INSTALLATION & SERVICE INSTRUCTIONS

NAPCO®

Publicly traded on NASDAQ Symbol: NSSC

NAPCO NAX-200X

DOOR ACCESS CONTROL PANEL

WI1590 5/07

FCC Warning
Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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

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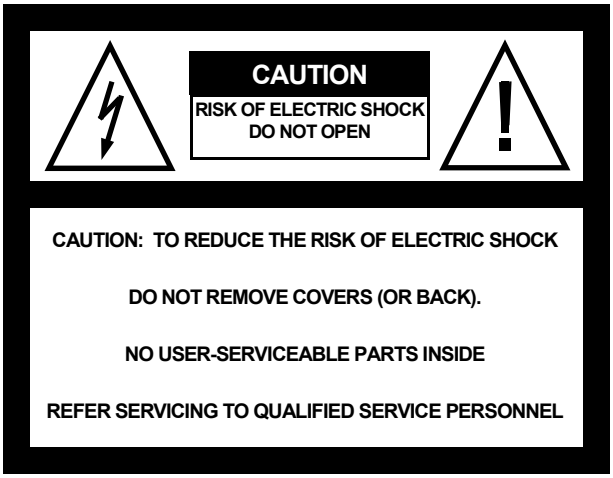
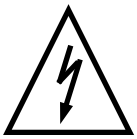
THE INSTALLATION OF THIS PRODUCT SHOULD BE MADE BY QUALIFIED SERVICE PERSONNEL AND SHOULD CONFORM TO ALL LOCAL CODES.





The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated 'dangerous voltage' within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

WARNING

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

UNPACKING AND INSPECTION

Unpack carefully. This is an electronic product and should be handled as such. Compare the items received with the packing list with your order.

BE SURE TO SAVE THE SHIPPING CARTONS AND INSERT PIECES. THEY ARE THE SAFEST MATERIAL IN WHICH TO MAKE FUTURE SHIPMENTS OF THE PRODUCT.

WARNING

TO REDUCE THE RISK OF FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.

MAINTENANCE

User maintenance of this unit is limited to external cleaning and inspection.

TABLE OF CONTENTS

DESCRIPTION

The NAX-200X control panel is a fully programmable, self contained, 2-door access control panel that offers users flexibility, expandability, and simplicity. Operating as a stand-alone unit or within a network, each NAX-200X makes independent access control decisions.

The NAX-200X accepts Wiegand Format, Magnetic Stripe, Proximity card readers, and Keypads to control the access functions for a maximum of two individual access points (entrances/exits). Contact Napco to determine specific readers and keypads supported.

It supports eight supervised alarm devices including door contact sensors, door bypass switches, or other related detection accessories. Five onboard Form C relays support door locking mechanisms, door alarm shunts or handicapped access privileges.

The standard NAX-200X features a user-programmable, onboard database that supports a maximum of 10,000 card holders.

The NAX-200X can use an onboard 7AmpHour (AH) backup battery to carry out full access control functions for a period of four hours (assuming typical accessory loads) in the event of an AC power supply loss.

The NAX-200X power supply automatically switches from 120 VAC/60Hz to 230 VAC/50Hz to meet the requirements of both North American and the European Union. With built-in overcurrent protection, this Access Control panel meets the requirements for Energy-Limited installations.

In addition, a replaceable lithium battery protects the onboard database and programmed operating instructions from loss for a period of 4 weeks. In the event of a total failure of the AC power supply *and* the backup battery, the NAX-200X would immediately be ready for full operating capability once a source of operating power is re-established.

For enhanced site access control requirements, multiple NAX-200X units (a maximum of 63) may be networked together. A NAX-200X network may be configured to operate in a repeat mode or in a multidrop mode, using the RS-422 communications protocols.

A single host computer may be used to manage and program one NAX-200X or a fully developed network of NAX-200X's, saving equipment and installation costs, database entry/deletion procedures, and monitoring individual access usage.

The host computer may communicate with the NAX-200X network by RS232/RS422 serial communication or by Ethernet using a plug-in Network Interface Adapter.

Changes or upgrades to the NAX-200X operating software are readily downloadable from the host computer to either one specific NAX-200X or an entire network of NAX-200X's, eliminating the need to physically change the EPROM chip inside the unit.

IMPORTANT SAFETY INFORMATION

The NAX-200X is defined as a Stand-Alone Access Control System. The PC connection provides convenient setup and monitoring of the system, but all decision-making for a Cardholder's Authorizations at a particular Time and Place are made by the Access Control Panel.

Disruptions to the communication with the PC, or to the operation of the PC itself will not result in impaired operation of the Access Control System. Thus, the use of any particular Personal Computer or Software Package with the NAX-200X has not been evaluated by UL and is not controlled by UL.

Nevertheless, safe operation of the system requires that the connected Accessory Computer Equipment carry markings showing the units are UL-Listed to UL 1950 or UL 60950. Power line surge protection must be used, with these devices listed to UL 1449, and marked to show the maximum rating as 330 V. Serial Data Lines and Ethernet equipment must be protected by signal line surge suppressors carrying UL 497B markings and a maximum marked rating of 50 V.

The NAX-200X Access Control panel is to be installed in a secured area. Nevertheless, because opening the Enclosure Door gives access to Terminals that can allow an invalid entrance, a Tamper Switch is installed on the Door. The Tamper Switch must be configured at the Host Computer to signal an Alert when the Tamper Switch is activated. The Tamper Switch may also be configured to activate the Console Relay, which may then be wired into an Alarm Signal Circuit or an Alarm Sounding Circuit.

Underwriters Laboratories (UL) has examined the construction, performance and operation of the NAX-200X Access Control Panel to the requirements of UL 294 (Access Control System Units) when used with HID Prox-Point™ Readers [Model 6005BGB00] and 36-bit cards. The many other Card Reader Formats and Card Technologies that are supported by the Napco Control Panels were not evaluated by UL.

In some localities, the Access Control System Reader, Serial Communication, Door Lock Circuits and other signal wiring may use UL Type CM or UL Type CL2 foil-shielded multi-conductor and multi-pair cable. Where the AHJ's (Authorities Having Jurisdiction) require Plenum-Rated Cabling, UL Type CL2P cabling will be acceptable. In Canadian Installations, CSA CMG FT4 foil-shielded cabling may be used in non-plenum installations, and CSA CMP FT6 foil-shielded cabling may be used in installations requiring plenum ratings.

Replace the Lithium Memory Backup Battery with a Matsushita/Panasonic BR1225 or BR1225A. Use of Another Battery may present a risk of Fire or Explosion.

The NAX-200X must be installed on a wall, permanently connected to the AC Mains.

Fault-Tolerance, Fault Isolation, and Conditions that may result in impaired operation.
As described above, a faulted computer or communication link with the computer will not impact the ongoing access management of the Access Control Panel. Furthermore, the transactions occurring during the equipment outage will be recorded in the Access Control Panel, then forwarded to the computer when the fault is removed.

If the Access Control Panel itself fails due to a long-term power failure or internal fault, the Access Control Software on the host computer will normally detect this failure, signal an alert, and log the time of this event.

Sensing the status of the Door Monitor Contacts, the Request to Exit (REX) and the Accessory Alarm Inputs will be impaired by a cut cable or short-circuit in the Signal Circuit Wiring. By installing end-of-line termination resistors, as described in this manual, the Alarm and Signal Circuits may be supervised to detect such faults and indicate the need for a repair.

CONFIGURATION

Standard Version

Capacities

The standard version NAX-200X provides access control functions for up to two doors and two card readers. Each 5V reader may draw as much as 100mA from the PWR pin of the reader connector, for a total current draw of 200mA per panel. Each 12V reader may draw 200mA from the PWR pin of the reader connector, for a total of 400mA.

Each of the 8 alarm inputs on the main board may be configured as supervised alarms (requiring termination resistors), or standard alarms (requiring plain electrical contacts).

Memory Configuration

The standard 512K memory configuration provides resources for downloadable firmware as well as for the cardholder database and a transaction buffer.

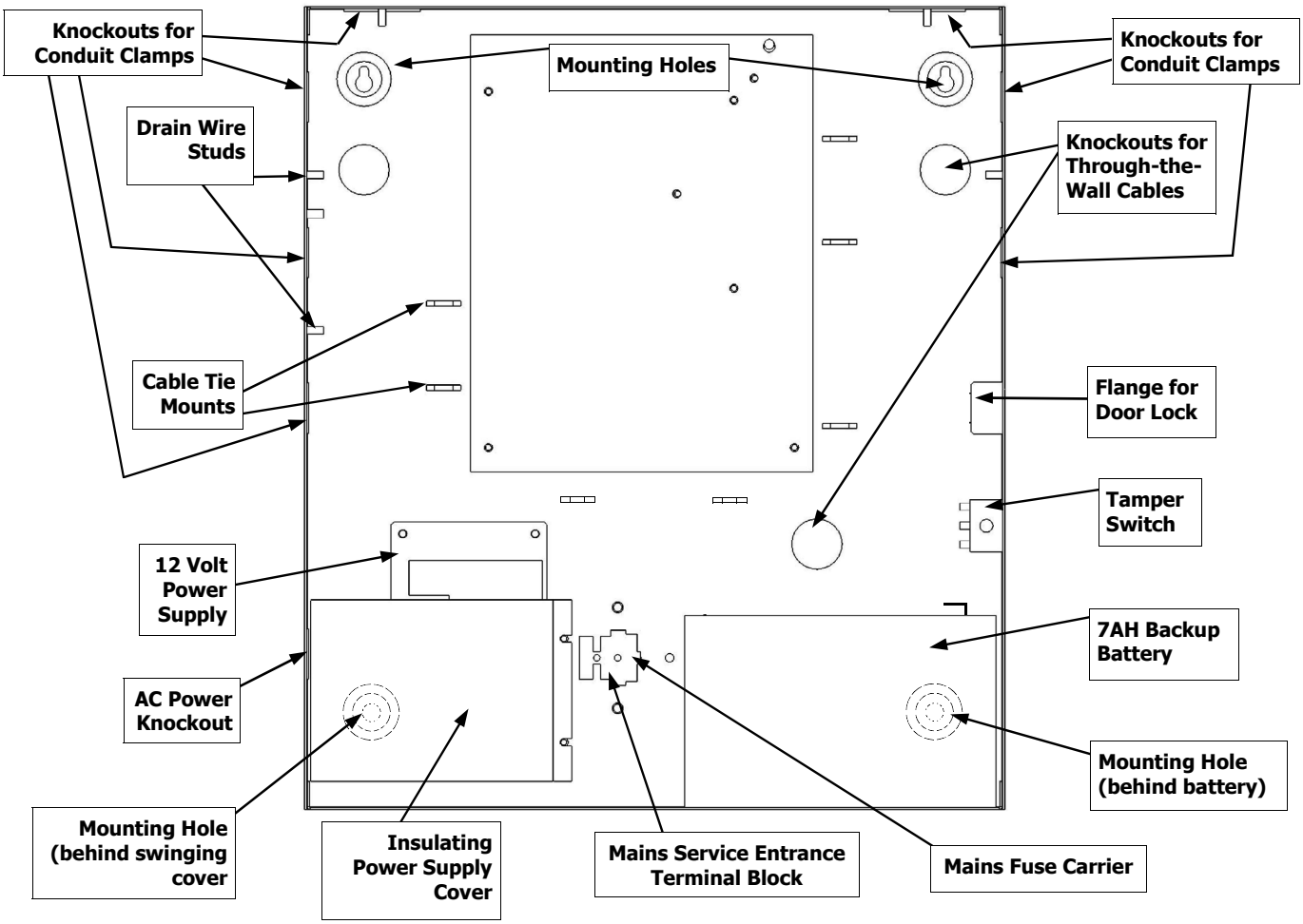


Figure 2 - 200X Components

Accessories

Network Interface Board NAX-ENET
This plug-in board provides direct 10/100 Base-T Ethernet connect capability.

Battery Backup
During power interruptions, the NAX-200X normally continues operating for 4 hours via an on-board 7 AmpHour back-up battery.

The backup battery provides DC power for all NAX-200X access control and alarm monitoring functions. After charging for 48-hours, the battery carries the rated load for four or more hours. A low-voltage battery sensing circuit protects the NAX-200X by disconnecting the battery from the main circuit before it becomes too deeply discharged.

AC Power Supply
The power supply provides 12VDC to the on-board power supply. An AC power terminal block and grounding screw provide connection points for the three incoming AC service lines.

The NAX-200X may be powered by 230VAC/50Hz when used outside North America. No switches and jumpers need to be set, but the supplied IEC127-approved fuse must be used for installations in the European Union.

NOTE: The NAX-200X may be used to power 12 Volt Electromagnetic (EM) Locks as well as standard Access Control Readers and Accessories. Should AC power fail, the internal 12 Volt, 7AH battery will power the panel, readers, locks and accessories for up to four hours, assuming normal operating conditions.

INSTALLATION

Only qualified service personnel familiar with all local building codes should attempt this installation. Take appropriate safeguards to avoid unintentional operation by employees and maintenance personnel working about the premises.

The installation of each NAX-200X system should be completed and tested on its own before connecting into a network. Any possible wiring or installation problems are magnified many times by the complexity of the network.

Once an individual panel has been tested and found operating satisfactorily, it can then be safely brought into the network.

The NAX-200X is categorized as PERMANENTLY CONNECTED EQUIPMENT with fixed wiring. This system must be installed within the protected premise in accordance with the National Electrical Code (NFPA70), local codes, and the authorities having jurisdiction.

A Ground Bond Strap is bolted between the Enclosure and the Door to reduce the risk of electric shock. If the Ground Bond Strap is unbolted from the Door to allow the Door to be removed, it is critical that the Ground Bond Strap be correctly attached before putting the Access Control Unit into service.

The following warnings are designed for the safety of the NAX-200X install/service technician and for the continued proper function of the NAX-200X unit.

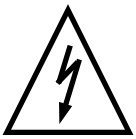
About This Manual

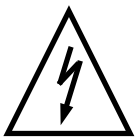
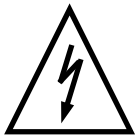
This manual describes the installation of the NAX-200X Access Control Unit and the specific accessories that connect to it.

End-User Periodic Tests and Emergency Planning

The Host Computer Software supervises the Access Control System, reporting failures at an individual panel within seconds of the occurrence. Nevertheless, failures can occur at the Door Sense and Bypass contact monitoring hardware, the individual Card Reader electronics and wiring, or the Electric Door Lock Hardware that will not be detected until the equipment is used. For this reason, please instruct staff at the installation to perform a "walk through" test at every controlled entrance and verify operation of all the monitored contacts at least once per week, especially at sites that are less frequently used. Assist the Security Staff at the installation to devise acceptable alternates to allow entrance and monitoring of access at controlled sites impacted by equipment failures, especially in high-traffic areas.

Provide staff members at the facility with contact information that will help assure the swift correction of equipment outages.

NOTES:	Notes are included with a procedure informing the installer about related material.
CAUTION 	Cautions indicate that a particular process requires special attention.
WARNING 	Warnings indicate that a particular process exposes the installer to live circuits or that making wrong connections can lead to equipment failure.
CAUTION 	Do not place accessory circuit cables in the same conduit sections containing power cables.

CAUTION 	Prevent the risk of a fire by replacing ALL fuses with the same type and rating. The main fuse protects the power supply circuit against excessive currents and short circuits. Failure of the power supply (other than a blown fuse) fuse usually indicates a fault in a power supply component. There are no user-serviceable parts in the NAX-200X cabinet. The power supply must be replaced if it fails.
WARNING 	The lower part of the power supply has exposed terminals and components (see page 10). DO NOT probe the power supply and expose yourself to high voltage and a shock hazard.
WARNING 	The risk of a serious electrical shock exists if the wiring harness power connector is removed from the NAX-200X circuit board, but AC power remains live at the AC Input Terminal Block (see Figure 7, page 15).

Installation Preparation

First, select a mounting location within a secure, limited access area (see Figure 3). Note the type of wall construction that the enclosure will be secured to.

- Determine that adequate space is available for mounting the NAX-200X cabinet on a wall with no interference from wires, pipes, or other obstructions.
- Proper installation of the NAX-200X cabinet requires an area of free space measuring:

  20 inches high (508mm)
  X
  20 inches wide (508mm)
  X
  4.0 inches deep (101.6mm)

- Confirm that adequate free space exists on both sides of the NAX-200X cabinet for cabling conduit entering and exiting the cabinet.
- Determine the directions of the cabling conduit exiting the NAX-200X cabinet. Confirm sufficient access to ceilings and/or walls before fitting the conduit lengths.
- Knockouts at the back of the unit may be used for "hidden wiring" installations.

  NOTE: All NAX-200X signal wiring and accessory power circuits are certified as power limited. The use of conduit is optional for these circuits.

