEYOND THE TERMS OF THIS PROVISION. IN NO EVENT SHALL NORTHERN BE LIABLE FOR ANY RE-PROCUREMENT COSTS, LOSS OF PROFITS, LOSS OF USE, INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES TO ANY PERSON RESULTING FROM THE USE OF NORTHERN'S PRODUCTS.

Confidentiality

All software, drawings, diagrams, specifications, catalogs, literature, manuals and other materials furnished by Northern relating to the design, use and service of the Products shall remain confidential and shall constitute proprietary rights of Northern and Customer agrees to treat such information as confidential. Customer shall acquire no rights in the design of the Products or the related materials except to use such information solely for the purpose of and only during the time it sells the Products. Customer shall not copy the design of any of the Products or use or cause to be used any Product design or related materials for its own benefit or for the benefit of any other party. The covenants contained in this section shall remain effective throughout the term of this Agreement and thereafter unless specifically waived by Northern in writing.

Description

The Intelligent Controller is the heart of the PW-5000 and provides the real time processing for the connected I/O interfaces. It holds the database for the subsystem configuration and card holders, and the event log buffer in battery-backed memory.

Port 1 provides the standard connection to the host computer.

Port 2 provides a redundant connection to the host computer via modem or direct connection. Up to a total of 32 I/O boards can be connected to ports 3, 4, 5, and 6. This board has an optional memory expansion board (PW5KxM4) that allows the card database to hold as many as 100,000 cards in addition to a buffer capable of storing 50,000 transactions while this board is off-line. The PW5KxIC is designed to be rack-mounted for maximum density or tile-mounted to save cost when it is remotely mounted near the devices to be controlled.

1. Port 1 may be set up as an RS-232 interface or an RS-485 interface. An optional interface board (PW5KxEN) converts the RS-232 output of port 1 into an Ethernet port capable of supporting TCP/IP. If this interface board is present, this port must be set up as an RS-232 interface. See Jumper Settings in the setup section on how to perform this setup

2. Port 2 may be set up as an RS-232 interface or an RS-485 interface.

3. Ports 3, 4, 5, and 6 are RS-485 interfaces.

An on-board real time clock maintains the date and time, taking into account leap year and accounting for global time zones and daylight savings time changes. The program is stored in FLASH memory and may be downloaded through a serial port, allowing the program to be changed without physically changing board components.

Set Up

The controller hardware is configured with jumpers and a set of 8 switches. These jumpers/switches setup the memory chip size, port interface, end of line termination, controller address, and baud rate. Please refer to the tables.

Jumper Settings:

Jumper	Setting	Default	Selected
J4, J5, J6	1 - 2	*	Port 1 RS-485
	2-3		Port 1 RS-232 (Required for PW5KxEN)
J9	OFF		Port 1 RS-485 EOL terminator is not active
	ON	*	Port 1 RS-485 EOL terminator is active
J13, J14, J15	1-2		Port 2 RS-485
	2-3	*	Port 2 RS-232
J18	OFF		Port 2 RS-485 EOL terminator is not active
	ON	*	Port 2 RS-485 EOL terminator is active
J21	OFF	*	Port 3 RS-485 EOL terminator is not active
	ON		Port 3 RS-485 EOL terminator is active
J22	OFF	*	Port 4 RS-485 EOL terminator is not active
	ON		Port 4 RS-485 EOL terminator is active
J23	OFF	*	Port 5 RS-485 EOL terminator is not active
	ON		Port 5 RS-485 EOL terminator is active
J24	OFF	*	Port 6 RS-485 EOL terminator is not active
	ON		Port 6 RS-485 EOL terminator is active
J25	1-2		Reserved - currently jumper ignored
	2-3	*	Reserved - currently jumper ignored

DIP Switch Settings:

S8	S7	S6	S5	S4	S3	S2	S1	SELECTION
				OFF	OFF	OFF	OFF	ADDRESS 32
				OFF	OFF	OFF	ON	ADDRESS 1*
				OFF	OFF	ON	OFF	ADDRESS 2
				OFF	OFF	ON	ON	ADDRESS 3
				OFF	ON	OFF	OFF	ADDRESS 4
				OFF	ON	OFF	ON	ADDRESS 5
				OFF	ON	ON	OFF	ADDRESS 6
				OFF	ON	ON	ON	ADDRESS 7
			OFF					No Hardware Handshake *
			ON					TX Enabled By CTS **
	OFF	OFF						Reserved
	OFF	ON						9,600 BPS
	ON	OFF						19,200 BPS
	ON	ON						38,400 BPS *
OFF								No Password *
ON								Password Required *
* Default								
**Required. for PW-5KxEN								

LED Operation

The controller uses 3 on-board LEDs to provide status information during its power-up sequence and normal operation.

