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N-500

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# Installation and Programming Manual

Version 1.4



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# **I. Introduction**

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## **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 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: N-500 Overview**

The N-500 Card Access System is a low cost, easy to use system with reliable "Watch-Dog" circuitry, which monitors the Central Processing Unit (CPU) and automatically resets it if necessary. The N-500 System provides all functions necessary for most commercial and residential building access control needs.

The three components of the N-500 are the Reader Module, the Printer Module and the Programmer Module.

The central component of the system is the N-500 Reader Module. The Reader Module can operate with or without the other two components. The Reader Module supports card readers and/or keypads, and controls access for one or two doors. The system stores up to 500 codes (card numbers and/or keycodes) per reader/keypad and can be configured to accept cards by site code group and/or unique card numbers. The system accepts unique cards of up to 12 digits and unique keycodes of up to 8 digits. (See Operation/Programming Section for more information.)

If printer logging is required, a Printer Module can be added to the system. The Printer Module allows connection of up to four Reader Modules to a serial or parallel printer for buffered printer output (see Figure 1).

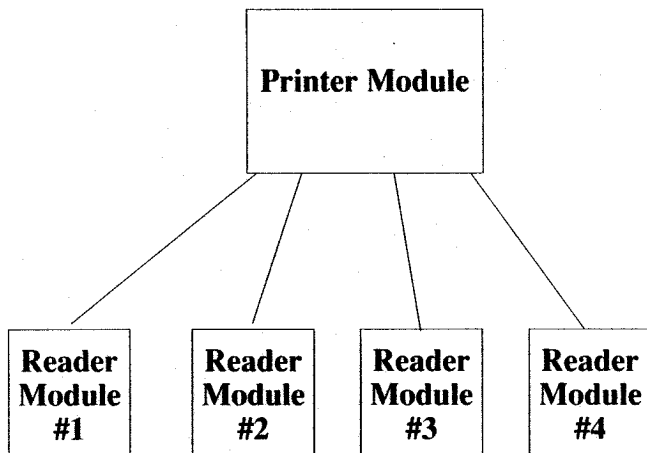


Figure 1

If specific card or timezone programming is required, a Programmer Module can be added to the system. The Programmer Module supports up to four Reader Modules via the Printer Module (see Figure 2) or one Reader Module without a Printer Module (see Figure 3), to allow programming of unique card numbers and timezones.

The Programmer Module addresses each Reader Module as unit #1 through #4. Any code can be validated or invalidated for any of the eight card readers/keypads supported by the Programmer Module. In a system with a Programmer Module, the Reader Module has the ability to store four user-defined timezones. Cards can then be assigned unique timezones for any of the readers. The Programmer Module also allows any of the relays to be assigned a timezone for timed door control. The Programmer Module is menu driven and prompts the user for SET TIME AND DATE, TIMEZONE PROGRAMMING, CARD PROGRAMMING, OUTPUT CONTROL and REPORT with positive result feedback.