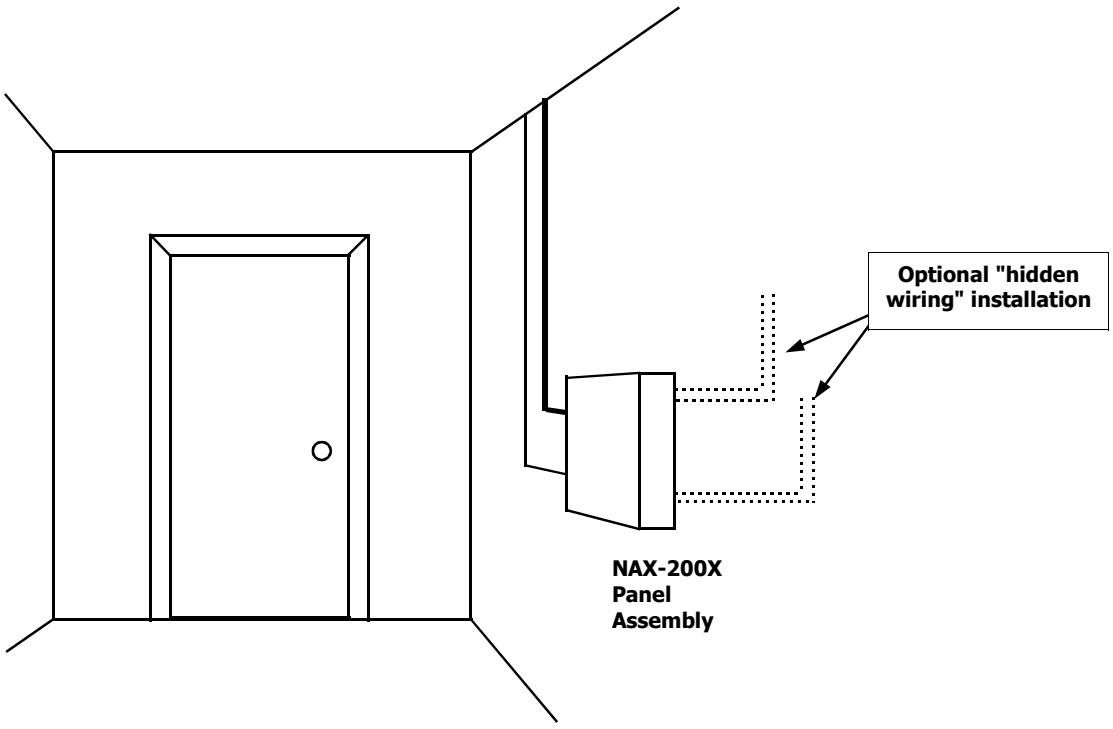


Figure 3 - NAX-200X Installation Location

Cabinet Mounting

Inspect the mounting surface around the proposed installation site. The mounting surface must be capable of supporting 14 pounds (6.3Kg) plus any additional weight of the installation hardware.

CAUTION
Use only suitable mounting hardware for the type of wall construction encountered.

1. Determine the NAX-200X cabinet mounting location.

2. Mark the four mounting holes against the mounting surface using the NAX-200X cabinet as a template or using the measurements provided in Figure 4.

NOTE: Mark the small oval portion of the cabinet screw holes (see Figure 5, Detail A and B).

3. Place the NAX-200X cabinet out of the way.

4. Drill pilot holes to the required depth and size for the mounting screws.

5. Insert the top two mounting screws into the wall. Leave approximately one quarter of the screw's length protruding from the wall.

NOTE: Do not tighten screws completely at this time.

6. Place the NAX-200X cabinet over the mounting screws.

   Secure the NAX-200X cabinet to the mounting surface using the two lower screws, and then tighten the remaining length of the screws.

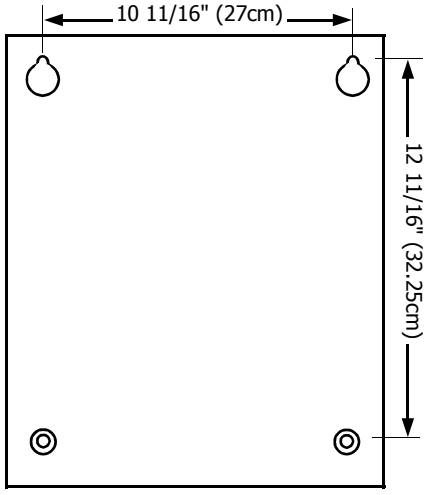


Figure 4 - NAX-200X Cabinet Mounting Hole Dimensions

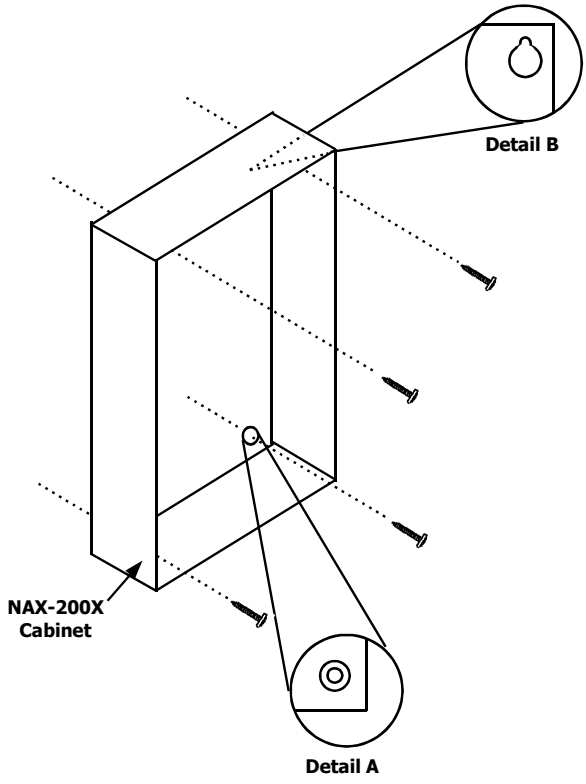


Figure 5 - NAX-200X Mounting Screws

Cable and Wiring Categories

The wiring and cabling for the NAX-200X are divided into three categories:

Mains Power Cables and Wiring
This category contains Mains AC power cables servicing the NAX-200X Panel. The connection to the mains must be carried out by qualified personnel.

Low-Voltage Power and Accessory Relay Devices
12 or 5 Volt Reader Power, any accessory relay controlled devices connected to the Panel, and any 12 Volt Accessories receiving battery-backed power from the panel. (These are power-limited circuits, and normally do not require a licensed electrician to complete this work). The wiring inside the enclosure must be kept at least 1/4" away from the high-power (black and white pair) wires between the AC Terminal Block and the Power Supply, as well as the Red and Blacks Leads between the Battery and the PC Board.

Communication Cables
This category contains all the communication cabling between the NAX-200X and all communication equipment, all alarm circuits, and all card reader devices. (These are power-limited circuits, and normally do not require a licensed electrician to complete this work). The wiring inside the enclosure must be kept at least 1/4" away from the high-power wires, as described in the paragraph above.
NOTE: For proper operation of the NAX-200X, route EACH category of cabling in SEPARATE conduit or bundle (i.e., **DO NOT mix alarm and communication cables in the same conduit as relay and power cables**). Plenum-Rated cabling may be required in certain installations. See Important Safety Information, page 8.

Incoming Power Conduit Knockout
The NAX-200X System requires 120VAC, 60 Hz voltage to the AC Input Power Terminal Block (see page 15). The power cabling is delivered to the NAX-200X through a knockout located on the lower center of the left side cabinet wall (see Figure 6). The 3/4 inch knockout accepts EIA standard conduit connectors.

NOTE: This system must be installed within the protected premise in accordance with the National Electrical Code (NFPA70), local codes, and the authorities having jurisdiction.

Accessory Conduit Knockouts

All cabling for the NAX-200X is routed through EIA standard 3/4-inch knockouts located on the left and right sides of the cabinet (see Figure 6). On the top of the enclosure, three-size knockouts are available.

Grounding Accessory Drain and Shield Wires

Ensure electromagnetic compatibility and reliable performance by keeping all accessory drain and shield wires as short as possible.

All accessory drain and shield wires connect to ground posts mounted along the knockout strips on both sides of the NAX-200X cabinet (see Figure 6).

The following procedures assure proper installation of all drain and shield wires.

- Carefully remove the cable jacket after the cable enters the NAX-200X cabinet.
- Place the drain wires under the ground post screw. Trim as needed.
- Verify a good connection and tighten the ground post screw.
- Connect the accessory wires to the appropriate terminal strip on the NAX-200X circuit board.

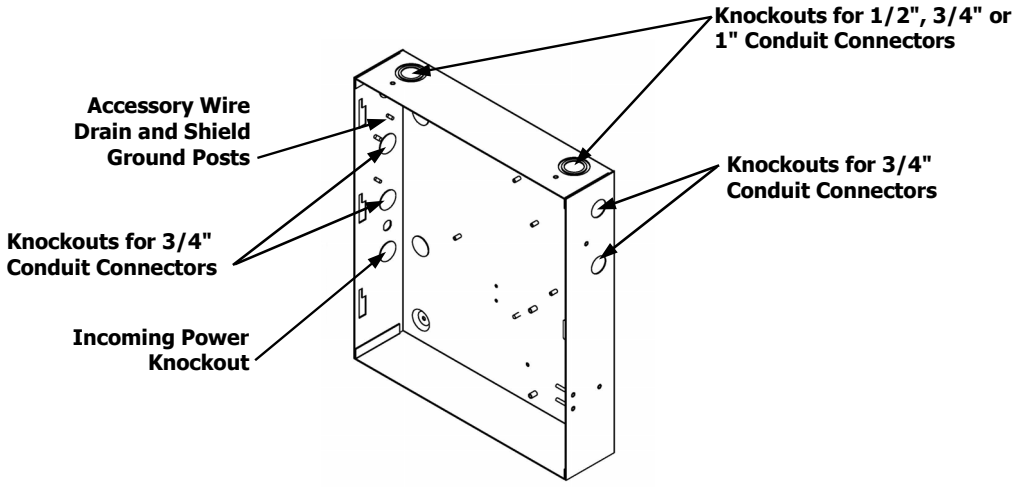


Figure 6 - Cabling Conduit Knockouts

POWER CONNECTIONS

AC Power Source Grounding

The NAX-200X main circuit board has built-in surge suppression devices. The surge suppressors require a good earth ground connection to operate effectively.

WARNING

Verify that the AC source voltage is switched off at the breaker panel before proceeding with connections.

AC Power

The incoming AC source voltage connects to the AC Input Power Terminal Block located in the lower middle of the NAX-200X cabinet (see Figure 7).

Run the AC power wiring through a knockout normally hidden by the insulation cover. Do not place any other wiring in this area.

First, secure the Green or Green/Yellow "Ground" wire to the center terminal of the AC Input Terminal Block. Then secure the White "Neutral" wire to the left terminal. Finally, secure the Black "Line" wire to the right terminal.

After the wiring is completed, use a cable-tie to secure the wires to the cable-tie mount (provided) located below the AC Input Power Terminal Block.

NOTE: Use of a dedicated, unswitched AC power source results in optimal performance with minimum interference.

Table 1 lists the incoming AC source voltage connections to the AC Input Power Terminal Block.

NOTE: Knockouts for conduit Fittings are located on the back of the metal housing and can be used if "hidden cable" installation is required.

IMPORTANT SAFETY REQUIREMENT: If the enclosure door is removed, the Ground Strap may be unbolted--but MUST be REATTACHED after installation or service is completed. Failure to Reconnect the Ground Strap may increase the Risk of Electric Shock.

Backup Battery Installation

1. Place the backup battery (P/N CI-HE0042) into to the lower right of the cabinet with the terminals on the right side.
2. Push the terminal of the BLACK lead onto the NEGATIVE (Black) Tab of the battery.
3. Push the terminal of the RED lead onto the POSITIVE (Red) Tab of the battery.

NOTE: Because of the Low Battery Voltage Disconnect feature, the NAX-200X will not start to operate until mains (AC) power is connected.

Table 1- AC Input Power Terminal Block Connections

Incoming AC	Wire Color	AC Input Terminal Block
Line	Black	L
Neutral	White	N
Ground	Green	⏚

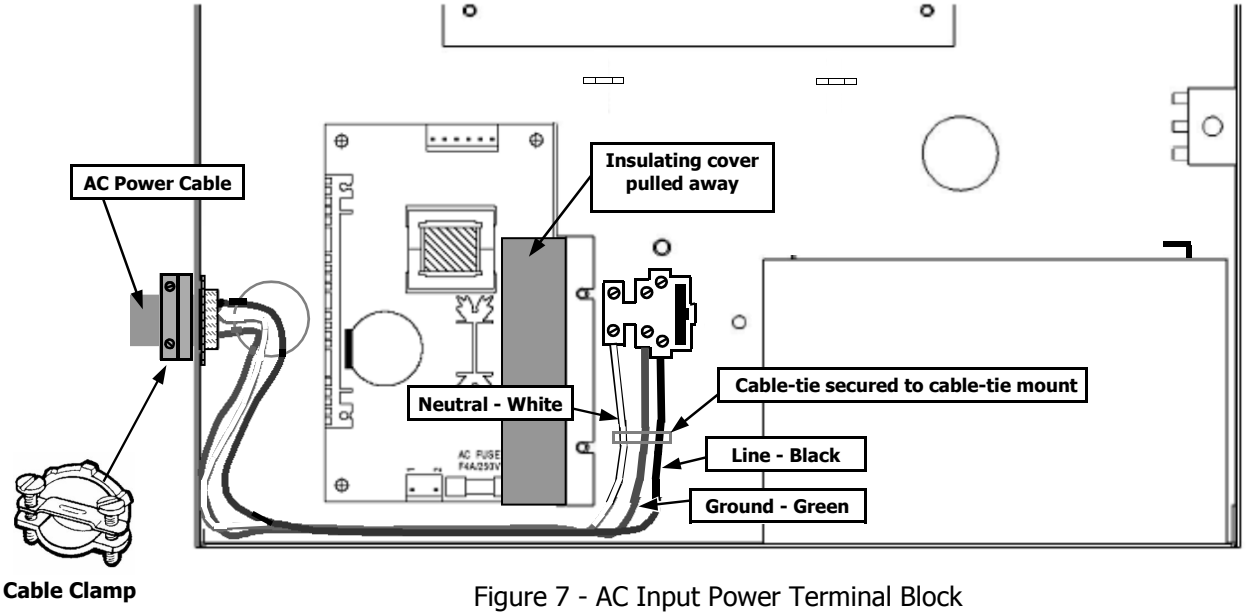


Figure 7 - AC Input Power Terminal Block

NAX-200X Circuit Board Layout

The NAX-200X circuit board (see Figure 8) provides wiring terminal strips for external access control devices (card readers, keypads, alarms, etc.).

The following descriptions in this manual reference the NAX-200X main circuit board, shown below, and use cutaway drawings to identify specific locations on the circuit board.

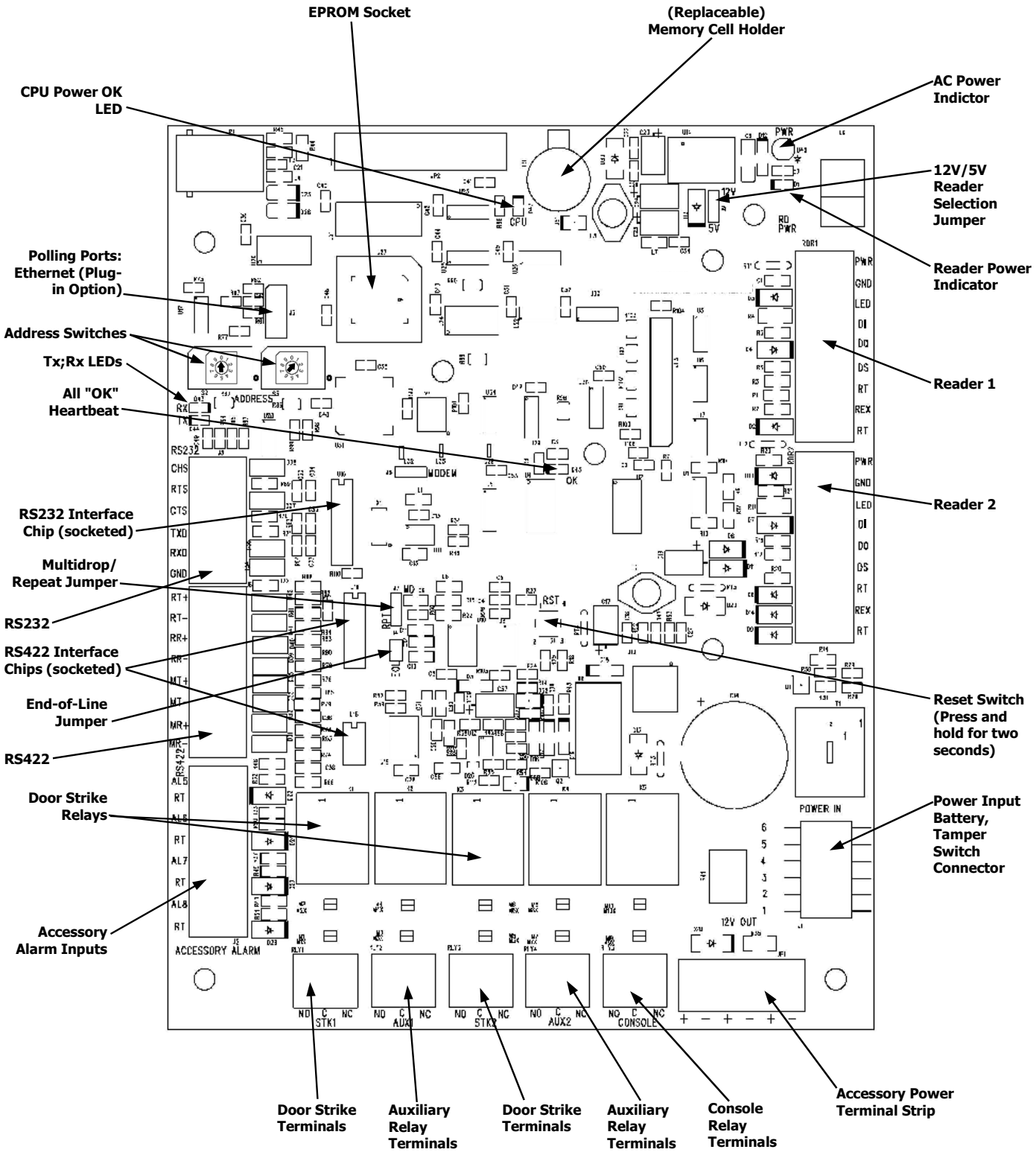


Figure 8 - NAX-200X Circuit Board Layout

DOOR CONNECTIONS

Inputs from Card Readers, Keypad/Card Readers and Door Alarms connect to the NAX-200X via the two terminal strips on the right of the board labeled RDR1 and RDR2.