MODE	LED A	LED B	LED C	DESCRIPTION
Power-up Sequence	ON	OFF	OFF	Start Power-up, hardware setup
	OFF	ON	ON	Testing RAM and Clearing Database (approx. 5 sec./MB)
	OFF	ON	OFF	Testing RAM and NOT Clearing Database (approx. 5 sec./MB) database is O.K.
	ON	ON	ON	Power-up complete, held for 1 second
Normal Operation	FLASH			This LED has a faint flicker and should flash once every second when system is active.
		FLASH		Flash when there is activity on either Host Port 1 or 2
			FLASH	Flash when there is activity on I/O Port. (Ports 3, 4, 5, 6)

Power

The controller accepts 12 VDC with an operating range of 10 to 16 VDC and consumes 400mA of current.

Locate power source as close to this board as possible. Connect power with minimum of 18AWG wires.

The addition of the PW5KxEN adds an additional consumption of 150 mA.

The addition of the PW5KxM4 adds an additional consumption of less than 1 mA.

NOTE: POLARITY for 12 VDC power is important. Make sure the +12 VDC is connected to the terminal labeled +12V and the return is connected to the terminal labeled GND.

Communications

The controller communicates to the host primarily through port 1.

Port 1 may use one of three communications specifications:

RS-232—When this port is selected as an RS-232 interface, the communication is a direct point to point connection to a host computer port (only one PW5KxIC per computer port), via direct connection or modem and this device acts as Data Terminal Equipment (DTE).

RS-485—When this port is selected as an RS-485 interface, up to 8 controller boards can share one host computer port.

Ethernet—When the Ethernet option board is present, the port is set to the RS-232 setting and DIP switch 5 must be set to ON (handshaking enabled).

The default selection for port 1 is RS-485. The default speed of this port is 38.4Kbps but it can be downgraded to 19.2Kbps or 9.6Kbps if the line conditions or receiving equipment require it (see jumper and DIP switch settings).

Port 2 may be set up as RS-232 or RS-485 interface. This port can be configured to act as a redundant connection to the host. For example, if the RS-232 interface is selected and a modem is connected, this port can use a telephone connection to the host as a backup to a direct connection with port 1. When RS-232 is selected this device acts as Data Terminal Equipment (DTE).

The default selection of port 2 is RS-232. The default speed of this port is 38.4Kbps but it can be downgraded to 19.2Kbps or 9.6Kbps if the line conditions or receiving equipment require it (see jumper and DIP switch settings).

Ports 3–6 are RS-485 interfaces. These interfaces allow multi-drop communication up to 4,000 feet (1,250 m total per port). Use two twisted pairs (120 Ω , 23pF minimum 24 AWG) with shield for the communication. Install termination jumper only for end of line unit. The default speed of each these ports is 38.4Kbps but they can be downgraded to 19.2Kbps or 9.6Kbps if the line conditions or receiving equipment require it (see jumper and DIP switch settings). Up to 32 boards can be connected in any combination to ports 3, 4, 5 and 6.

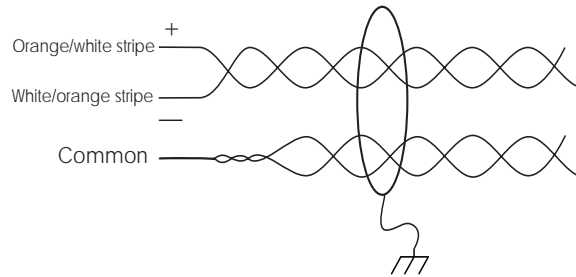
For Wiring to an RS-232 port:

1. TXD indicates Transmit and is the conductor of data from the PW5KxIC to another device.
2. RXD indicates Receive and is the conductor of data from another device to the PW5KxIC.
3. RTS indicates Request To Send and conducts the signal that the PW5KxIC has data to send.
4. CTS indicates Clear To Send and conducts the signal that another device is ready for data.
5. GND is the signal ground. The wiring for this signal is required and **NOT** optional. This signal must **NOT** be tied to Chassis Gnd.