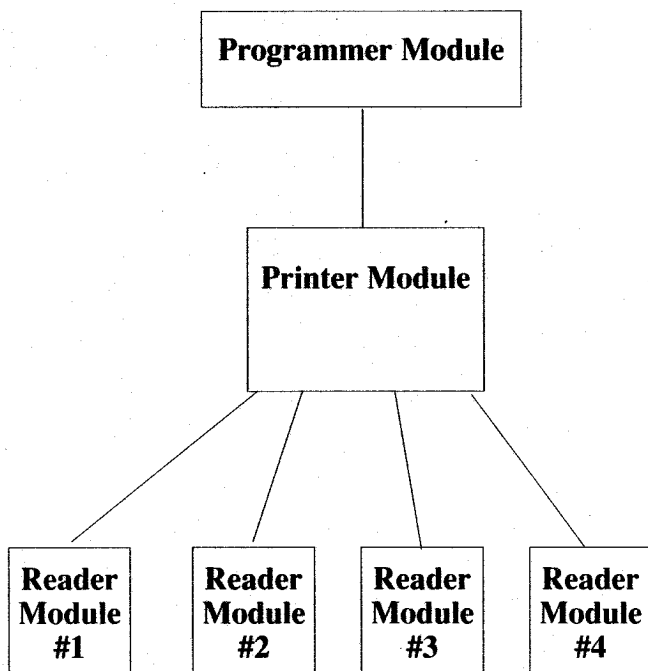


Figure 2

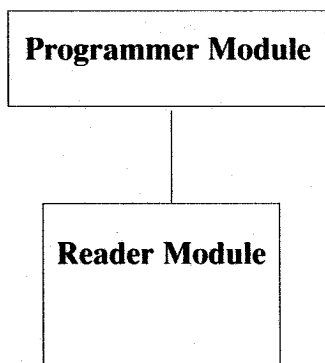


Figure 3



Northern Computers, Inc. has a nationwide LOCK-PAK program, designed to reduce errors in the selection of door hardware. Please make use of this service by calling the factory. Always remember to have local fire officials approve all equipment installations *prior* to installing door hardware. Use of infrared or space detectors may not be allowed on fire doors. Use caution when installing egress buttons which must meet local life safety requirements.

In order to make any installation a success, proper planning is essential. Before installing the panels, have a clear understanding of the N-500 system and a site diagram indicating locations of all modules, readers, door strikes and input points, with cabling schemes.

## Section 3: Hardware Specifications

### N-500 Reader Module

**Power Input:** The N-500 Reader Module requires a 12 volt AC or DC power supply. The power supply may be a step down from 110 volts 60 hz or 220 volts 50 hz.

**Battery Back-Up:** If battery back-up is required, use a 12 volt DC power supply that includes a battery back-up.

**Current Draw:** Reader Module .....70 mA

LEDs .....12 mA each

All Wiegand readers .....27 mA each

NR-1 reader .....60 mA each

Relays .....20 mA each

**Lithium Battery:** The 3 volt lithium battery retains Reader Module memory for 30 days upon loss of 12 volt power.

**Card Readers:** The N-500 Reader Module supports the following card readers:

Type	Northern Model Number(s)
Wiegand Swipe.....	CR-1, CR-1B
Wiegand Card Insert.....	CI-1, CI-2
Wiegand Key Insert.....	KR-1
Wiegand Turnstile.....	TR-1, TR-1C
Magnetic Stripe Swipe .....	NR-1
Cotag Proximity .....	PR-1
IDI Proximity.....	PR-2, PR-2S, PR-2X
Indala Proximity.....	PR-3, PR-3B, PR-5, PR-5B, PR-10, PR-10B, PR-12, PR-12B, PR-20, PR-22

**Keypads:** The N-500 Reader Module supports the Northern KP-6 keypad.

**Inputs:** N-500 Reader Module inputs use screw-down terminal strips. Egress device inputs have normally-open contacts. Door position inputs have normally-closed contacts.

**Relay Outputs:** Double-pole, double-throw (DPDT) relay contacts are provided with both normally-open and normally-closed sides and are rated for 28 volts DC at 2.5 amps or 110 volts AC. Separate relay outputs are used for each door. The pulse time of the relay is programmable. The second set of contacts per relay can be used to shunt alarm contacts from a secondary panel.

### **Watch-Dog Timer**

The Watch-Dog Timer circuitry monitors the CPU of the N-500. If the CPU halts, the Watch-Dog Timer automatically restarts it.

### **Environmental Specifications:**

Storage temperature .....5 to 149° F (-15 to 65° C)

Operating temperature.....32 to 120° F (0 to 49° C)

Relative Humidity .....95% @ 120° F

## **Printer Module**

**Inputs:** Supports up to four N-500 Reader Modules via 20 mA data transmission.

**Outputs:** Supports either a serial printer via RS-232 data transmission or a parallel printer via Centronics parallel data transmission (IBM PC compatible).

## **Programmer Module**

**Operator Input:** The Programmer Module uses a standard numeric keypad. All operator input through the keypad is menu prompted, with numeric input selection.

**Operator Output:** Four line, 20 character liquid-crystal display (LCD).

# II. Installation

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## Section 4: Wiring Requirements

### Card Readers to the N-500

The N-500 Reader Module supports up to two card readers. Five conductor, 18 gauge shielded cable between the card readers and the N-500 is recommended. This enables the card readers to be located up to 500 feet away from the Reader Module.

Most card readers require 5 volts of power, which is supplied by the N-500. For readers that require more than 5 volts, such as proximity readers (which require 12 volts), an external power supply must be used.

