# N-1000-II

## Installation & Programming Manual

**Version 8.03**

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# Notices

**Fire Safety Notice:** Never connect any card reader devices or locks to doors, gates or barriers without first consulting the local fire codes. You must consult with and get approval of, local fire officials before installing locks or devices on any doors that may be fire exits. Use of egress push buttons may not be legal. Single action exit may be required. Always obtain proper permits and approvals in writing before installing equipment.

**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. To meet FCC requirements, shielded cable or metal conduit may be required in some installations.

**Notice:** The information in this document is subject to change without notice.



**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 this agreement carefully.

# Contents

# Preface

The *N-1000-II Installation and Programming Manual* provides all information necessary for installation of N-1000-II control panels.

All panels in a loop using anti-passback with the N-485-API-x and the I Command, I Option, must use version 8 firmware or higher.

The following table identifies the different features of each version of the N-1000-II panel:

| Version | Card Readers | Matrix Keypads | Alarm Inputs* | Relay Outputs | Cards** | Buffers** |
|---|---|---|---|---|---|---|
| N-1000-II | 2 | 2 | 16 | 4 | 4,000 | 4,039 |
| N-1000-II-X | 2 | 2 | 16 | 8 | 10,000 | 3,635 |

*Two system alarms are independent of the sixteen zone inputs. Matrix keypads use 8 of the 16 alarm inputs.

**These are default values. Capacity can be changed by use of the I Command, U Option. Refer to *Appendix A: Programming Quick Reference Guide* for details.

# INTRODUCTION

## Section 1: Access Control

Access control is computerized control over entry to any area that can be secured with a lock and key. Entry is only allowed to authorized people at authorized times. Control of who is allowed to come and go is easily maintained.

The weakness of a lock and key security system is the common key. The key is a readily duplicated piece of metal that gives anyone who holds it access to an area. The risk of lost or stolen keys, with the expense of changing locks, is a costly problem. Access control is an effective and affordable solution to this problem. With access control, each person receives a card or keycode which restricts access to authorized areas at authorized times. A small, programmable control panel allows or denies access. If a card is lost or stolen, or if a keycode is no longer secure, the control panel can be reprogrammed quickly and easily.

An additional benefit of access control is report capability. The system provides reports of all card/keycode activity, including whether access was granted or denied, and why. A permanent record of all entries to an area can be maintained.

# Section 2: System Overview

## 2-1: N-1000-II

The N-1000-II control panels are the decision-making units in the access control system. Each control panel contains a central processing unit (CPU) and memory for local control capability. Control panel database information is programmed from a central programming device (computer, printer/programmer or data terminal). The panels then operate independent of the programming device. In this distributed database system, the programming device need not be on-line for system operation.

The control panels interface to the programming device via the C-100-A1, 20 mA current loop converter or via the 485 multi-drop interfaces (N-485-PCI-2 or N-485-HUB-2) with the addition of the N-485-API or 485 Board. A single communication loop supports up to 63 uniquely addressed control panels if the 20 mA loop is utilized or 31 panels for 485 communications. A typical 20 mA communication loop configuration is shown in Figure 2-1 while Figure 2-2 illustrates a typical 485 multi-drop configuration.

The N-1000-II control panel provides 16 points for alarm monitoring and four output control relays. The N-1000-II-X control panel includes four additional relays

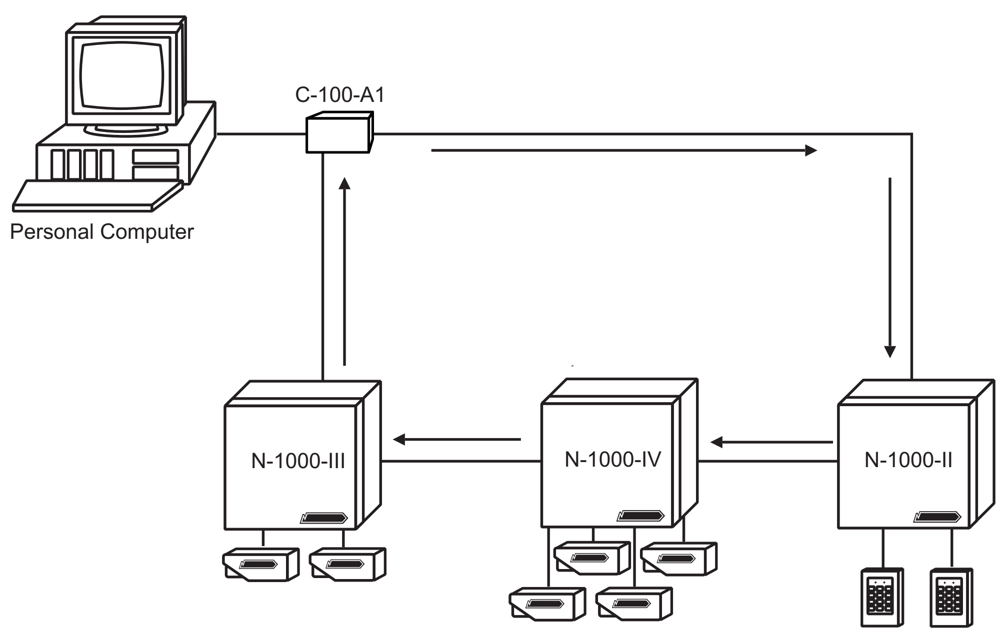



Figure 2-1. **Typical Multi-panel Communications Loop.** *The N-1000 control panels can be in any order in the loop or drop line as long as each has a unique address.*

(providing a total of eight) and has expanded database/buffer memory capacity. The N-1000-II-X is shown in figure 2-3 with enclosure and battery.

Control panels can operate in a buffered mode, in which system transactions are stored in transaction buffer memory at the panels, rather than transmitted to the programming device. Every transaction (input point change of state, code use) uses one location in buffer memory. The buffered information can later be transmitted to the programming device.

The N-1000-II firmware (version 08.01.29 or later) has a built-in test capability that can be used to check the functioning of most of the circuit board's hardware. Refer to *Appendix B: Troubling Shooting* for details.

## 2-2: Programming Devices

N-1000-II control panels in a communication loop are programmed with a personal computer, printer/programmer or data terminal.

When using a personal computer as the system programming device, the PC software serves as a database manager for the N-1000-II control panels. Information is entered into the PC databases and then “downloaded” to the control panels. During the download procedure, the PC software converts the database information at the disk level to a series of command strings from the N-1000 instruction set. The commands are then sent to the appropriate control panels. The panels then operate independently from the computer. The advantages of using a computer as the system programming device include ease of programming and operation, permanent disk storage of all database information and extensive report options.

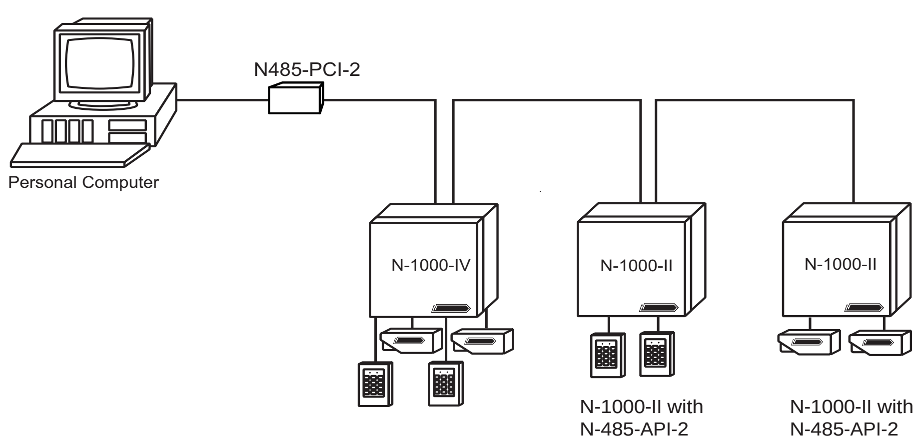



Figure 2-2. **Typical 485-Multidrop Configuration.** *The N-1000-II can be used with N-1000-III/IV panels. When the N-1000-II is configured for 485 communication, as in this example, the N-485-API-2 firmware version must match the 485 version in the N-1000-III/IV.*

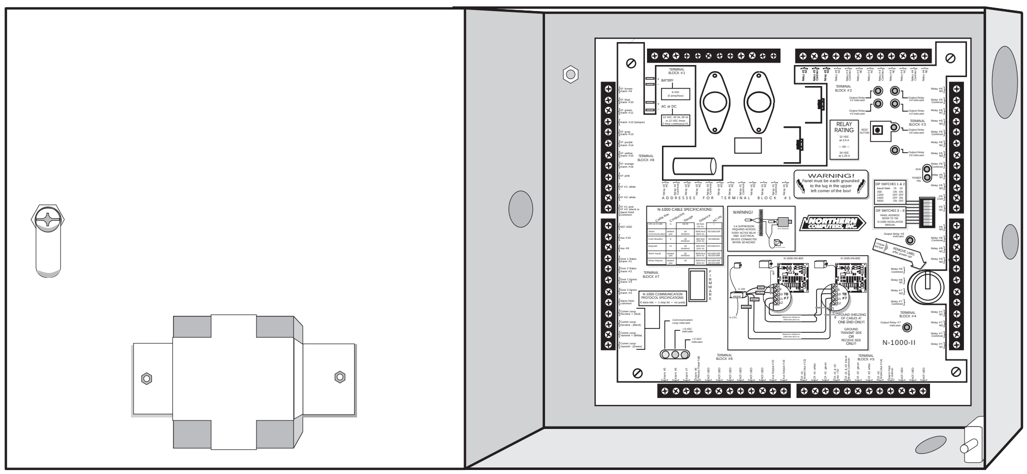


Figure 2-3. **N-1000-II-X Panel with Enclosure.** *The N-1000-II control panel provides 15 alarm points for alarm monitoring capability and four relays for output control capability. The N-1000-II-X includes four additional relays (providing a total of eight) and has expanded database/buffer memory capacity.*

When using a printer/programmer or data terminal as the system programming device, all command strings are sent manually to the control panels by the operator. Printer/programmer and data terminal programming provide no safeguard against lost database memory at the panel level.

## 2-3: C-100-A1 Converter

The C-100-A1 Converter serves as the interface between the programming device and the N-1000 control panels. The C-100-A1 allows the programming device, using the RS-232 port, to communicate with the control panels in a 20 mA current loop. The C-100-A1 can be configured for use as a C-100-C, C-100-T or C-100-M, determined by the position of six DIP switches on the RS-232 connector. These configurations are used as follows:

| | |
|---|---|
| • computer to local control panels | C-100-C |
| • printer/programmer to local control panels | C-100-T |
| • computer to remote control panels via modem | C-100-M |

Refer to the *C-100-A1Manual* for further details.

## 2-4: N-485-PCI-2 or HUB-2

The N-485-PCI-2 is used to interface between a PC's RS-232 port and the 485 multi-drop communications bus. The N-485-HUB-2 is used to interface between a modem's RS-232 port and the 485 multi-drop bus.

## 2-5: N-485-API

The N-485-API (485 Board) provides an interface between the N-1000-II and the RS-485 multi-drop line. The unit is mounted in the enclosure and is connected to the control panel's 20 mA port. Refer to the *N-485 Board Installation Guide* for further details.

## 2-6: PROM Versions

The N-1000-II PROM (programmable read-only memory) chips provide permanent storage for the program and control logic information necessary to coordinate and drive the system hardware. The PROM chip is also referred to as the control panel's FIRMWARE.

The PROM version in use determines the commands and programming features available for use with the control panel. Operations such as alarm point programming, site code checking, card/keycode capacity, transaction buffer capacity, Visitor and Limited Use status cards and local anti-passback are all functions of the PROM version in use. Specific command string syntax and the availability of advanced programming commands are also dependent upon the PROM version.

Refer to the command summary in *Appendix A* of this manual. Or contact NCI for additional information on PROM versions.

# Section 3: Hardware Specifications

## Power Requirements:

The N-1000-II requires a 12 VAC, 40 VA, 60 HZ or 12 VDC linear (2 amp continuous) power supply.

## Output Power:

A 5 volt, 350 mA output is available for standard 5 VDC reader requirements.

## Battery Backup:

The 8 VDC (4 amp/hr.) battery provides up to three hours of full operational backup (depending on the load and the age of the battery). To maintain the maximum back-up time, the replace the battery every four years or every two years if operating at higher temperatures.

## Battery Current Draw:

| | | | |
|---|---|---|---|
| Control panel | 750 mA | | 750 mA |
| Alarm points | 10 mA each | (x 16) | 160 mA |
| Relays activated | 50 mA each | (x 8) | 400 mA |
| 5 V card readers | 350 mA maximum | | 350 mA |
| Total | 1.8 amps maximum | | 1.660 amps |

## Memory Backup:

A 3 VDC lithium battery (ALQW) retains panel memory for up to 30 days on loss of power.

## Fuses:

The panel is equipped with 3 amp, slow-blow, fuses.

## Alarm Input Points:

The panel has 16 normally-closed, non-supervised input points. When 11-conductor keypads are used, only eight alarm inputs are available for use.

## Relay Output Points:

The panel has four double pole, double throw (DPDT) relay contacts with both normally-open and normally-closed sides, rated for 24 VDC 1 amp resistive load (12 VDC, 2 amp resistive load). The N-1000-II-X controller provides four additional relays (eight total).

## Operating Temperature:

35º F to 110º F ( 2º C to 43º C).

## Operating Relative Humidity:

Up to 95% non-condensing.

## Enclosure:

14" H x 16" W x 4" D (35.6 cm x 40.6 cm x 10.2 cm) with knockouts, hinged cover with lock and key. Enclosure tamper switch provided. The N-1000-II enclosure (with control panel) is illustrated in figure 3-1.

## Weight:

21 pounds (9.5 kg) with enclosure and backup battery.

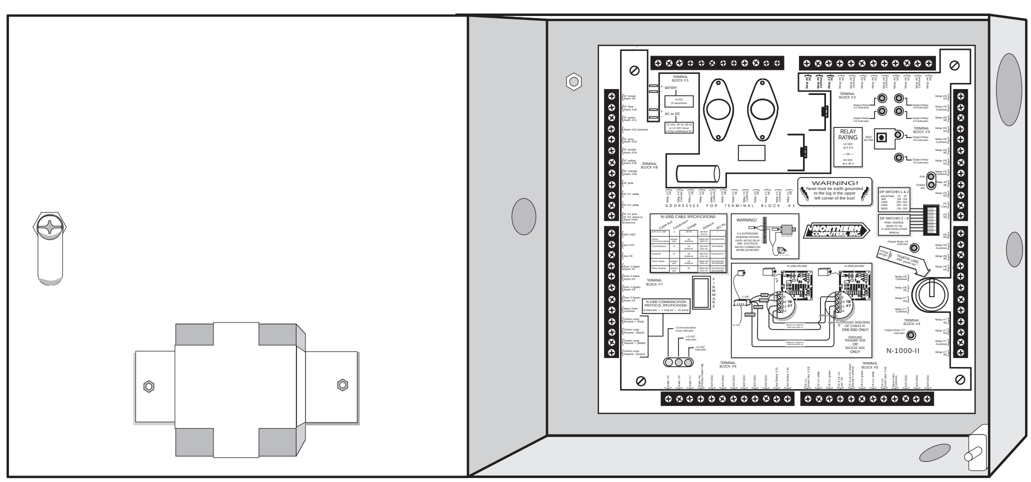


Figure 3-1. **Enclosure for the N-1000-II.** *The N-1000 enclosure, shown here with the N-1000-II-X panel, has a lock and key, knockouts and a tamper switch. An 8 VDC battery is mounted on the door.*

# INSTALLATION

## Section 4-1: Panel Layout

The N-1000-II-X has 8 screw-down terminal blocks. Each of the terminal blocks has, in turn, 12 individual terminal positions. These are described in the following sections. Figure 4-1 shows the panel with its printed template. Complete terminal block details follow.

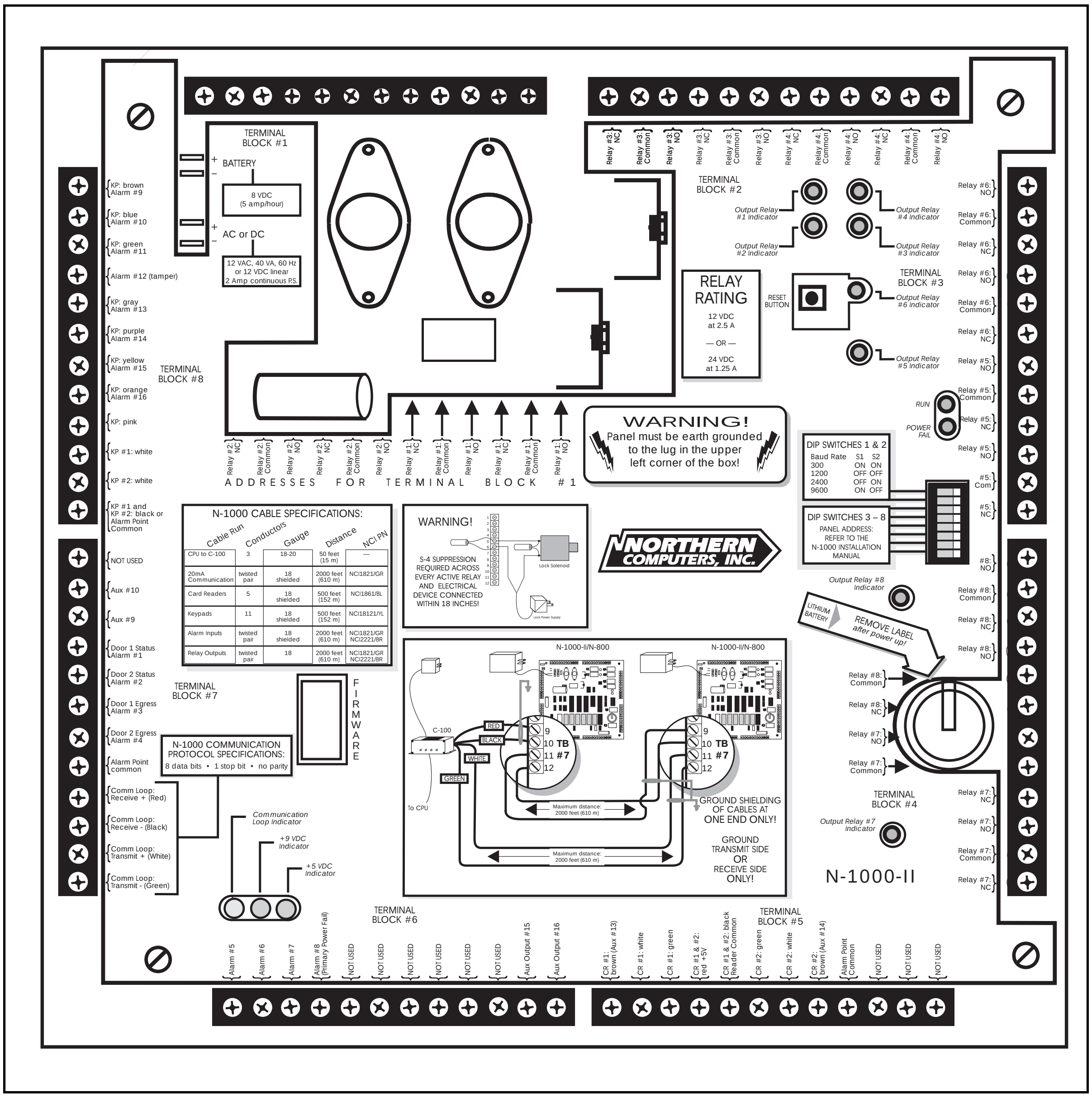



Figure 4-1. **N-1000-II Panel**. *The panel is shown with its printed template.*

## 4-2: Terminal Blocks 1, 2, 3, 4

**(Terminal Blocks 3 and 4 are available on the N-1000-II-X only)**

Each DPDT relay provides control for up to two external devices. Both poles of a given relay have a normally-closed terminal, a common terminal and a normally-open terminal. (See Figure 4-2.) Northern recommends using the A pole of the relays for locks (inductive loads) and the B pole for dry circuit (logic) application.

Terminal Block 1 provides relay contacts for relays 1 and 2.

Terminal Block 2 provides relay contacts for relays 3 and 4.

Terminal Block 3 provides relay contacts for relays 5 and 6.

Terminal Block 4 provides relay contacts for relays 7 and 8.

Terminal Block 1, 2, 3, 4 terminations are as follow:

| *Pos.* | *TB1* | *TB2* | *TB3* | *TB4* | *Function* |
|---|---|---|---|---|---|
| 1 | Relay 2: A | Relay 3: A | Relay 6: A | Relay 8: A | Normally-Closed |
| 2 | Relay 2: A | Relay 3: A | Relay 6: A | Relay 8: A | Common |
| 3 | Relay 2: A | Relay 3: A | Relay 6: A | Relay 8: A | Normally-Open |
| 4 | Relay 2: B | Relay 3: B | Relay 6: B | Relay 8: B | Normally-Closed |
| 5 | Relay 2: B | Relay 3: B | Relay 6: B | Relay 8: B | Common |
| 6 | Relay 2: B | Relay 3: B | Relay 6: B | Relay 8: B | Normally-Open |
| 7 | Relay 1: A | Relay 4: A | Relay 5: A | Relay 7: A | Normally-Closed |
| 8 | Relay 1: A | Relay 4: A | Relay 5: A | Relay 7: A | Common |
| 9 | Relay 1: A | Relay 4: A | Relay 5: A | Relay 7: A | Normally-Open |
| 10 | Relay 1: B | Relay 4: B | Relay 5: B | Relay 7: B | Normally-Closed |
| 11 | Relay 1: B | Relay 4: B | Relay 5: B | Relay 7: B | Common |
| 12 | Relay 1: B | Relay 4: B | Relay 5: B | Relay 7: B | Normally-Open |

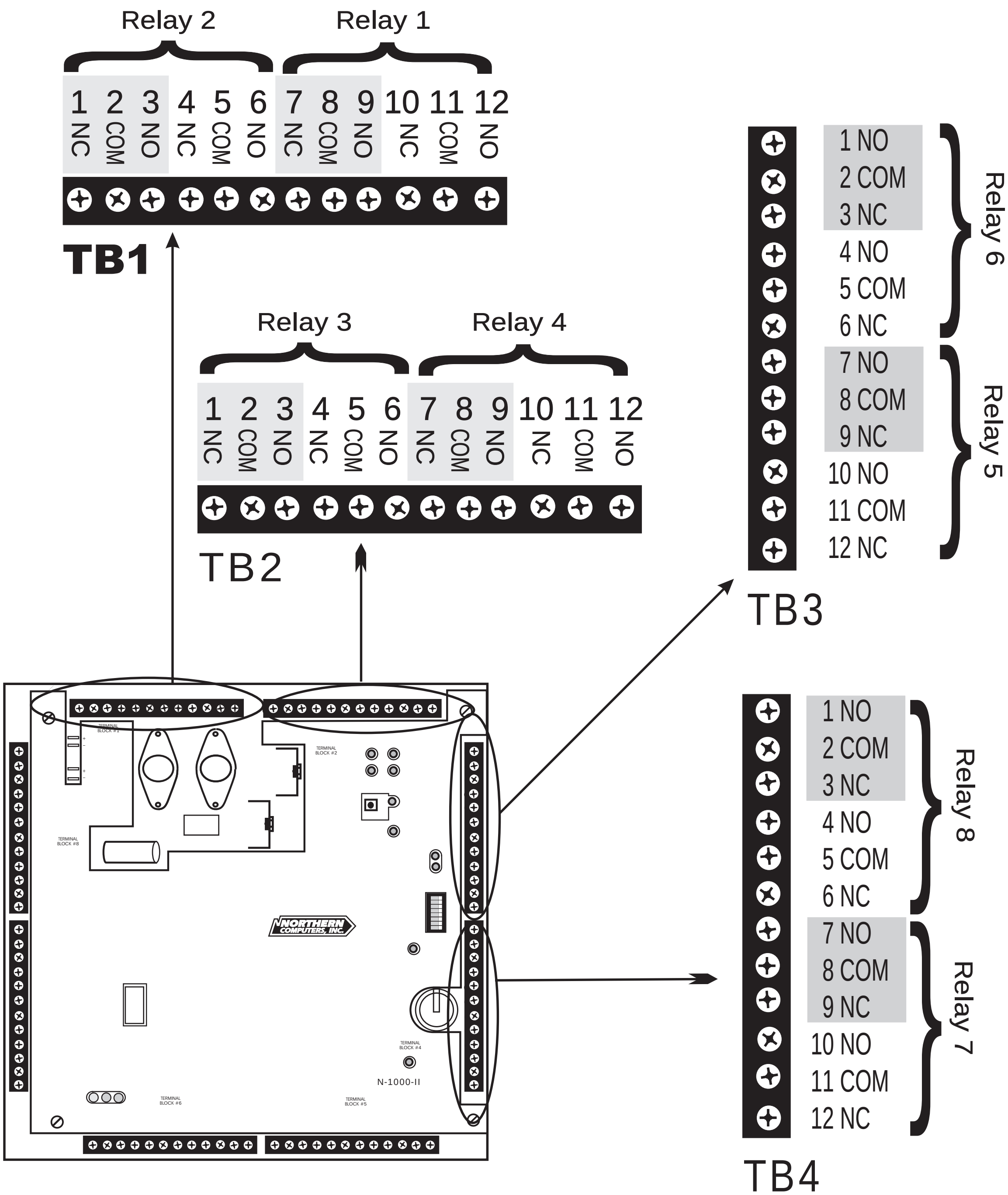



Figure 4-2 **Terminal Blocks 1, 2, 3, 4**. *Terminal blocks 3 and 4 are available on the X versions of the N-1000-II.*

## 4-3: Terminal Block 5

Terminal Block 5 provides the interface for two Wiegand output card readers and an alarm point common. Each card reader port includes terminals for LED control, Data 1 signal, Data Ø signal, +5 VDC output and Ground. Figure 4-3 illustrates typical wire color terminations.