Wiegand/Proximity Reader Connections

Table 2 below lists the connections between the RDR1 and RDR2 terminal strips and the Wiegand/Proximity Readers.

Table 2 - Connection Table for Wiegand / Proximity Reader

RDRx Terminal Strip Pin	Function	Wire Color
PWR	+5VDC/+12VDC	Red *
GND	Ground	Black
LED	LED	Brown
D1	Data-1	White
D0	Data-0	Green

*Jumper Selectable. +12VDC Normally preferred for Proximity Readers.

* Proximity Reader may be powered by either +5VDC or +12VDC, set by jumper.

Note: UL performed the product evaluation of NAX-200X Access Control Panel with HID ProxPoint™ Readers [Model 6005BGB00] and 36-bit cards. All other Card Reader Formats and Card Technologies were not evaluated by UL.

Wiegand/Proximity Reader Cable Requirements

Wiegand/Proximity Readers require a 5-conductor cable between the NAX-200X and the particular unit (see Figure 9). **Do not use twisted pair cable.**

NOTE: Readers may have a maximum current draw of 200mA each at +12VDC, or a total current draw of 200mA if +5VDC Reader Power is selected.

EXAMPLE: If two identical +5VDC Readers are connected to one NAX-200X, each Reader could draw up to 100mA.

Table 3 lists the cable gauge-vs-length requirements for proper operation of the NAX-200X and a Wiegand/ Proximity Reader.

Table 3 - Cable Requirements for Wiegard/ Proximity Readers

Unit	Distance (maximum)	Wire Gauge
Wiegand Reader	500ft/153m	22AWG Shielded w/ drain
Proximity Reader**	500ft/153m	22AWG Shielded w/ drain

**500ft/153m maximum for unbuffered Wiegand units.

CAUTION

Keep all drain and cable shield wires between the NAX-200X and any Wiegand/ Proximity Readers short. Connect drain and cable shield wires to the ground posts located on both sides of NAX-200X cabinet. DO NOT ground drain wires and cable shields at any other point.

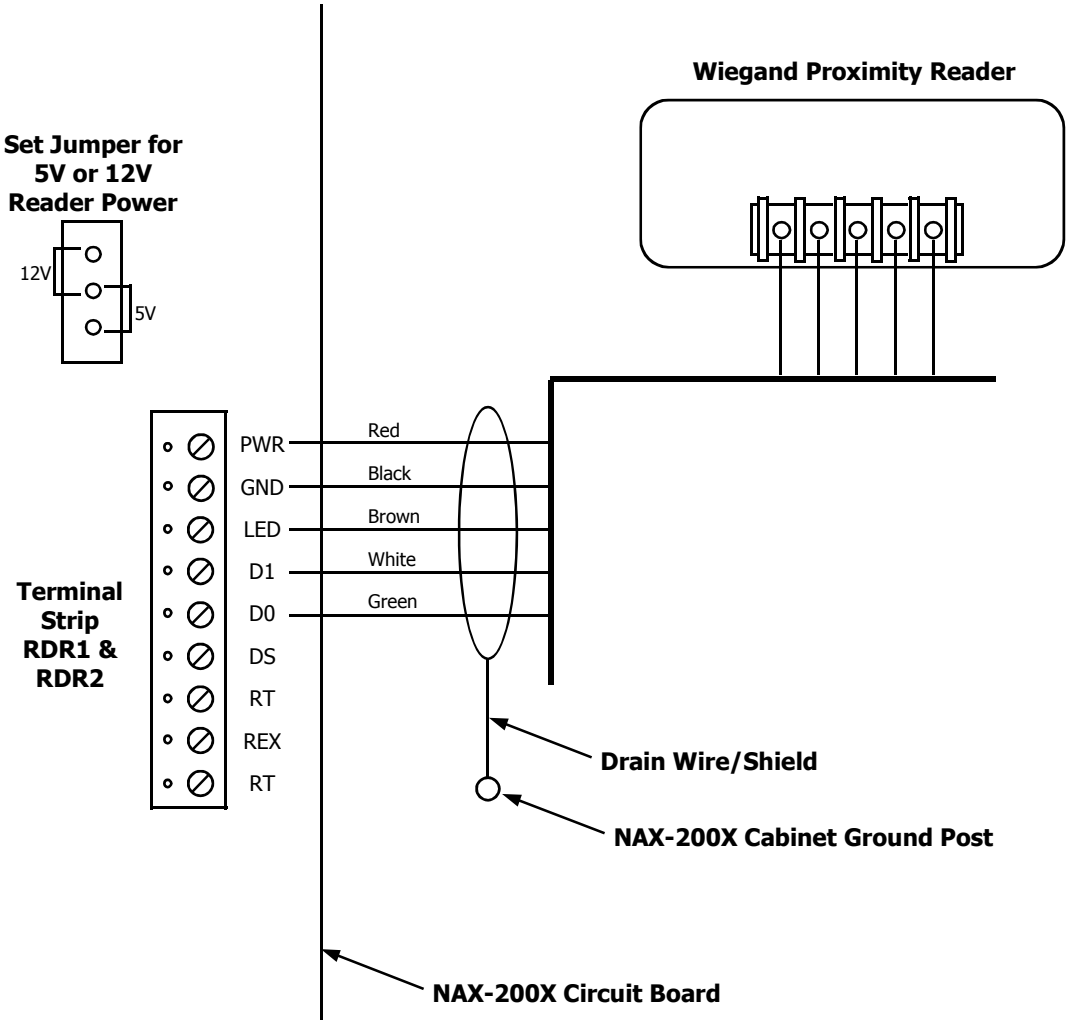


Figure 9 - Wiegand/Proximity Reader Connection to NAX-200X Board

Magnetic Stripe Reader Connection (Not Evaluated by UL)

Magnetic Stripe Readers connect to terminal strips RDR1 and RDR2 (see Figure 10). Terminal strips RDR1 and RDR2 follow the same connection procedures.

Table 4 lists the connections between the RDRI and RDR2 terminal strips and the Magnetic Stripe Reader.

Table 4 - Connection Table for Magnetic Stripe Reader

DRx Terminal Strip Pin	Function
PWR (Red)	+5VDC/12VDC (Red)
GND (Black)	Ground (Black)
LED (Brown)	LED[1] (Yellow)
D1 (White)	Data-1/DAT (Blue)
D0 (Green)	Data-0/CLK (Green)
Note 1: If the Magstripe Reader does not feature an LED indicator, 4-conductor cable may be used.	

Magnetic Stripe Reader Cable Requirements

Magnetic Stripe Readers require a 5-conductor cable between the NAX-200X and the particular unit (see Figure 10). **Do not use twisted pair cable.**

Table 5 lists the cable gauge-vs-length requirements for proper operation of the NAX-200X and Magnetic Stripe Readers.

Table 5 - Cable Requirements for Magnetic Stripe Reader

Unit	Distance	Wire Gauge
Magnetic Stripe Reader	(maximum) 500ft/153m	22AWG Shielded w/ drain

CAUTION
Keep all drain wires between the NAX-200X and Magnetic Stripe Readers short. Connect drain wires to the ground posts located on both sides of NAX-200X cabinet. DO NOT ground drain wires and cable shields at any other point.

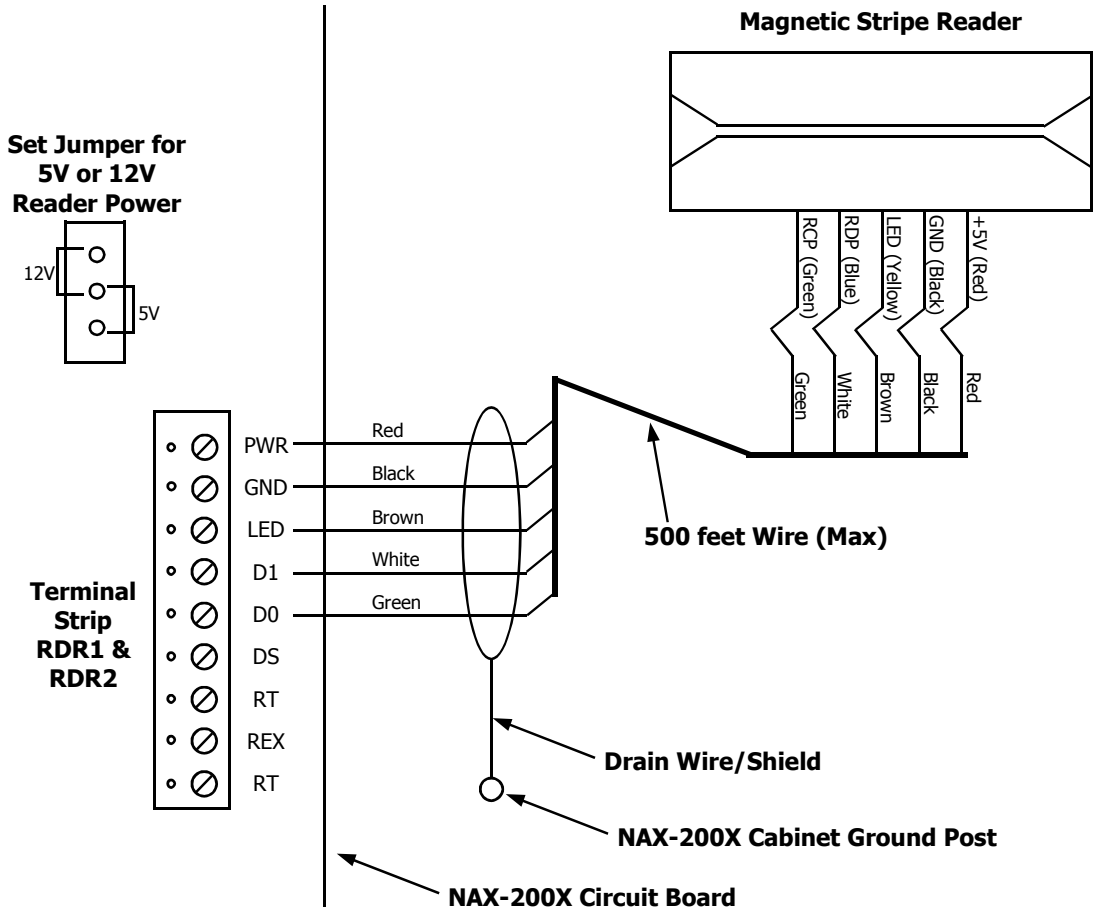


Figure 10 - Magnetic Stripe Reader Connection to NAX-200X Board

Keypad Connection

Wiegand-Output Card and Keypad Readers -

The preferred connection for "Card and Keypad" installations is the use of a Wiegand – Output Reader/Keypad such as the HID 5355AGK00 or 5355ABK00. These products eliminate the cost of additional wiring, and require no addition Interface Equipment. Compatible equipment produce the following codes for Keypad entries:

0 = 0000	4 = 0100	8 = 1000
1 = 0001	5 = 0101	9 = 0101
2 = 0010	6 = 0110	* = 1010
3 = 0011	7 = 0111	# = 1011

NOTE: Wiegand-output Keypads may simply be connected to the Card Reader inputs at DR1 and DR2 for "Keypad Only" connections.

Door Status Sensor Connection

Door Status sensors connect to the NAX-200X through two terminal strips labeled RDR1 and RDR2 (see Figure 12).

Table 8 lists the connections between the RDR1 and RDR2 terminal strips and the Door Status sensor.

Table 8 - Connection Table for Door Status Sensor		
RDRx Terminal Strip Pin	**Signal**	**Door Status Sensor Function**
DS	Alarm	Positive
RT	Return	Negative

Door Status Sensor Cable Requirements

Door Status sensors require a 22AWG, 2-conductor, stranded, shielded, cable with drain wire between the NAX-200X and the particular unit (see Figure 12).

Table 9 lists the cable gauge-vs-length requirements for proper operation of the NAX-200X and the Door Status sensor.

Table 9 - Cable Requirements for Door Status Sensor		
Unit	**Distance**	**Wire Gauge**
Door Status Sensor	500ft/153m	22AWG Shielded w/ drain

NOTES: Refer to page 26, Alarm Connections, to configure Door Status sensors as supervised alarms.

CAUTION
Keep all drain wires short. Connect drain wires to the ground posts located on both sides of NAX-200X cabinet. DO NOT ground drain wires and cable shields at any other point.

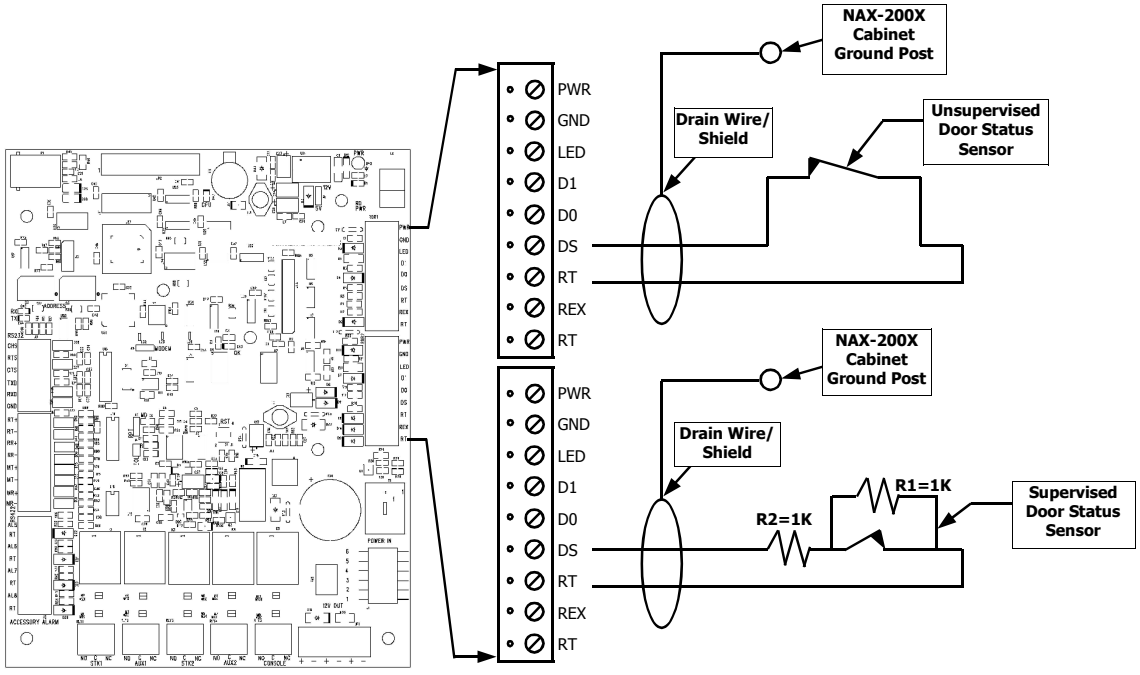


Figure 12 - Door Status Sensor to NAX-200X Connections.
Plain (Unsupervised) Contacts, and Supervised Contacts

Request-to-Exit (Bypass) Sensor Connection

Request-to-Exit sensors (also known as Bypass sensors) work in conjunction with Door Status Sensors to provide complete facility entry and exit control. The Request-to-Exit sensor input connects to the same NAX-200X terminal strip (RDR1 and RDR2) that the associated Door Status Sensor connects to (see Figure 13).