*Any combination of card reader types and keypads can be used on a given N-500 Reader Module.*

### Wiegand Readers

Wiegand Card Swipe readers, Wiegand Card Insert readers, Wiegand Key Insert readers and Wiegand Turnstile readers have the following terminations:

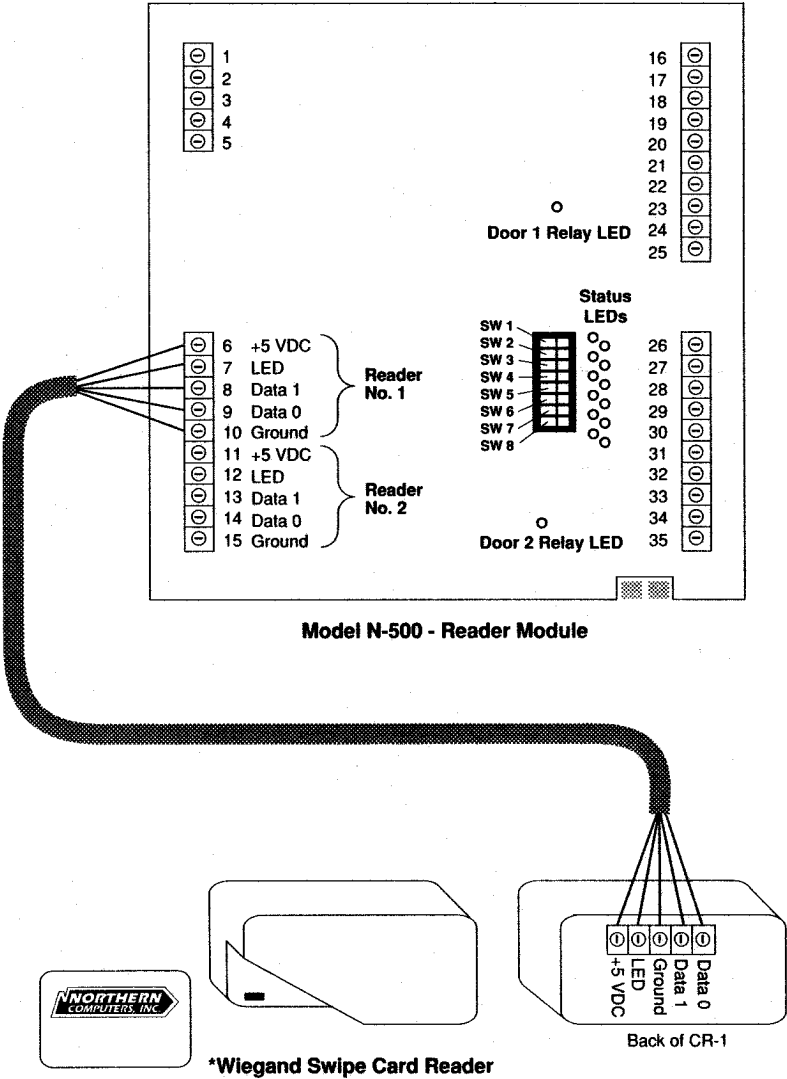
#### Reader #1

N-500 Terminal	Wire Color	Function
6	Red	+5 VDC
7	Brown	LED
8	White	Data 1
9	Green	Data 0
10	Black	Ground

#### Reader #2

N-500 Terminal	Wire Color	Function
11	Red	+5 VDC
12	Brown	LED
13	White	Data 1
14	Green	Data 0
15	Black	Ground

The following diagram illustrates how the N-500 is connected to Wiegand readers.



**\*Wiegand Swipe Card Reader**

\*The Wiegand Card Insert Reader, the Wiegand Turnstile Card Reader and the Wiegand Key Insert Reader are connected the same.

## Magnetic Stripe Swipe Readers

Magnetic Stripe Swipe Readers have the following terminations:

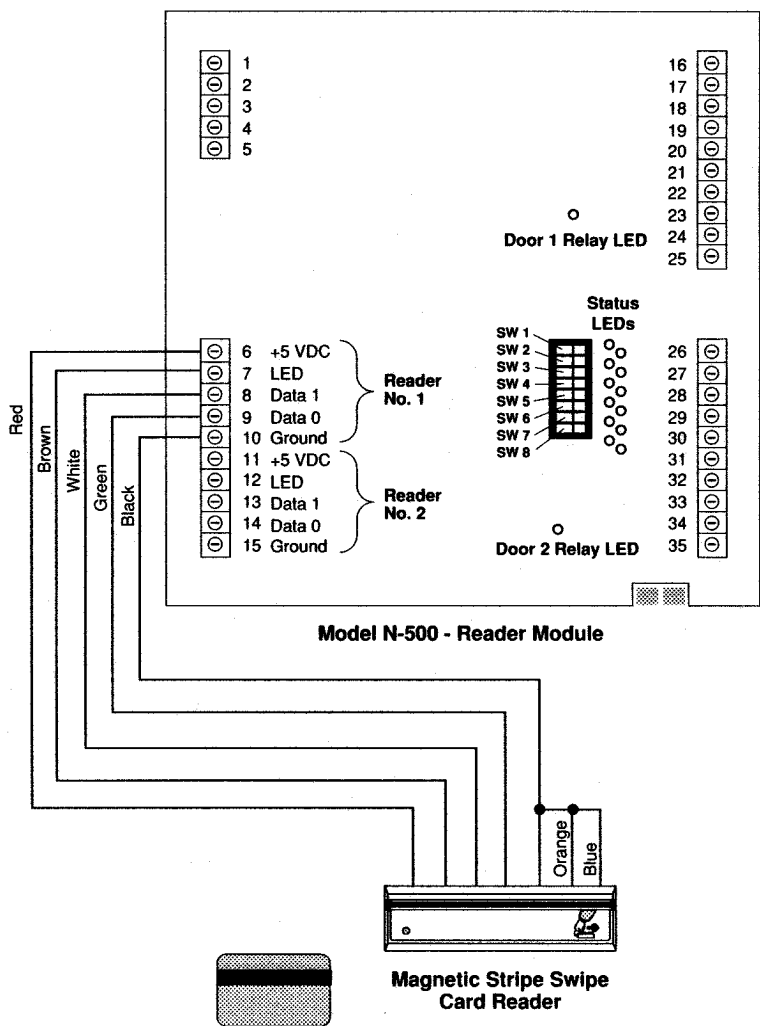
### *Reader #1*

<b>N-500 Terminal</b>	<b>Wire Color</b>	<b>Function</b>
6	Red	+5 VDC
7	Brown	LED
8	White	Data 1
9	Green	Data 0
10	Black	Ground
10	Orange	---
10	Blue	---

### *Reader #2*

<b>N-500 Terminal</b>	<b>Wire Color</b>	<b>Function</b>
11	Red	+5 VDC
12	Brown	LED
13	White	Data 1
14	Green	Data 0
15	Black	Ground
15	Orange	---
15	Blue	---

The following diagram illustrates how the N-500 is connected to Magnetic Stripe Swipe readers.



## Cotag Proximity Readers

Cotag Proximity Readers require a 12 Volt DC regulated power supply and have the following terminations:

### *Reader #1 (CONN 2)*

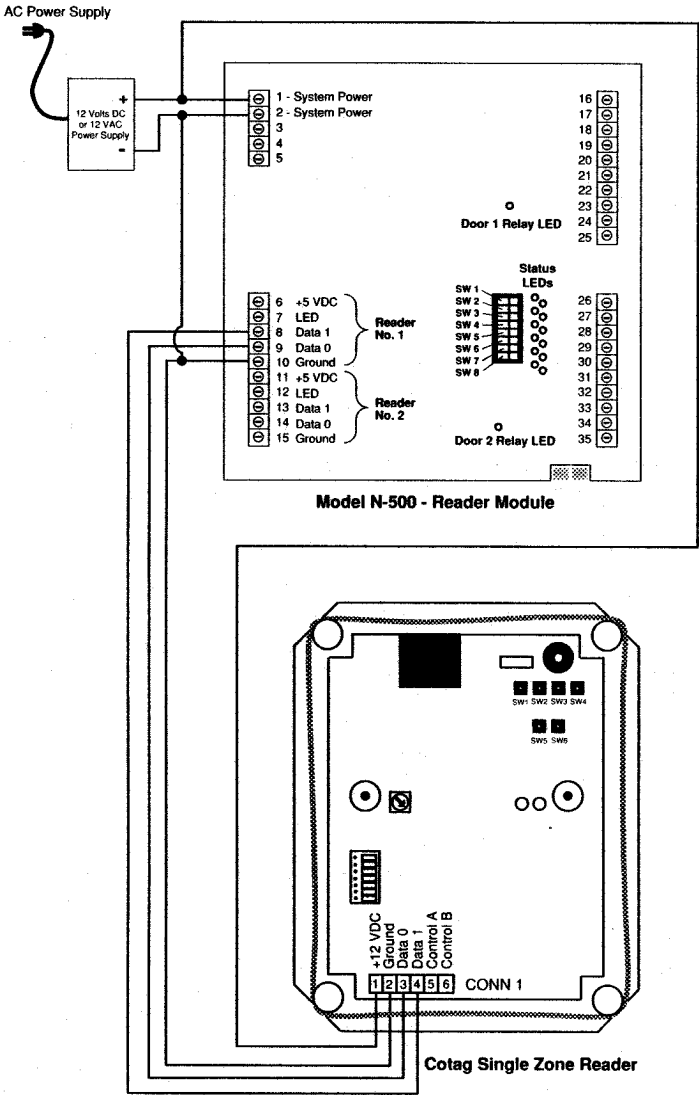
Terminal	Wire Color	Function	N-500 Terminal
1	Red	+12 VDC	External Power Supply
2	Black	Ground	10 & External Power Supply
3	Green	Data 0	9
4	White	Data 1	8