Refer to the reader installation technical bulletin that is included with your reader for the most recent color terminations. Refer to *Section 6* of this manual for specific card reader wiring/installation details.

| *Terminal* | *Function* | *Reader Wire Color* |
|---|---|---|
| 1 | Card Reader 1: LED (Aux. Output 11) | Brown |
| 2 | Card Reader 1: Data 1 | White |
| 3 | Card Reader 1: Data Ø | Green |
| 4 | Card Readers 1 & 2: +5 VDC | Red |
| 5 | Card Readers 1 & 2: Ground | Black |
| 6 | Card Reader 2: Data Ø | Green |
| 7 | Card Reader 2: Data 1 | White |
| 8 | Card Reader 2: LED (Aux. Output 12) | Brown |
| 9 | Alarm Point Common* | |
| 10 | Not used | |
| 11 | Not Used | |
| 12 | Not Used | |

**All N-1000 alarm point commons are electrically the same and can be used with any panel alarm point.*

## 4-4: Terminal Block 6

Terminal Block 6 contains terminals for alarm input points 5 through 7 and auxiliary outputs 15 and 16. Any N-1000 alarm common can be used with the alarm inputs. (See Figure 4-3.)

| *TB6 Terminal* | *Function* |
|---|---|
| 1 | Alarm Input 5 |
| 2 | Alarm Input 6 |
| 3 | Alarm Input 7 |
| 4 | Primary Power Indicator (DO NOT wire to this point) |
| 5 | Not Used |
| 6 | Not Used |
| 7 | Not Used |
| 8 | Not Used |
| 9 | Not Used |
| 10 | Not Used |
| 11 | Aux. Output 15 |
| 12 | Aux. Output 16 |

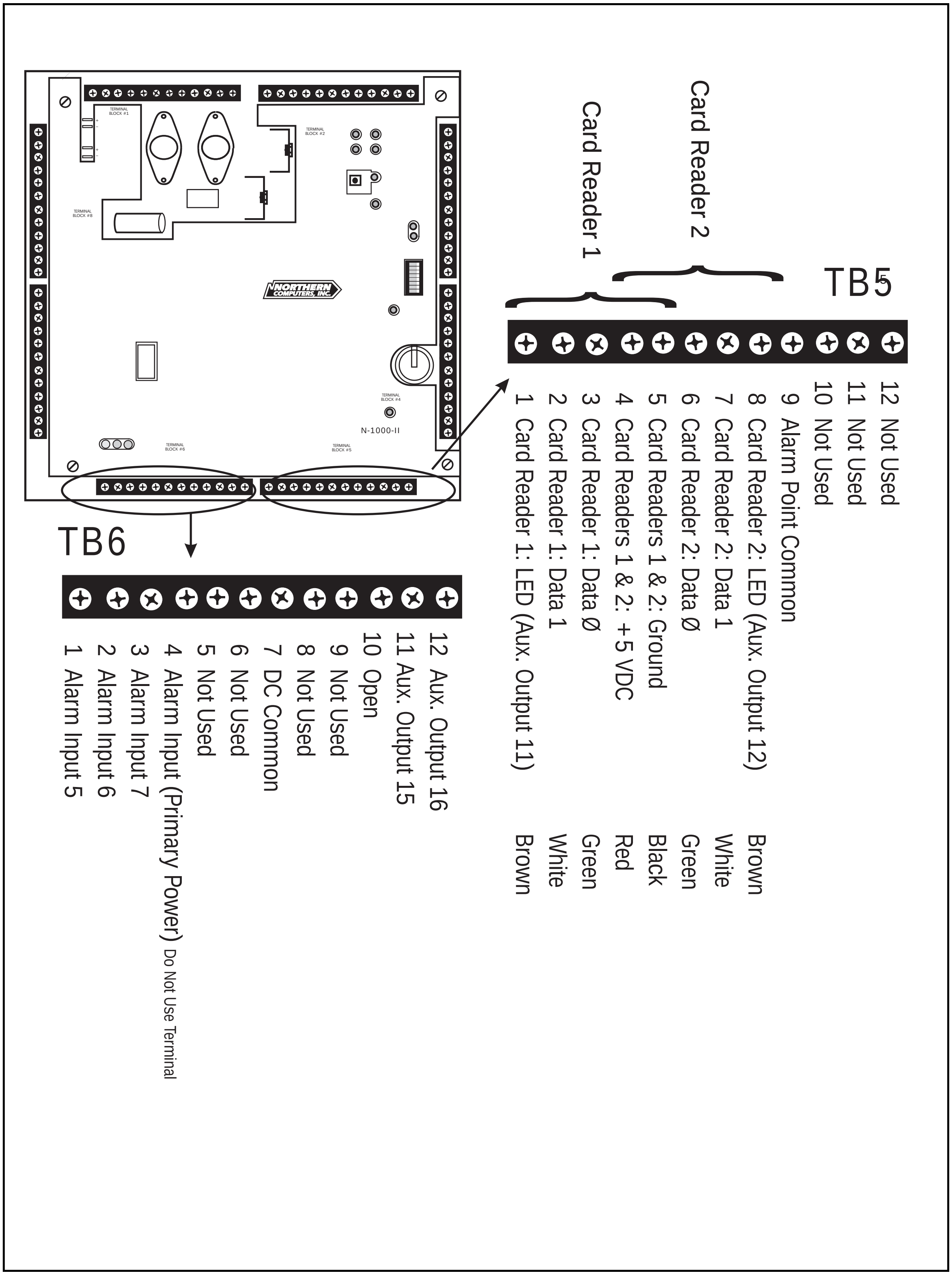



Figure 4-3. **Terminal Block 5 and Terminal Block 6.** *Terminal Block 5 provides the interface for two Wiegand-output card readers and an alarm point common. Terminal Block 6 contains terminals for alarm input points 5 through 7 and auxiliary outputs 15 and 16. Any N-1000 alarm common can be used with the alarm inputs.*

## 4-5: Terminal Block 7

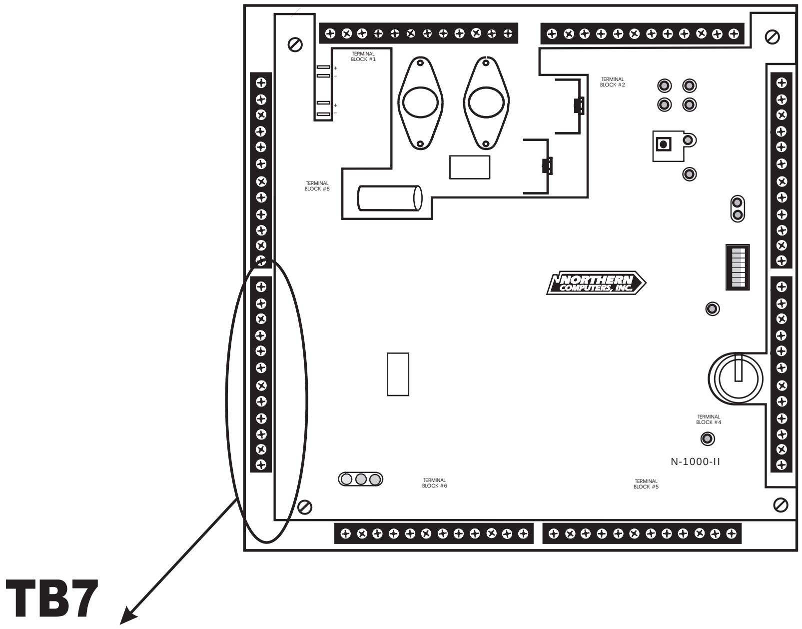
Terminal Block 7 contains terminals for an LED, auxiliary outputs 9 and 10, alarm input points 1 through 4, an alarm point common and the 20 mA communication loop (receive and transmit) terminals as illustrated in Figure 4-4. The 20 mA communication protocol specifications are as follow:

ASCII text characters
8 data bits
1 stop bit
No parity

Refer to *Section 4-8* for baud rate settings.

| *Terminal* | *Function* | | *Wire Color(s)* |
|---|---|---|---|
| 1 | LED +V | | |
| 2 | Aux. Output 10 | | |
| 3 | Aux. Output 9 | | |
| 4 | Alarm Input 1 | (door 1 status) | |
| 5 | Alarm Input 2 | (door 2 status) | |
| 6 | Alarm Input 3 | (door 1 egress) | |
| 7 | Alarm Input 4 | (door 2 egress) | |
| 8 | Alarm Point Common* | | |
| 9 | 20 mA | Communication Loop: Receive+ | Red |
| 10 | 20 mA | Communication Loop: Receive– | Black |
| 11 | 20 mA | Communication Loop: Transmit+ | White |
| 12 | 20 mA | Communication Loop: Transmit– | Green |

**All N-1000 alarm point commons are electrically the same and can be used with any panel alarm points.*




| | | | |
|---|---|---|---|
| 1 | LED +V | | |
| 2 | Aux. Output 10 | | |
| 3 | Aux. Output 9 | | |
| 4 | Alarm Input 1 | (Door 1 Status) | |
| 5 | Alarm Input 2 | (Door 2 Status) | |
| 6 | Alarm Input 3 | (Door 1 Egress) | |
| 7 | Alarm Input 4 | (Door 2 Egress) | |
| 8 | Alarm Point Common | | |
| 9 | 20 mA Com Loop: Receive + | | Red |
| 10 | 20 mA Com Loop: Receive – | | Black |
| 11 | 20 mA Com Loop: Transmit + | | White |
| 12 | 20 mA Com Loop: Transmit – | | Green |

Figure 4-4. **Terminal Block 7.** *Terminal Block 7 contains terminals for auxiliary outputs 9 and 10, alarm input points 1 through 4, an alarm point common and the 20 mA communication loop (receive and transmit) terminals.*

## 4-6: Terminal Block 8

Terminal Block 8 can be used for 11 conductor matrix keypad connections or alarm input points 9 through 16. It also provides an alarm point common. (See Figure 4-5.)

Refer to the 11 conductor keypad instructions in *Section 6* for 2 of 7 matrix (row/column) information.

| *TB8 Terminal* | *Keypad Use:* *Color/Function* | *Alternate Function* |
|---|---|---|
| 1 | Brown (Column 1) | Alarm Input 9 |
| 2 | Blue (Column 2) | Alarm Input 10 |
| 3 | Green (Column 3) | Alarm Input 11 |
| 4 | Alarm Tamper | Alarm Input 12 |
| 5 | Gray (Row 1) | Alarm Input 13 |
| 6 | Purple (Row 2) | Alarm Input 14 |
| 7 | Yellow (Row 3) | Alarm Input 15 |
| 8 | Orange (Row 4) | Alarm Input 16 |
| 9 | Peach/Pink (+5 V) | |
| 10 | White (Keypad 1 Select) | |
| 11 | White (Keypad 2 Select) | |
| 12 | Black (Common) | Alarm Point Common* |

**All N-1000 alarm point commons are electrically the same and can be used with any panel alarm points.*

**TB8**

| Keypad Use | Alt. Function | |
|---|---|---|
| Brown (Column 1) | Alarm 9 | 1 |
| Blue (Column 2) | Alarm 10 | 2 |
| Green (Column 3) | Alarm 11 | 3 |
| | Alarm 12 Tamper | 4 |
| Gray (Row 1) | Alarm 13 | 5 |
| Purple (Row 2) | Alarm 14 | 6 |
| Yellow (Row 3) | Alarm 15 | 7 |
| Orange (Row 4) | Alarm 16 | 8 |
| Peach/Pink (+5v) | | 9 |
| White (Keypad 1 Select ) | | 10 |
| White (Keypad 2 Select) | | 11 |
| Black (Common) | Alarm Point Common | 12 |

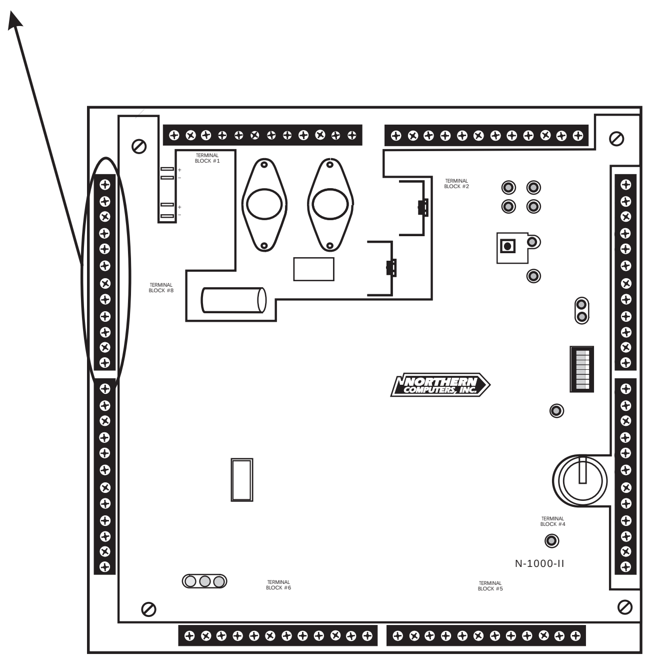



Figure 4-5. **Terminal Blocks 8.** *Terminal Block 8 is used for 11 conductor matrix keypad connections or alarm inputs 9 through 16 and an alarm point common.*

## 4-7: DIP Switch Settings

N-1000-II DIP switch positions 1 and 2 control the panel baud rate for the 20 mA Loop. Set the panel baud rate to match that of the system programming device. 1200 baud is recommended for computer and data terminal systems. For 485 communications use the 4800 baud setting.

N-1000-II DIP switch positions 3 through 8 determine a control panel's address. (See Figure 4-6.) Each control panel in the communication loop must have a unique address to allow unique referencing during system programming. When running the panel's self-test, set all DIP switches to the On position before restarting the panel. (For details of the self-test, Refer to *Appendix B: Trouble Shooting.*)

Baud rate and panel address DIP switch settings are as follow:

| *Baud Rate* | *1* | *2* | *Panel* | *3* | *4* | *5* | *6* | *7* | *8* |
|---|---|---|---|---|---|---|---|---|---|
| 1200 | Off | Off | 1 | On | On | On | On | On | Off |
| 2400 | Off | On | 2 | On | On | On | On | Off | On |
| 4800 | On | On | 3 | On | On | On | On | Off | Off |
| 9600 | On | Off | 4 | On | On | On | Off | On | On |
| | | | 5 | On | On | On | Off | On | Off |
| | | | 6 | On | On | On | Off | Off | On |
| | | | 7 | On | On | On | Off | Off | Off |
| | | | 8 | On | On | Off | On | On | On |
| | | | 9 | On | On | Off | On | On | Off |
| | | | 10 | On | On | Off | On | Off | On |
| | | | 11 | On | On | Off | On | Off | Off |
| | | | 12 | On | On | Off | Off | On | On |
| | | | 13 | On | On | Off | Off | On | Off |
| | | | 14 | On | On | Off | Off | Off | On |
| | | | 15 | On | On | Off | Off | Off | Off |
| | | | 16 | On | Off | On | On | On | On |
| | | | 17 | On | Off | On | On | On | Off |
| | | | 18 | On | Off | On | On | Off | On |

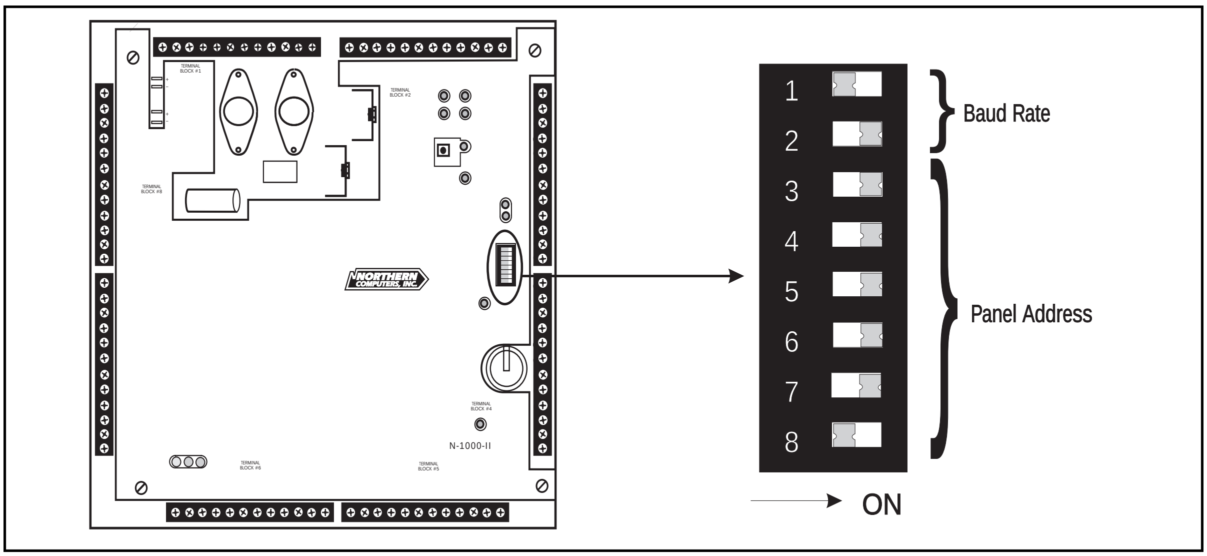



Figure 4-6. **DIP Switches.** *Switch positions 1 and 2 control the panel baud rate for the 20 mA loop; switch positions 3 through 8 determine the control panel's address.*

| Panel | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|
| 19 | On | Off | On | On | Off | Off |
| 20 | On | Off | On | Off | On | On |
| 21 | On | Off | On | Off | On | Off |
| 22 | On | Off | On | Off | Off | On |
| 23 | On | Off | On | Off | Off | Off |
| 24 | On | Off | Off | On | On | On |
| 25 | On | Off | Off | On | On | Off |
| 26 | On | Off | Off | On | Off | On |
| 27 | On | Off | Off | On | Off | Off |
| 28 | On | Off | Off | Off | On | On |
| 29 | On | Off | Off | Off | On | Off |
| 30 | On | Off | Off | Off | Off | On |
| 31 | On | Off | Off | Off | Off | Off |
| 32 | Off | On | On | On | On | On |
| 33 | Off | On | On | On | On | Off |
| 34 | Off | On | On | On | Off | On |
| 35 | Off | On | On | On | Off | Off |
| 36 | Off | On | On | Off | On | On |
| 37 | Off | On | On | Off | On | Off |
| 38 | Off | On | On | Off | Off | On |
| 39 | Off | On | On | Off | Off | Off |
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| 56 | Off | Off | Off | On | On | On |
| 57 | Off | Off | Off | On | On | Off |
| 58 | Off | Off | Off | On | Off | On |
| 59 | Off | Off | Off | On | Off | Off |
| 60 | Off | Off | Off | Off | On | On |
| 61 | Off | Off | Off | Off | On | Off |
| 62 | Off | Off | Off | Off | Off | On |
| 63 | Off | Off | Off | Off | Off | Off |

**NOTE**: Addresses 32 and above cannot be used with the 485 multi-drop.

**Note:** For DIP switches with OPEN/CLOSED notation:
OPEN = Off CLOSED = On

**Note:** The restart button MUST be pressed to activate a change made to any DIP switch setting (for baud rate and/or panel address). Pressing the restart button DOES NOT alter N-1000-II database memory.

## 4-8: LEDs

The functions of the N-1000-II LEDs are listed below and also illustrated in Figure 4-7. Eight of the Red LEDs (CR23, CR24, CR25, CR26, CR29, CR32, CR67, CR70) are relay output indicators. When one of these LEDs is lit it indicates that its relay is energized, that is, the normally open relay contacts become closed and the normally closed relay contacts become open. Not lit indicates the relay is de-energized, that is, the normally open and normally closed contacts are in normal state.

### Relay output indicators

| *LED* | *Color* | *Lit indicates* |
|---|---|---|
| CR23 | Red | Relay 1 energized |
| CR25 | Red | Relay 2 energized |
| CR26 | Red | Relay 3 energized |
| CR24 | Red | Relay 4 energized |
| CR32 | Red | Relay 5 energized |
| CR29 | Red | Relay 6 energized |
| CR70 | Red | Relay 7 energized |
| CR67 | Red | Relay 8 energized |

### Other LED indicators

| *Label* | *Color* | *Function* |
|---|---|---|
| RUN | Red | Run indicator flashes slowly to indicate normal operation. It stays on when the panel is being initialized. |
| POWER FAIL | Red | Power Fail indicator comes on if the Panel has switched over to the backup battery. It flashes rapidly when the panel shuts down due to a drained battery. |
| Communication | | |
| Loop | Yellow | 20 mA COM Loop indicator is on when the output terminals have a closed circuit and flashes when outgoing transmissions occur. |
| + 9 VDC | Green | Indicates primary 9 volt power is present. |
| + 5 VDR | Green | Indicates that 5 volt power is available to the readers. |

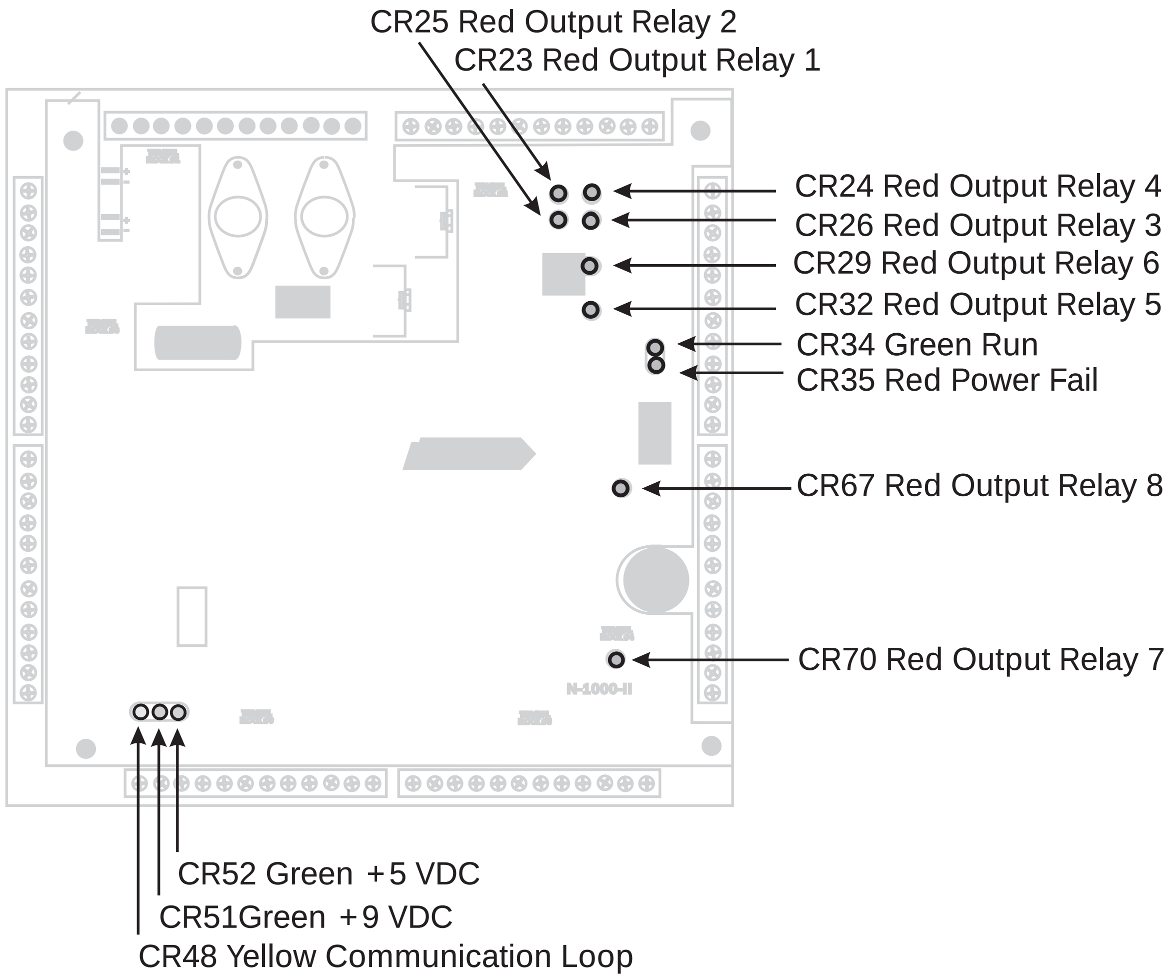


Figure 4-7. **LED Functions.** *Thirteen LED indicators provide information on the panel functions. When a RED output relay indicator is lit this indicates that its relay is energized, which means, the normally open relay contacts become closed and the normally closed relay contacts become open. When the LED is not lit, this indicates that the relay is de-energized, normally open and normally closed contacts are in normal state.*

## 4-9: Power Connections

Power connections are located just to the right of Terminal Block 8. (See Figure 4-8.) The 8 volt backup battery wires are connected to the circuit board above the power terminals. When connecting an external DC supply the N-1000-II 8 VDC battery can remain connected and provide additional battery backup.

## 4- 10: Lithium Battery

The 3 VDC lithium battery retains panel database and transaction buffer memory for up to 30 days on loss of power. The 8 VDC backup battery is not required for proper lithium battery retention. (See Figure 4-8.)

## 4-11: Connectors

White and black power cables with fast-on clips are provided to connect the panel to the 8 volt backup battery. (See Figure 4-8.)

## 4-12: Restart Button

The restart button is used to restart the N-1000-II microprocessor. (See Figure 4-8.) Press the restart button to restart a "locked-up" control panel and to activate a change made to any DIP switch setting (for baud rate and/or panel address).

The panel's self-test feature can be activated by setting all of the DIP switches to the on position and then depressing the Restart button. For details of the self-test, refer to *Appendix B: Troubling Shooting.*

Pressing the restart button DOES NOT alter N-1000-II database memory. The data base can be completely cleared by the following method: Disconnect the AC power and battery backup. Remove the lithium battery and short across C27 remove short, return the lithium battery and apply power. Restore the power connections.