- Use 24 AWG shielded cable up to 25 feet.

For Wiring to an RS-485 port:

- TR+ is the plus side of the transmit and receive differential signal.
- TR– is the negative side of the transmit and receive differential signal.
- GND is the signal ground. The wiring for this signal is required and **NOT** optional. This signal must **NOT** be tied to Chassis Gnd.
- Use 24 AWG low capacitance, two twisted-pair, shielded cable (Belden 9842 or equiv.).



Note: For N-485 Communication Connections, twist the blue pair together and use as the common; use the orange pair as your data pair, observing polarity. Connect the external drain shield to the appropriate earth ground on one end.

- When daisy-chaining RS-485 ports together connect the TR+ wires from the upstream and downstream boards to the TR+ terminal and likewise, connect the TR– wires from the upstream and downstream boards to the TR– terminal.

The Ethernet adapter board provides an RJ-45 connection for the network. See the installation guide for the PW5KxEN for instructions on mounting and connecting the board to the PW5KxIC

Alarm Inputs

The two alarm inputs on this board are dedicated to the detection of cabinet tamper and power fault monitoring. The normal (non-alarm) condition is closed contact. If these inputs are not used, install a shorting wire between the signal terminal and the GND terminal to simulate the non-alarm state. As the wiring between the alarm sensor and the input terminals is typically contained within one enclosure, these inputs are not supervised.

Memory Backup Battery

A 3V Lithium battery backs up the configuration data and the event buffer. This battery should be replaced annually or sooner if the cabinet is subjected to unusually high temperatures.

Mounting Options

This board can be mounted on-edge in the rack-mount enclosure provided by Northern Computers or it can be mounted flat against any surface using standoffs under the mounting holes provided in each of the four corners of this board. The functionality of this board does not change with the mounting selection.

Suggested Installation Sequence

1. Set Jumpers and the DIP-switch per this installation guide.
2. Install the PW5KxEN and/or PW5KxM4 option boards per the appropriate installation guide.
3. Mount this board in the appropriate enclosure—If this board is being mounted in a rack the component side of the board is to your right as you face the rack.
4. Connect the communications and power supply to the circuit boards with the Power Supply Harness.

WARNING: DO NOT CONNECT THE POWER SUPPLY TO THE AC SOCKET UNTIL ALL WIRING HAS BEEN INSTALLED AND RECHECKED.

5. Connect wiring to alarm input sensors or install jumper wire as appropriate.
6. Connect communications wiring to I/O boards as appropriate.
7. Recheck wiring for correct connections and continuity.
8. Run communication wiring to PC, central station, modem or printer.
9. Recheck communication wiring for correct connections and continuity.
10. Connect the Power Supply Cord for proper connections and power.
11. Setup the panel controls using the host software.

Note: You may install a map of 32 boards per Intelligent Controller. It is recommended for maximum performance, that the I/O Reader boards be installed in a configuration that doesn't exceed 8 boards per port.

Specification Summary

The controller is for use in low voltage, class 2 circuit only.

Primary power:

DC input 12 VDC \pm 10%, 400mA (550mA with PW5KxEN)(401mA with PW5KxM4)
With an operating range of 10 VDC to 16 VDC

Memory and Clock Backup:

3 volt Lithium, type BR2325

Data memory:

1Mb standard (4Mb with optional memory module, J3)

Ports:

1 RS-232 or RS-485 (9,600 to 38,400 BPS, asynchronous) – optional Ethernet BD
2 RS-232 or RS-485 (9,600 to 38,400 BPS, asynchronous)
3-6 RS-485 (9,600 to 38,400 BPS, asynchronous)

Inputs:

2 non-supervised, dedicated function (Tamper and Power Fail Detect)