### *Reader #2 (CONN 2)*

Terminal	Wire Color	Function	N-500 Terminal
1	Red	+12 VDC	External Power Supply
2	Black	Ground	15 & External Power Supply
3	Green	Data 0	14
4	White	Data 1	13



The following diagram illustrates how the N-500 is connected to Cotag Proximity readers.



## IDI Proximity Readers

IDI Proximity Readers require a regulated 12 volt DC power supply. IDI readers are composed of a scanner, to which the proximity card is presented, and a reader which is an interface between the scanner and the N-500 Reader Module.

Connections between the *scanner* and the *reader* are shown below:

SCANNER (TB1)			READER (TB1)
Terminal	Function	Wire Color	Terminal
1	DC Rtn	Black	1
2	DC +	White	2
3	LED +	Black	3
4	not used	Shield	4
5	Enable	Green	5
6	not used		6
7	Signal	Red	7
8	Signal Rtn	Black	8

The *IDI Readers* and the *N-500* have the following connections:

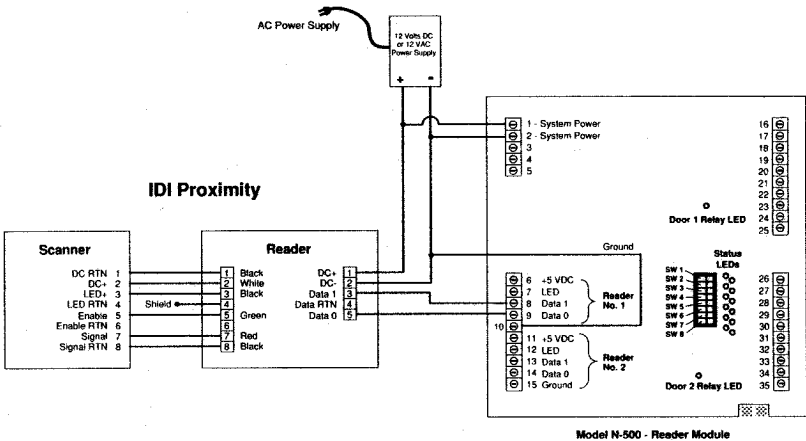
### Reader #1 (TB2)

Terminal	Function	Wire Color	N-500 Terminal
1	DC+	Red	External Power Supply
2	DC-	Black	10 & External Power Supply
3	Data 1	White	8
4	Data Rtn	not used	--
5	Data 0	Green	9

Reader #2 (TB2)

Terminal	Function	Wire Color	N-500 Terminal
1	DC+	Red	External Power Supply
2	DC-	Black	15 & External Power Supply
3	Data 1	White	13
4	Data Rtn	not used	--
5	Data 0	Green	14

The following diagram illustrates how the N-500 is connected to IDI Proximity readers.



## **Indala Proximity Readers**

(Models PR-3, PR-5, PR-20 and PR-22)

Indala Proximity Readers require a 12 Volt DC regulated power supply. The PR-3, PR-5, PR-20, and PR-22 models consist of a proximity head and a Remote Electronics Module (REM).