## 4-13: RAM Chip

Control panel RAM chips store all database and transaction buffer memory. The N-1000-II control panel uses two 256K RAM chips with the option of additional 256K chips. The N-1000-II-X comes equipped with three RAM chips. (See Figure 4-8.)

**NOTE:** Control panel card database and transaction buffer capacities are determined by the number of RAM chips used and can be modified by use of the U command, I option. Refer to *Appendix A: Programming Quick Reference Guide* for details.

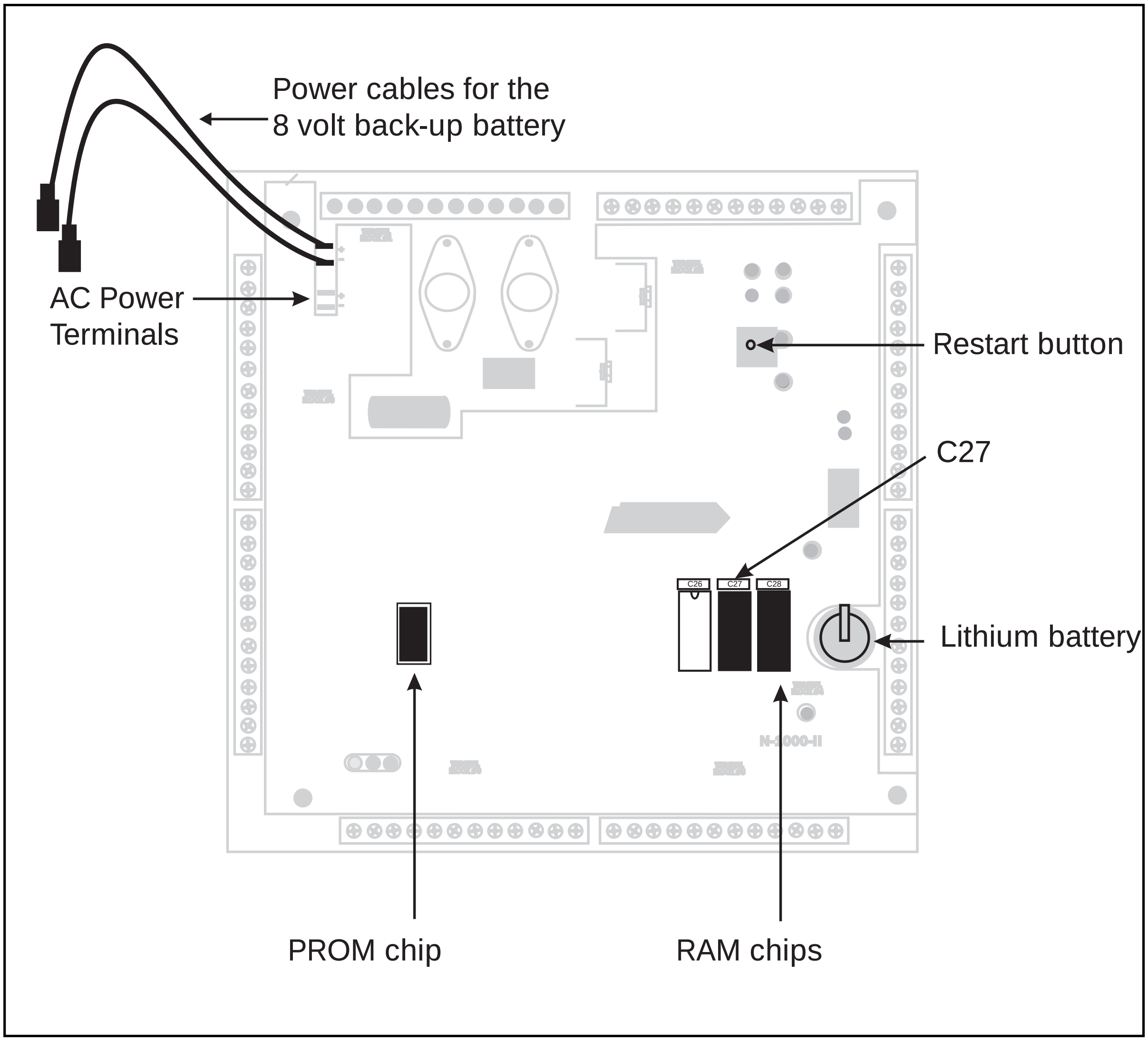


Figure 4-8. **Power Connectors, PROM Chip, C27 and Lithium Battery.** *Cables are provided to connect the 8 volt backup battery. The restart button can be used to restart a "locked-up" control panel or to activate a change made to any DIP switch setting (for baud rate and/or panel address). The lithium battery retains panel database and transaction buffer memory in case of power loss.*

## 4-14: PROM Chip

The control panel PROM chip, which stores all N-1000-II program and control logic memory, is located in socket U19. (See Figure 4-8.) Each PROM is labeled with a sticker indicating its firmware version. Refer to the main PROM number when referencing specific programming and operation functions.

## 4-15: Additional Installation Information

Northern Computers recommends the following installation techniques for the N-1000-II panel:

DO

- *Do* run all wiring for door locks/strikes and panel primary power in a separate conduit* or allow at least 12 inches of space between the power cables and the data/reader cables.
- *Do* use shielded cables or metal conduit when necessary to reduce interfering radio frequency emissions.

DO NOT

- *Do not* mount the power supplies, modem, or external relays inside the N-1000-II enclosure. An empty enclosure (ENC-0 or ENC-2) is available for this purpose. It is the same size as the N-1000 enclosure, with the same locking mechanism.
- *Do not* “string” wire across the face of the N-1000-II panel.
- *Do not* use the same power supply for both locks and control panel or locks and readers.
- *Do not* mount the control panel in or near an area that has electric noise (e.g., next to a large electric motor or power transformer).

*Conduit insures compliance with Subpart S of Part 15 of FCC regulations.

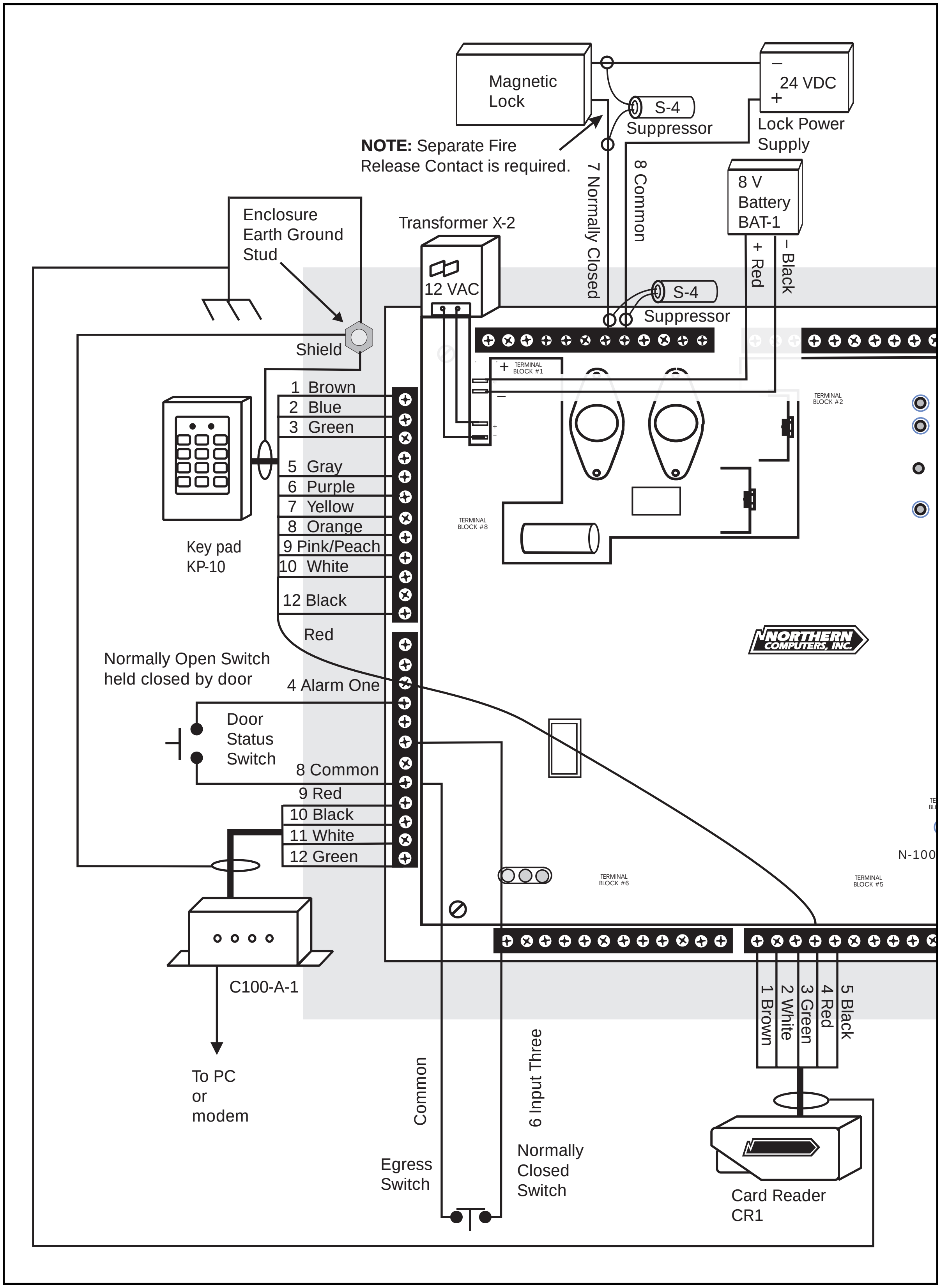


Figure 4-9. **Example Wiring Diagram.** *Card readers connect to Terminal Block 5 of the N-1000-II as shown here. For additional wiring details refer to* Section 6.

# Section 5: Operation

## 5-1: Card Reader/Keypad Operation

Some card readers require that a format (software) command be programmed into the host N-1000-II controller before cards can be read. If the format command is not programmed into the control panel, these readers or keypads will not transmit card numbers to the terminal/printer. See *Appendix A: Programming Quick Reference Guide* for complete *F Command* format listings.

Verify card reader/keypad operation before programming. Codes need not be programmed into memory to verify reader/keypad operation. When a code is entered or a card presented, it should appear on the display/printer, followed by an *NF* or not found message.

The control panel continuously monitors the card reader and keypad ports for code use. Access is restricted by placing timezone limitations on the codes in use, NOT by timezone controlling (disabling) the reading devices.

Card reader or keypad activation of output points is determined by the presence or absence of the anti-passback option in panel memory. See *I Command, A Option* in *Appendix A* for further information.

In anti-passback configurations with two card readers or two keypads, both devices activate Output Relay 1 (Door 1) upon valid code use (Figure 5-1). In anti-passback applications requiring a separate output relay for the reader (such as turnstile applications), refer to *A Command in Appendix A.*

In configurations WITHOUT anti-passback enabled, Card Reader or Keypad 1 activates Output Relay 1 (Door 1) and Card Reader or Keypad 2 activates Output Relay 2 (Door 2) (Figure 5-2).

Card readers and keypads can be reassigned to activate a specified input point, output point or group (multiple outputs) upon valid code use, via the *A Command.* Refer to *Appendix A.*

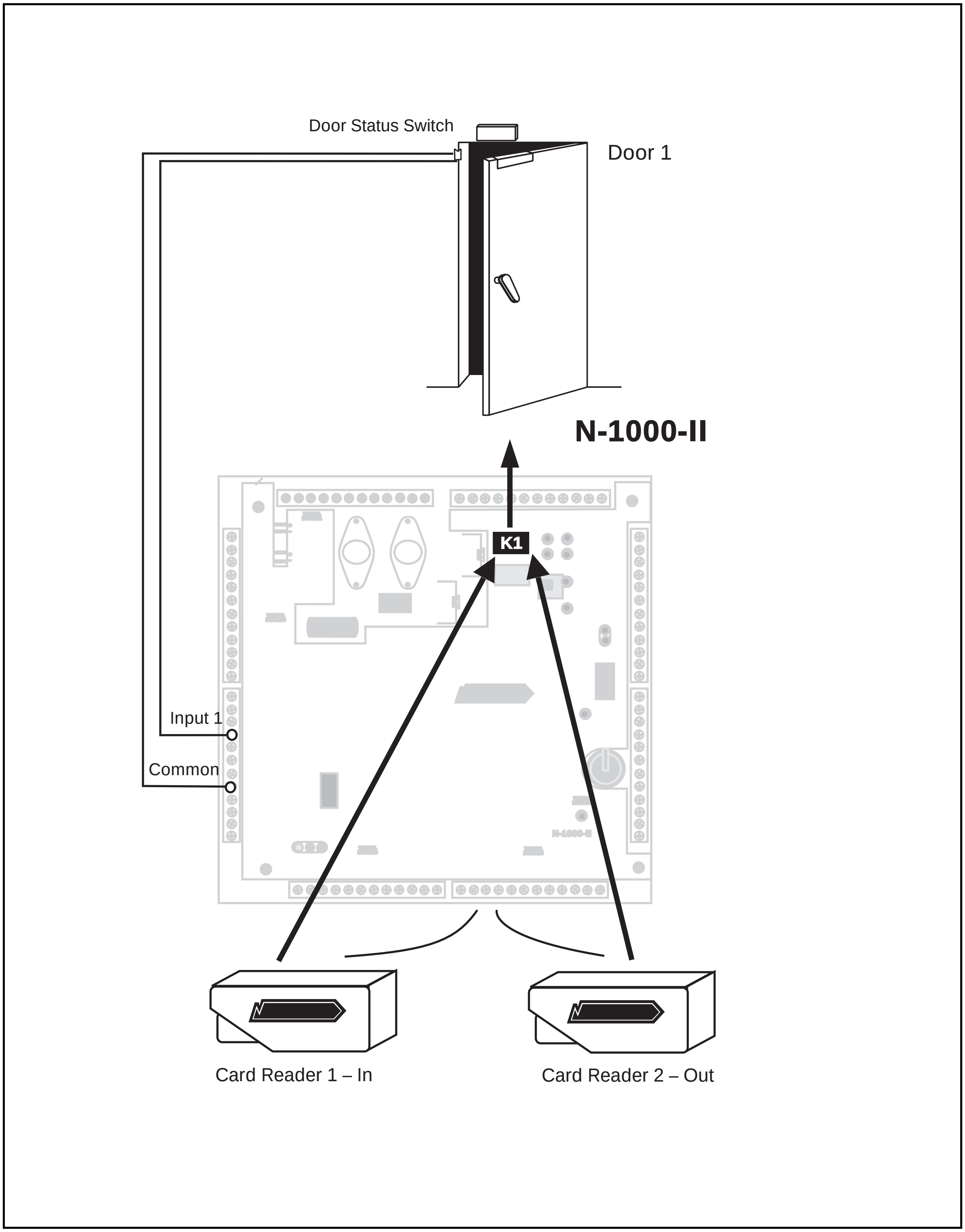


Figure 5-1. **Anti-passback with Two Card Readers.** *(Keypads may be substituted for card readers on TB8.) In anti-passback configurations with two card readers, both devices activate Output Relay 1 (Door 1) upon valid code use. In anti-passback applications requiring a separate output relay for each reader (such as turnstile applications) refer to Appendix A for information on the A Command.*

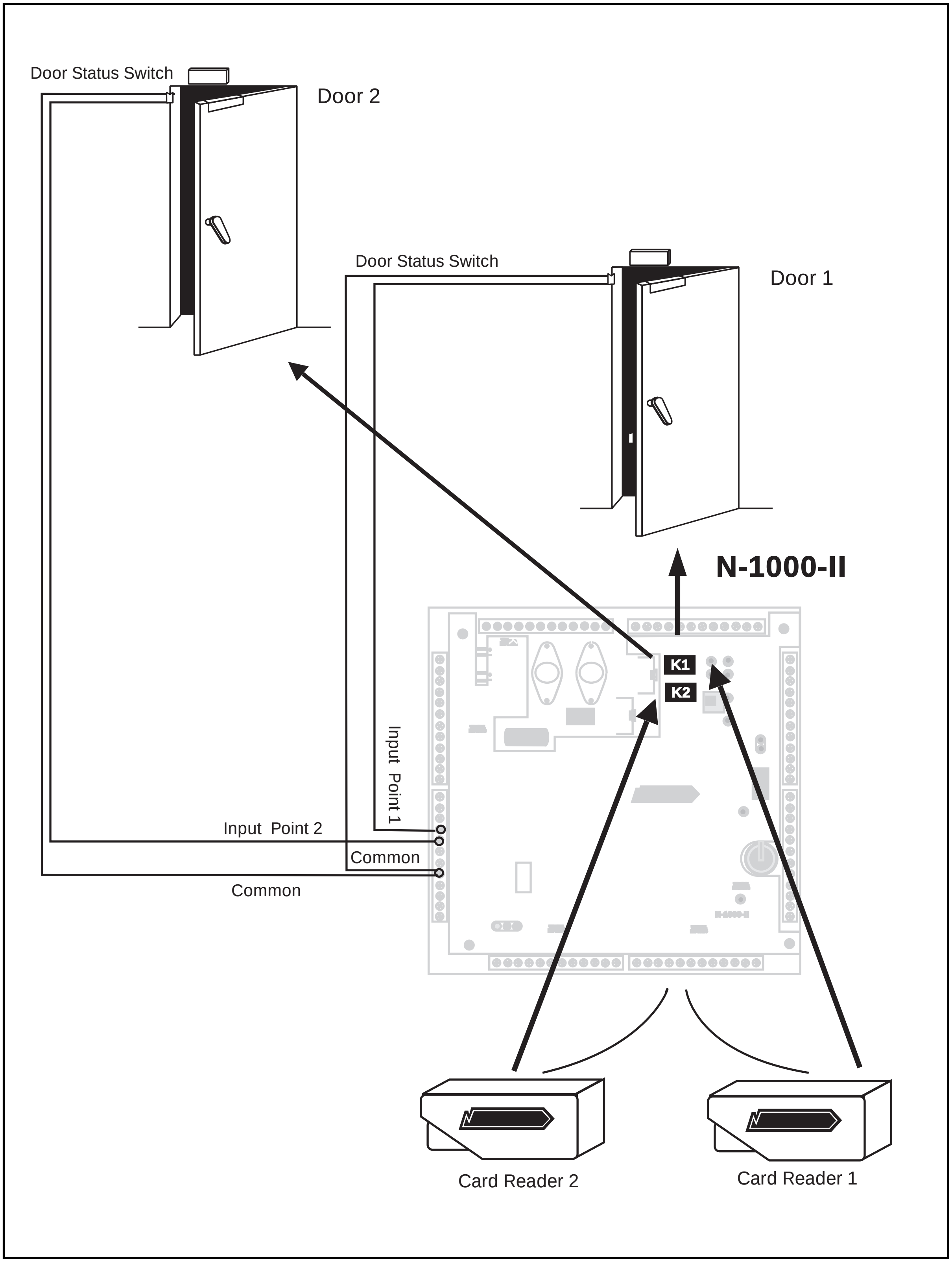


Figure 5-2. **Two Card Readers *without* Anti-passback.** *In configurations* without *anti-passback enabled, Card Reader 1 activates Output Relay 1 (Door 1) and Card Reader or Keypad 2 activates Output Relay 2 (Door 2).*

## 5-2: Alarm Input Points

All N-1000-II alarm input points default to normally-closed, non-supervised circuits used to monitor changes of state. N-1000-II inputs can also be configured for normally open circuits . Input points have both a physical state and a software state, as described below:

### Physical State

Input points have physical states of *open* and *closed*. An open input is considered to be in ALARM condition. A closed input is considered to be in *normal* condition.

### Software State

Input points have software states of *unshunted* (active) and *shunted* (not active). When an input is unshunted, all physical changes of state (openings and closures) are recognized. When an input is shunted, physical changes of state are not recognized. Input shunting is software controlled and does not involve a physical change of state of the input.

The default software state of all input points is unshunted. No programming is necessary to keep inputs in the default state. Programming is only necessary to shunt input points.

N-1000-II Input Configurations

| ***Input Condition*** | ***Input Status*** |
|---|---|
| 1. Non-Supervised Normally Closed Circuit (default) | |
| Shorted | Normal |
| Open | Alarm |
| 2. Non-Supervised Normally Open Circuit | |
| Shorted | Alarm |
| Open | Normal |

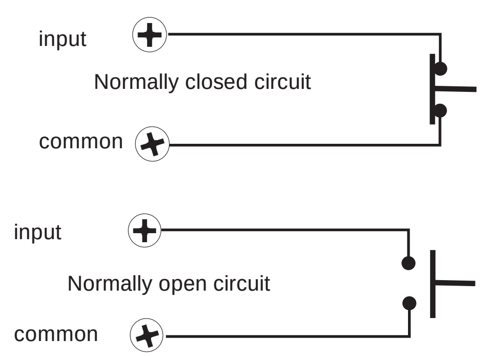


Figure 5-3. **Input Point Configuration.**

Input points are assigned both shunt time and time zone parameters, as described below:

### Shunt Time

The shunt time parameter defines the amount of time the input point is shunted (deactivated) when triggered, such as upon valid code use.

### Timezone

The timezone parameter defines the time the input point is automatically shunted (deactivated).

## 5-3: Relay Output Points

All N-1000-II relay output points have both normally-open and normally-closed contacts, used to switch (activate/deactivate) electrical devices. Output points have only a physical state, as described below:

### Physical State

Output points have physical states of DE-ENERGIZED and ENERGIZED. When an output is de-energized, normally-open and normally-closed contacts are in normal state. When an output is energized, normally-open contacts become closed and normally-closed contacts become open.

The default state of all output points is de-energized. No programming is necessary to keep outputs in the default state. Programming is only necessary to energize output points.

**Note:** *The appropriate side of the relay contact (normally-open or normally-closed) MUST be used to satisfy the following conditions:*

Door locks *MUST* be wired such that the following conditions are met:

1. *DE-ENERGIZED* relay outputs (default state) result in *LOCKED* doors.

2. *ENERGIZED* relay outputs result in *UNLOCKED* doors.

Output points are assigned both pulse time and timezone parameters, as described below:

### Pulse Time

The pulse time parameter defines the amount of time the output point is energized when triggered, such as upon valid code use.

### Timezone

The timezone parameter defines the time the output is automatically energized.

Outputs 13 and 14 control LEDs for card readers 1 and 2, respectively. Card reader LEDs change state upon valid code use for the duration of the programmed pulse time. Default pulse time for LED outputs is two seconds. See *Appendix A, I Command, M Option* and *V Command* for further card reader LED information.

## 5-4: Default Input Point/Output Point Interaction

The actions of all input points and output points are independent of one another, unless otherwise programmed. Selected inputs and outputs can be programmed to interact with one another through an interlocking option (refer to *Appendix A, P Command* as well as I *Command, E Option*). Interlocking allows an input point or output point to take a specified action, based upon another input point or output point change of state.

The reserved input and output points, default interlocks, default pulse times and default shunt times for various system configurations (without anti-passback, with anti-passback and with free egress) are shown below:

### Configurations *without* Anti-Passback

| *Input Point* | *Reserved for:* | *Default shunt time* |
|---|---|---|
| Input 1 | Door position switch for Door 1 | 15 seconds |
| Input 2 | Door position switch for Door 2 | 15 seconds |

| *Output Point* | *Reserved for:* | *Default pulse time* |
|---|---|---|
| Output 1 | Door lock for Door 1 | 10 seconds |
| Output 2 | Door lock for Door 2 | 10 seconds |
| Output 13 | Reader 1 LED | 2 seconds |
| Output 14 | Reader 2 LED | 2 seconds |

Output 1 is interlocked to Input 1. Output 2 is interlocked to Input 2. An activation of Output 1 (such as upon valid code use at card reader/keypad 1) causes Input 1 to be shunted for the duration of its shunt time. Similarly, activation of Output 2 causes Input 2 to be shunted for the duration of its shunt time. (See Figure 5-4.)