Table 10 lists the connections between the RDR1 and RDR2 terminal strips and the associated Request-to-Exit sensor.

Table 10 - Connection Table for Request-to-Exit Sensor

DRx Terminal Strip Pin #	Signal	Request-to-Exit Sensor Function
REX	Alarm	Positive
RT	Return	Negative

Request-to-Exit Sensor Cable Requirements

Request-to-Exit sensors require a 22AWG, 2-conductor, stranded, shielded, cable with drain wire between the NAX-200X and the particular unit (see Figure 13). Table 11 lists the cable gauge-vs-length requirements for proper operation of the NAX-200X and the Request-to-Exit sensor.

Table 11 - Cable Requirements for Request-to-Exit Sensor

Unit	Distance	Wire Gauge
Request-to-Exit Sensor	(maximum) 500ft/153m	22AWG Shielded w/drain

CAUTION
Keep all drain wires short. Connect drain wires to the ground posts located on both sides of NAX-200X cabinet. DO NOT ground drain wires and cable shields at any other point.

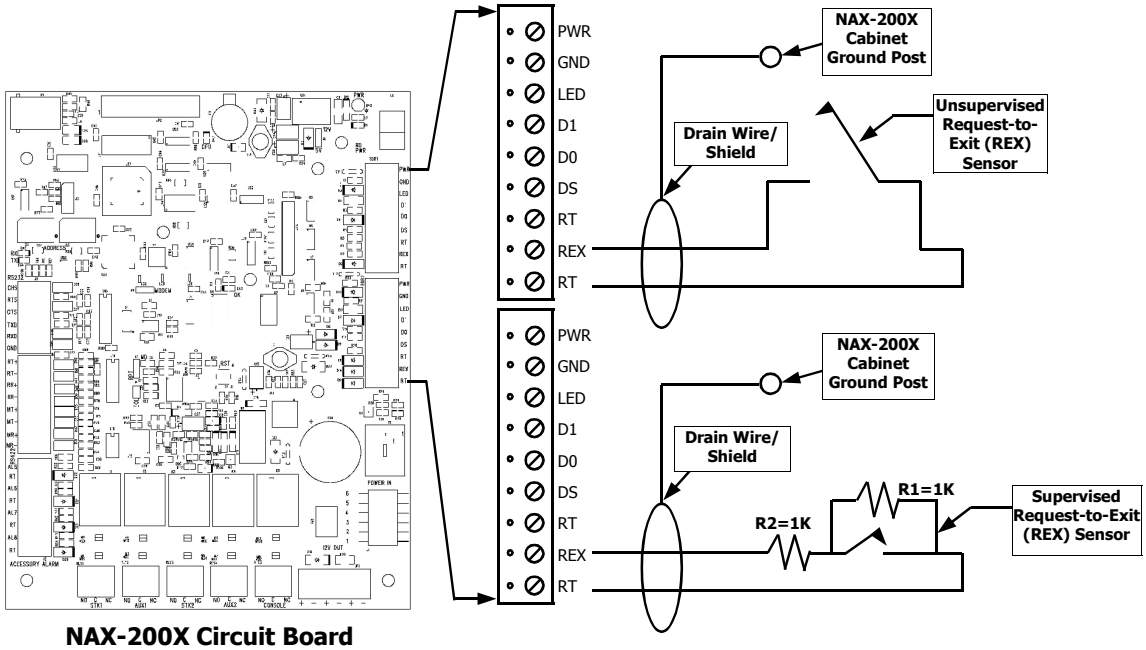


Figure 13 - Request-to-Exit Sensor to NAX-200X Connections.
Plain (Unsupervised) Contacts, and Supervised Contacts

RELAY CONNECTIONS

Description

The NAX-200X provides five Form C relays to control door strikes, door alarm shunts, console functions, etc.

The relays are divided into three categories: Door Strike Relays, Auxiliary Relays, and Console Relay

Door Strike Relays

Two relays are designated as door strike relays and work in conjunction with Wiegand/Proximity readers, Magnetic Stripe readers and Keypad to control access at particular door sites.

The door strike relays, labeled STK1 and STK2, are located on the bottom of the NAX-200X Circuit Board (see Figure 14).

The door strike relay circuits are rated 2A at 24V AC/DC.

Auxiliary Relays

Two relays are designated as Auxiliary Relays are typically used to control door alarm shunts.

The Auxiliary Relays are user-programmable and may be used for low-voltage control functions.

The Auxiliary Relays outputs, labeled AUX1 and AUX2 are located on the bottom of NAX-200X Circuit Board (see Figure 14).

Console Relay

The Console Relay activation may be linked to specific events such as invalid door access, alarm input, and tamper switch input. The console relay is linked to an event through software.

The console relay output is labeled CONSOLE and is located on the far right hand side of the relay terminal strips on the NAX-200X Circuit Board (see Figure 14).

Relay Characteristics

The relays on the NAX-200X Circuit Board all share the following characteristics:
Form C relay with a contact rating of 2A at 24V AC/DC. The Normally Open (NO), and the Normally Closed (NC) contacts are the default state of non-energized relays. Metal oxide varistors (MOVs) are placed across the contacts to reduce electrical noise. The MOVs limit any noise caused by the strike coil to 56 volts.

NOTES: Installing a 56V MOV at the strike coil further reduces possible noise input.

Because of this noise, door strike wiring MUST NOT be put in the same conduit with other wiring.

Using door strikes with a coil voltage greater than 24VDC or 24VAC requires using external relays that can be driven by NAX-200X relays.

NAX-200X Circuit Board

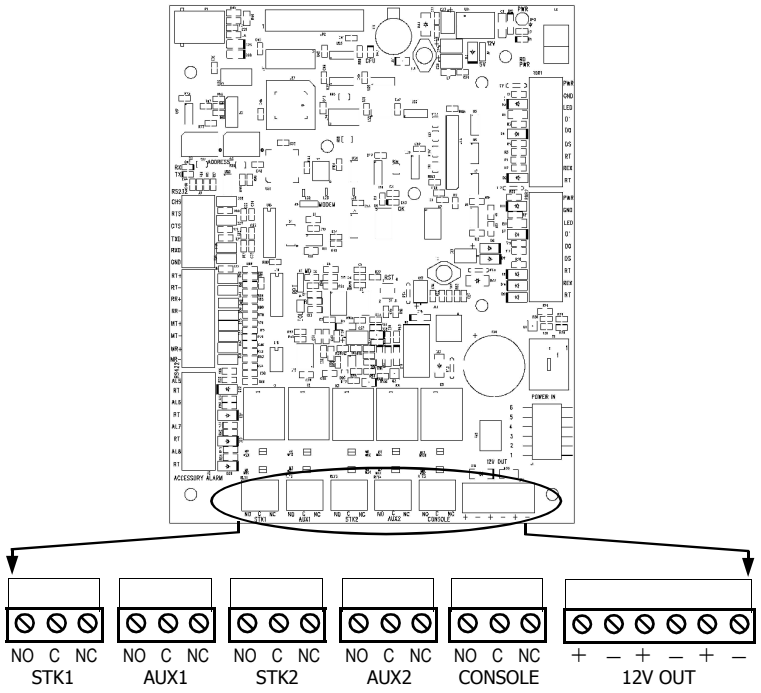


Figure 14 - Relay Contact and Accessory Power Outputs

Powering Electromagnetic (EM) Locks

Sufficient Battery-Backed 12-Volt DC Power is available to power the NAX-200X Circuit Board, two Access Control Readers, the Network Interface Adapter, and two modern EM Locks.

After a Power Failure, the installed 7AH Battery can be expected to keep the system operating for two hours (under normal conditions).

If two EM Locks used each consume 400mA or less, operation under backup power can be expected to last four or more hours.

Fire Alarm Control Panel (FACP) Connection

Emergency Disconnect of the Fail–Safe EM Lock Power can be accomplished as shown for the STK2 Circuit in Figure 15.

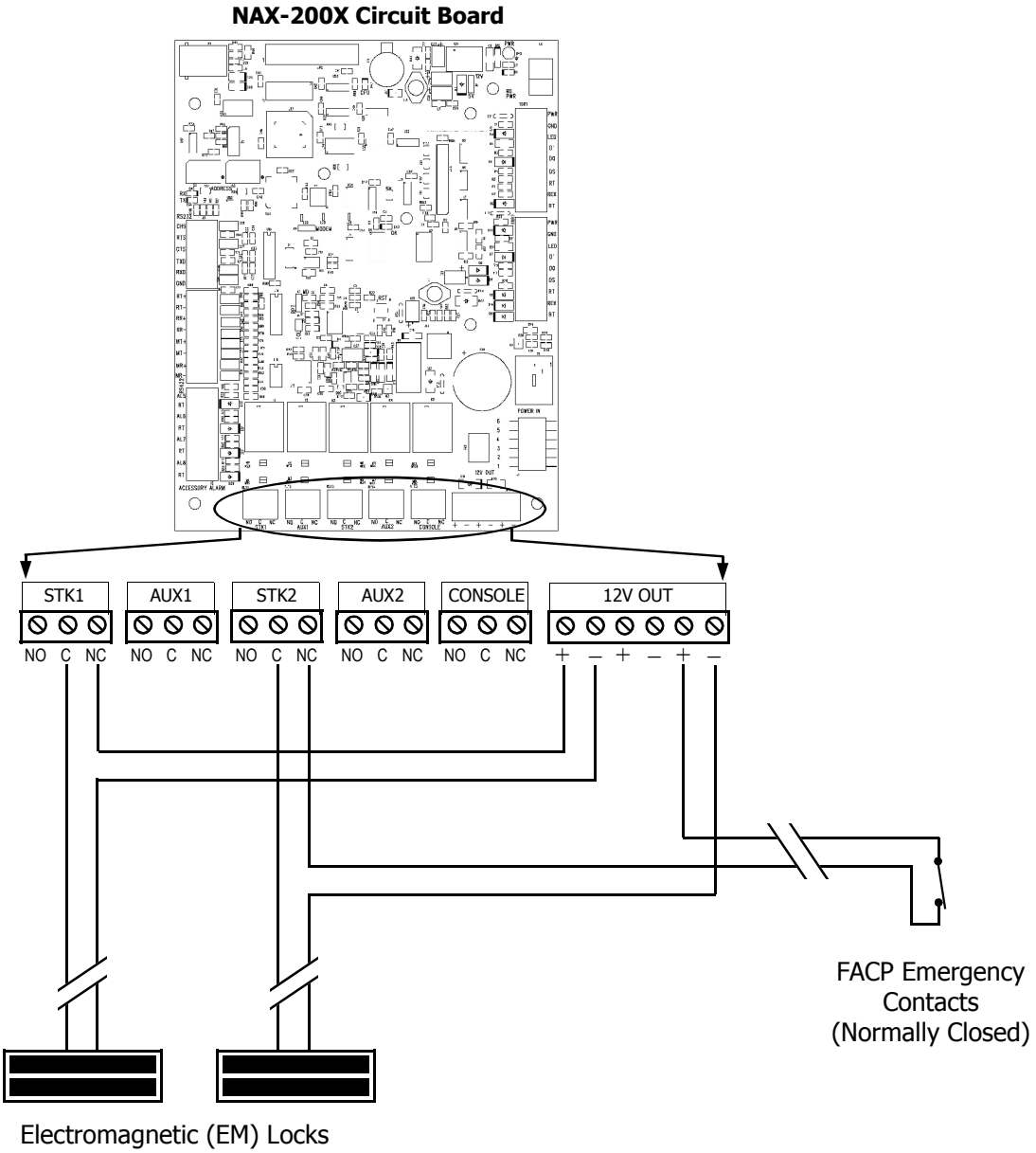


Figure 15 - Fire Alarm Control Panel (FACP) Connection

ACCESSORY POWER

The ACCESSORY POWER terminal strip (labeled 12V OUT) provides battery backed +12VDC power outlets for auxiliary devices. This terminal strip is located in the lower right-hand corner of the NAX-200X circuit board.

Table 12 lists the ACC. POWER terminal strip pin numbers and their associated functions.

Table 12 - ACCESSORY POWER (12_V) Terminal Strip Functions

Pin	Function
1	+12
2	GND
3	+12
4	GND
5	+12
6	GND

NOTE: +12VDC current draw is limited to a total maximum of 1.60 Amps for Readers, EM Locks, and Accessories.

WARNING
Observe Positive and Negative wire polarity between accessory devices and the NAX-200X.

ALARM CONNECTION

The NAX-200X has a total of 8 supervised alarm inputs. Four alarm inputs are located on the RDR1 and RDR2 terminal strips, and are used for Request-to-Exit and Door Status sensor functions (see pages 21 and 22).

An additional four accessory alarm inputs are located on the Accessory ALARM terminal strip located on the lower left corner of the NAX-200X circuit board (see Figures 25 and 26). These alarm inputs may be used for dry contact type inputs (unsupervised) or supervised alarms.

Supervised Alarms

Supervised alarms provide monitoring of alarm inputs for fault or tamper conditions. Two additional alarm states may be detected by installing two-1K Ohm) resistors near the alarm contacts.

In addition to the standard Normal and Abnormal alarm conditions, the supervised alarms report Line Open and Line Short conditions.

- A Line **Open** condition is the result of a cut wire.
- A Line **Short** condition is the result of a short in the alarm wiring.

These fault conditions may be the result of tampering, and indicate the system cannot correctly detect the state of the alarm contacts.

Configuring an Alarm in the Supervised Condition

1) Use two 1K Ohm, 1/4W, ±5% carbon film resistors per alarm.
2) Install R 1 in parallel with the alarm contacts (see Figure 16).
3) Install R2 in series with the alarm input conductor.

NOTE: For maximum protection, install the resistors close to the alarm contacts and embed them in epoxy.

Table 13 lists the ALARM terminal strip pin numbers and the respective signals.

Table 13 - ALARM Terminal Strip Input Pins

Pin	Signal
1	AL 5
2	RT 5
3	AL6
4	RT6
5	AL 7
6	RT7
7	AL8
8	RT8

Alarm Cable Requirements

Connecting alarm sensors to the NAX-200X board requires 22 AWG, stranded, shielded, cables with drain wires.

CAUTION

Keep all drain wires short. Connect drain wires to the ground posts located on both sides of NAX-200X cabinet. DO NOT ground drain wires at any other point.

Tamper Switch

The NAX-200X cabinet has a built-in tamper switch. The tamper switch is factory wired and requires no adjustment. For a UL-Compliant Installation, the Tamper Switch must be configured at the Host Computer to signal an Alert when the Tamper Switch is activated. The Tamper Switch may also be configured to activate the Console Relay that is wired to an alarm signal circuit or an alarm sounder

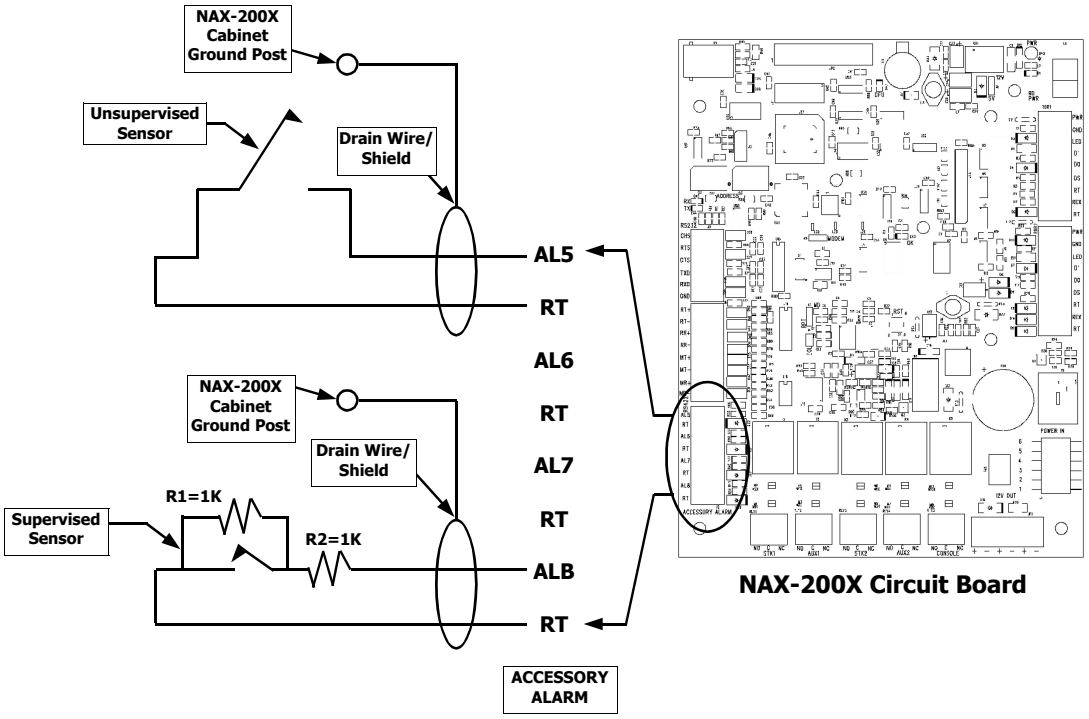


Figure 16 - ALARM Terminal Strip - Unsupervised and Supervised Alarm Connections

RS-232 Communications - Host Operation

Operating as a stand-alone system, the NAX-200X communicates with a host computer (directly, through the optional Ethernet Network Interface) through the RS-232 channel.