Connections between the PR-3 and PR-5 *proximity heads* and the *REM* are shown below:

<b>PROXIMITY HEAD</b>	<b>REM</b>	
	<b>Terminal</b>	<b>Function</b>
<b>Wire Color</b>		
Shield, Black and Orange	A	Ground
Red	B	+12 VDC
White	C	Drive
Brown	D	Beep
Blue	E	Ant
Green	F	Beep

Connections between the PR-20 and PR-22 *proximity heads* and the *REM* are shown below:

<b>PROXIMITY HEAD</b>	<b>REM</b>	
	<b>Terminal</b>	<b>Function</b>
<b>Wire Color</b>		
Black & Shield	A	Ground
Red	B	+12 VDC
	C	not used
Brown	D	LED
White	E	Ant
Green	F	Beep

Connections between the *REM* and the *N-500* are shown below:

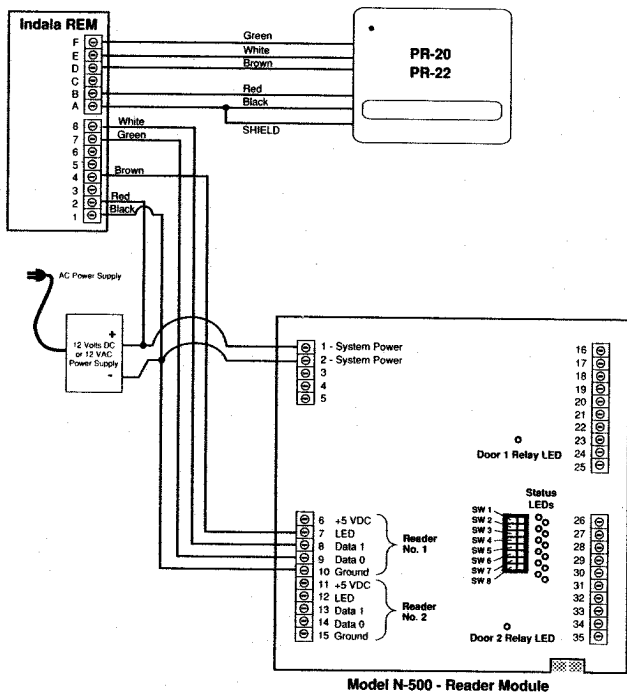
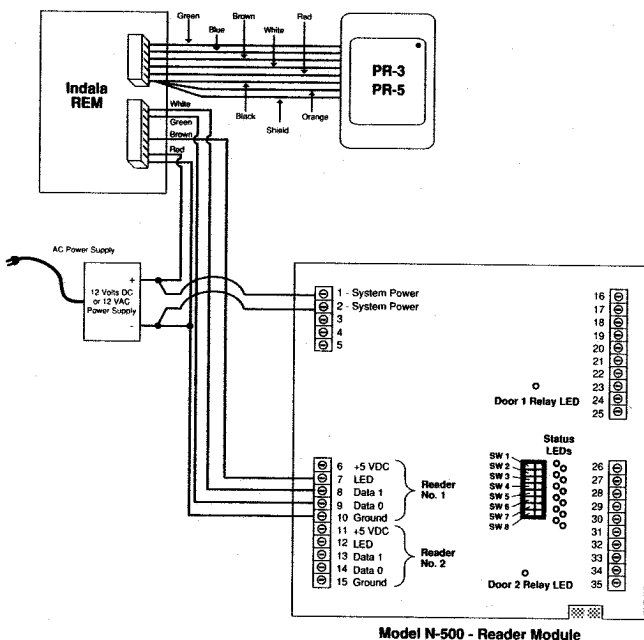
*Reader #1*

<b>REM</b>			<b>N-500</b>
<b>Terminal</b>	<b>Function</b>	<b>Wire Color</b>	<b>Terminal</b>
1	Ground	Black	10 and External Power Supply
2	+12 VDC	Red	External Power Supply
3	Beeper	not used	--
4	LED	Brown	7
5	not used		--
6	not used		--
7	Data 0	Green	9
8	Data 1	White	8

*Reader #2*

<b>REM</b>			<b>N-500</b>
<b>Terminal</b>	<b>Function</b>	<b>Wire Color</b>	<b>Terminal</b>
1	Ground	Black	15 and External Power Supply
2	+12 VDC	Red	External Power Supply
3	Beeper	not used	--
4	LED	Brown	12
5	not used		--
6	not used		--
7	Data 0	Green	14
8	Data 1	White	13

*Illustrations are on the following page.*



## **Indala Proximity Readers**

(Models PR-10 and PR-12)