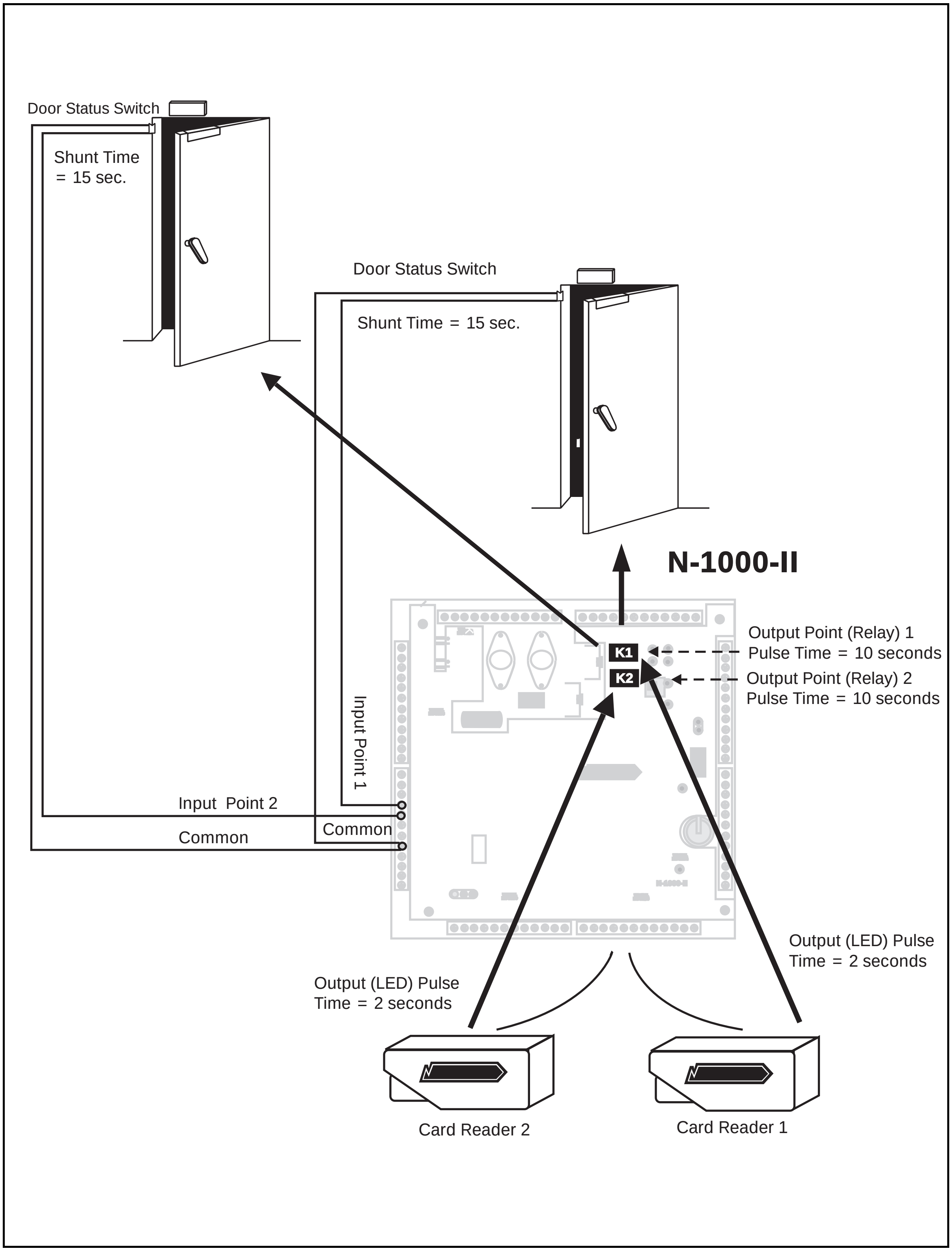


Figure 5-4. **Interlocked Input/Output on Doors without Anti-passback.**
Example: *Valid code use at Card Reader (or Keypad) 1 triggers the pulse time of Output Relay 1, unlocking Door 1 for 10 seconds and pulsing the reader LED for 2 seconds.*
*The activation of Output 1 triggers the shunt time of Input 1 (via interlock) shunting Door 1 status switch for 15 seconds.*

## Configurations *with* Anti-Passback:

| *Input Point* | *Reserved for:* | *Shunt Time* |
|---|---|---|
| Input 1 | Door position switch for Door 1 | 15 seconds |

| *Output Point* | *Reserved for:* | *Pulse Time:* |
|---|---|---|
| Output 1 | Door lock for Door 1 | 10 seconds |

Output 1 is interlocked to Input 1. Activation of Output 1 causes Input 1 to be shunted for the duration of its shunt time. (See Figure5-5.)

## Configurations with Free Egress:

| *Input Point* | *Reserved for:* | *Default shunt time* |
|---|---|---|
| Input 1 | Door position switch for Door 1 | 15 seconds |
| Input 2 | Door position switch for Door 2 | 15 seconds |
| Input 3 | Egress device for Door 1 | 0 seconds (N/A) |
| Input 4 | Egress device for Door 2 | 0 seconds (N/A) |

| *Output Point* | *Reserved for:* | *Default pulse time* |
|---|---|---|
| Output 1 | Door lock for Door 1 | 10 seconds |
| Output 2 | Door lock for Door 2 | 10 seconds |

Input 3 is interlocked to Output 1. An activation of Input 3 (via egress attempt) causes Output 1 to energize for the duration of its pulse time.

Input 4 is interlocked to Output 2. An activation of Input 4 (via egress attempt) causes Output 2 to energize for the duration of its pulse time.

Output 1 is interlocked to Input 1. An activation of Output 1 (such as upon valid code use at card reader/keypad 1 or egress attempt) causes Input 1 to be shunted for the duration of its shunt time.

Output 2 is interlocked to Input 2. An activation of Output 2 (such as upon valid code use at card reader/keypad 2 or egress attempt) causes Input 2 to be shunted for the duration of its shunt time. (See Figure 5-6.)

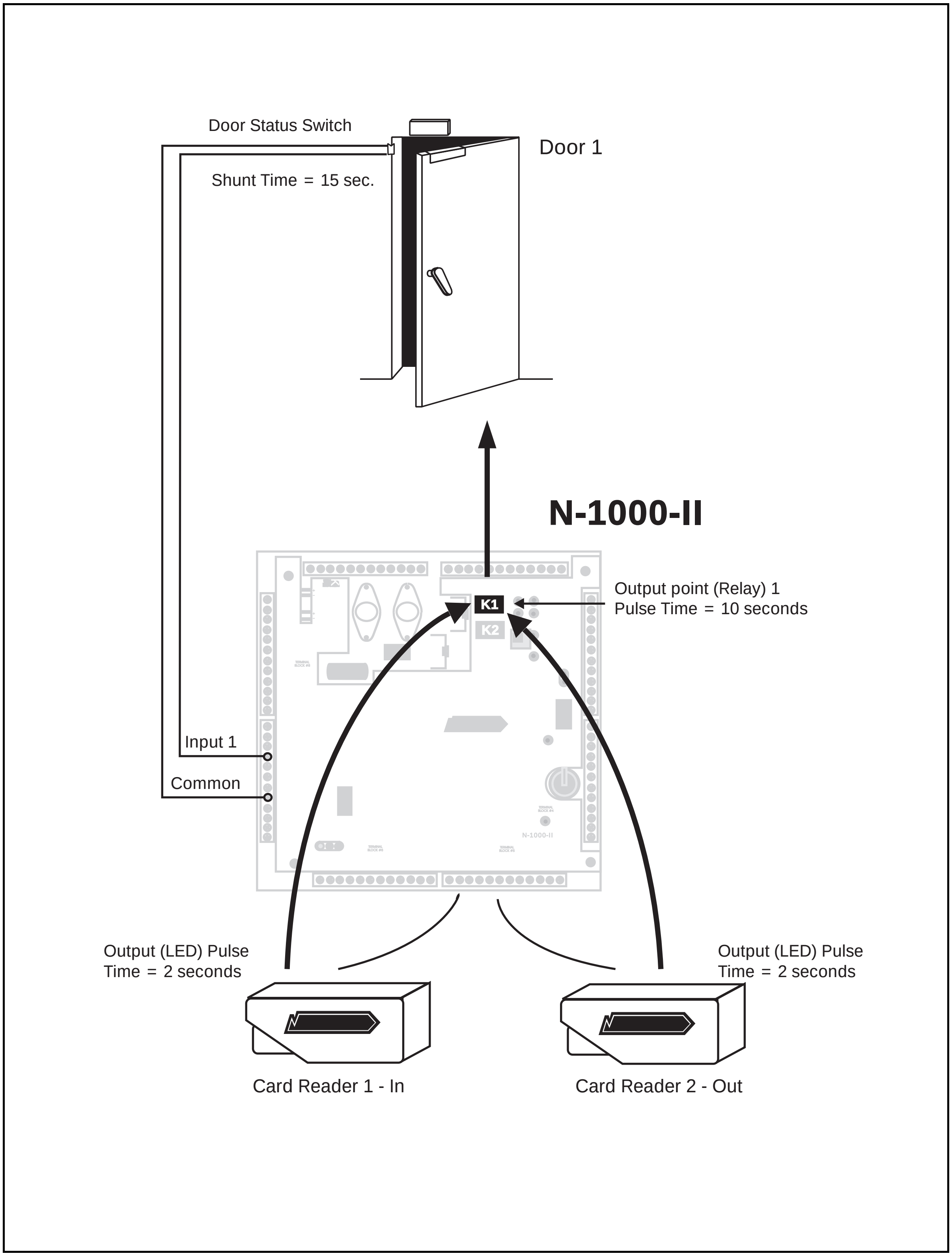


Figure 5-5. **Interlocked Input/Output Points on Door *with* Anti-passback.**
Example: *Valid code use at either card reader (or keypad) triggers the pulse time of Output Relay 1, unlocking Door 1 for 10 seconds. The activation of Output 1 triggers the shunt time of Input 1 (via the interlock), shunting Door 1 status switch for 15 seconds.*

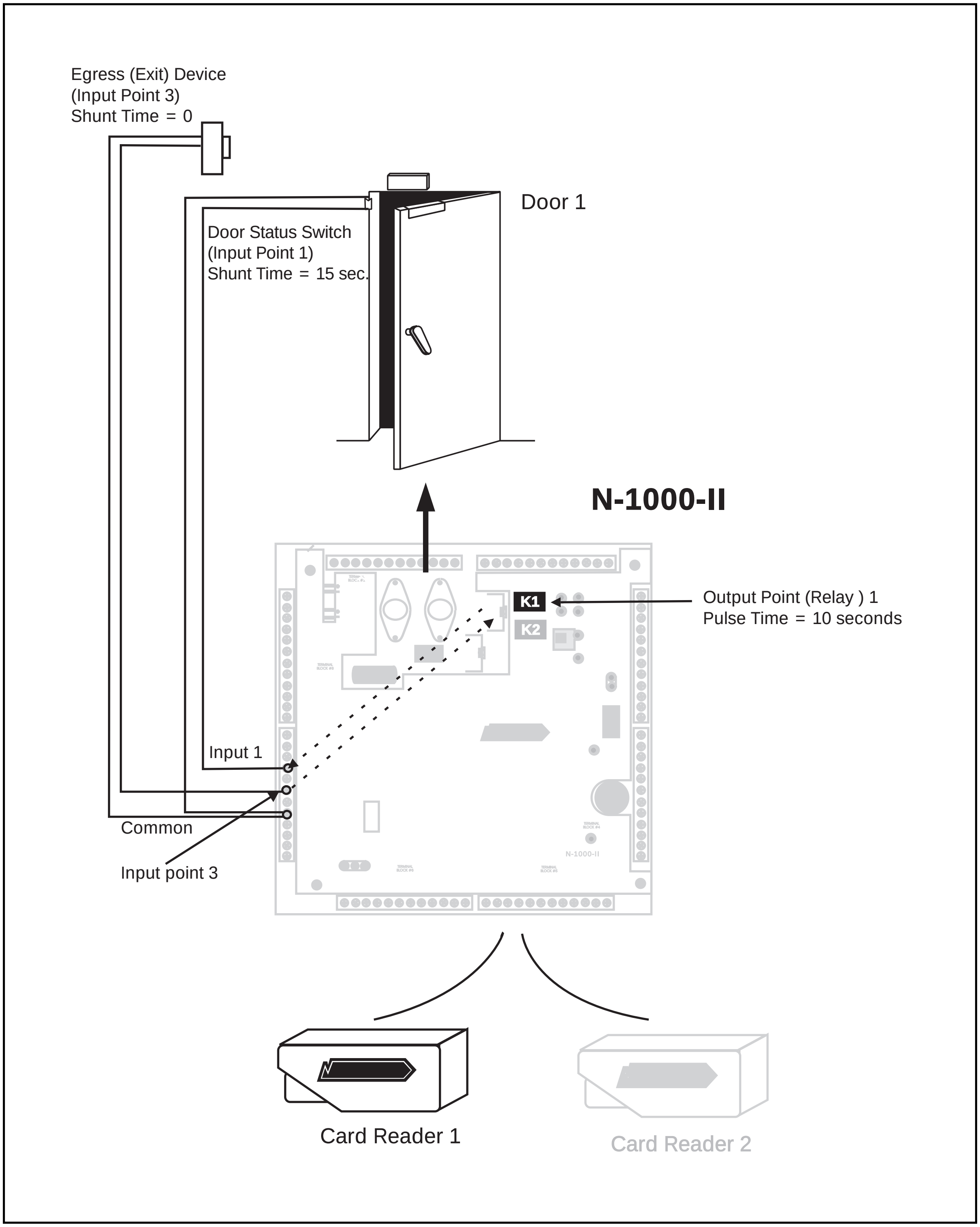


Figure 5-6. **Door 1 with Free Egress.** *Valid code use at Card Reader (or Keypad) 1* or *egress attempt (at Input 3) triggers the pulse time of Output Relay 1, unlocking Door 1 for 10 seconds. The activation of Output 1 triggers the shunt time of Input 1 (via the interlock), shunting Door 1 status switch for 15 seconds. Input 1 is shunted for the duration of its shunt time (15 seconds by default) upon valid code use* or *upon egress attempt, Door 1 shunt time is determined by Input 1 shunt time,* not *Input 3 shunt time. Input 3 shunt time does not apply.*

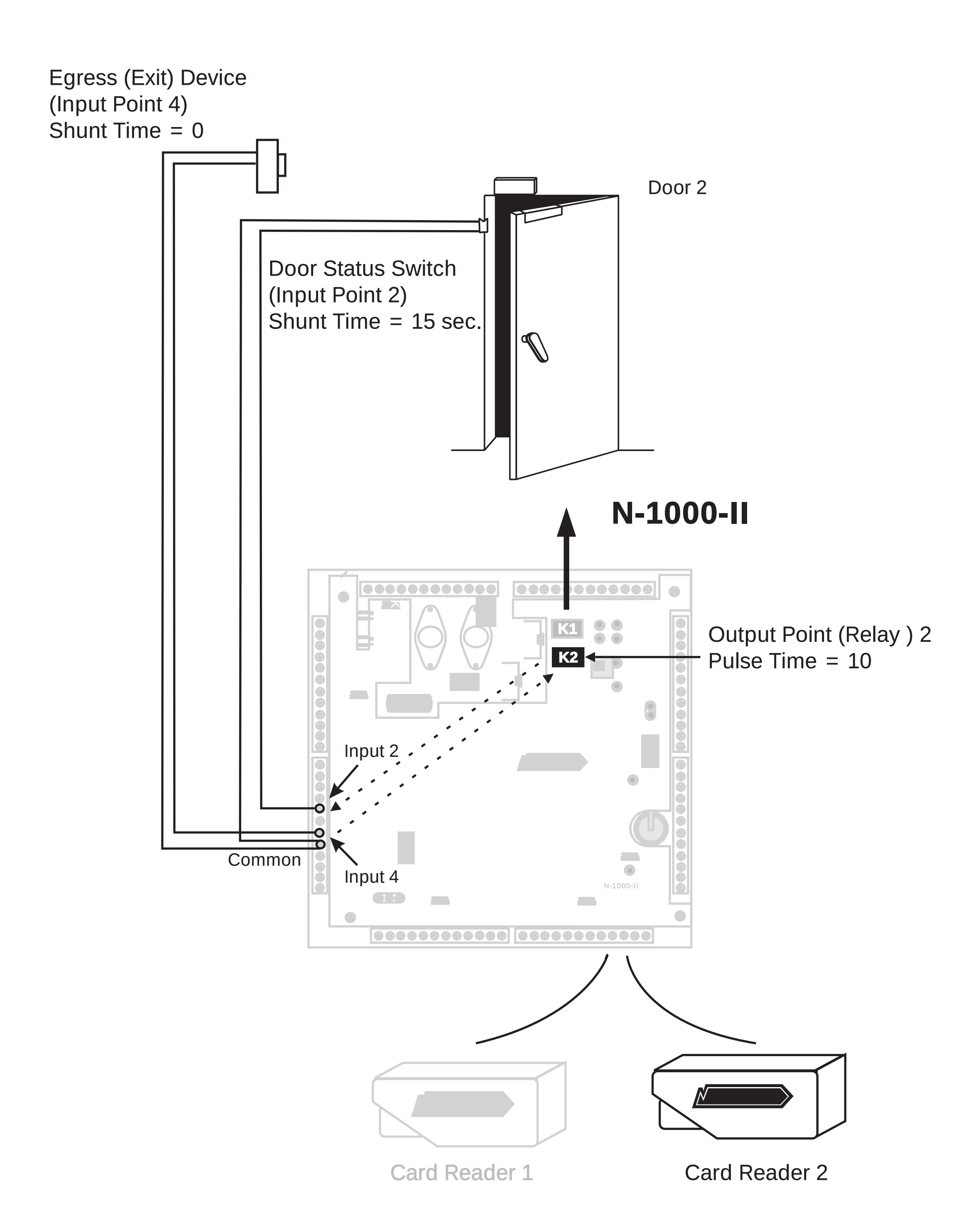


Figure 5-7. **Door 2 with Free Egress.** *Valid code use at Card Reader (or Keypad) 2* or *egress attempt (at Input 4) triggers the pulse time of Output Relay 2, unlocking Door 2 for 10 seconds. The activation of Output 2 triggers the shunt time of Input 2 (via the interlock), shunting Door 2 status switch for 15 seconds. Input 2 is shunted for the duration of its shunt time (15 seconds by default) upon valid code use* or *upon egress attempt. Door 2 shunt time is determined by Input 2 shunt time,* not *Input 4 shunt time. Input 4 shunt time does not apply.*

## 5-5: Auto-Relock Operation

The auto-relock feature results in the immediate re-locking and rearming (unshunting) of a door when the door status switch is closed after entry. With auto-relock operation, an output relay (controlling a door lock) de-energizes when the corresponding input point (door status switch) returns to normal state, and the input point is rearmed (unshunted) rather than remaining energized (shunted) for the duration of its pulse/shunt time.

Auto-relock associations between inputs and outputs are NOT considered interlocks and do not appear as interlocks on input point reports and output point reports.

Auto-relock operation can be set manually with the *V Command, K option* found in *Appendix A*.

Default auto-relock operation is described below and illustrated in figures 5-8 and 5-9.

### With Anti-Passback

With anti-passback enabled, Input 1 is configured for auto-relock with Output 1.

### Without Anti-Passback

Without anti-passback enabled, Input Point 1 is configured for auto-relock with Output 1 and Input 2 is configured for auto-relock operation with Output 2.

## 5-6: Timezone-Controlled Doors

When timezone-controlling a door (for free access) that is operated by a card reader or keypad, the time zone must be assigned to the relay output point.

Example:

You want to keep Door 1 (controlled by Card Reader 1) unlocked during Timezone 5, defined as 9 A.M. to 6:30 P.M., Monday through Friday.

Timezone 5 must be assigned to Output 1 (to unlock the door during that timezone).

The default interlock to shunt the door status switch will prevent an alarm from occurring while the output is pulsed/energized.

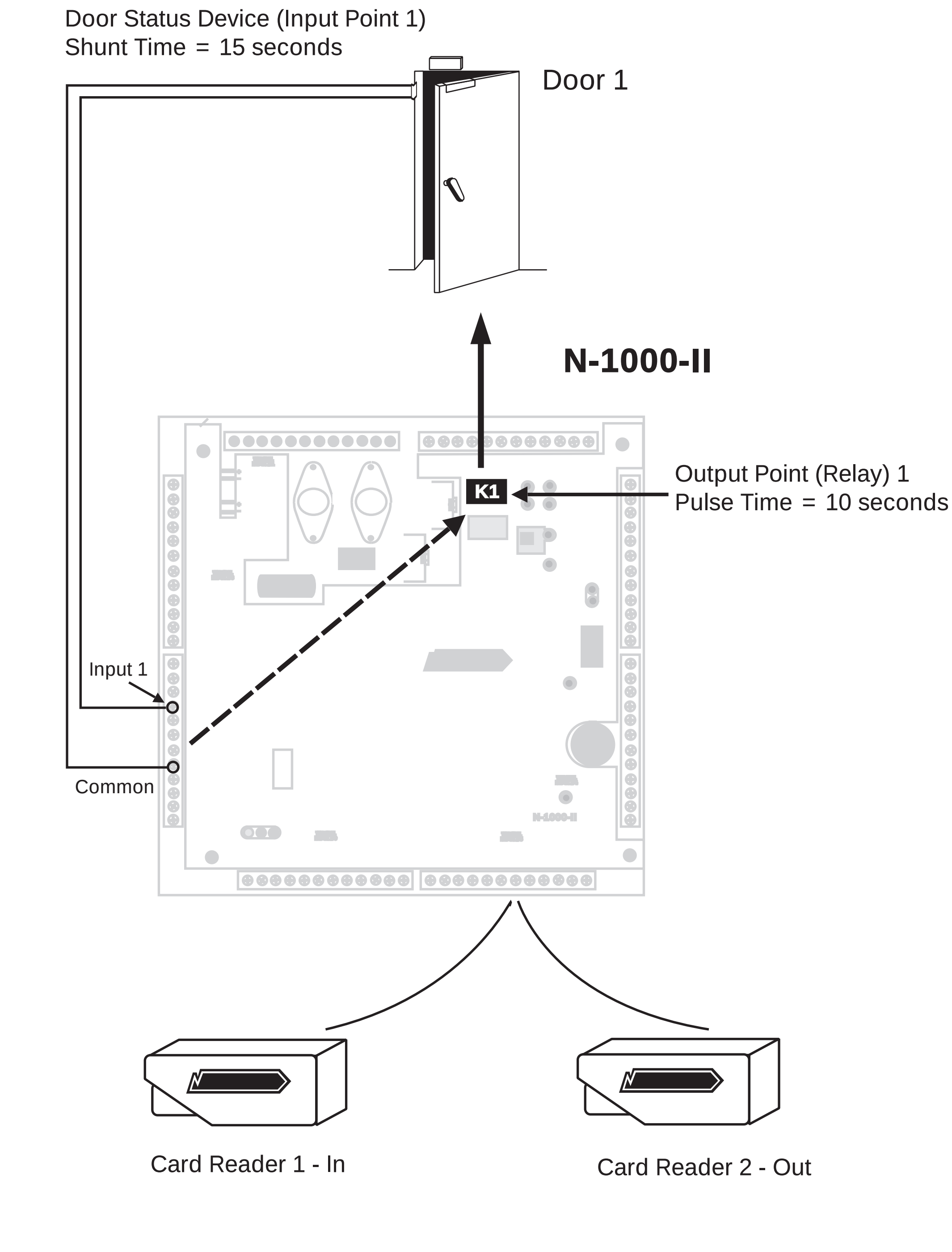


Figure 5-8. **Auto-relock with Anti-Passback.** *Example: Valid code use at either card reader (or keypad) triggers the pulse time of Output Relay 1, unlocking Door 1 for 10 seconds. The activation of Output 1 triggers the shunt time of Input 1 (via the interlock), shunting Door 1 status switch for 15 seconds. Output relay 1 de-energizes immediately upon Input 1's return to normal state, relocking Door 1 and rearming Input 1, rather than remaining energized (shunted) for the duration of the 10 second pulse time/15 second shunt time.*

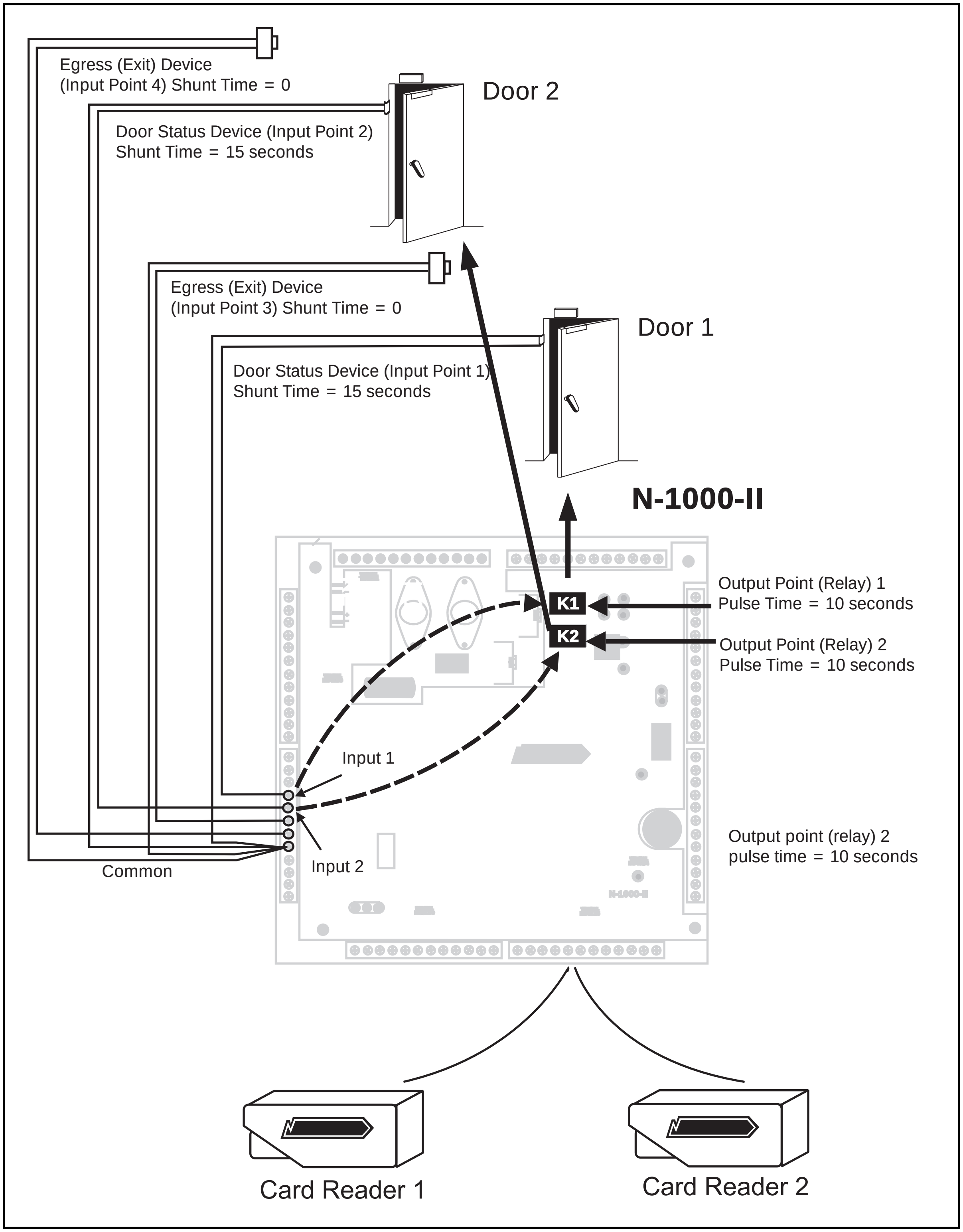


Figure 5-9. **Auto-relock Doors 1 and 2 without Anti-passback.** *Output Relay 1 de-energizes immediately upon Input Point 1's return to normal state, re-locking Door 1 and rearming Input 1, rather than remaining energized (shunted) for the duration of the 10 second pulse time/15 second shunt time. Output Relay 2 de-energizes immediately upon Input Point 2's return to normal state, re-locking Door 2 and rearming Input 2, rather than remaining energized (shunted) for the duration of the 10 second pulse time/15 second shunt time.*

# Section 6: Wiring Requirements

## 6-1: Card Readers

Some card readers require that a format (software) command be programmed into the host N-1000-II controller before cards can be read. When a card is run through a card reader that requires a format command and the format command has not been programmed into the control panel, no card number is transmitted to the terminal/printer. See Appendix A for complete F Command format listings.