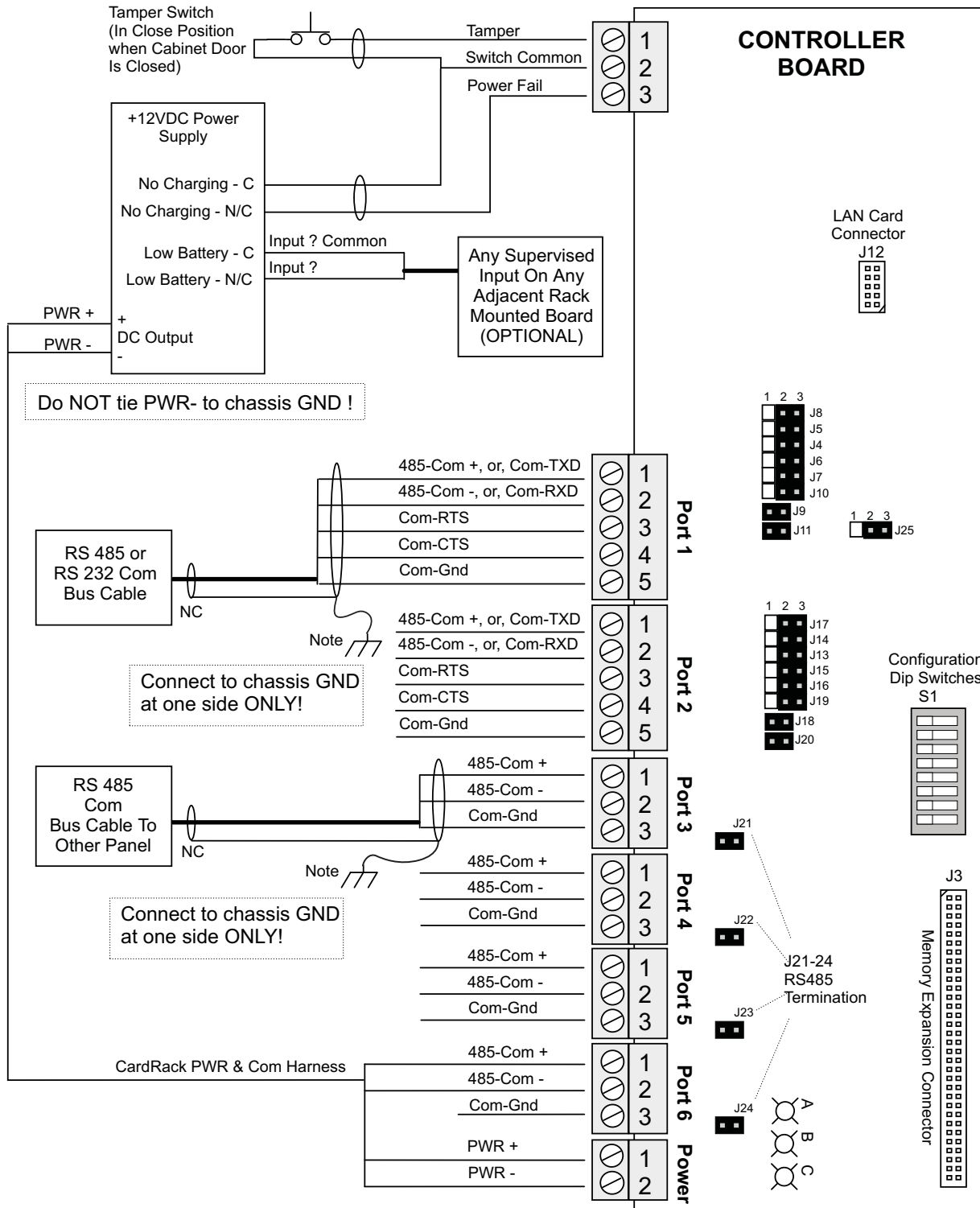
Wire requirements:

Power 1 twisted pair, 18 AWG
RS-485 24 AWG, 4,000ft (1,200m) max,
 2 twisted pair(s) with shield ((120 Ω , 23pF, Belden 9842 or equiv.)
RS-232 24 AWG, 25ft (7.6m) max.
Alarm input 1 twisted pair, 30 ohms max.

Environmental:

Temperature 0 to 70 °C, operating -55 to +85 °C, storage
Humidity 0 to 95% RHNC

Wiring Diagram



Note: For N-485 Communication Connections, twist the blue pair together and use as the common; use the orange pair as your data pair, observing polarity. Connect the external drain shield to the appropriate earth ground on one end.



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