Proper RS-232 communications requires observing the EIA standard pin definitions of Data Terminal Equipment (DTE) and Data Control Equipment (DCE).

NOTE: All RS-232 equipment made by NAPCO, including the NAX-200X, are configured as DTE devices.

RS-232 Cable Requirements

RS-232 communication between the NAX-200X and a host computer require stranded, 3 conductor, 22 AWG cable with shielding and a drain wire. **Do not use twisted pair cable**.

Table 14 displays the cable gauge and length requirements for proper operation of the NAX-200X and the host computer.

Table 14 - RS-232 Cable Gauge-vs-Length

Unit	Distance	Wire Gauge
Host Computer	50ft (15.2m) (Maximum)	22AWG

NOTES: A host computer is typically connected to the RS-232 cable using either a DB9-S or a DB25-S connector.

RS-232 Jumper Settings

RS-232 communications between the NAX-200X and a host computer require setting the MD/RPT and EOL jumpers on the NAX-200X board. Refer to page 38, EOL and MD/RPT Jumper Settings, for specific information.
NOTE: Operating as a stand-alone system, the NAX-200X must be configured in the REPEAT mode.

Address Setting

Operating the NAX-200X on the RS-232 channel requires setting a board address (Address Zero not valid) on the small rotary switches marked ADDRESS (S2 and S3). Refer to page 29, Network Address Settings for specific information.

NAX-200X to Host Computer Connection

Figure 17 shows a direct NAX-200X-to-host computer connection.

1) Connect the Transmit pin of the RS-232 device to COMM terminal strip pin number 5 (labeled RxD) (See Figure 18).
2) Connect the Receive pin of the RS-232 device to COMM terminal strip pin number 4 (labeled TxD).
3) Connect the Ground pin of the RS-232 device to COMM terminal strip pin number 6 (labeled GND).
4) Connect the RS-232 cabling drain wire/shield to GROUND at the host computer end of the cable. Do Not connect the drain wire at the NAX-200X end of the cable.

Table 15 lists the connections between the COMM terminal strip and a host computer.

Table 15 - Connection Table for Host Computer

Signal	NAX-200X COMM Pin #	Host Computer DB9-S pin
TXD	4	2
RXD	5	3
GND	6	5

COMMUNICATION CONNECTIONS

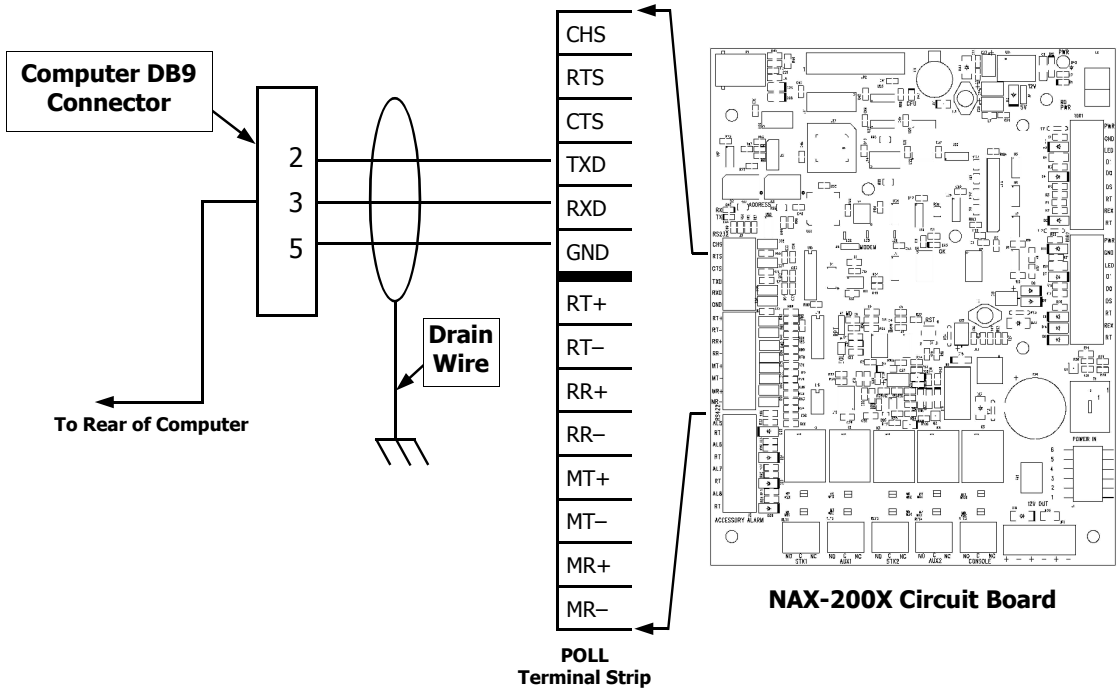


Figure 17 - NAX-200X-to-Host Computer Connection

Networking

The NAX-200X can be networked with a maximum of 62 other NAX-200X units.

NOTE: Multidrop networks require line drivers if more than 32 NAX-200X Panels are configured.

The following network configurations are possible:

RS-232 to RS-422 Networks

RS-232 to RS-422 REPEAT Networks
RS-232 to RS-422 MULTIDROP Networks

RS-422 to RS-422 Networks

RS-422 to RS-422 REPEAT Networks
RS-422 to RS-422 MULTIDROP Networks

NOTES: If the first NAX-200X in the network is less than 50 feet (15.2m) from the host computer, the first NAX-200X in the network may be used to convert the RS-232 polling signal to RS-422 for the remainder of the network.

If the first NAX-200X in the network is more than 50 feet (15.2m) from the host computer, an RS-422 polling line converter is required.

Network Jumper Settings

The MD/RPT and EOL jumpers on each NAX-200X must be set depending on the type of network configuration.

Refer to page 38 for specific information regarding the EOL jumper. Also refer to page 38 for specific information regarding the MD/RPT jumper.

Network Cable Requirements

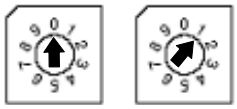
Networking multiple NAX-200X panels requires 4-conductor cable (2-two wire twisted pair), stranded, 22AWG, with shielding, and drain wire.

For REPEAT network configurations, cable length between EACH NAX-200X is restricted to a maximum length of 4000 feet (1220m).

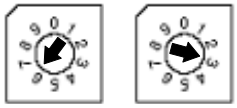
For MULTIDROP network configurations, total cable length is restricted to a maximum 4000 feet (1220m) between the FIRST NAX-200X and the LAST NAX-200X in the network.

Network Address Settings

Operating the NAX-200X with a host computer, or in a network, requires that each NAX-200X (and other devices) have an individual, unique address other than zero.



Example: Address "01" is set.



Example: Address "63" is set.

Figure 19a – Setting Network Address

The BCD Rotary Switches are set with a small screwdriver. There is a click detent for each number. The valid address range is "01" to "63". (Address "00" is not valid).

See "Clear Memory and Force Download to Panel" on page 43.

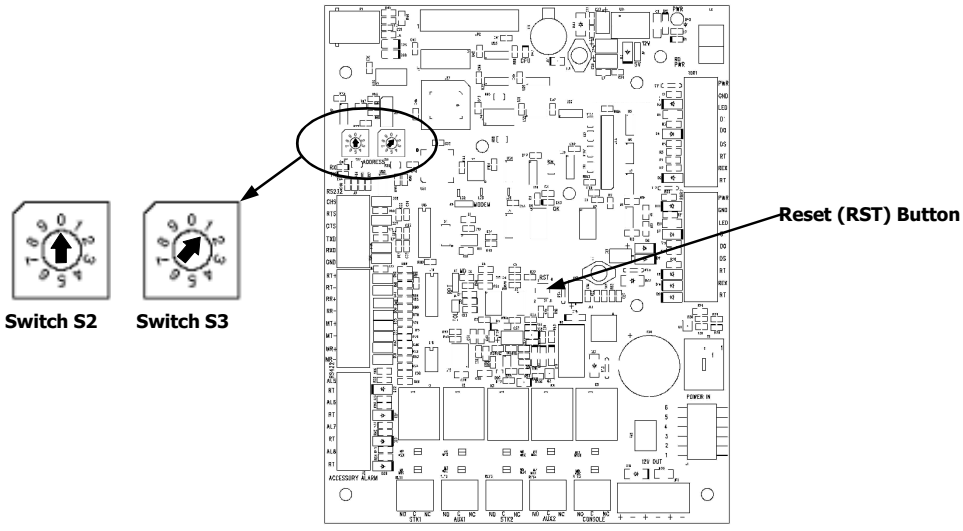


Figure 19 - NAX-200X Address Switch (S2 & S3) Location

RS-232 to RS-422 REPEAT Network

If the first NAX-200X in the network is less than 50 feet (15.2m) from the host computer, it may be used to convert the RS-232 polling signal from the host to RS-422 for the remainder of the network.

1. Connect the first NAX-200X to the RS-232 port of the host computer.
2. Connect the remainder of the network using the NAX-200X's RS-422 ports.

Refer to Figure 20, page 31, for a typical REPEAT mode network connection diagram.

Table 17 lists the required connections for an RS-232 to RS422 REPEAT network.

RS-232 to RS-422 REPEAT Jumper Settings

To convert an RS-232 signal to an RS-422 signal, the first NAX-200X unit in the network must be in REPEAT mode.

Operating a NAX-200X network in the REPEAT mode requires setting the MD/RPT and EOL jumpers.

Refer to page 38 for information regarding setting the MD/RPT jumper and for information regarding setting the EOL jumper.

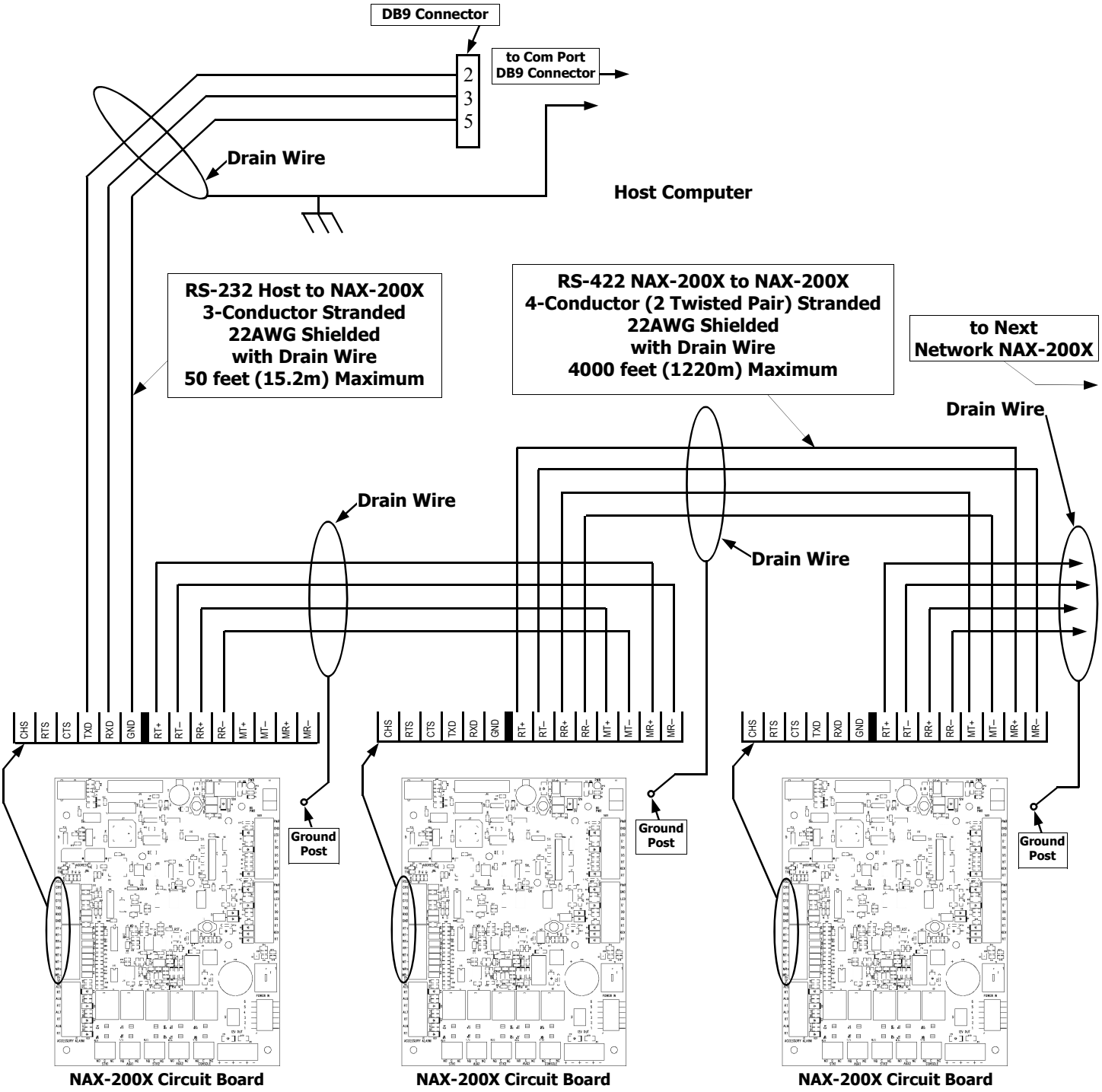
RS-232 to RS-422 REPEAT Ground and Drain Cables

The drain wires for all RS-422 cables in the network must be grounded to the individual NAX-200X's Cabinet Ground Post (see Figure 20). Ground RS-422 cables at the end closest to the host computer.

NOTE: Ground the drain wire for the RS-232 cables at the host computer end of the cable.

Table 17 - RS-232 to RS-422 REPEAT Network Connections

Host Computer	NAX-200X #1	NAX-200X #2	NAX-200X 3#	NAX-200X #4	to next NAX-200X
	MODE1 Jumper = REPEAT EOL jumper = IN	MODE1 Jumper = REPEAT EOL jumper = IN	MODE1 Jumper = REPEAT EOL jumper = IN	MODE1 Jumper = REPEAT EOL jumper = IN	MODE1 Jumper = REPEAT EOL jumper = IN
Signal	Connector	Connector	Connector	Connector	Connector
RS-232 RXD RS-232 TXD RS-232 GND	TXD RXD GND				
	RT+ RT- RR+ RR-	MR+ MR- MT+ MT-			
		RT+ RT- RR+ RR-	MR+ MR- MT+ MT-		
			RT+ RT- RR+ RR-	MR+ MR- MT+ MT-	>>>> >>>> >>>> >>>>



First Network NAX-200X
REPEAT Mode
MD/RPT Jumper = RPT pins 2 and 3)
EOL Jumper - IN

Second Network NAX-200X
REPEAT Mode
MD/RPT Jumper = RPT (pins 2 and 3)
EOL Jumper = IN

Third Network NAX-200X
REPEAT Mode
MD/RPT Jumper = RPT (pins 2 and 3)
EOL Jumper = IN

Figure 20 - NAX-200X RS-232 to RS-422 REPEAT Network Connection

RS-232 to RS-422 MULTIDROP Network

Figure 21 shows the required connections for an RS-232 to RS-422 MULTIDROP network.

- Connect the first NAX-200X to the RS-232 port of the host computer.
- Connect the remainder of the network using the NAX-200X's RS-422 ports.

NOTE: Thirty-two (32) NAX-200X panels may be installed in a Multidrop network.

Table 18 lists the required connections for an RS-232 to RS-422 MULTIDROP network.

RS-232 to RS-422 MULTIDROP Network Ground and Drain Wires

The drain wires for all RS-422 cables in a MULTIDROP network must be connected together (isolated from the cabinet ground) and connected only to the ground post at the FIRST NAX-200X in the network (the NAX-200X unit CLOSEST to the host computer).