N-1000-II Terminal Block 5 supports interface to two Wiegand output card readers and provides an alarm point common. Each card reader port includes terminals for LED control, Data 1 signal, Data Ø signal, +5 VDC output and Ground. See Figure 6-1 for typical wiring diagram.*

Card reader/keypad communication shields should be connected to the chassis ground located in the upper left corner of the enclosure. The shield at the card reader/keypad end should not be grounded unless the device is electrically floating (not touching metal). (See Figure 6-1.)

Typical card readers using reader cable NC1861 or for Plenum applications NCP1861 have the following terminations (maximum distance is 500' or 152 m). Refer to documentation included with your reader for the latest information. (Cable specifications and part numbers are listed at the end of this section.)

### Reader 1:

| *Terminal Block* | *Terminal* | *Function* | *Reader Wire Color* |
|---|---|---|---|
| 5 | 1 | LED (Aux. Output 13) | Brown |
| 5 | 2 | Data 1 | White |
| 5 | 3 | Data 0 | Green |
| 5 | 4 | +5 VDC | Red |
| 5 | 5 | Ground | Black |
| | – | Not used | Blue |
| | Chassis Gnd | | Shield |

### Reader 2:

| *Terminal Block* | *Terminal* | *Function* | *Reader Wire Color* |
|---|---|---|---|
| 5 | 4 | +5 VDC | Red |
| 5 | 5 | Ground | Black |
| 5 | 6 | Data 0 | Green |
| 5 | 7 | Data 1 | White |
| 5 | 8 | LED (Aux. Output 14) | Brown |
| | – | Not used | Blue |
| | Chassis Gnd | | Shield |

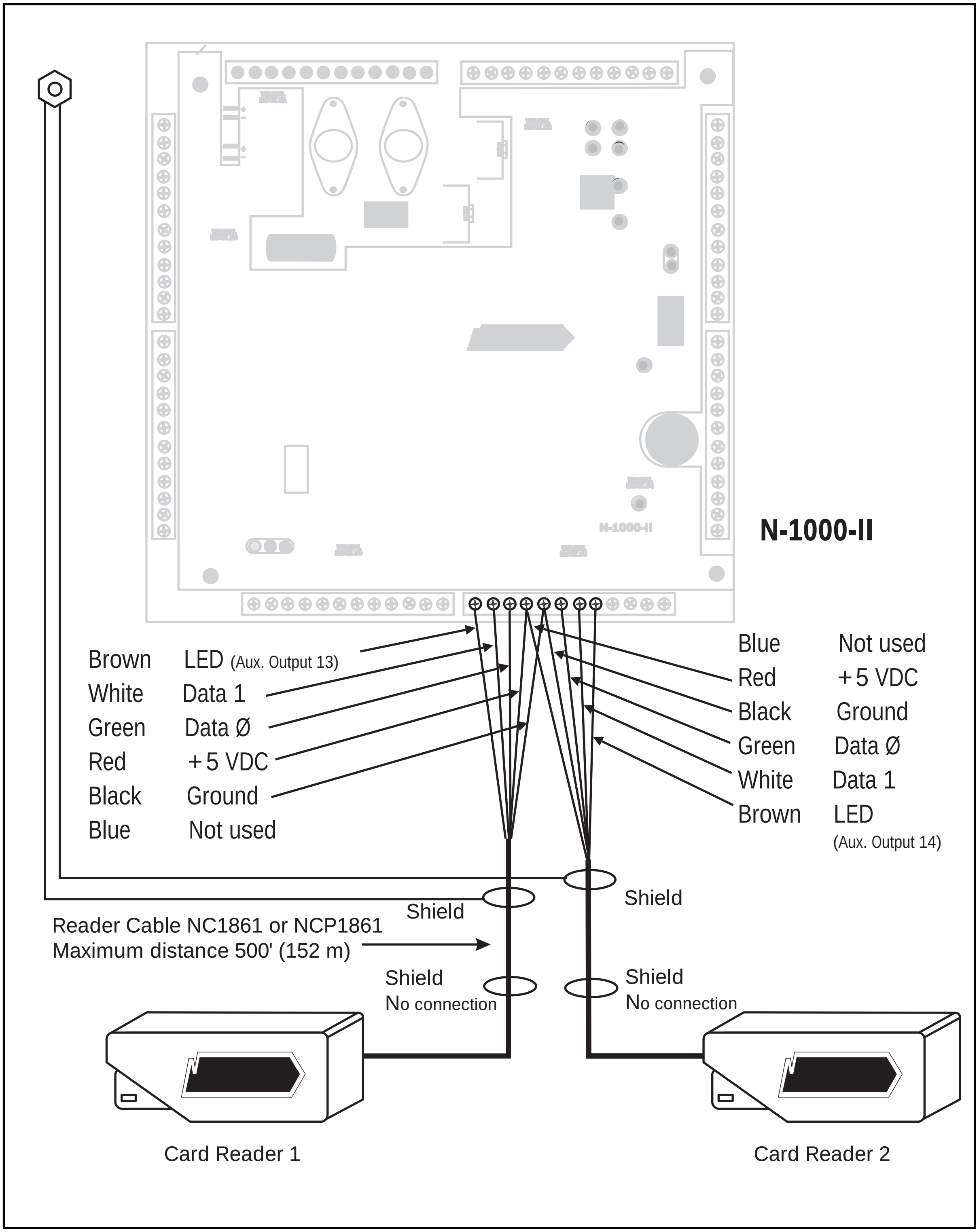


Figure 6-1. **Card Reader Connections to TB5.** *N-1000-II Terminal Block 5 supports interface to two Wiegand output card readers and provides an alarm point common. Each card reader port includes terminals for LED control, Data 1 signal, Data Ø signal, +5 VDC output and Ground. Card reader/keypad communication shields should be connected to the chassis ground. The shield at the card reader/keypad end should not be grounded unless the device is electrically floating (not touching metal).*

## 6-2: Eleven Conductor Keypads

A typical eleven conductor keypad uses a 2 of 7 matrix configuration where each keypad row and column corresponds to a unique wire (Figure 6-2). When a key is pressed, two of seven wires are activated (two of the wires are put to ground); one wire corresponds to the key's row and one wire corresponds to the key's column. For example: if the *3* key is pressed, the gray (row 1) and green (column 3) wires are activated (put to ground). If the *8* key is pressed, the yellow (row 3) and blue (column 2) wires are activated (put to ground).

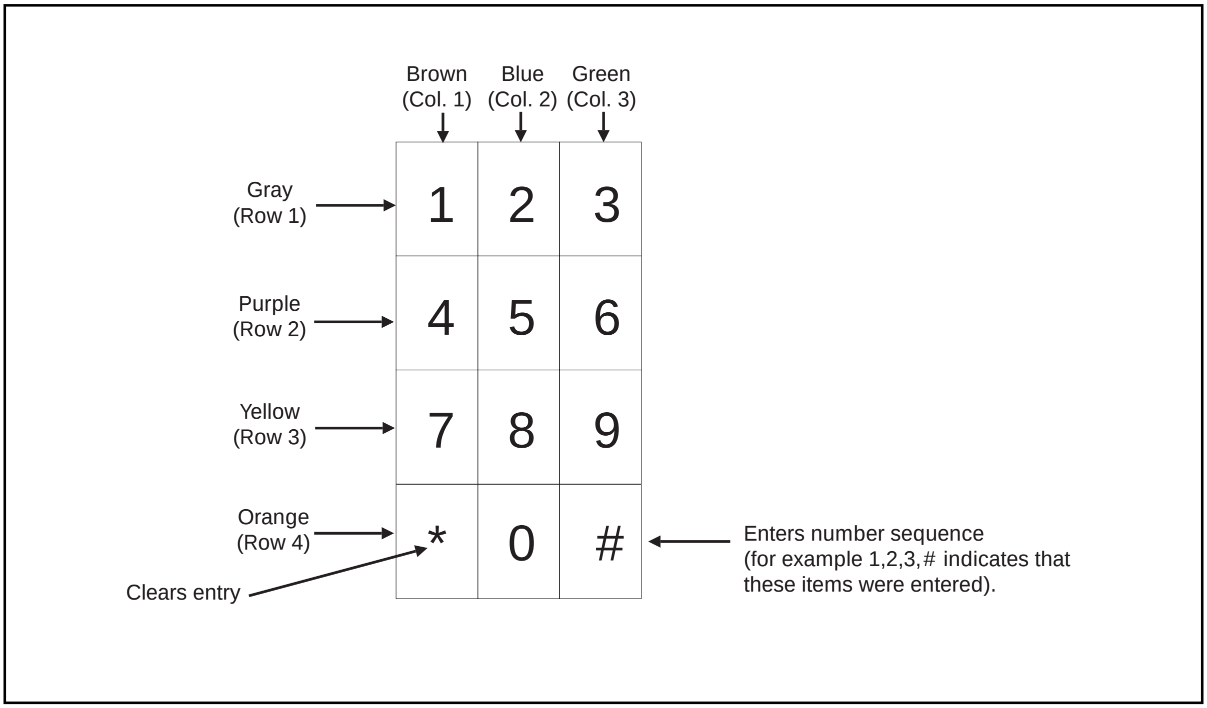


Figure 6-2. **Eleven Conductor Keypad 2 of 7 Matrix.**

Typical eleven conductor keypads, using keypad cable NC18121 or for Plenum applications NCP18121 (maximum distance is 500' or 152 m), have the following terminations (see Figure 6-3):

| *Keypad 1* | | | *Keypad 2* | | |
|---|---|---|---|---|---|
| *TB* | *Terminal* | *Wire Color* | *TB* | *Terminal* | *Wire Color* |
| 8 | 1 | Brown | 8 | 1 | Brown |
| 8 | 2 | Blue | 8 | 2 | Blue |
| 8 | 3 | Green | 8 | 3 | Green |
| 8 | 4 | Black | 8 | 4 | Black |
| 8 | 5 | Gray | 8 | 5 | Gray |
| 8 | 6 | Purple | 8 | 6 | Purple |
| 8 | 7 | Yellow | 8 | 7 | Yellow |
| 8 | 8 | Orange | 8 | 8 | Orange |
| 8 | 9 | Peach/Pink | 8 | 9 | Peach/Pink |
| 8 | **10** | White | 8 | **11** | White |
| 5 | 4 | Red | 5 | 4 | Red |

*Note: When two keypads are used, the terminations for both keypads are the same except for the White wire, shown **bold** above.*

*Refer to your keypad technical documentation for the latest information.*

### **Tan Earth Ground wire connections** (Not used on all keypads)

If the keypad is mounted directly on grounded metal, tie the tan wire to the grounded metal and tie the keypad cable shield to the N-1000-II grounding point (float shield at keypad).

If the keypad is mounted on ungrounded metal or nonmetallic material, tie the tan wire to the keypad cable's shield only and connect the shield to the N-1000-II ground point.

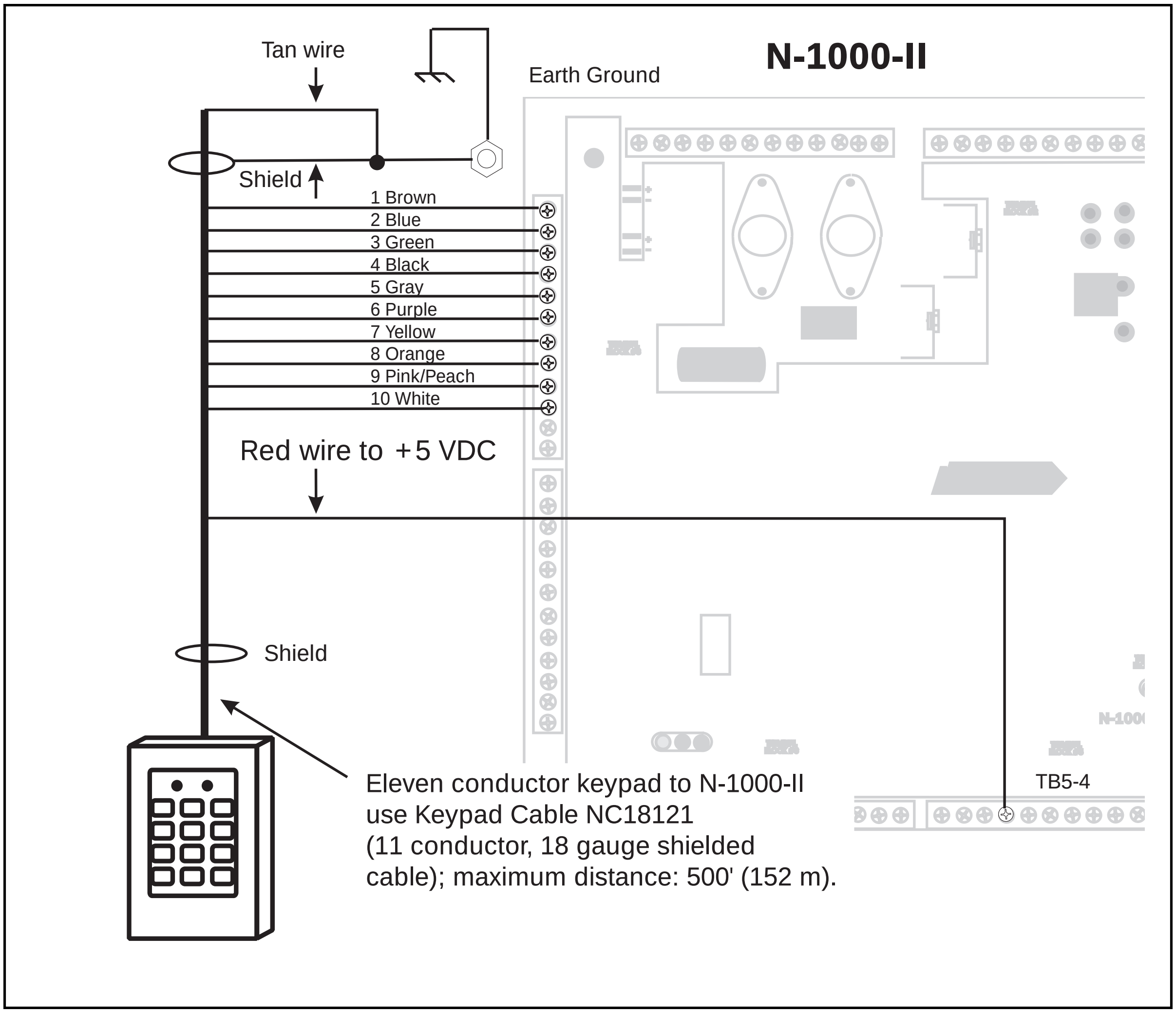


Figure 6-3. **Eleven Conductor Keypad Connection to the N-1000-II.** *If the keypad is mounted on ungrounded metal or nonmetallic material, tie the tan wire to the keypad cable's shield only and connect the shield to the N-1000-II ground point.*

## 6-3: Alarm Input Points

Use panel/communication cable NC1821/NCP1821 (twisted, 18 gauge overall shielded cable) for connection to alarm input points. This enables the input device to be located up to 2000 feet (610 meters) away from the N-1000-II.

Connect the shield to the panel's earth ground and leave the other end of the shield not connected.

All N-1000-II alarm point commons are electrically the same and can be used with any panel alarm point. Alarm Point commons are located at TB5-9, TB7-8 and TB8-12.

If end of line (EOL) resistors are used for supervised inputs, then they must be located at the switch in order to be effective.

Refer to *Appendix A* for a summary list of specific alarm input point commands.

## 6-4: Relay Output Points

Panel/communications cable NC1821/NCP1821 (twisted pair, 18 gauge, overall shielded) is recommended for relay output point use. This enables the output device to be located up to 2000 feet (620 meters) away from the N-1000-II. An 18 gauge wire's resistance results in a 6.5 volt drop for a quarter ampere load at 2000 feet.

See *Appendix A* for a summary list of specific relay output point commands.

## 6-5: Communications

### 6-5-1: PC to C-100-A1

Cable CBL-2 (three conductor, 18-20 gauge) is recommended for use between the PC and the C-100-A1 Converter. This enables the C-100-A1 to be located up to 50 feet (15 meters) away from the CPU (See Figure 6-4).

### 6-5-2: C-100-A1 to Panel(s)

Panel/communications cable NC1821/NCP1821 (twisted pair, 18 gauge shielded) is recommended, enabling runs of up to 2000 feet (610 meters), for each of the following:

C-100-A1 to first panel in communication loop
Panel to panel
Last panel in communication loop to C-100-A1 (see Figure 6-5)

The 20 mA communications loop for the C-100-A1 and the N-1000-II operates using active-transmit and passive-receive.

In a single panel 20 mA communication loop, ground the communication cable shield only at the panel, as shown in Figure 6-6.

In a multiple 20 mA panel communication loop, the 20 mA communication cable shield between any two given panels in the loop should be grounded at one end only. Ground either the receive side *or* the transmit side of the shield (but *not both*), giving care to be consistent throughout the loop. The receive side grounding method is preferred (see Figure 6-7). The transmit side grounding method is not recommended.

## 6-5-3: AEP to N-1000-II

Up to two AEP-3 Relay Expansion Boards per N-1000-II panel can be added to the communication loop. Using the cable supplied with the unit, one AEP-3 connects to the N-1000-II at terminal blocks 6 and 7, and then to the next AEP-3.

Refer to the *AEP-3 Installation and Programming Manual* for further details.

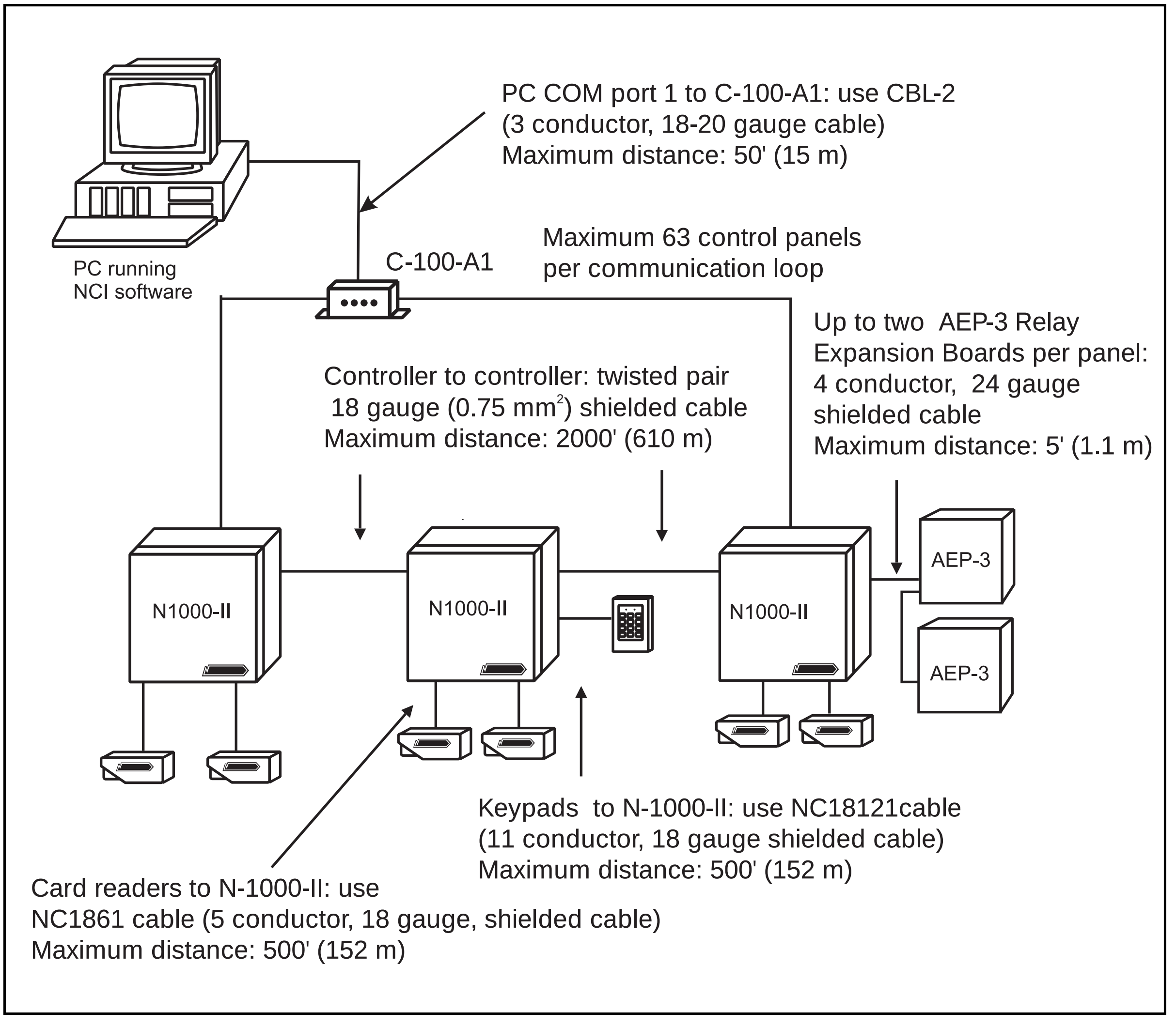


Figure 6-4. **Typical 20 mA Communication Loop.**

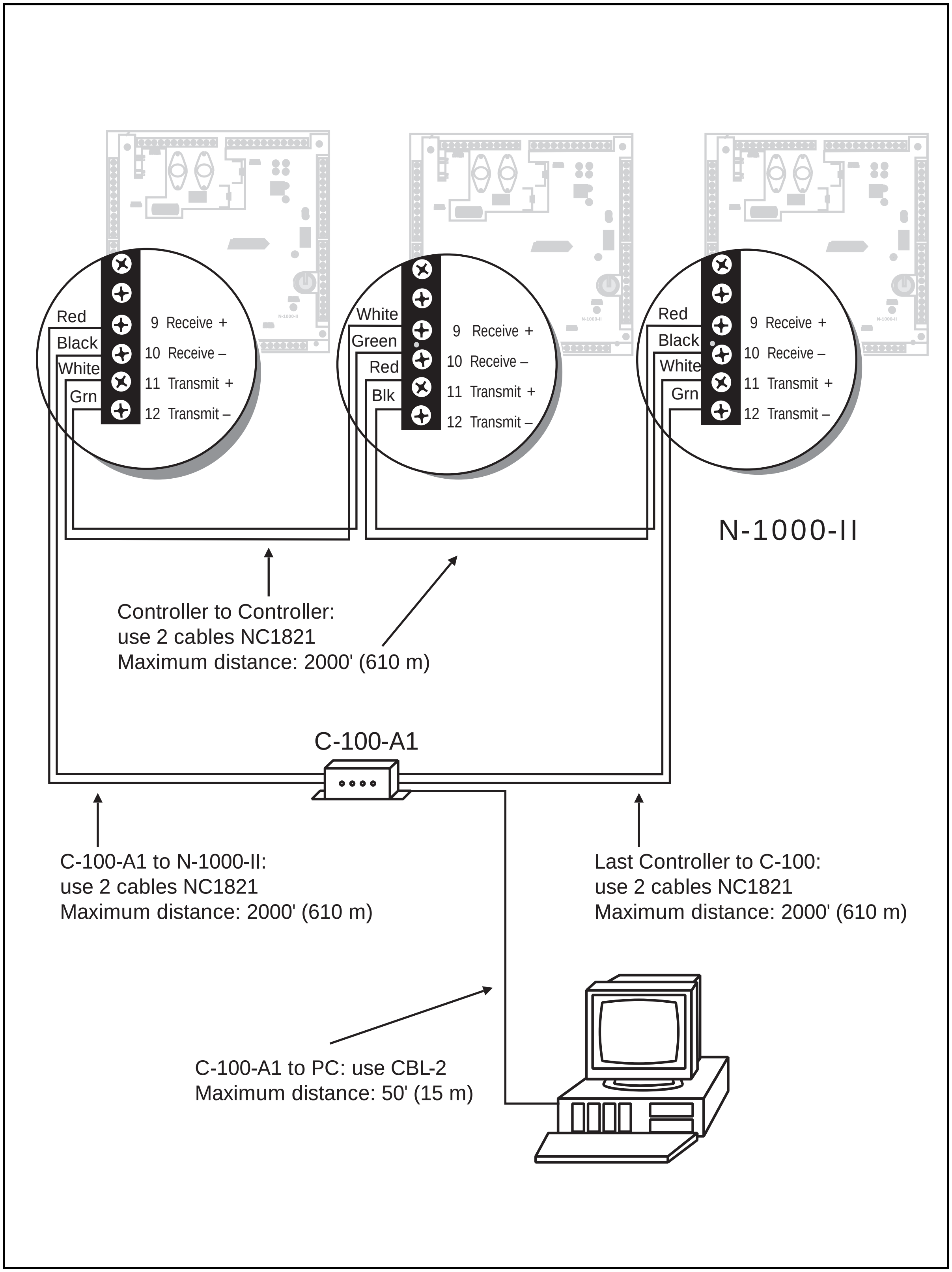


Figure 6-5. **Typical C-100-A1 Multiple Panel 20 mA Communication Loop.** *Refer to Figure 6-7 for grounding of the communication loop.*

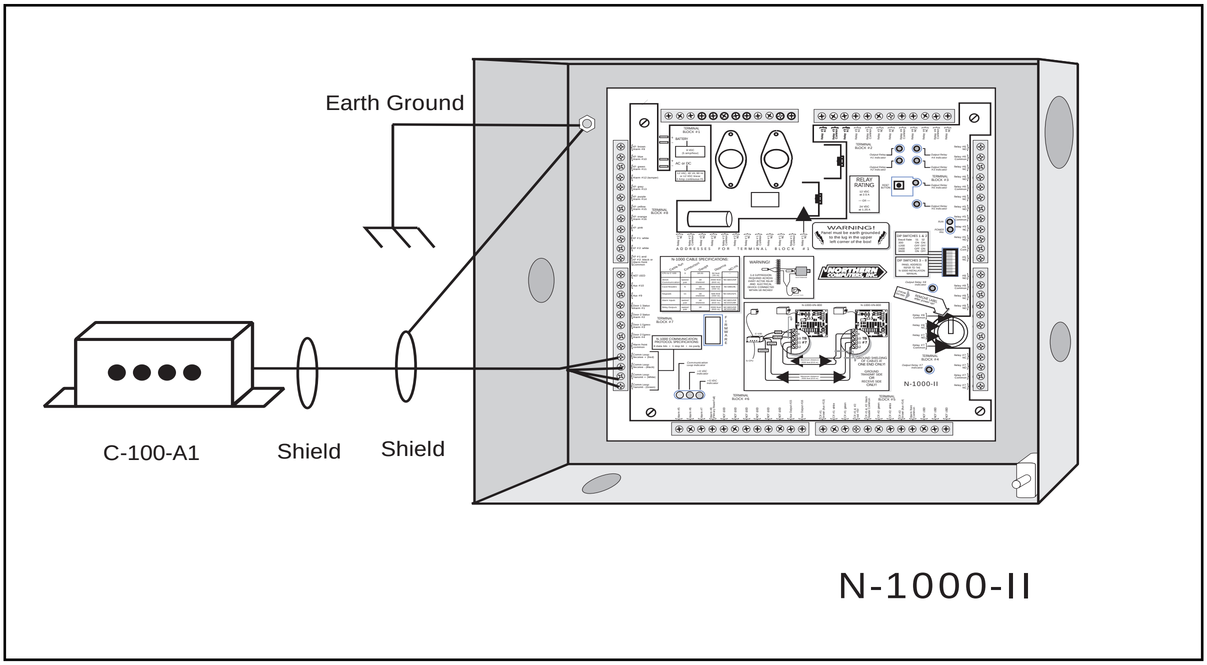


Figure 6-6. **Grounding a Single Panel, 20 mA Communication Loop.** *In a single panel 20 mA communication loop, ground the communication cable shield only at the panel.*

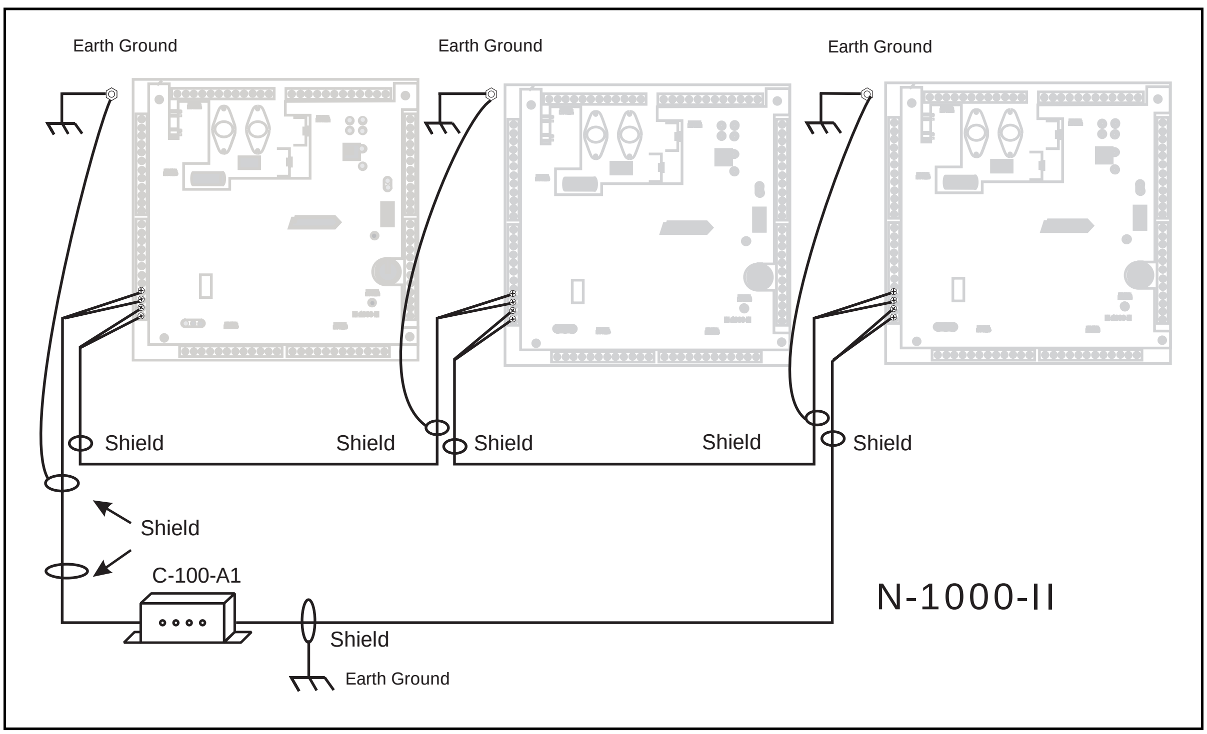


Figure 6-7. **Grounding a Multiple Panel, 20 mA Communication Loop.** *In a multiple 20 mA panel communication loop, the 20 mA communication cable shield between any two given panels in the loop should be grounded at one end only. The preferred receive side grounding method is shown here. The transmit side grounding method is not recommended.*

# 6-6: Cable Specifications

| *Application* | *NCI Part No.* | *AWG* | *Description* | *Max. Dist.* | *Imp.* | *Cap.* |
|---|---|---|---|---|---|---|
| CPU to C-100-A1 | CBL-2 | N/A | 9-25 adapter cable | 6' (1.8 m) | — | |
| C-100-A1 to controller,<br>controller to controller,<br>controller to C-100-A1 | NC1821-GR | 18 | twisted pair, shielded | 2000' (610 m) | | |
| N-485 connections | NC2021-GY-A | N/A | twisted pair, shielded | 4000' (1200 m) | 120 W | 20pf/ft |
| or | NCP2021-WH-A | N/A | 2 conductor | | | |
| N-1000-II to AEP-3 | | | | 5' (1.1 m) | | |
| CR-1, TR-1, CI-1, KR-1<br>Wiegand card readers | NC1861-BL | 18 | 6 conductor shielded | 500' (152 m) | | |
| NR-1 magstripe reader | NC1861-BL | 18 | 6 conductor shielded | 500' (152 m) | | |
| PR-1-280 Cotag reader: | | | | | | |
| 280 read head to SZC | NC1861-BL | 18 | 6 conductor shielded | 300' (91 m) | | |
| SZC to N-1000-II | NC1861-BL | 18 | 6 conductor shielded | 500' (152 m) | | |
| PR-2 Hughes reader: | | | | | | |
| scanner to reader | NC1861-BL | 18 | 6 conductor shielded | 30' (9 m) | | |
| reader to N-1000-II | NC1861-BL | 18 | 6 conductor shielded | 500' (152 m) | | |
| PR-3, PR-5 Indala readers:<br>A-3/A-5 read head to RE-2 | NC18121-YL | 18 | 12 conductor shielded | 75' (23 m) | | |
| RE-2 to N-1000-II | NC1861-BL | 18 | 6 conductor shielded | 500' (152 m) | | |
| PR-20 , PR-22<br>Indala readers:<br>A-20/A-22 read head<br>to RE-2 | NC18121-YL | 18 | 12 conductor shielded | 75' (23 m) | | |
| RE-2 to N-1000-II | NC1861-BL | 18 | 6 conductor shielded | 500' (152 m) | | |
| PR-10, PR-12 Indala<br>readers: | NC1861-BL | 18 | 6 conductor shielded | 500' (152 m) | | |
| HG-3 hand geometry<br>reader: | NC1861-BL | 18 | 6 conductor shielded | 500' (152 m) | | |
| 11 conductor keypad | NC18121-YL | 18 | 12 conductor shielded | 500' (152 m) | | |
| 5 conductor keypad | NC1861-BL | 18 | 6 conductor shielded | 500' (152 m) | | |
| Alarm input points | NC1821-GR | 18 | twisted pair, shielded | 2000' (610 m) | | |
| or | NC 2221-BR | 22 | | | | |
| Relay outputs | NC 1821-GR | 18 | twisted pair, shielded | 2000' (610 m) | | |
| or | NC 2221-BR | 22 | 2 conductor | | | |

**Note:** *for Plenum rated cable just add a "P" to Northern's part number prefix*

## 6-7: NCI Cable Part Numbers

| *Part Number* | *Description* | *Application* | *Length* |
|---|---|---|---|
| NC1821-GR | 18 AWG/2 conductor | panel/communication cable | 1,000' |
| NC2021-GY-A | 24 AWG/2 conductor communication cable 120 ohm impedance, 20 pf/ft capacitance | RS-485 panel/ | 1,000' |
| NC1841-GY | 18 AWG/4 conductor | reader cable | 1,000' |
| NC1861-BL-500 | 18 AWG/6 conductor | reader cable | 500' |
| NC1861-BL | 18 AWG/6 conductor | reader cable | 1,000' |
| NC18121-YL-500 | 18 AWG/12 conductor | keypad cable | 500' |
| NC18121-YL | 18 AWG/12 conductor | keypad cable | 1,000' |
| NCNET-1 | 50 ohm | network cable | 1,000' |
| NC2221-BR | 22 AWG/2 conductor | alarm cable | 1,000' |
| NC1821-OR | 18 AWG/2 conductor | power/door cable | 1,000' |
| NCC59206-BK | RG-59 | video cable | 1,000' |
| NCP1821-GR | 18 AWG/2 conductor Plenum | panel/communication cable | 1,000' |
| NCP2021-WH-A | 24 AWG/2 conductor Plenum 120 ohm impedance, 20 pf/ft capacitance | RS-485 communication cable | 1,000' |
| NCP1841-GY | 18 AWG/4 conductor Plenum | reader cable | 1,000' |
| NCP1861-BL-500 | 18 AWG/6 conductor Plenum | reader cable | 500' |
| NCP1861-BL | 18AWG/6 conductor Plenum | reader cable | 1,000' |
| NCP18121-YL | 18 AWG/12 conductor Plenum | keypad cable | 1,000' |
| NCP18121-YL-500 | 18 AWG/12 conductor Plenum | keypad cable | 500' |
| NCPNET-1 | 50 ohm Plenum | network cable | 1,000' |
| NCP2221-BR | 22 AWG/2 conductor Plenum | alarm point cable | 1,000' |
| NCP1821-OR | 8 AWG/2 conductor Plenum | power/door cable | 1,000' |

## 6-8: Configurations for RS-232 Serial Communication Ports

### PC's, DigiBoard or WIN-EXP-8 or 16 connected to a MODEM or a C-100 (C setting)

| PC/Digiboard DTE | | | WIN-EXP-8 or 16 | | | Modem DCE | | | C-100 (C) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DB | 25 | male | DB | 25 | male | DB | 25 | female | DB | 25 | female |
| 1 | Shld | — | 1 | Shld | — | 1 | Shld | — | 1 | n/c | |
| 2 | TxD | output | 2 | TxD | output | 2 | TxD | input | 2 | TxD | input |
| 3 | RxD | input | 3 | RxD | input | 3 | RxD | output | 3 | RxD | output |
| 4 | RTS | output | 4 | RTS | output | 4 | RTS | input | 4 | RTS | n/a |
| 5 | CTS | input | 5 | n/c | | 5 | CTS | output | 5 | n/c | |
| 6 | DSR | input | 6 | DSR | to 20 | 6 | DSR | output | 6 | n/c | |
| 7 | GND | common | 7 | GND | common | 7 | GND | common | 7 | GND | common |
| 8 | DCD | input | 8 | DCD | input | 8 | DCD | output | 8 | n/c | |
| 20 | DTR | output | 20 | DTR | to 6 | 20 | DTR | input | 20 | n/c | |
| 22 | RI | input | 22 | n/c | | 22 | RI | output | 22 | n/c | |

### PC's or WIN-EXP-8 or 16 connected to a 485-PCI-2 or EXP (SW1-1 & SW2-1 closed & SW1-2 and SW2-2 open)

| PC DTE | | | WIN-EXP DTE | | | 485-PCI-2 | | | PC-EXP/CCTV | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DB | 9 | male | DB | 9 | male | DB | 9 | female | DB | 9 | female |
| 1 | DCD | input | 1 | DCD | input | 1 | n/c | | 1 | n/c | |
| 2 | RxD | input | 2 | RxD | input | 2 | RxD | output | 2 | RxD | output |
| 3 | TxD | output | 3 | TxD | output | 3 | TxD | input | 3 | TxD | input |
| 4 | DTR | output | 4 | DTR | to 6 | 4 | DTR | to 6 | 4 | n/c | |
| 5 | GND | common | 5 | GND | common | 5 | GND | common | 5 | GND | common |
| 6 | DSR | input | 6 | DSR | to 4 | 6 | DSR | to 4 | 6 | n/c | |
| 7 | RTS | output | 7 | RTS | output | 7 | RTS | to 8 | 7 | n/c | |
| 8 | CTS | input | 8 | n/c | | 8 | CTS | to 7 | 8 | n/c | |
| 9 | RI | input | 9 | n/c | | 9 | n/c | | 9 | n/c | |

### C-100 (M setting) or a 485-HUB-2 connected to a MODEM

| C-100 (M) | | | 485 HUB | | | 485 MODEM DCE | | |
|---|---|---|---|---|---|---|---|---|
| DB | 9 | male | DB | 9 | male | DB | 9 | female |
| 1 | N/C | | 1 | n/c | | 1 | Shld | — |
| 2 | TxD | output | 2 | TxD | output | 2 | TxD | input |
| 3 | RxD | input | 3 | RxD | input | 3 | RxD | output |
| 4 | RTS | n/a | 4 | RTS | to 5 | 4 | RTS | input |
| 5 | CTS | | 5 | CTS | to 4 | 5 | CTS | output |
| 6 | DSR | | 6 | DSR | to 20 | 6 | DSR | output |
| 7 | GND | common | 7 | GND | common | 7 | GND | common |
| 8 | n/c | | 8 | n/c | | 8 | DCD | output |
| 20 | n/c | | 20 | DTR | to 6 | 20 | DTR | input |
| 22 | n/c | | 22 | n/c | | 22 | RI | output |

### DB9/25 Adapter

| DB9/25 ADAPTER | | |
|---|---|---|
| DB9 | | DB 25 |
| 1 | DCD | 8 |
| 2 | RxD | 3 |
| 3 | TxD | 2 |
| 4 | DTR | 20 |
| 5 | GND | 7 |
| 6 | DSR | 6 |
| 7 | RTS | 4 |
| 8 | CTS | 5 |
| 9 | RI | 22 |

**General rules of thumb:**

- Inputs are connected to outputs
- Two outputs are never connected together
- The hardware handshaking lines should be ignored in software (if possible)
- For connecting 2 **DB25** DTEs together cross pins 2 & 3, 4 & 5, 8 & 20, and connect 6 to 20
- For connecting two **DB9** DTEs together cross pins 2 & 3, 1 & 4, 7 & 8, and connect 4 to 6
- Keep cables away from electrical noise sources and less than 50 feet long
- Use shielded cable and connect all of the units to the same earth ground point

# Section 7: Locks and Suppression

An S-4 Suppressor Kit must be installed with every electrical switching device run through a relay contact on the N-1000-II. The Suppressor Kit protects the N-1000-II from the power generated by the collapsing magnetic field of an electrical load device.

The S-4 Suppressor Kit consists of two identical pieces. Each piece contains a resistor, a capacitor and tranzorb network. These parts are encapsulated in a rubber-like insulating material. One piece is installed across the relay contacts without regard to polarity. The second is installed within 18 inches (45.7 cm) of the electrical load locking device, without regard to polarity. (See Figure 7-1.)

**Note:**
*Do not* run the panel wires or the lock power wires in the same cable/conduit as the reader/communication line cables. The lock wiring should be at least 12 inches away from the data lines, or it should have a separate conduit.

*Do not* power door locks with the same power supply used for the N-1000-II or card readers.

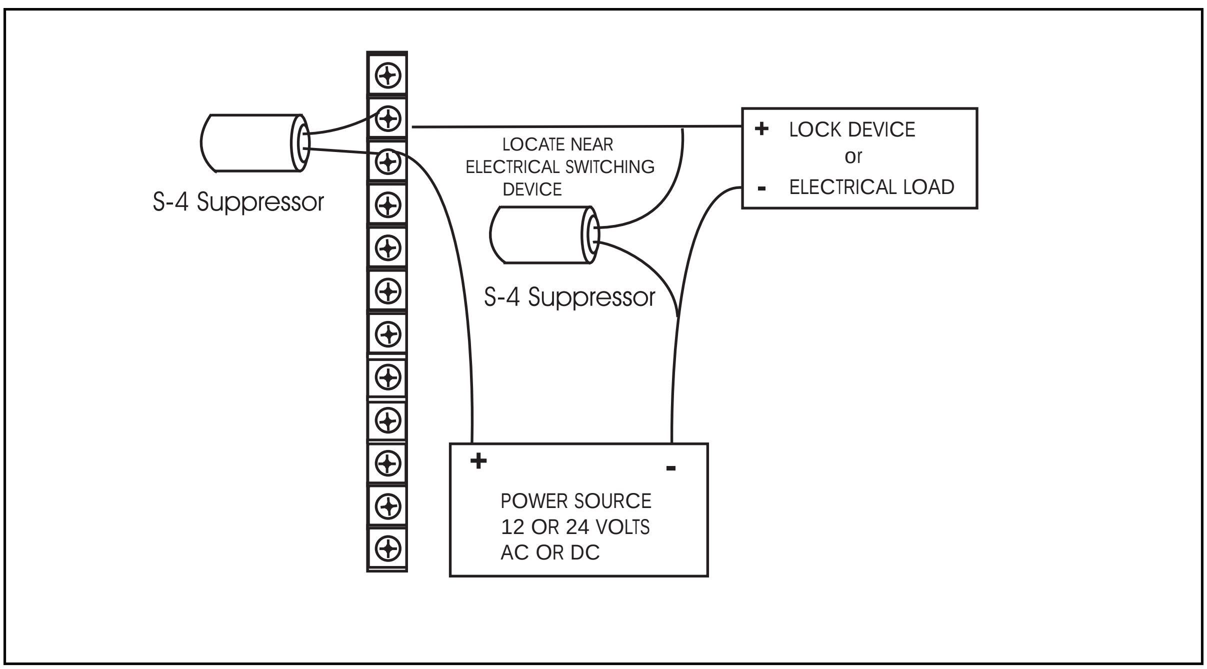


Figure 7-1. **S-4 Suppressor Kit Installation.**

# Section 8: Grounding

It is important to ground all N-1000-II control panels properly. Each panel in the communication loop should be individually grounded.

In some locations, the individual earth ground is not adequate and a separate 12 to 14 gauge common ground wire should be run along with the communication loop wire. Ground this wire at one location for the entire system. The 18 gauge or larger cable must be connected from the panel ground point directly to earth ground. The grounding point is shown in Figure 8-1.

In installations where there is a significant amount of electrical noise, shields should be grounded outside of the panel.

The access control system should use a consolidated earth ground, in which the power line, telephone and access control system ground rods are bonded together.

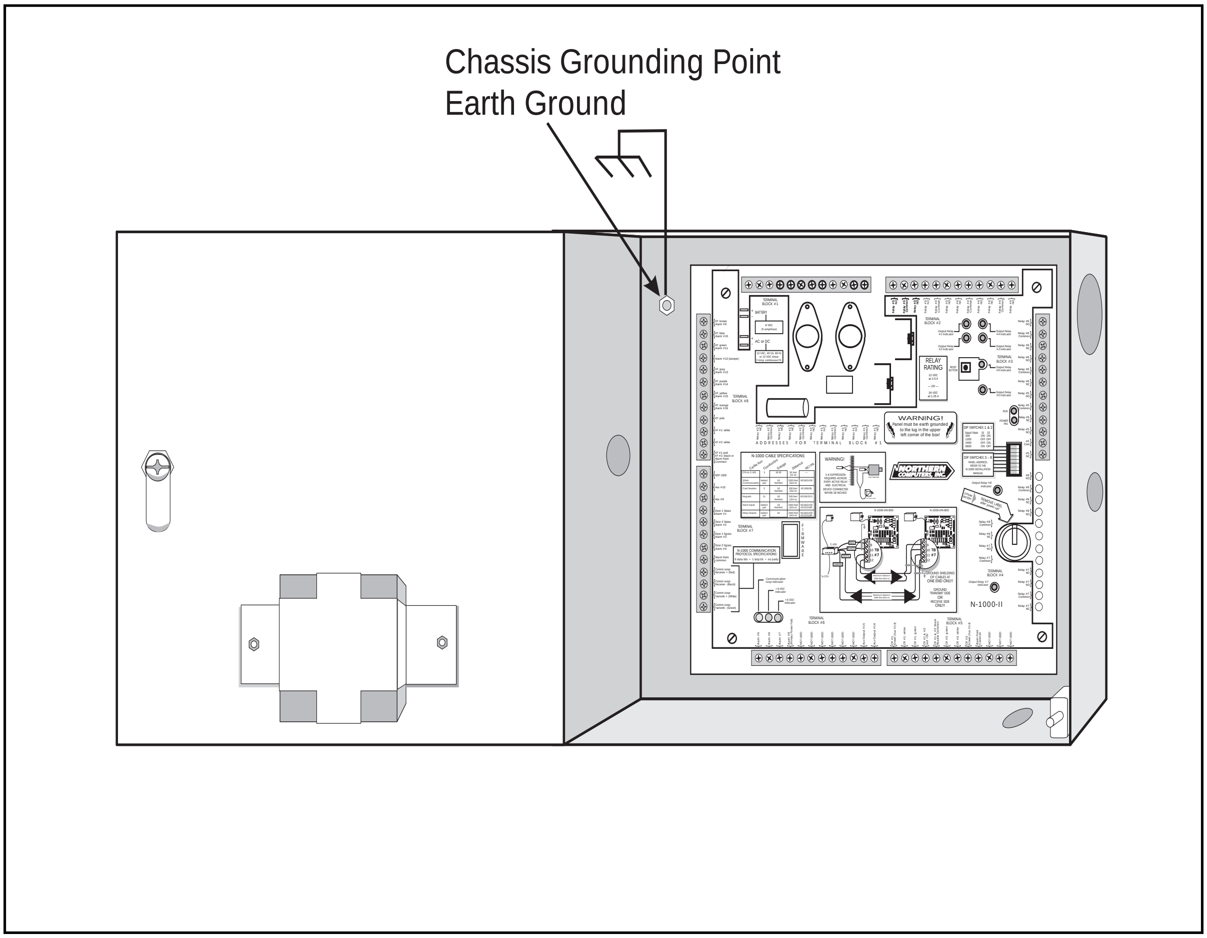


Figure 8-1. **Access Control System with Grounding Point.**

A consolidated earth ground eliminates the problem of step voltage blowout, in which measurable voltage potential exists between earth ground rods. In the event of a lightening strike, step voltage provides a current flow path resulting in damage to the access control system. A consolidated earth ground configuration is shown in Figure 8-2.

In regard to grounding, Northern makes the following recommendations:

DO

- *Do k*eep ground wire runs as short and straight as possible
- *Do a*void sharp turns, using a minimum radius of eight inches (20 cm) for bends.
- *Do r*un ground wires separately from other wires
- *Do r*oute ground wires toward the earth
- *Do u*se eight foot (2.4 m) copper clad ground rods

DO NOT

- *Do not* run ground wires parallel to metal without proper bonding to the metal

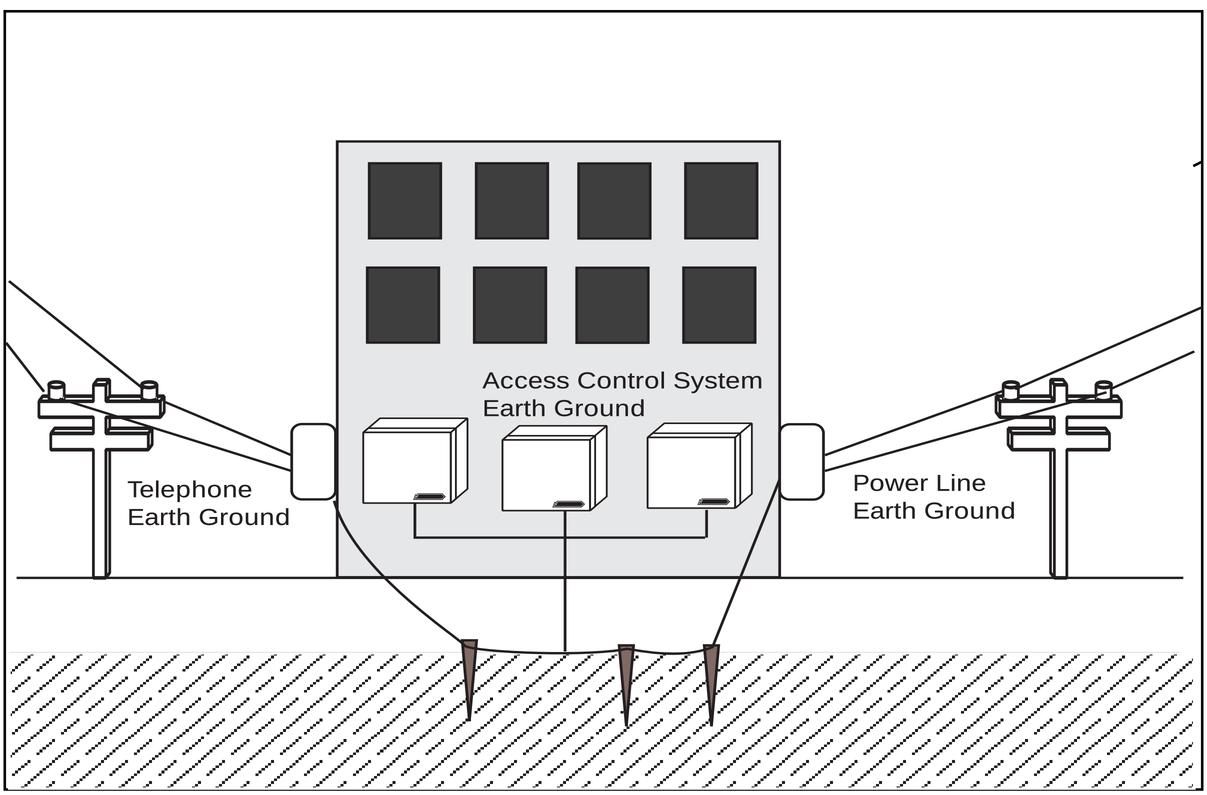


Figure 8-2 **Access Control System with Consolidated Earth Ground.**

# Section 9: Power

The N-1000-II requires a 12 VAC, 40 VA, 50 or 60 HZ, or a 12 VDC linear (2 Amp continuous) primary power supply. If using an AC power source as primary power supply, connect the primary power supply to the AC power terminals, without regard to polarity.