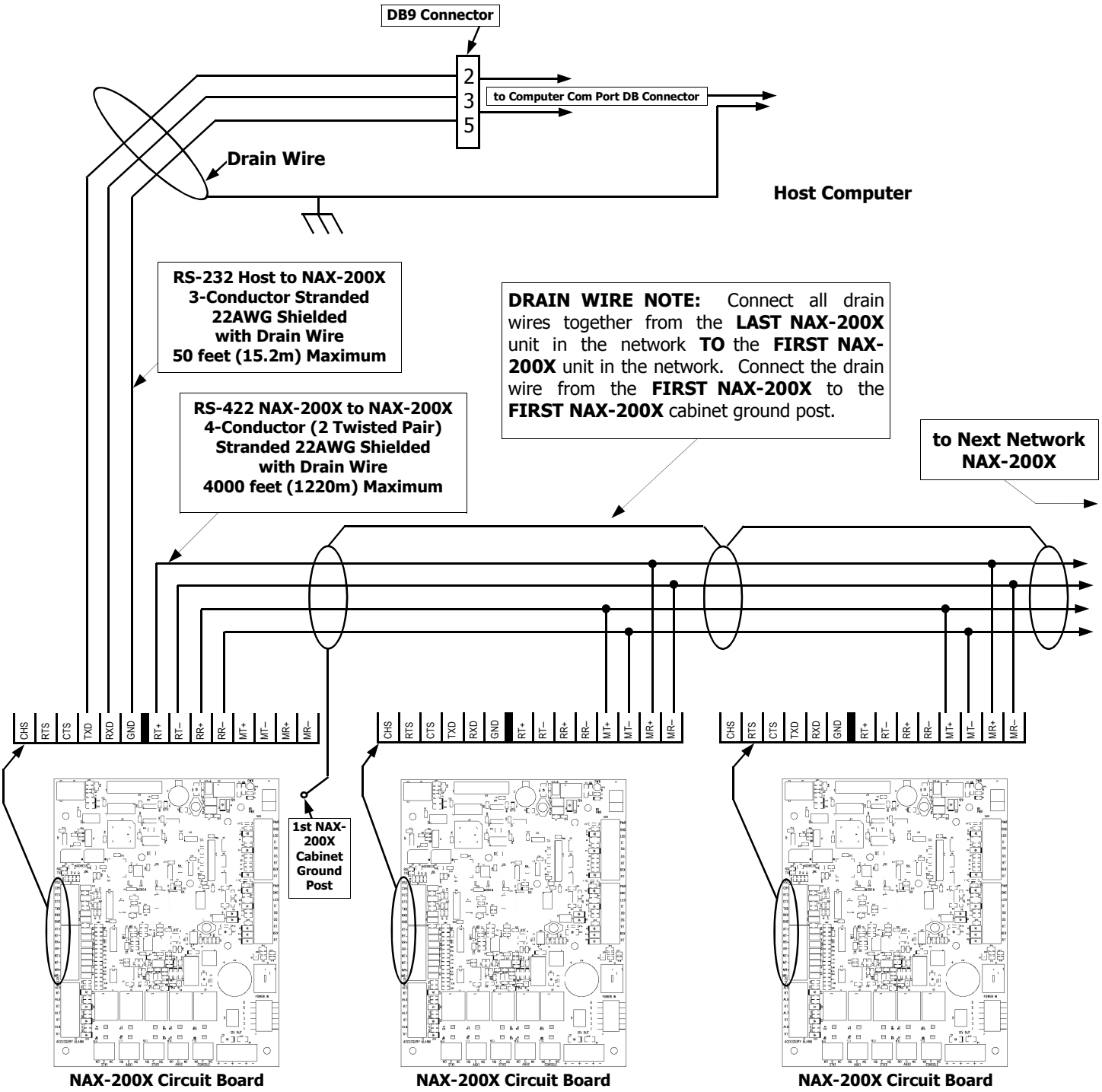
RS-232 to RS-422 MULTIDROP Network Jumper Setting

Operating a NAX-200X network in the MULTIDROP mode requires setting the MD/RPT and EOL jumpers.

Refer to page 38 for information regarding setting the MD/RPT jumper, and for information regarding setting the EOL jumper.

Table 18- RS-232 to RS-422 MULTIDROP Network Connections

Host Computer	NAX-200X #1	NAX-200X #2	NAX-200X 3#	NAX-200X 4#	Last NAX-200X
	MD/RPT Jumper=RPT EOL Jumper = IN	MD/RPT Jumper=MD EOL Jumper = OUT	MD/RPT Jumper=MD EOL Jumper = OUT	MD/RPT Jumper=MD EOL Jumper = OUT	MD/RPT Jumper=MD EOL Jumper = **IN**
Signal	**Connector**	**Connector**	**Connector**	**Connector**	**Connector**
RS-232 RXD RS-232 TXD RS-232 GND	TXD RXD GND				
	RT+ RT- RR+ RR-	MR+ MR- MT+ MT-	MR+ MR- MT+ MT-	MR+ MR- MT+ MT-	>>>MR+ >>>MR- >>>MT+ >>>MT-



First Network NAX-200X
REPEAT Mode
MD/RPT Jumper = RPT (pins 2 and 3)
EOL Jumper = IN

Second Network NAX-200X
MULTIDROP Mode
MD/RPT Jumper = MD (pins 1 and 2)
EOL Jumper = OUT

Third Network NAX-200X
MULTIDROP Mode
MD/RPT Jumper = MD (pins 1 and 2)
EOL Juniper = OUT

NOTE: Set the EOL jumper for the last NAX-200X in the network to IN.

Figure 21 - NAX-200X RS-232 -to- RS-422 MULTIDROP Network Connection

RS-422 to RS-422 REPEAT Network

If the first NAX-200X in a network is more than 50 feet (15.2m) from the host computer, the polling line from the host computer must use RS-422 standards.

An RS-232 to RS-422 Polling Line Converter may be used at the host computer to convert the polling signal.

Figure 22, page 35 shows the required connections for an RS-422-to-RS-422 REPEAT network.

Table 19 lists the necessary connections between:

A host computer and the first NAX-200X in the network,

and

The first NAX-200X in the network and the remaining NAX-200X Panels (63 maximum) in a network.

RS-422 to RS-422 REPEAT Network Jumper Settings

Operating a NAX-200X network in the REPEAT mode requires setting the MD/RPT jumper and the EOL jumper.

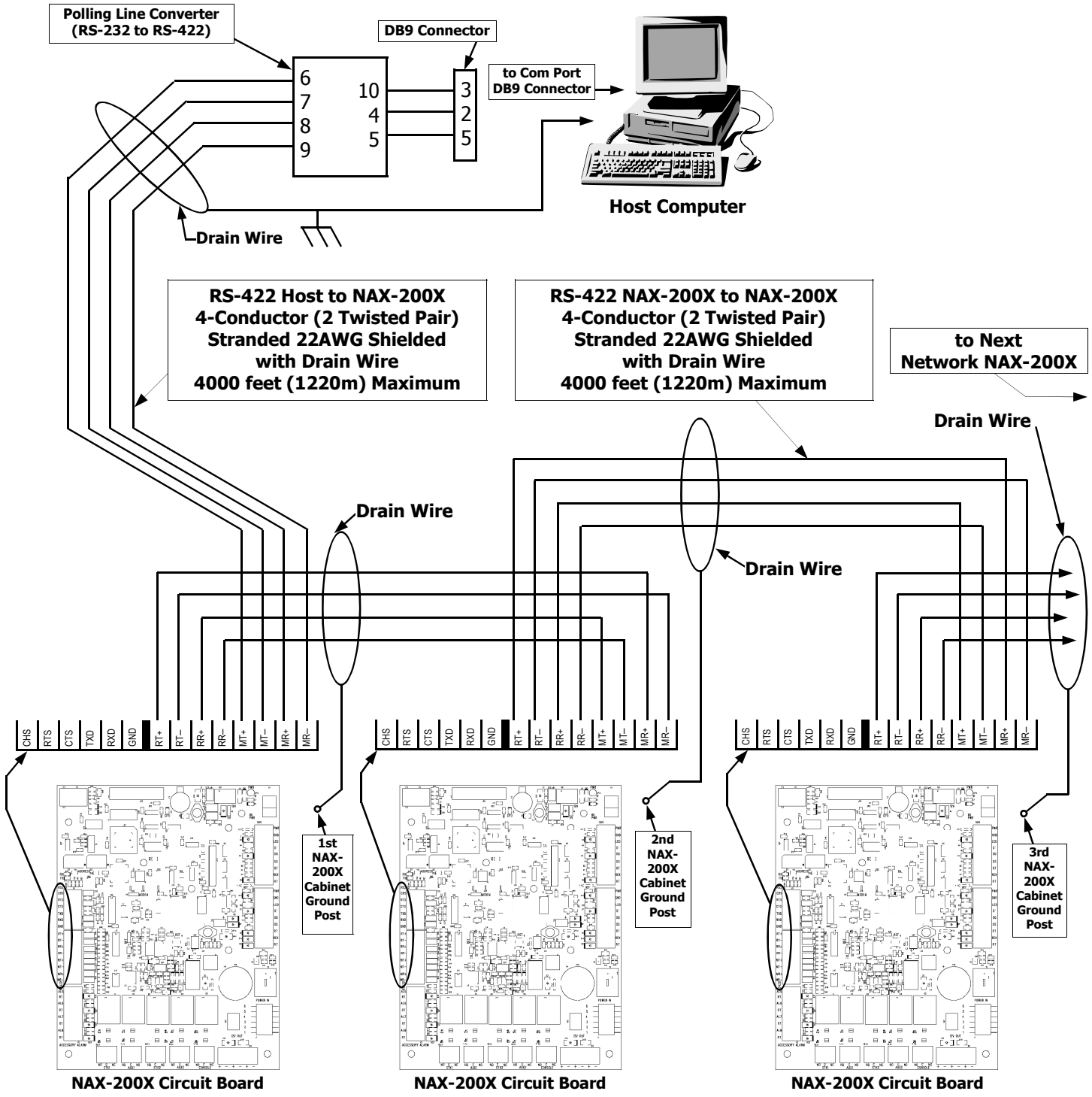
Refer to page 38 for information regarding setting the MD/RPT jumper, and for information regarding setting the EOL jumper.

RS-422 to RS-422 REPEAT Network Ground and Drain Cables

Ground the drain wires for all RS-422 cables in the network at each individual NAX-200X in the network.

Table 19 - RS-422 to RS-422 REPEAT Network Connections

Host Computer	NAX-200X #1	NAX-200X #2	NAX-200X 3#	NAX-200X #4	to next NAX-200X
	MD/RPT Jumper=RPT EOL Jumper =IN	MD/RPT Jumper=RPT EOL Jumper =IN	MD/RPT Jumper=RPT EOL Jumper =IN	MD/RPT Jumper=RPT EOL Jumper =IN	MD/RPT Jumper=RPT EOL Jumper =IN
Polling Line Connector Signal	Connector/Pin	Connector/Pin	Connector/Pin	Connector/Pin	Connector/Pin
RS-422 TXD+ RS-422 TXD- RS-422 RXD+ RS-422 RXD-	MR+ MR- MT+ MT-				
	RT+ RT- RR+ RR-	MR+ MR- MT+ MT-			
		RT+ RT- RR+ RR-	MR+ MR- MT+ MT-		
			RT+ RT- RR+ RR-	MR+ MR- MT+ MT-	>>>> >>>> >>>> >>>>



First Network NAX-200X
REPEAT Mode
MD/RPT Jumper = RPT (pins 2 and 3)
EOL Jumper = IN

Second Network NAX-200X
REPEAT Mode
MD/RPT Jumper = RPT (pins 2 and 3)
EOL Jumper = IN

Third Network NAX-200X
REPEAT Mode
MD/RPT Jumper = RPT (pins 2 and 3)
EOL Jumper = IN

Figure 22 - NAX-200X RS-422 to RS-422 REPEAT Network Connection

RS-422 to RS-422 MULTIDROP Network

Figure 23 shows the required connections for an RS-422-to-RS-422 MULTIDROP network.

Table 20 lists the necessary connections between:

- A host computer and the first NAX-200X in the network,

and

- The first NAX-200X in the network and the following NAX-200X Panels in a network.

NOTE: Thirty-two (32) NAX-200X panels may be installed in a Multidrop network.

RS-422 to RS-422 MULTIDROP Network Jumper Settings

Operating a NAX-200X network in the MULTIDROP mode requires setting the MD/RPT and EOL jumpers.

Refer to page 38 for information regarding setting the MD/RPT jumper, and for information regarding setting the EOL jumper.

RS-422 to RS-422 MULTIDROP Network Ground and Drain Cables

Ground the drain wires for all RS-422 cables in the network to the NAX-200X ground posts.

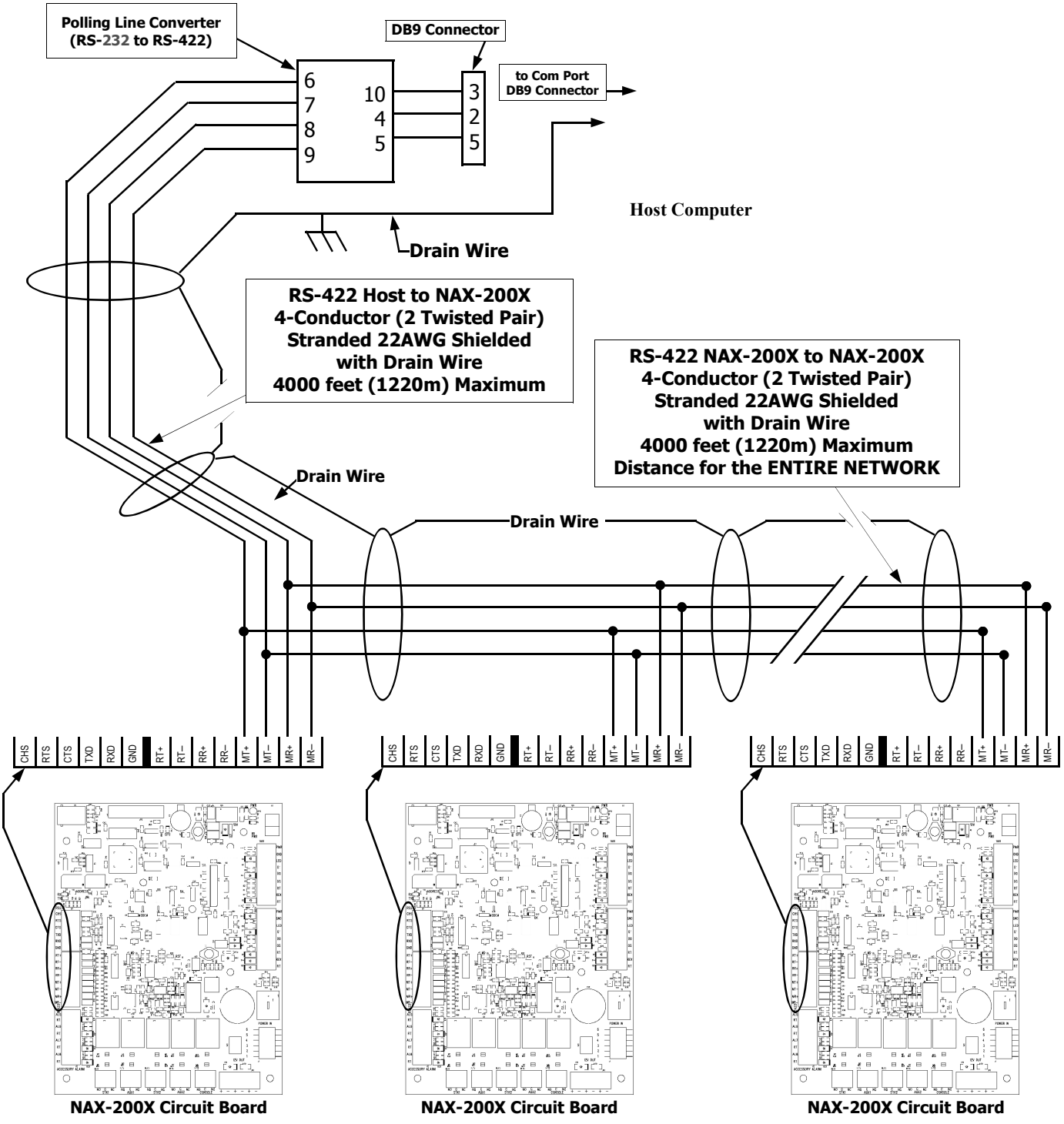
NOTE: Connect all drain wires together starting at the LAST NAX-200X in the network and working toward the FIRST NAX-200X in the network.

Connect the drain wire from the FIRST NAX-200X in the network to the drain wire at the Polling Line Converter (see Figure 23).

Connect the drain wire from the Polling Line Converter to the ground at the rear of the host computer.

Table 20 - RS-422 to RS-422 MULTIDROP Network Connections

Host Computer	NAX-200X #1	NAX-200X #2	NAX-200X 3#	NAX-200X #4	Last NAX-200X
	MD/RPT Jumper=MD EOL Jumper = OUT	MD/RPT Jumper=MD EOL Jumper = OUT	MD/RPT Jumper=MD EOL Jumper = OUT	MD/RPT Jumper=MD EOL Jumper = OUT	MD/RPT Jumper=MD EOL Jumper = **IN**
Signal	**Connector**	**Connector**	**Connector**	**Connector**	**Connector**
RS-422 TXD+ RS-422 TXD- RS-422 RXD+ RS-422 RXD-	MR+ MR- MT+ MT-	MR+ MR- MT+ MT-	MR+ MR- MT+ MT-	MR+ MR- MT+ MT-	>>>MR+ >>>MR- >>>MT+ >>>MT-



First Network NAX-200X
MULTIDROP Mode
MD/RPT Jumper = MD (pins 1 and 2)
EOL Jumper = OUT

Second Network NAX-200X
MULTIDROP Mode
MD/RPT Jumper = MD (pins 1 and 2)
EOL Jumper = OUT

Third Network NAX-200X
MULTIDROP Mode
MD/RPT Jumper = MD (pins 1 and 2)
EOL Jumper = IN

Figure 23- RS-422 to RS-422 MULTIDROP Network Connection

JUMPER SETTINGS

The NAX-200X circuit board functions with a variety of options. Proper circuit operation requires setting specific jumpers depending on the installed access control accessories, the installed system options, and any network configurations.