If an external 12 volt DC power supply (providing 13.8 volts) is utilized, select one with battery backup. Connect to the AC power terminals. N-1000-II power connections are shown in Figure 9-1.

When using an external DC supply it may be necessary to provide an external primary power sensor and tie its output (relay) to an input on the control panel. Then program the input as a primary Power status indicator.

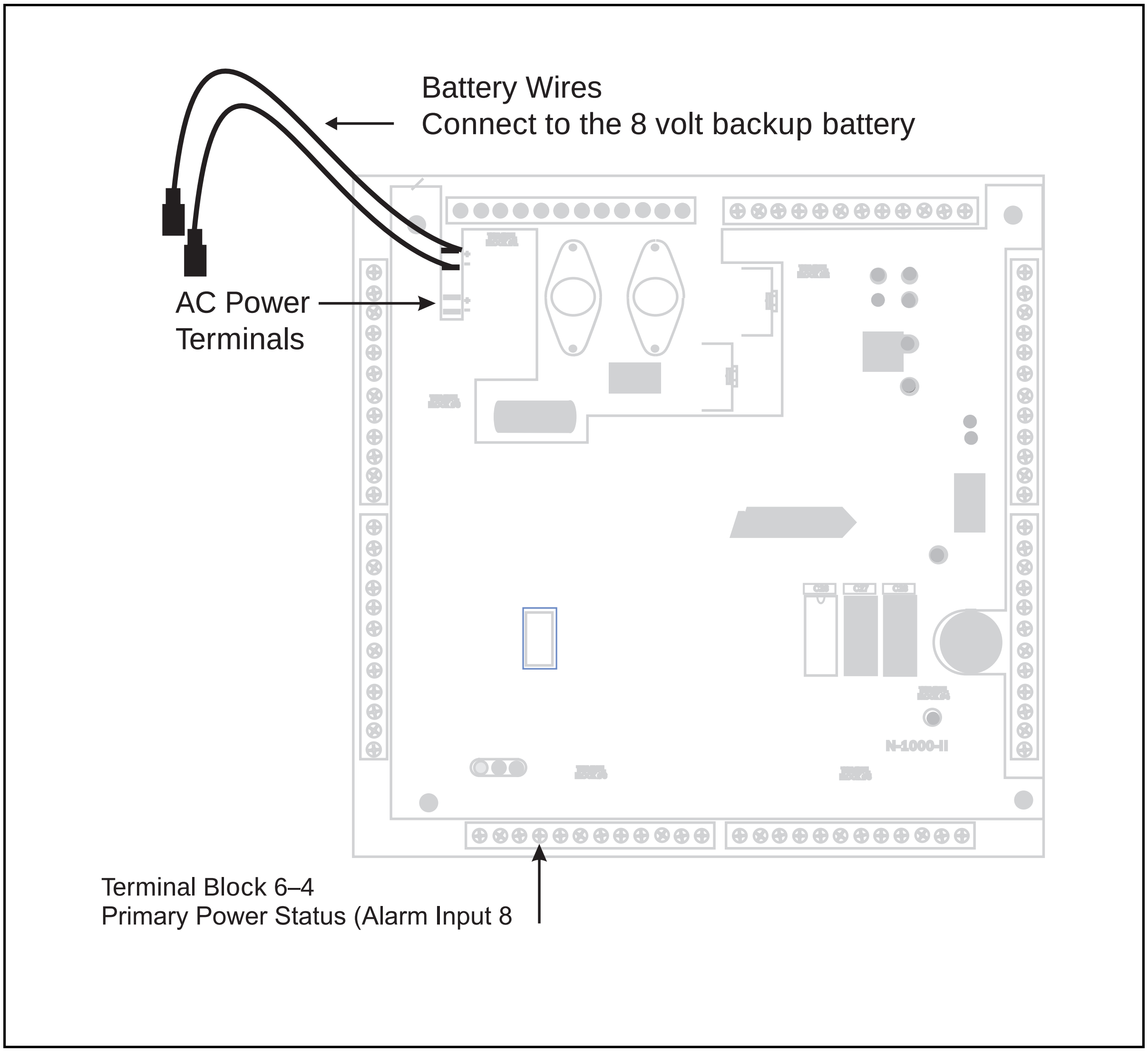


Figure 9-1 **AC, Optional External DC and Backup Power Connections.**

Upon loss of primary power, the control panel is powered from the 8 VDC (4 amp/hour) backup battery, if present, for up to 4 hours of full operation. Alarm Point 8 (TB 6–4) goes into alarm state upon primary power loss. Battery wires with fast-on connectors are provided on the N-1000-II panel. Use these to connect the 8 VDC battery to the panel, *with* regard to polarity. (See figure 9-1).

For backup function with 12 VDC power, select a 12 VDC power supply with battery backup capability.

Upon loss of backup battery power, the control panel ceases operation, but retains database/transaction buffer memory for up to 30 days.

Power-up Sequence for the N-1000-II

1. Set DIP-switches and verify jumper settings

2. Connect the primary power supply

3. Connect backup battery

Power-down Sequence for the N-1000-II

1. Disconnect backup battery

2. Disconnect primary power supply

# Appendix A:
# Programming Quick Reference Guide

## Preface

The following Programming Guide applies to the N-1000-II and the N-1000-III/IV panels. The text indicates where there are differences between the N-1000-II and the N-1000-III/IV. These panels can be programmed using Northern's access control software installed on a PC. Information on timezones, areas, panel variables and access levels can be managed automatically using this software.

These operations can also be performed via terminal or printer/programmer. This Programming Guide provides basic code format information necessary to program the N-1000-II and N-1000-III/IV control panels. For complete explanations and examples, contact the factory.

**Note:** If the N-1000-II or the N-1000-III/IV is to be used in an existing N-1000-II system, the N-1000-II must be at lease version 7.0 panel firmware.

## Notation Conventions

The following notation conventions are used:

| | |
|---|---|
| **bold** | Literal elements of a command that must be entered exactly as shown. |
| *italic* | Variables that must be defined by the user. Descriptions of these variables follow this section |
| _ (underscore) | A space |
| <CR> | The ENTER key (Carriage Return) |
| [ ] | Brackets surround optional command elements. |
| { } | Braces surround two or more choices |
| \| | A vertical bar separates individual choices within the braces: {choice 1 \| choice 2 \| choice 3}. The user must select only one of the choices. |

## Invalid Code Error Messages

| Error Message | Violation |
|---|---|
| AP | Anti-passback violation. |
| EX | Code expired (Limited Use or Visitor status) |
| NF | Code not found (programmed) in memory for the selected card reader or keypad. |
| TR | Trace message (enabled with the C Sub-command 1/T option). **Access is allowed.** |

| | |
|---|---|
| TZ | Timezone violation. |
| PN | PIN number violation. |
| SC | Site Code violation. |

## User Defined Parameter Variables

| ***Parameter*** | ***User Response*** | |
|---|---|---|
| *code* | card number or keycode (1–65535)* OR card number or keycode range. In a card number or keycode range, specify the first and last codes in the range, separated by a hyphen (-). | |
| *code1* | first code in a range (1–65535)* | |
| *code2* | last code in a range (1–65535)* | |
| *cc* | the number of characters to use in the access code number (F Command, Sub-Commaned 5) | |
| *dev* | device number, as shown below: | |
| | (**N-1000-II**) | (**N-1000-III/IV**) |
| | 1 = card reader #1 | 1 = card reader #1 |
| | 2 = card reader #2 | 2 = card reader #2 |
| | | 3 = card reader #3 |
| | | 4 = card reader #4 |
| | 3 = keypad #1 | 5 = keypad #1 |
| | 4 = keypad #2 | 6 = keypad #2 |
| *day(s)* | day of week, as shown below:<br>1 = Monday<br>2 = Tuesday<br>3 = Wednesday<br>4 = Thursday<br>5 = Friday<br>6 = Saturday<br>7 = Sunday<br>0 = Holiday notation (all holidays) | |
| *dd* | day of month (1–31) | |

---
* Value range
With the OL Option it is a 10 digit number where the value range of the 1st 5 digits is 1-65535; and the 2nd 5 digits is 1-65535
With the OJ Option it is an 11 digit number where the value range of the 1st 4 digits is 1-4095; and the next 7 digits is 1-1,048,575
With the Y Option it is a 16 digit number with a range of 1- 9,999,999,999,999,999

| Parameter | User Response |
|---|---|
| *deb* | debounce time (1–255) in seconds |
| *desc* | descriptive name up to 12 characters |
| *durA* | duration of time as shown below:<br>{S_*sec* \| M_*min* \| H_*hr*} where<br>*sec* = seconds (1–63)<br>*min* = minutes (1–63)<br>*hr* = hours (1–63) |
| *errors* | error count (0–255) |
| *fsn* | format slot number (1–8) |
| *format* | format command parameters for a specific card reader and/or cards (see F command) |
| *group* | group number (1–32) |
| *h1* | start timezone: hours (00–23) |
| *h2* | end timezone: hours (00–23) |
| *hol* | holiday number (1–32) |
| *input* | input number (1–16) are hardwire Panel/System alarms<br>***(N-1000-II)***<br>17 com status 20 mA<br>18 aux status 232 port<br>***(N-1000-III/IV)***<br>17 com status 485–20 mA<br>18 aux status 232 port<br>19 primary power<br>20 tamper<br>21 input ground fault status<br>22 low power supply<br>23 external 5 volt short<br>99 reset |
| *i/o* | This symbol actually stands for **{** I_#,O_#,G_# **}** and indicates that you must choose one **Input**, **Output**, or **Group**. *Refer to individual parameter for details.* |
| *limit* | maximum use limit |
| *m1* | start timezone: minutes (00–59) |
| *m2* | end timezone: minutes (00–59) |
| *mm* | month number (1–12) |
| *nn* | a two digit number between 16 and 64 that indicates the number of characters to skip after the beginning of the access code number |

| Parameter | User Response |
|---|---|
| *output* | output number<br>***(N-1000-II)***<br>N-1000 (1–4, 13, 14)<br>N-1000-X (1–8, 13, 14)<br>1st AEP-3 (17–24) 13 = rdr 1 LED<br>2nd AEP-3 (25–32) 14 = rdr 2 LED<br>***(N-1000-III/IV)***<br>N-1000 (1–4, 11, 12, 13, 14) 11 = rdr 1 LED<br>N-1000-X (1–8, 11, 12, 13, 14) 12 = rdr 2 LED<br>1st AEP-3 (17–24) 13 = rdr 3 LED<br>2nd AEP-3 (25–32) 14 = rdr 4 LED |
| *pn* | panel number (0–63); Ø = global command |
| *relock* | component to relock as shown below:<br>{I_*input* \| O_*output* \| G_*group*} See *input*, *output*, and *group*. |
| *shunt time* | shunt time as shown below:<br>{S_*sec* \| M_*min* \| H_*hr*} where<br>*sec* = seconds (1–63)<br>*min* = minutes (1–63)<br>*hr* = hours (1–63) |
| *sss* | card site code(s) (0–65535) |
| *tz* | timezone number (0–63) |
| *tz link* | timezone link number |
| *# delay count* | 1–255 (255 = 6 seconds delay) |
| *zgn* | input group number 1–16 |

## Error Codes

| | |
|---|---|
| C? | Command Structure Error |
| F? | Database Full Error |
| R? | Range Error |
| S? | Syntax Error |
| T? | Timeout Error |
| U? | Unable to Complete Error |

## Programming Order

The following command list serves as a general guideline for the chronological order of programming.

| *Command* | *General Purpose* |
|---|---|
| I | Clear panel memory |
| I | Initialize panel |
| T | Set time |
| D | Set date |
| F | Set format commands |
| N | Assign descriptive names |
| L | Define timezones |
| H | Set holidays |
| G | Define groups |
| P | Set interlocks |
| V | Assign input/output/group information |
| O | Assign input/output/group information |
| C | Add codes (cards/keycodes) |
| M | Set buffer/print options |
| E | Eliminates pin/invalid attempt counting |
| A | Assigns reader to pulse output/input/groups |
| W | Defines alarm input type (NO, NC, & supervision) |
| Z | Creates groups of Inputs (zones) |

## Commands

The following commands are listed in alphabetical order

## A Command

### Sub-Command 1

*Function:* Assign reading devices (card readers/keypads) to activate specified input points, output points and groups.

*Syntax:* **_A**=*pn_dev_i/o_*<CR>

*Example:* **_A**=1_2_I_5

A valid code use at Card Reader 2 (Device 2) on Panel 1 shunts Input 5 for the duration of the input's set shunt time.

### Sub-Command 2

*Function:* Set the device from which a PIN is expected for a given card reader. Eliminates required PIN use at specified card reader.

*Syntax:* **_A**=*pn_dev***_D_Ø_***dev*<CR> (first dev = card reader, second dev = keypad)

*Example:* **_A**=1_2**_D**_Ø

A PIN is not required for access at Card Reader 2 (Device 2) on Panel 1. (This is the most common use of this command.)

## C Command

### Sub-Command 1

*Function:* Add a single or multiple codes to memory with special options.

*Syntax:* **_C**=*pn_code_tz_dev* [_i/o][_A][_K][_L_#][_P_#][_T][_N_*desc*]<CR>

*User options:*

A: Set Anti-passback feature to "IN" (card added with "IN" status.) (NOTE: the default status of cards is "Unused")

K: No PIN required

L_#: Limited code use

P: Personal Identification Number (PIN)

T: Trace code

N: Name (must not be used with access control software)

*Example:* **_C**=1_594_1_1_2**_A_P_**12345

Card number 594 is valid with PIN 12345 during Timezone 1 at both card reader/keypad 1 and card reader/keypad 2 (devices 1 and 2) on panel 1.

### Sub-Command 2

*Function:* Allow cards to have different timezones per reader or keypad on a single panel. Panel must be initialized with I Command, Z_Ø option.

*Syntax:*

*N-1000-II* **_C**=*pn_card#_tz1_tz2{dev1/dev3}{dev2/dev4}*<CR>

or

*N-1000-III/IV* **_C**=*pn_card#_tz1_tz2_tz3_tz4{dev1/dev5}{dev2/dev6}{dev3}{dev4}*<CR>

*Example:* **_C**=1_750_1_3_1_2

Card number 750 is valid at panel during Timezone 1 on Reader 1 and Timezone 3 on Reader 2.

## Sub-Command 3

*Function:* Deletes single or multiple code(s) from memory.

*Syntax:* **_C**=*pn_code*<CR> or **_C**=*pn_code1-code2***_Ø**<CR>

*Example:* **_C**=1_25Ø-299_Ø

Codes 25Ø-299 are deleted from memory in panel 1.

## Sub-Command 4

*Function:* Generate code database reports based on user-selected parameters.

*Syntax:* **_C**=*pn*_{**L_***limit* | **N** | **R** | **U** | **Z_***tz*} [_*code*]<CR>

*User options:*

L: Limited Use/Visitor status specification

N: IN status

R: Full report

U: OUT status

Z: Timezone specification

*Example:* _C=1_L_3_1ØØØ-12ØØ

The returned report includes only those codes from 1000 to 1200 with three or fewer uses remaining in Panel 1.

## Sub-Command 5

*Function:* Manually set anti-passback IN/OUT code status.

*Syntax:* **_C**=*pn*_{**I** | **O**}_*card #*<CR>

*User options:*

I: Set IN status

O: Set OUT status

*Example:* Reset code

Cardholder 750 enters the building in the morning via the *In* reader (on Panel 1, Device 1) and exits without using the *Out* reader (Panel 1, Device 2) in the evening. The following morning, the cardholder is denied access at the *In* reader (anti-passback violation).

The system operator enters the following command to set the status of Card 750 to OUT:**_C**=1_**O**_75Ø

Card 750 is then allowed entry at the *In* reader.

### Sub-Command 6

*Function:* Allow information in a split timezone card record to be modified without overwriting the whole command.

*Syntax:* **_C**=*pn*_**T**_*card#_tz_tz_dev* <CR>*

**_C**=*pn*_**C**_*card#_DeviceList*<CR>

*User Options:* T: Reset Timezones

C: Delete devices from the card without removing it from the panel

*Example:* **_C**=1_**T**_750_3_5_1

Card 750 already exists in panel but is valid during Timezones 1 & 6. Now it changes Card 750 to be valid during Timezone 3 and 5 at device 1.

*Example:* **_C**=1_**C**_22939_3_4

Card 22939 had access to devices 1 through 4 at panel 1. Card 22939 now only has access at devices 1 and 2 at Panel 1.

**If Ø is entered for the 1st or 2nd timezone (or both) it will* ***not*** *overwrite the existing timezone. If a device is listed it will be* ***added*** *to the existing device list.*

### Sub-Command 7

*Function:* Immediately set the status of all cards to "Out." Used with panels programmed for Anti-passback.

*Syntax:* **_C**=*pn*_**F**<CR>

*Example:* **_C**=1_F<CR>

All cards in Panel 1 are set to "Out" status.

## D Command

*Function:* Set control panel date.

*Syntax:* **_D**=*pn_mm/dd_day* <CR>

*Example:* _D=Ø_2/6_3

The date is set for Wednesday, February 6 in all panels.

*Leap Year*

*Syntax:* **_D=***pn*_**2/29_***Day of week 1-7*

*Syntax:* **_D**=*pn_mm/dd_dow*_[yyyy]<CR>

**Note:** The date command has the option of adding a four digit year after the day of the week. If no year is specified, the panel will assume it is not a leap year, and February 29th will be skipped.

# E Command

## Sub-Command 1

*Function:* Establish the timezones for required use of PINs at specified panels. (Note: Panel must also be initialized with the P option.)

*Syntax:* **_E**=*pn*_**P**_*tz* <CR>

*Example:* _E=1_P_2

During Timezone 2, a valid card/PIN combination is required for access in Panel 1. Outside of Timezone 2, only a valid card is required for access.

## Sub-Command 2

*Function:* Pulse input point, output point or group, based on a selected number of consecutive invalid code uses.

*Syntax:* **_E**=*pn*_**C**_*errors*_[**R**_{device #}]{**I_***input* | **O_***output* | **G_***group*} <CR>

*Example:* _E=1_C_3_R_3_O_3<CR>

Upon three consecutive invalid code uses at Device 3, on Panel 1, Output 3 is pulsed.

# F Command

## Sub-Command 1

*Function:* Sets the method of interpreting card read data for Weigand type cards.

*Syntax:* **_F**=*pn_fsn_format*<CR>

User options:

| | |
|---|---|
| *CR-1 Wiegand Card Swipe Reader:* | _F=*pn*_1_26_S_1_D_1_B1_B2_B3_B4 |
| *CI-1 Wiegand Card Insert Reader:* | _F=*pn*_1_26_I_S_1_D_1_B1_B2_B3_B4 |
| *NR-1 Magstripe Swipe Reader:* | _F=*pn_fsn*_32_S_Ø_D_Ø_B1_B2_B3_B4 |
| *PR-1-280 Cotag Proximity Reader:* | _F=*pn_fsn*_32_S_Ø_D_Ø_B1_B2_B3_B4 |
| *PR-2 Hughes/IDI Proximity Reader:* | _F=*pn_fsn*_34_S_1_D_1_B1_B2_B3_B4 |
| *HG-1 Hand Geometry Reader:* | _F=*pn_fsn*_32_S_Ø_D_Ø_B1_B2_B3_B4 |
| *5-Conductor Keypad:* | _F=*pn_fsn*_32_S_Ø_D_Ø_B1_B2_B3_B4 |
| *Dorado Magstripe Cards:* | _F=*pn_fsn*_34_S_1_D_Ø_B1_B2_B3_B4 |
| *Sielox Wiegand Cards:* | _F=*pn_fsn*_34_S_1_D_1_B1_B2_B3_B4 |
| *Sielox Proximity Cards:* | _F=*pn_fsn*_32_S_Ø_D_Ø_B1_B2_B3_B4 |
| *NCS 25-Bit Cards:* | _F=*pn_fsn*_25_S_1_D_1_B1_B4_B2_B3 |
| *NCS 29-Bit Cards:* | _F=*pn_fsn*_29_S_1_D_1_B1_B4_B2_B3 |
| *Kidde Cards:* | _F=*pn_fsn*_31_S_1_BØ_B2_B3_B4 |
| *Continental 36-Bit Cards:* | _F=*pn_fsn*_36_S_3_D_2_B1_B2_B3_B4 |
| *Continental 37-Bit Cards:* | _F=*pn_fsn*_37_S_3_D_2_B1_B2_B3_B4 |

*Example:* _F=1_2_32_S_O_D_Ø_B1_B2_B3_B4

The format command entered (as format #2) enables use of Cotag Proximity Readers in Panel 1.

### Subcommand 2

*Function:* Sets the format for use with ABA encoded cards—12 digits are used with PCPAK and WIN-PAK.

*Syntax:* **_F**=*pn*_**M**[**_R**]_*positions 1–12*<CR>

*User option* **R**: Allows debugging of raw card number information.

*Example:* _F=1_M_Ø_Ø_Ø_Ø_Ø_Ø_1_2_3_4_5_6<CR>

The number indicates the digit number from the card. The position of the number in the format indicates where the digit will appear in the final mapped card number. A zero in the format will cause a zero to appear at that point in the final card read.

**Note:** User Option R can be used as shown here when adding to exisiting information or with position specified as a seperate command.

### Sub-command 3

*Function:* Set the format for 35 bit cards used with the I Command, OJ Option.

*Syntax:* **_F**=*pn*4_35_S_1_D_2_B1_B2_B3_B4<CR>

### Sub-command 4

*Function:* Set the format for use with 29 bit format cards (TI/Silicon Systems) with the I Command, OL Option.

*Syntax:* **_F**=*pn*_*fsn*_**29_S_1_1_B0_B4_B2_B3**<CR>

### Sub-command 5

*Function:* Sets the format to support Track 1 Readers, for use with the M400-NORT1 reader.

T: Track 1 reader.

*Syntax:* **_F**=*pn*_**M_T**_*nn_cc*<CR>

## G Command

*Function:* Define output point groups.

*Syntax:* **_G**=*pn*_[**Z**_*input*]_*group_outputs*[**_W_***wgroup*] <CR>

**_G**=*pn*[**Z**_*input*]_*group_outputs*[**_W_***wgroup*] <CR>

*Example:* **_G**=1_1_5_6_7_8

Group 1 is defined as outputs 5, 6, 7 and 8 in Panel 1.

*User options*: W: Warning group

Z: Special output groups

Note: All warning groups must be on the N-1000 panel NOT the AEP-3 board.

*Syntax:* **_G**=*pn_group_***W**_*wgroup__Outputs*<CR>

*Example:* **_G**=1_1_W_2_1_1_2<CR>

Creates Group 1 on Panel 1. Group 1 has relays 1 and 2 and uses Group 2 as a warning group. (Group 2 must be created and given a pulse time.)

Syntax: **_G**=*pn_***Z**_*input_group_outputs*<CR>

(When the group is used singly the input number functions only to signify that the group is Special and will follow the rules below. In the case where only one group is used this should be Ø in order to prevent action being transferred to the next group);

The single Special Group has one main function: It will not go on during its Timezone unless a card is swiped to turn it on. But it will go off automatically at the end of its timezone in the normal manner. This means, for example, if your front door is on a timezone and there is a snow storm preventing personnel from getting to the office, the door will not unlock.

*Example:* **_G**=*pn*_Z_Ø_2_3_4<CR>

Group 2 containing relays 3 and 4 is established. A timezone can then be attached to Group 2 via the V Command. When the timezone begins, nothing happens. When a card valid for Group 2 is used, relays 3 and 4 go on. Subsequent reads during the timezone toggle relays 3 and 4 off or on. If they are on when the timezone ends, they go off.

## H Command

*Function:* Set holiday dates.

*Syntax:* **_H**=*pn_hol_mm/dd*<CR>

*Deleting Holidays:*

To delete an existing holiday database entry, enter the H Command for the desired holiday number WITHOUT the month (*mm) and day (dd) parameters.*

*Example:* _H=Ø_1_12/25

Holiday 1 is set as December 25 in all panels.

## I Command

*Function:* Initialize the control panel, enabling features and programming options for future use and set panel site code(s).

*Syntax:* _I=*pn*[_*sss*][**_A**][**_B**][**_E**][**_F**][**_G**][**_K**][**_I**][**_L**][**_M**][**_N**][**_OA**][_OJ][**_OL**][**_ON**][{**_OP_19_S|_OP_Ø**}][**_P**][**_R**][**_S**][**_U**][**_V**][**_Y**][**_Z_Ø**] [**_Z_tzn**]<CR>

User *options*:

A: Anti-passback

B: Continuous code reads (busy)

E: Free egress

F: Forgiveness (with anti-passback)

G: Groups

K: Keypads

I: In/Out command sent from panel

L: Limited Use Cards

M: Card Reader LED function reversed

N: Names

OA: Alarms are reported when coming out of timezone shunt

OJ: Format for 35 bit card numbers, the first 12 bits (after the 2 starter bits) are interpreted as the site code and the next 20 as the card number, followed by 1 stop bit. The resulting site code and card number are concantenated to form one card number, which is sent to the head end software as a 12-digit number. **Note:** A special format is required. Refer to *F Command, Sub-Command 3*.

**Application Note:** For simplicity of system management, it is recommended that you set the site code value to Ø when the OJ Option is used.

OL: Create Wiegand card numbers by concantenating site code with card number. The result is transmitted as a 12 digit number.

ON: Normals are reported when coming out of timezone shunt

OP: Switches the Power Fail Input from Input Point 8 to Input Point 19 (**_OP_19 _S**) or from Input Point 19 to Input Point 8 (**_OP_Ø**). NOTE: Redirecting the Power Fail to Input 19 re-claims Input 8 as a normal input on the AEP-5 board only. However, this change will disable the AEP-5 *Board Present/ Functioning* alarm.

P: Personal identification numbers (PIN)

R: Restart

S: Supervisory Board (Not for use with N-1000-III/IV)

U: The number of cards panel should set itself for

V: Visitor cards

Y: Long format ABA cards

Z_Ø: Split timezone

Z_*tzn*: All cards with timezone numbers higher than the number indicated will use the next higher timezone at Reader 2. At Reader 1 they will use the timezone attached to the card number.

### Global Specification

Control panels MUST be initialized on an individual basis. The global specification (*pn*=Ø) is NOT allowed with the I command.

## L Command

*Function:* Define timezones.

*Syntax:* **_L**=*pn_tz_h1*:*m1*-*h2*:*m2_days* [*tz link*]<CR>

*Comment:* Timezone definition consists of a reference number, start time, end time, day(s) of week specification and optional link number. The end period of a timezone goes until the last second of the last minute (e.g., 8:00-17:00–at 17:01 the door is locked).

A timezone definition alone causes no action. Timezones must be assigned to cards/keycodes, input points or output points to cause action.

*Example:* _L=Ø_1_ØØ:ØØ-23:59_1_2_3_4_5_6_7_Ø

Desired timezone: 24 hours every day, including holidays.

## M Command

### Sub-Command 1

*Function:* Sets control panel buffer/print options.

*Syntax:* **_M**=*pn*[**_P**][**_D**][**_L**][**_V**][**_X**][**_F**][**_R**]<CR>

*User options*:

P: The panel buffers all activity.

D: The panel does not buffer or print valid code activity

L: The panel buffers and prints all activity

V: The panel buffers only valid code activity and prints invalid codes and alarm input point activity.

X: The panel buffers all activity and prints invalid codes and alarm input point activity

F: The panel "dumps" the buffer when it is within 100 transactions of capacity

R: The buffer is dumped, all buffer/transmit options are cleared

*Example:* **_M**=1**_P**

Panel 1 buffers all activity and transmits no activity.

### Sub-Command 2

*Function:* Set control panel anti-passback and "print names" mode of operation.

*Syntax:* **_M**=*pn*_{**A** | **_N** | **_B** | **_E** | **_K** | **_G**}<CR>

*User options*:

A: Enable anti-passback

N: Disable anti-passback

B: Disable names

E: Print names

*Example:* _M=1_N

Panel 1 is operating in the anti-passback mode.

*Result:* Panel 1 is taken out of the anti-passback mode.

### Sub-Command 3

*Function:* Disables global “OK” message.

*Syntax:* **_M**=**Ø_K** <CR>

### Sub-Command #4

*Function:* Time delay between transmissions.

*Syntax:* **_M**=*pn*_# *delay count*<CR>

Default: delay count = 1

Maximum = 255 at 6 seconds between transactions.

## N Command

### Sub-Command 1

*Function:* Assigns 12 character descriptive names to codes (cards and keycodes).

*Syntax:* **_N**=*pn*_**C**_*code_desc* <CR>

*Example:* **_N**=1_**C**_8562_JONES,_MIKE

Code 8562 is assigned the name JONES, MIKE in Panel 1.

### Sub-Command 2

Function: Assigns 12 character descriptive names to control panels, card readers and keypads.

*Syntax:* **_N**=*pn*_**R**_*dev_desc* <CR>

*Example:* **_N**=1_**R**_Ø_LOBBY_PANEL

Control Panel 1 is assigned the name “LOBBY PANEL”

*Example:* **_N**=1_**R**_6_BACK_KEYPAD

Keypad 2 (N-1000-IV) is assigned the name “BACK KEYPAD”

### Sub-Command 3

*Function:* Assigns 12 character descriptive names to input points, output points and groups.

*Syntax:* **_N**=*pn*_*i /o_desc* <CR>

*Example:* **_N**=1_**I**_6_BACK DOOR CT

Assigns the name BACK DOOR CT to Input 6 on Panel 1.

# O Command

## Sub-Command 1

*Function:* Provides manual control and sets special options for input points, output points and groups.

*Syntax:* **_O**=*pn_i /o*_{**A** | **C** | **D** | **E** | **I** | **P** | **O** | **T** | **Z** } <CR>

*User options*:

A: Acknowledge alarm

C: Clear all options

D: De-energize/Unshunt

E: Energize/Shunt

I: Interlock disable

P: Pulse/Shunt (Definable Duration)

O: Keep on

T: Returns a point to its Timezone when removed by the *O command* with the *D or E option*.

Z: Timezone control disable

*Example:* Group 3 (outputs 1, 3, 5, 7) in Panel 60 is de-energized and assigned a 12 second pulse time.

*Command:* **_O**=6Ø**_G**_3**_P**

*Result:* Group 3 (outputs 1, 3, 5, 7) pulses for 12 seconds.

## Sub-Command 2

*Function:* Used to control input point groups (Zones) which are created using the Z Command.

*Syntax:* **_O**=*pn***_Z**_*zgn*_E<CR>

or

**_O**=*pn***_Z**_*zgn*_D<D>

## P Command

*Function:* Sets interlocks between alarm input points and/or output points.

*Syntax:* **_P**=*pn_i /o1***_***i /o2*_{**D**|**E**|**F**|**I**|**N**|**P**|**S**}_{**D**|**E**|**F**|**I**|**N**|**P**|**S**}<CR>

*User options:*

D: De-energize

E: Energize

F: Follow

I: Invert follow

N: No action

P: Pulse

S: Pulse off

*Example:* i/o1: Input 5 (motion detector)

i/o2: Output 3 (siren)

Action 1: Energize

Action 2: De-energize

*Interlock command:* **_P**=1**_I**_5**_O**_3**_E_D**

*Result:* When Input 5 goes into alarm state (motion detector triggered), Output 3 energizes (sounding the alarm). When Input 5 returns to normal state, Output 3 de-energizes (turning off the siren).

## R Command

*Function:* Generates control panel database reports which are displayed on the system monitor and/or printer.

*Syntax:* **_R**=*pn*_{**C** | **G** | **H** | **I** | **O** | **o** | **P** | **p** | **T** | **V** |**Z**} <CR>

*Report options*:

C: Code (card/keycode) database

G: Groups

H: Holiday schedule

I: Initialization parameters

O: Output points

o: Short output points report

P: Input points

p: Short input points report

T: Timezones

V: Firmware version

Z: Z Groups

## T Command

*Function:* Sets control panel time.

*Syntax:* **_T**=*pn_hh*:*mm* <CR>

*Example:* **_T**=Ø_17:45

The time is set to 5:45 P.M. in all panels.

## V Command

### Sub-Command 1

*Function:* Assigns shunt times and timezones to input points **WITH** special options.

*Syntax:* **_V**=*pn*_**I**_*input_shunt time_tz*[_**1**][_**A**_*durA*[_*tzA*]][_**B**[_*tzB*]][_**C**][_**D**_*deb*][_**K**_*relock*][_**S**[_*tzS*]][_**X**][_**N**_*name*][_**Y**[_*tzY*]]<CR>

*User options*:

1: Disable alarm/normal messages, but transmit trouble messages

A: Acknowledge required

B: Buffered mode activation

C: Clear options

D: Debounce

K: Enable auto-relock

S: Disable alarm/normal messages

X: Reverse alarm/normal states

N: Name input point

Y: Disabling response to interlock by timezone

*Example:* *Alarm Acknowledge* message without timezone

Input 5 (motion detector) monitors a secure area. You want the input to be shunted (de-activated) during Timezone 20 for free access. Input shunt time is not applicable. You want *alarm acknowledge* message activation.

*Command:* **_V**=1_*I*_5_Ø_2Ø_**A**_1Ø

*Result:* Input 5 is shunted during Timezone 20 and is assigned a shunt time of 0 (not applicable). When Input 5 goes into alarm condition, an *alarm acknowledge* message is sent to the system monitor and/or printer. The message is transmitted every 10 seconds until acknowledged with the following command: **_O**=1_**I**_5_**A**

### Sub-Command 2

*Function:* Assign pulse times and timezones to output points **WITH** special options.

*Syntax:* **_V**=*pn*_{**O**_}*output_pulse time_tz*[**_C**][**_L**][**_Y**_*tzY*][**_N**_*name*] <CR>

*User options*:
- C: Clear options
- L: Latch
- N: Name output point
- Y: Disabling response to interlock by timezone

*Example:* **_V**=1_O_4_8_Ø**_N**_FRONT_SIREN

Output Point 4 is not timezone controlled and is assigned a pulse time of eight seconds. The output is assigned the name “FRONT SIREN.”

### Sub-Command 3

*Function:* Assign pulse times and timezones to groups **WITH** special options.

*Syntax:* **_V**=*pn*_**G**_*group_pulse time_tz* [**_Y**_*tzY*]**_N**_*name* <CR>

*User options*:

N: Name group

Y: Timezone control interlock

*Example:* **_V**=1_**G**_5_6_Ø**_N**_ALL_RELAYS

Group 5 is not timezone controlled and is assigned a pulse time of six seconds. The group is assigned the name “ALL RELAYS.”

## W Command (Used with the N-1000-III/IV only)

*Function:* Program each input point for either NO/NC and Supervised or NON-Supervised operation.

*Syntax:* _W=*pn_ input*_{**SO**|**SC**|**NO**|**NC**} <CR>

SO: Supervised normally open (Resistor in parallel with switch);

SC: Supervised normally closed (Resistor in series with switch);

NO: Non-supervised normally open; and

NC: Non-supervised normally closed (default).

If an EOL resistor is put on a point, and it is not set up as a supervised point (using one of the commands above), it will report TROUBLE whenever the resistance is connected. This should serve as a warning that the point has not been set up.

*Example:* **_W**=1_9_**SO** <CR>

Alarm Input 9 has been programmed as supervied, normally open on Panel 1.

## Z Command

*Function:* Creates groups of inputs (Zones). Allows shunting of multiple inputs. One command can shunt all required points on the panel rather than one command for each point. Commands are similar to the G command.

*Creation*: **Z**=*pn_zgn_input_input* etc.

*zgn*: The number of the group being created (up to 16 of these groups can be created)

*input:* The input number included in the group.

*Control:* Through O commands with energize and de-energize such as:
**_O**=*pn*_**Z**_*zgn*_E<CR>

or

**_O**=*pn*_**Z**_*zgn*_D<D>

## OR'ing of Inputs

If two or more inputs are interlocked to a single output to energize on alarm and de-energize on normal, both/all inputs must be normal before the interlock will allow the relay to de-energize.

1. This E (Energize) action will allow situations where, for example, several input points can be interlocked to one relay which is driving a sounder, visual alert or digital dialer. When several inputs go into alarm and remain in alarm all at once, the relay will not be turned off *after one of them goes back to normal. Rather all inputs must go back to normal before the output will be turned off.*

2. The above operation is standard. An alternate method, where one input returning to normal would de-energize the relay, is offered as an option through the use of a terminal or text command. The command is written with a G designation in place of the E for energize.

*Example:* **_P**=*pn*_**I**_*input*_**O**_*on*_**G_D**<CR>

## Output Groups by Readers

This feature allows a card to be used to activate one group when it is used at Reader 1 and a different group if it is used at Reader 2.

1. Initialization must include the E Option and the G designation with a number following it. The number following the G will tell the panel that groups with a number higher than this number are to be used in the split method. If the number is EVEN, the jump described below will be 1. If the number is ODD, the jump will be 2. The ODD/EVEN distinction is used to distinguish the situation of regular groups, described here, from that of Paired Special Groups.

2. In setting up the groups and assigning them with access levels, it is necessary to keep in mind that group numbers higher than the number specified in the I command will be incremented by 1 when the card is used at Reader 2. (If the number above was EVEN. If the number above was ODD it will be incremented by 2.) The original group number will be used at Reader 1.

*Example:* **_I**=*pn*_**E_G_**4<CR>

**_C**=*pn*_444_1_1_2_**G_**3<CR>

**_C**=*pn*_555_1_1_2_**G_**7<CR>

Card 444 will pulse group 3 on either reader but card 555 will pulse Group 7 on Reader 1 and Group 8 on Reader 2.

# Appendix B: Troubleshooting

**Problem:** The N-1000-II control panel experiences “lock-ups.”

**Solution:** Press the restart button to reset the panels and check the following:

- Verify a circular timezone link or interlock does not exist in the programming of the panel. Refer to *Appendix A* or software operator's manual for programming details.
- Verify proper panel/reader grounding procedures are followed. Improper grounding is a primary cause of panel lock-ups. Refer to *Section 8* for grounding guidelines. In environments where there is severe electrical noise, the shields should be grounded outside of the enclosure and a separate ground wire (12 gauge) should be used for the system ground, removing the individual panel grounds. Ground each panel to the single system ground wire and ground the single system ground wire at one point only.
- Confirm the installation of the two-piece S-4 Suppressor Kits with every electrical switching device run through a panel relay. Refer to *Section 7* for Suppressor Kit information.
- If all above attempts fail to correct the problem, completely power down the panel. Refer to *Section 9* for power-down instructions. After complete power-down, momentarily apply a short across C-27. This will clear all RAM while the panel is powered-down. After 10 seconds remove the short. This brings the N-1000-II back to its factory default settings.

**Problem:** Communication from the system programming device to the control panel(s) is not established (20 mA).

**Solution:** When programming in a data terminal mode (Hyperterminal, Procomm, etc.) or printer programmer, press the SPACE BAR followed by the ENTER key to verify communication. If communication is established, each panel in the loop returns an *S?*. If communication is not established, check the following:

- Verify communication loop wiring. Refer to *Section 6* for panel and multi-panel loop wiring specifications.
- A locked-up panel in a 20 mA configuration causes communication problems. Starting with the last (physical) panel in the loop and working back to the first (physical) panel, press the restart button on all control panels in the loop. Check communication at the programming device after every restart to locate the panel which is causing the lock-up. Check for proper grounding as mentioned above, and S-4 suppressor usage.
- Verify the baud rate of all control panels match that of the programming device. Refer to *Section 4* for baud rate DIP switch settings.
- Verify C-100-A1 operation by shorting the red and white wires together, then shorting the black and green wires together (disconnecting these wires from the

loop). Enter into the terminal emulation program. Type some letters and press the ENTER key. The letters will echo back on the screen if the C-100-A1 is working properly. Refer to *C-100-A1 Manual* for further details.

**Problem:** A card number is not transmitted to the programming device when a card is run through a reader.

**Solution:** Check the following:

- Verify communication from the N-1000-II to the programming device.
- Confirm the panel is not operating in the buffered mode.
- For readers requiring +5 VDC power (from the control panel), verify voltage at the reader is +4.9 to +5 VDC.
- For readers requiring +12 VDC power, verify output of external power supply.
- Verify card reader wiring. Refer to *Section 6* for general card reader wiring details.
- Wire the card readers directly to the N-1000-II (to eliminate reader to panel distance). If card reads are then transmitted, the problem is due to environmental factors.
- Determine whether the problem is related to the card reader in use or the N-1000-II reader port in use. Wire the card reader in question to an N-1000-II reader port that is known to operate properly or wire a card reader known to operate properly to the reader port in question and test with known card.

**Problem:** A keycode is not transmitted to the programming device when entered at an Eleven-conductor Keypad.

**Solution**: Check the following:

- Verify communication from the N-1000-II to the programming device.
- Confirm the panel is not operating in the buffered mode.
- Verify the keypad pound key (#) is pressed after entering the keycode. Pressing # is necessary for keycode transmission.
- To test operation of an N-1000-II keypad port without the use a keypad, simulate keypunches with a three-way jumper. To simulate a keypunch, connect one end of the jumper to a row terminal, one end to a column terminal and momentarily touch the third end to the keypad ground terminal. Refer to eleven conductor keypad instructions in *Section 6* for 2 of 7 matrix terminal information.

**Example:** Simulate pressing the *4* key.

Connect one end of the jumper to the brown wire terminal (column 1, TB8-1).

Connect the second end of the jumper to the purple wire terminal (row 2, TB8-6).

Momentarily touch the third end of the jumper to the keypad ground terminal (TB8-4). (Refer to *Section 6-3*)

Simulate pressing the pound (#) key.

Connect one end of the jumper to the green wire terminal (column 3, TB8-3).

Connect the second end of the jumper to the orange wire terminal (row 4, TB8-8).

Momentarily touch the third end of the jumper to the keypad ground terminal (TB8-4). (Refer to *Section 6-3*.)

Individually simulate the pressing of each keypad key, as described above, to verify operation of the keypad port.

## Built-in Self-test Capability

The N-1000-II panel's firmware (version 08.01.25 or later) has a built-in test capability that can be used to check the functioning of most of the circuit board's hardware. To enable the COM LED for the test below, connect a C-100-A1 at TB7-11 and TB7-12 or jump TB7-11 and TB7-12. To enable the built-in test, move all eight of the S1 Dip-switches to the ON position then push the Reset/Restart Button. The circuit board will function as follows:

1. Once after reset the output relays 1 through 4 (or 8 for an –X board) will sequentially turn ON for a half second each. (**Note**: If the first RAM is missing then the built-in self test will stop after this step.) The RUN LED will flash rapidly to indicate that the panel is now in the self-test mode.

2. The 20 mA Loop-Enable Relay (K9) and the amber COM LED on the (CR48) will turn on (provided the C-100-A1 or the jumper are in place as described above) and then, after one second, the following message is transmitted from the 20 mA (and the optional RS-232) serial port at 9600 baud; "<CR> Test Mode <CR>".

3. While in this self-test mode the S1 Dip-switch settings are used to select the various tests. (The tests selected by the higher number DIP-switch positions take precedence over the state of lower number switch positions.)

   3.1. With all of the Dip-switches still in the ON position, the status of the keypad inputs are displayed on the relay outputs (respectively). When Input 9 (TB8-1) is connected to common, then Relay 1 turns on, etc. Also, the Battery Relay (K10) is also controlled by Input 13 (TB8-5) and the Power Status LED is controlled by Input 14 (TB8-6).

   3.2. With only DIP-switch Position 1 turned back OFF, the first four relay outputs indicate the state of the first four RAM chips (On indicates present and good).

   3.3. If DIP-switch Position 2 is turned back OFF then the first four relay outputs indicate the state of the second three RAM chips (On indicates present and good).

3.4. If DIP-switch position 3 is turned OFF then the first four relay outputs indicate the state of the Reader Data inputs as follows:

3.4.1. Connecting Reader 1's Data 1 input (TB5-2) to common turns on Relay 1.

3.4.2. Touching Reader 1's Data 0 input (TB5-3) to common pulses on Relay 2.

3.4.3. Touching Reader 2's Data 0 input (TB5-6) to common pulses on Relay 3.

3.4.4. Connecting Reader 2's Data 1 input (TB5-7) to common turns on Relay 4.

3.5. DIP-switch position 4 is used to select and display the status of the first four alarm inputs (Input 1 turns on Relay 1, etc.).

3.6. DIP-switch position 5 is used to select and display the status of alarm inputs 5 through 8 (Input 5 turns on Relay 1, etc.).

3.7. DIP-switch 6 is used to select and display the status of alarm inputs 9 through 12.

3.8. DIP-switch 7 is used to select and display the status of alarm inputs 13 through 16.

3.9. DIP-switch 8 is presently not utilized.

4. Regardless of the DIP-switch setting, while in the self-test mode alarm inputs 9 through 16 also control the open collector auxiliary outputs 9 through 16 (respectively) as follows:

4.1. The keypad 3 and 4 select line outputs Aux. 9 (TB7-3) and Aux. 10 (TB7-2) are controlled by the state of alarm inputs 9 and 10.

4.2. The Keypad 2 select line Output Aux. 11 (TB8-11) is controlled by Input 11.

4.3. The Keypad 1 select line Output Aux. 12 (TB8-10) is controlled by Input 12.

4.4. The reader LED outputs Aux. 13 (TB5-1) and Aux. 14 (TB5-8) are controlled by the state of alarm inputs 13 and 14.

4.5. Outputs Aux. 15 (TB6-11) and Aux. 16 (TB6-12) are controlled by alarm inputs 15 and 16.

5. To test these outputs using a voltmeter:

5-1. With a jumper, connect the auxiliary output to be checked to an unused input.

5-2. Connect the negative meter lead to common and the positive lead (along with the jumper end) to the auxiliary output that is being tested.

5-3. The meter should read +5 volts.

5-4. Trip the auxiliary output by grounding its related input.

5-5. The meter should read 0 volts .

To return to normal operation, move the S1 Dip-switches back to their proper settings, disconnect the backup battery and power down the panel. Then power up the panel.

DIP-Switch Position Settings:

| All on | 1 off 2–8 on | 1 on 2 off 3–8 on | 1–2 on 3 off 4–8 on | 1–3 on 4 off 5–8 on | 1–4 on 5 off 6–8 on | 1–5 6 off 7–8 on | 1–6 on 7 off 8 on | 1–7 on 8 off | Output Relay/LED |
|---|---|---|---|---|---|---|---|---|---|
| TB8-1 | RAM A-OK | RAM E-OK | TB5-2 | TB7-4 | TB6-1 | TB8-1 | TB8-5 | not used | Relay 1/CR23 |
| TB8-2 | RAM B-OK | RAM F-OK | TB5-3 | TB7-5 | TB6-2 | TB8-2 | TB8-6 | | Relay 2/CR25 |
| TB8-3 | RAM C-OK | RAM G-OK | TB5-6 | TB7-6 | TB6-3 | TB8-3 | TB8-7 | | Relay 3/CR26 |
| TB8-4 | RAM D-OK | n/a | TB5-7 | TB7-7 | Pwr Status | TB8-4 | TB8-8 | | Relay 4/CR24 |
| TB8-5 | | | | | | | | | Relay 5/CR32* |
| TB8-6 | | | | | | | | | Relay 6/CR29* |
| TB8-7 | | | | | | | | | Relay 7/CR70* |
| TB8-8 | | | | | | | | | Relay 8/CR67* |

*available only on the N-1000-II-X (see figure B-1 below for location of LEDs)

RAM: A=U26 B= U25 C= U24 D= U23 E= U22 F=U21 G=U20

Independent of the DIP-switch settings, the following outputs are activated:

| *Input:* | *Output* |
|---|---|
| TB8-1 (Input 9) | TB7-3 (Aux 9) |
| TB8-2 (Input 10) | TB7-2 (Aux 10) |
| TB8-3 (Input 11) | TB8-11 (Aux 11) |
| TB8-4 (Input 12) | TB8-10 (Aux 12) |
| TB8-5 (Input 13) | TB5-1 (Reader 1 LED) |
| TB8-6 (Input 14) | TB5-8 (Reader 2 LED) |
| TB8-7 (Input 15) | TB6-11 (Aux 15) |
| TB8-8 (Input 16) | TB6-12 (Aux 16) |

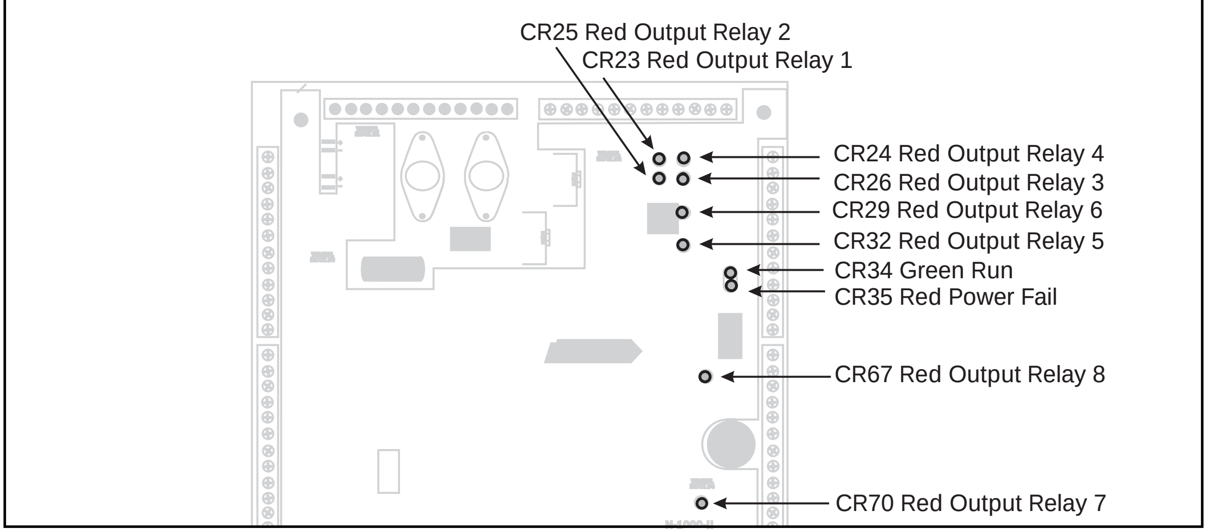


*Figure B-1* ***Location of LED indicators activated during the self-test.***

Northern Computers, Inc.

***Leaders in Access Control Technology***

**Headquarters:**
5007 S. Howell Ave.
Milwaukee, WI 53207 USA

http://www.nciaccess.com

Phone: (414) 769-5980
Toll Free: (800) 323-4576
Fax: (414) 769-5989

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