EOL Jumper

When operating multiple NAX-200X units in a MULTIDROP RS-422 network, the EOL jumper on the LAST unit in the communication network must be set to the TERMINATED position.

All other NAX-200X's should have the EOL jumper set to the NOT TERMINATED position.

When operating any NAX-200X unit in a REPEAT mode (stand-alone or part of a network), set the EOL jumper on EVERY unit to the TERMINATED position.

NAX-200X TERMINATED
Set the jumper to contact both pins (1 and 2--reference Figure 23a at right).

NAX-200X NOT TERMINATED
Remove the jumper or hang from lower pin as shown in Figure 23a.

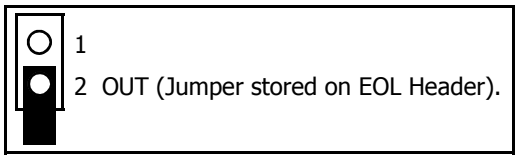


Figure 23a- EOL Jumper

MD/RPT Jumper

The MD/RPT jumper is used to designate the particular NAX-200X as an active REPEAT or a passive MULTIDROP network member (see Figure 24).

***MULTIDROP* Mode**
Use this mode when the NAX-200X is operating in the MULTIDROP mode as part of an RS-422 Multidrop network.
Set the jumper to contact the center post (pin 2) and the upper post (pin 1).

***REPEAT* Mode**
Use this mode when the NAX-200X is operating in the REPEAT mode as a stand-alone system (RS-232) or a part of a REPEAT or MULTIDROP (RS-422) network.
Set the jumper to contact the center post (pin 2) and the lower post (pin 3).

NOTE: Stand-alone NAX-200X Panels must be configured in the REPEAT mode.

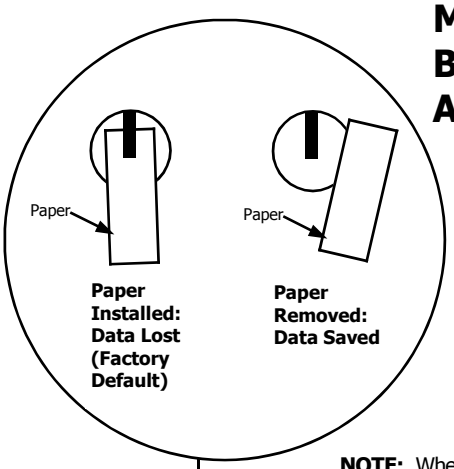
Memory Battery Activation

The NAX-200X contains a 3.0 volt Lithium battery (B 1) used to preserve memory in the event of a power failure. Refer to Figure 8 for board layout.

The NAX-200X is shipped with a paper isolator between the battery and the battery holder to prevent unnecessary drainage.

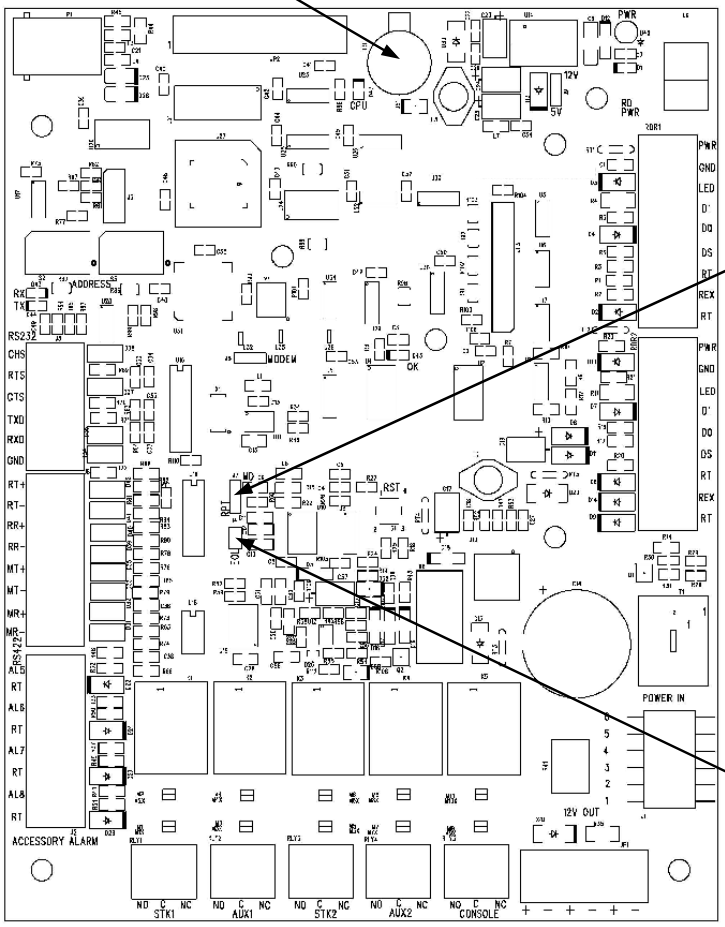
Remove the paper isolator immediately before powering up the NAX-200X . If the battery is not activated all user-programmed data will be lost if power is interrupted.

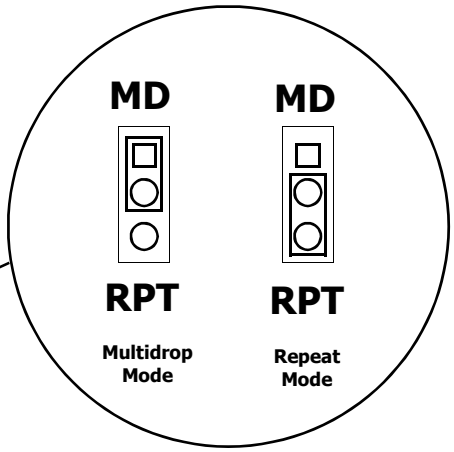
MEMORY BATTERY ACTIVATION



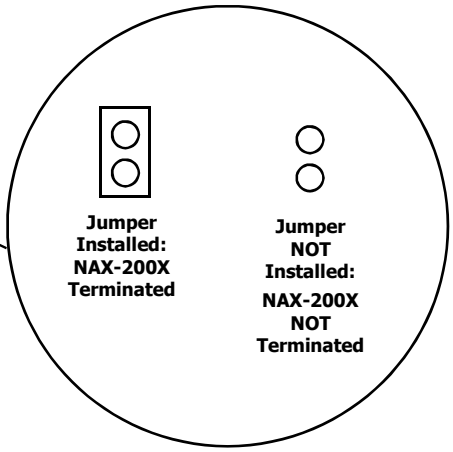
Replace the 3V Lithium Memory Battery only with a **Panasonic or Rayovac BR1225 or BR1225A**. (Napco BT101)
Use of another Battery may present a risk of Fire or Explosion.

NOTE: When installing the new cell, use a plastic forceps, or handle the cell by its edge to avoid contaminating the conductive surfaces of the device. For battery types, see above.





MD/RPT JUMPER



EOL JUMPER

Figure 24- Memory Battery Activation and Jumper Settings

LED Diagnostics

The NAX-200X circuit board uses LEDs to indicate the presence of a particular voltage and RS-232 signals. Figure 25 shows the LED position on the NAX-200X circuit board and the individual LED functions.

Table 21 - LED Diagnostic Functions		
Marking	**Function**	**Notes**
PWR	AC Power Status	AC Power connected and 12 Volt Power Supply Working
CPU	Processor Power Ind.	5 Volt Power on the PC Board
RD PWR	Reader Power	5 Volt or 12 Volt Reader Power. Brighter when 12 Volt is selected.
OK	Processor Running okay	Flashing "Heartbeat" verifies operation of CPU, Memory, etc.
RX	Receiving Host Signal	Serial Port or Ethernet Port receiving data from the Host Computer
TX	Transmitting to Host	Serial Port or Ethernet Port sending data to the Host Computer

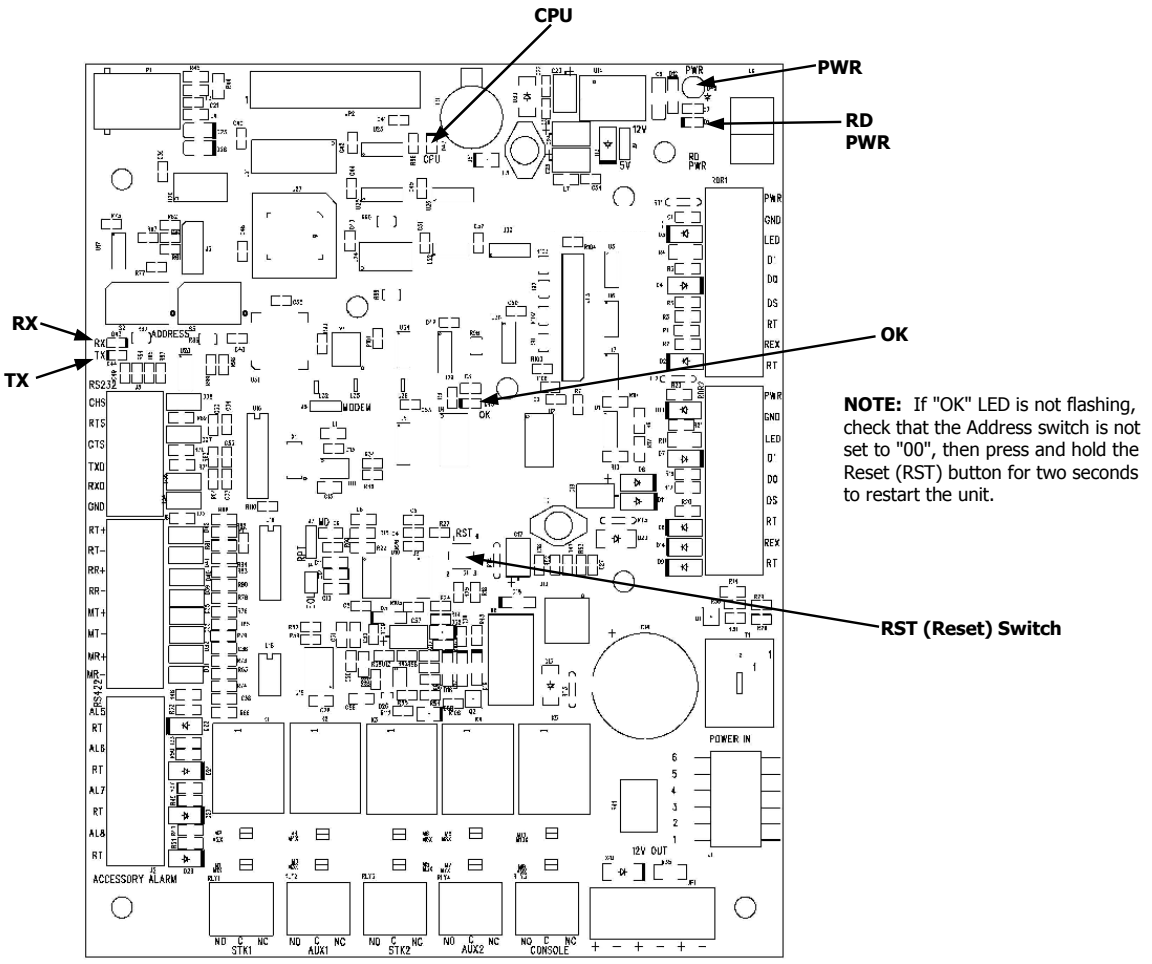


Figure 25 - NAX-200X Status LED's

NAX-200X Primary Fuse - 120VAC Installations (USA/Canada)

A 1 ampere (1.00A) 5x20mm slow-blow, UL approved fuse protects the NAX-200X primary circuit. The fuse is located on the Service Entrance Terminal Block on the bottom of the NAX-200X. (see Figure 26). The Fuse Holder is "shocksafe," and may be carefully removed while the unit is powered.

1. Find the Service Entrance Terminal Block near the Bottom Middle of the enclosure.
2. Grasp the Black Fuse Holder and pull straight out.
3. Replace the fuse with a 1-ampere (1.00A) 5x20mm slow-blow, UL approved fuse.
4. Re-install the fuse holder with the new fuse.

NAX-200X Primary Fuse - 230VAC Installations (European Union)

A 1/2 ampere (0.500A) time delay fuse meeting IEC standards protects the NAX-200X primary circuit. The fuse is located on the Service Entrance Terminal Block on the bottom of the NAX-200X. (see Figure 26). The Fuse Holder is "shocksafe," and may be carefully removed while the unit is powered.

1. Find the Service Entrance Terminal Block near the Bottom Middle of the enclosure.
2. Grasp the Black Fuse Holder and pull straight out.
3. Replace the fuse with a 1/2-ampere (0.500A) 5x20mm time-lag, IEC127 approval fuse.
4. Re-install the fuse holder with the new fuse.

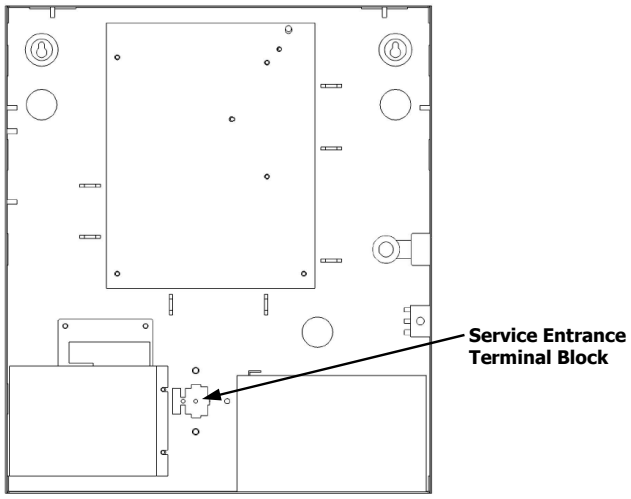


Figure 26 - NAX-200X Primary Fuse Location

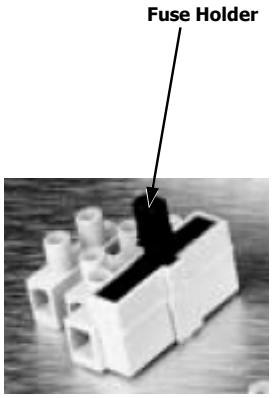


Figure 27 - Fuse Holder

NAX-200X Power Supply Fuse

A 4-ampere (4A) fast-blow fuse mounted on the lower part of the Power Supply Circuit Board, provides protection to the Power Supply from high-energy surges. If this fuse faults frequently, consider adding a UL-1449-Listed power-line surge protection device.

WARNING
Verify that the main AC power to the NAX-200X cabinet is switched OFF and locked against accidental starting.

1) Turn OFF the main circuit breaker controlling power to the NAX-200X cabinet.
2) Pull the insulating fishpaper cover away from the Power Supply.
3) Using a non-conducting fuse puller, remove the old fuse (see Figure 29).
4) Replace the fuse with a 5x20mm, 4-Amp, 250V, fast-blow (not a time-lag) fuse.
5) Reset the main circuit breaker.

NAX-200X Accessory Circuit Protection

A 0.75 Amp resetable fuse protects the Battery Charger Circuit, and a 3 Amp resetable fuse limits the output to the Accessory Circuits to safe levels. These devices limit the Accessory Current even when the product is operating under backup power from the battery.

Under conditions of moderate overloads, the power supply will shut down its output, but periodically power-up briefly to test to determine if the overload is removed. This will be visible because the PWR Lamp will flash on about once per second. Power will be restored immediately upon removal of the overload condition.

NAX-200X +5/+12V Reader Circuit Protection

0.25 ampere (0.25A) Resetable Fuses (RT1 and RT2) are used to limit the Reader current for RDR1 and RDR2. These are found near the RDR1 and RDR2 Terminal Blocks. A fault in the Reader Circuit may be indicated by one of these devices becoming warm to the touch.

NOTE: A fault in one Reader Circuit will **not** result in the other Reader Circuit loosing power.

NOTE: Removing the cause of the over-current fault will normally restore power to the affected circuit. If power is not restored after the fault is removed, disconnect the load by removing the RDR1 or RDR2 Terminal Block for about a half-minute. The Resetable Fuse will cool, and allow power to the circuit again when the Terminal Block is plugged onto the PC Board again.

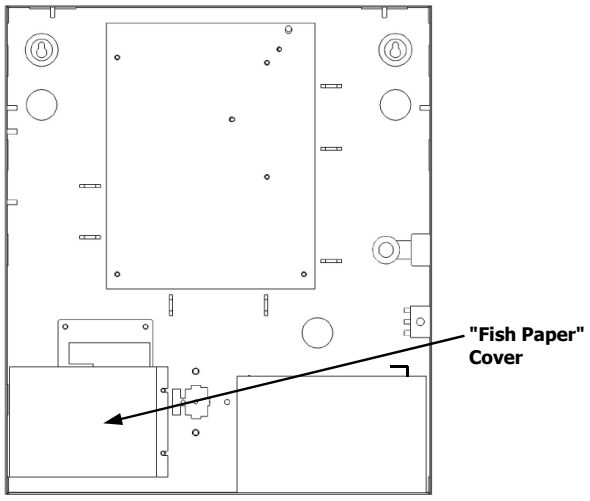


Figure 28 - NAX-200X Power Supply Fuse Location

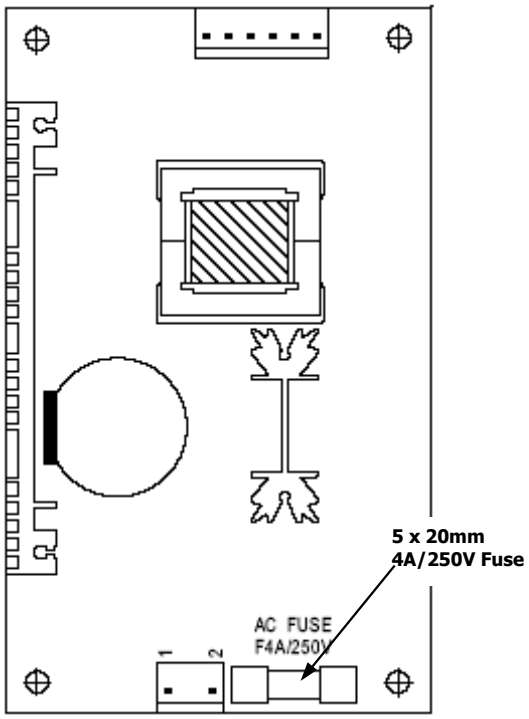


Figure 29 - Power Supply Fuse Location

MAINTENANCE

Power Supply Replacement

The following procedure applies after determining that the NAX-200X Power Supply (P/N MX1106) needs replacing.

WARNING
Verify that the AC source voltage is switched off at the breaker panel before proceeding with power supply replacement.

1. Open the NAX-200X cabinet and locate the 12VDC power supply in the lower left corner of the cabinet. Pull the insulating cover out of the way.
2. Disconnect the lower Molex connector from the power supply (one black and one white).
3. Disconnect the upper 6-pin Molex connector from the power supply.
4. Remove the four 6-32 screws securing the power supply bracket to the NAX-200X cabinet.
5. Remove the power supply from the NAX-200X cabinet.
6. Install the new power supply in the reverse order of the removal.

Backup Battery Replacement

WARNING
Verify that the AC source voltage is switched off at the breaker panel before proceeding with backup battery replacement.

1. Open the NAX-200X cabinet and locate the backup battery (12V/7AH) secured to the lower right of the cabinet.
2. Disconnect the RED lead from the POSITIVE terminal of the battery.
3. Disconnect the BLACK lead from the NEGATIVE terminal of the battery.
4. Remove the old battery.
5. Install the new battery in the reverse order of the removal.
6. Replace the Backup Battery at least once every five years.

NOTE: Because of the Low Battery Voltage Disconnect feature, the NAX-200X will not start to operate until mains (AC) power is connected.

Memory Coin Cell Replacement

The NAX-200X is normally powered on a 24/7 schedule. If the power is to be removed to the unit for more than a few days, **please re-install the insulating paper under the Cell Clip** to de-activate the Memory Battery.

If power was removed from a NAX-200X unit for more than four weeks without the Memory Cell protected by the insulating paper, please replace the Memory Coin Cell, as follows:

1. Open the NAX-200X cabinet and locate the Memory Coin Cell on the upper-middle of the PC Board.
2. Remove the old cell by pressing backward and downward.
3. Replace the Lithium Cell only with a Panasonic or Rayovac BR1225 or BR1225A. Use of another Battery may present a risk of Fire or Explosion.
4. When installing the new cell, use plastic forceps, or handle the cell by its edge to avoid contaminating the conductive surfaces of the device.
5. The expected life of the Lithium Cell is ten years. Changing the battery every five years is recommended.

Clear Memory and Force Download to Panel

1. Note setting of Address switches.
2. Set Address switches to "00".
3. Install the insulating paper under the Cell Clip to de-activate the Memory Battery.
4. Remove all power to panel (see above "**Power Supply Replacement**" for procedure).
5. Press and hold the reset (RST) button for at least two seconds.
6. Set Address switches to their original settings.

   Panel memory is cleared. The panel will request a new download.

SPECIFICATIONS

SPECIFICATION	Quantity (8/4-Door)	Comments
Readers	2	Full function on or off line
Anti-Passback		Standard
Access Modes	4	Card Only, Unique PIN only, Card and PIN, Free Access
Ethernet Port	1	Optional, 10/100 Base-T
Serial Port	1	Host computer
Polling Modes	4	Dial-up (RS-232), RS-422 Multidrop and Repeat
Baud Rates	7	1200, 2400, 4800, 9600, 19.2kbps, 38.4kbps, 57.6 kbps
Keypads	2	Four-bit Wiegand keypad input is standard
Relays	5	Form "C", contact rating of 2A @24V ac/dc
Alarms	8	Supervised or non-supervised (host programmable)
LEDs	2	One LED output per door
Tamper Switch	1	Pre-assigned
Reader Types		Wiegand/Proximity, Magnetic Stripe, Proximity and PIN
Supply Voltage		120/230 VAC 60/50Hz
Current Draw		1.0A @ 120VAC; 0.5A@230VAC
Accessory 12V Output	3	1.6A for Readers, Locks, and Accessories. Battery Backed.
Primary Battery Backup (Memory Only)		1 Month nominal at 25°C (field-replaceable)
Battery Backup		Approx. 4-6 hours. (When powering two EM locks rated 600mA each: 2 hours).
Weight		14 lbs. (with 7AH battery installed)
Enclosure Dimensions		15.75"H x 13.85"W x 3.25"D
Temperature Range Operating Storage		 32-115°F (0-46°C) 32-149°F (0-65°C)
Relative Humidity		0% to 85% non-condensing
Card Capacity	10,000	Standard
Time Schedules	128	Standard
Access Groups	256	Standard
Holidays	50	Standard
Link Programs	64	Standard
Facility Codes	10	Standard
Transaction Buffer	1000	Standard, configurable

Cables	AWG	Type *	Maximum Length
Alarm Inputs	22 ga	Stranded, shielded, w/drain 2-conductor alarm	500 ft (153m)
Readers: Magnetic Stripe & Wiegand/Proximity	22 ga	Stranded, shielded, w/drain 4 or 5-conductor (5-conductor for readers w/ LEDs)	500 ft 500 ft w/unbuffered Wiegand (153m unbuffered)
Readers: Magnetic Stripe	22 ga	Stranded, shielded, w/drain 4 or 5-conductor (5-conductor for readers w/ LEDs)	500 ft (153m)
Polling Line RS-422 (Network)	22 ga	Stranded, shielded, w/drain 2-twisted pair	4000 ft (1220m)
RS-232, Dial-Up (Host Computer)	22 ga	Stranded, shielded, w/drain	50 ft (15m)
Relay Lock Circuits	18 ga	Stranded, shielded, w/drain	500 ft (153m)

*** NOTE:** DO NOT use twisted pair cables for Reader, Keypad or RS232 connections.

POWER RATINGS

As supplied from the factory, the NAX-200X contains a Power Supply that operates on 120VAC/60Hz for North America, or 230VAC/50Hz for the European Union.

NAPCO recommends using a dedicated, unswitched power outlet to prevent any interference from other equipment that might be connected on the same line.

Voltage	Current (Maximum)
120VAC	1.0 Amperes
230VAC	0.5 Amperes
Accessory Output- 12VDC	1.6 Amperes**

**Including Readers, EM Locks, and Accessories such as PIR Sensors.

APPENDIX A
NETWORK INTERFACE BOARD INSTALLATION INSTRUCTIONS NAX-ENET

1. **Remove power from the NAX-200X®.** Inside the housing, remove the 6-pin Molex connector marked "Power In" located at the lower-right side of the panel. (see Figure A below). Ensure that all power LED's are off.
2. **On the NAX-200X main board, remove the 4-40 1/4" Phillips pan-head screw from the top left mounting hole.** Into this mounting hole, screw in the 7/16" round MF type standoff hand tight (see Figure B). **HINT:** Before installing the Network Interface Board, make a note of its MAC Address (see Figure C).
3. **Place the Network Interface board on to the main board**, at the upper left corner (parallel to the top), as shown in Figure C. Align the standoff hole in the network interface board with the standoff installed in step 2. Align the board socket with the J3 pins and press to insert the pins.

CAUTION: Before handling the Network Interface board, use a grounding strap (or touch the Controller PCB metal chassis) to reduce the possibility of static discharge damaging the PCB.

4. **Secure the Network Interface board.** Screw in the 4-40 1/4" Phillips pan-head screw (removed in step 2) into the standoff hole.
5. **Install Flexible shield: (Required for FCC Compliance, allows the use of Unshielded Network Cable)**. Install Cable Clamp to the knockout nearest the Network Interface board on left side of metal enclosure. Insert the CAT5 or CAT6 Network UTP cable through the cable clamp, slip the 3-inch flexible shield over the cable, then plug in the CAT5 or CAT6 Network UTP cable into the Network Interface. Slide the shield so the left side is under the clamp, then gently tighten the clamp to secure the cable and shield into place. (see Figure 4 for image of finished installation).
   NOTE: Pull shield snugly over Ethernet cable--do not extend shield over jack--install as shown in Figure D).
6. **Restore power.** Reconnect the 6-pin Molex connector marked "Power In". The "OK" lamp should blink (at a rate of approximately once every second). An LED next to the cable socket on the Network Interface will light or blink, indicating a successful connection and/or network activity.

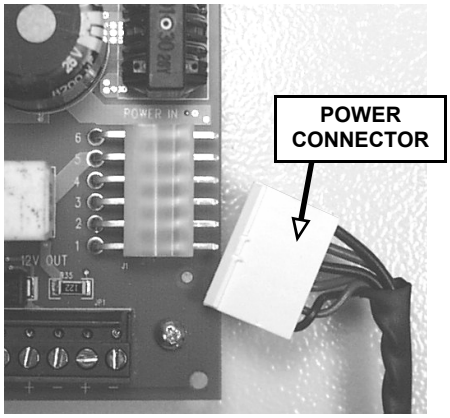


Figure A: Remove Power.

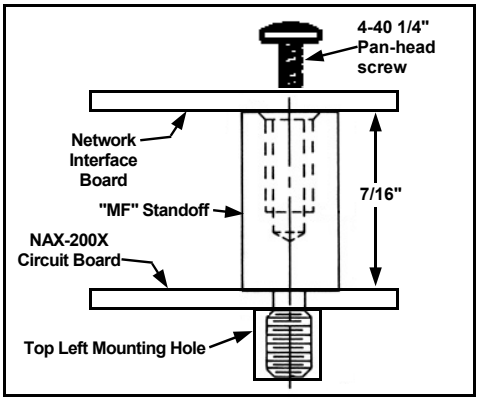


Figure B: 7/16" "Screw-on" type standoff.

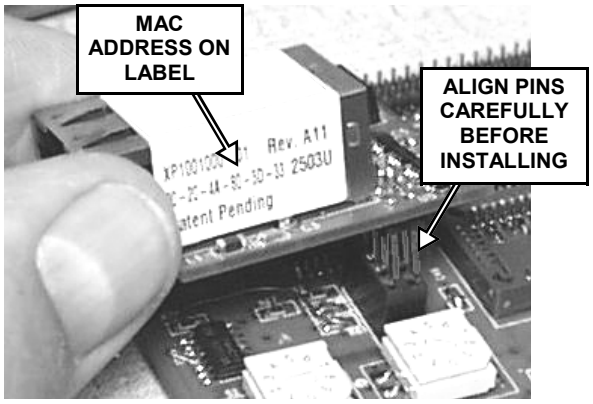


Figure C: Network Interface board placed on top of main board. Press in to secure. Location of MAC address is shown

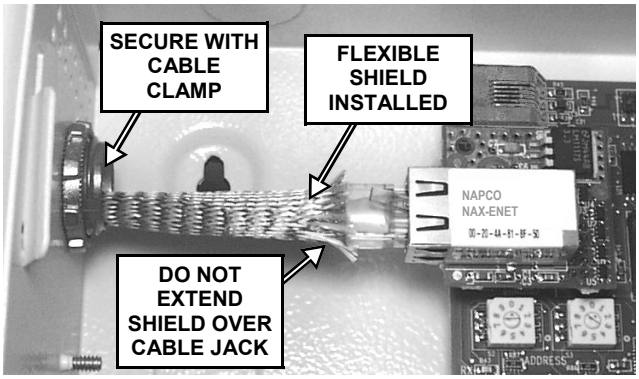


Figure D: Install Flexible Shield over Ethernet Cable

NAPCO LIMITED WARRANTY

NAPCO SECURITY SYSTEMS, INC. (NAPCO) warrants its products to be free from manufacturing defects in materials and workmanship for *thirty-six months* following the date of manufacture. NAPCO will, within said period, at its option, repair or replace any product failing to operate correctly without charge to the original purchaser or user.

This warranty shall not apply to any equipment, or any part thereof, which has been repaired by others, improperly installed, improperly used, abused, altered, damaged, subjected to acts of God, or on which any serial numbers have been altered, defaced or removed. Seller will not be responsible for any dismantling or reinstallation charges.

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. THERE IS NO EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR A WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. ADDITIONALLY, THIS WARRANTY IS IN LIEU OF ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF NAPCO.

Any action for breach of warranty, including but not limited to any implied warranty of merchantability, must be brought within the six months following the end of the warranty period.

IN NO CASE SHALL NAPCO BE LIABLE TO ANYONE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF THIS OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, EVEN IF THE LOSS OR DAMAGE IS CAUSED BY THE SELLER'S OWN NEGLIGENCE OR FAULT.

In case of defect, contact the security professional who installed and maintains your security system. In order to exercise the warranty, the product must be returned by the security professional, shipping costs prepaid and insured to NAPCO. After repair or replacement, NAPCO assumes the cost of returning products under warranty. NAPCO shall have no obligation under this warranty, or otherwise, if the product has been repaired by others, improperly installed, improperly used, abused, altered, damaged, subjected to accident, nuisance, flood, fire or acts of God, or on which any serial numbers have been altered, defaced or removed. NAPCO will not be responsible for any dismantling, reassembly or reinstallation charges.

This warranty contains the entire warranty. It is the sole warranty and any prior agreements or representations, whether oral or written, are either merged herein or are expressly cancelled. NAPCO neither assumes, nor authorizes any other person purporting to act on its behalf to modify, to change, or to assume for it, any other warranty or liability concerning its products.
In no event shall NAPCO be liable for an amount in excess of NAPCO's original selling price of the product, for any loss or damage, whether direct, indirect, incidental, consequential, or otherwise arising out of any failure of the product. Seller's warranty, as hereinabove set forth, shall not be enlarged, diminished or affected by and no obligation or liability shall arise or grow out of Seller's rendering of technical advice or service in connection with Buyer's order of the goods furnished hereunder.

NAPCO RECOMMENDS THAT THE ENTIRE SYSTEM BE COMPLETELY TESTED WEEKLY.

Warning: Despite frequent testing, and due to, but not limited to, any or all of the following; criminal tampering, electrical or communications disruption, it is possible for the system to fail to perform as expected. NAPCO does not represent that the product/system may not be compromised or circumvented; or that the product or system will prevent any personal injury or property loss by burglary, robbery, fire or otherwise; nor that the product or system will in all cases provide adequate warning or protection. A properly installed and maintained alarm may only reduce risk of burglary, robbery, fire or otherwise but it is not insurance or a guarantee that these events will not occur. CONSEQUENTLY, SELLER SHALL HAVE NO LIABILITY FOR ANY PERSONAL INJURY, PROPERTY DAMAGE, OR OTHER LOSS BASED ON A CLAIM THE PRODUCT FAILED TO GIVE WARNING. Therefore, the installer should in turn advise the consumer to take any and all precautions for his or her safety including, but not limited to, fleeing the premises and calling police or fire department, in order to mitigate the possibilities of harm and/or damage.

NAPCO is not an insurer of either the property or safety of the user's family or employees, and limits its liability for any loss or damage including incidental or consequential damages to NAPCO's original selling price of the product regardless of the cause of such loss or damage.

Some states do not allow limitations on how long an implied warranty lasts or do not allow the exclusion or limitation of incidental or consequential damages, or differentiate in their treatment of limitations of liability for ordinary or gross negligence, so the above limitations or exclusions may not apply to you. This Warranty gives you specific legal rights and you may also have other rights which vary from state to state.

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