The PR-10 and PR-12 models consist of a proximity head only and require a 12 volt DC regulated power supply. Connections from models PR-10 and PR-12 to the N-500 are shown below:

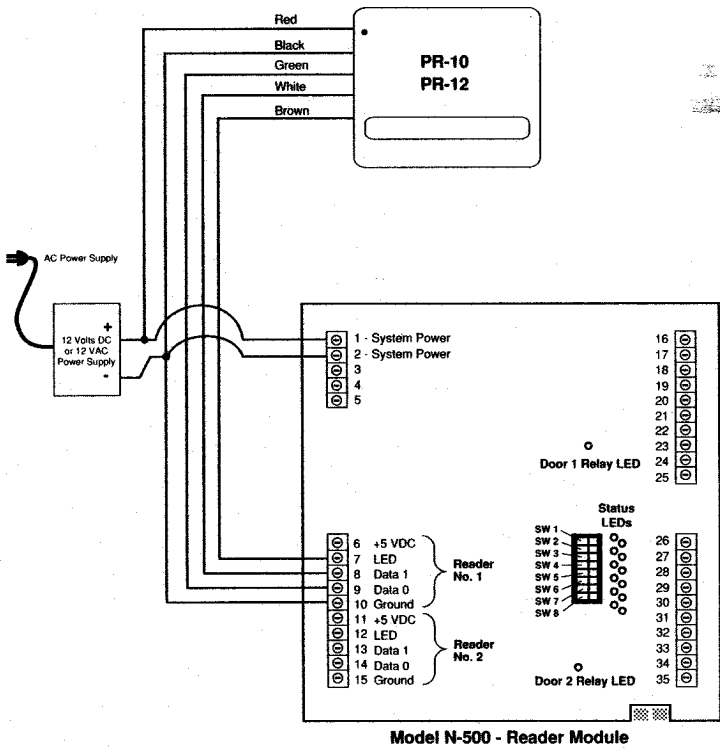
### *Reader #1*

<b>Proximity Head Wire Color</b>	<b>Function</b>	<b>N-500 Terminal</b>
Red	+12 VDC	External Power Supply
Black	Ground	10 and External Power Supply
White	Data 1	8
Green	Data 0	9
Yellow	Buzzer	not used
Brown	LED	7

### *Reader #2*

<b>Proximity Head Wire Color</b>	<b>Function</b>	<b>N-500 Terminal</b>
Red	+12 VDC	External Power Supply
Black	Ground	15 and External Power Supply
White	Data 1	13
Green	Data 0	14
Yellow	Buzzer	not used
Brown	LED	12

*An illustration is on the following page.*





## Keypads to N-500

The N-500 Reader Module supports up to two keypads. Five conductor, 18 gauge shielded cable between the keypads and the N-500 is recommended, which enables the keypads to be located up to 500 feet away from the Reader Module.

Keypads have the following terminations:

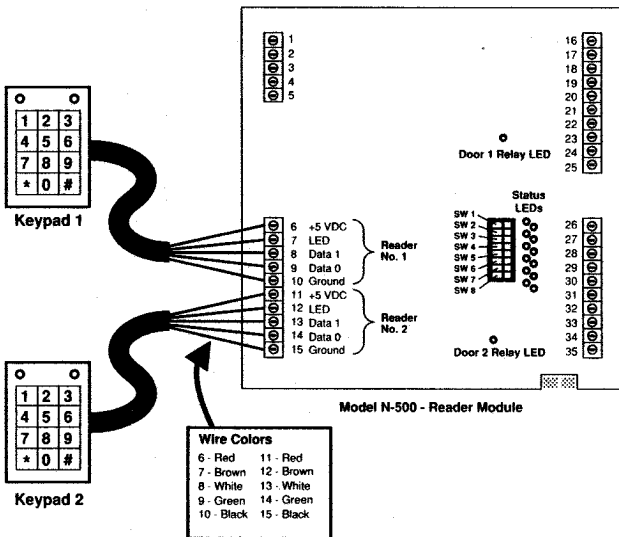
### Keypad #1

N-500 Terminal	Wire Color	Function
6	Red	+5 VDC
7	Brown	LED
8	White	Data 1
9	Green	Data 0
10	Black	Ground

### Keypad #2

N-500 Terminal	Wire Color	Function
11	Red	+5 VDC
12	Brown	LED
13	White	Data 1
14	Green	Data 0
15	Black	Ground

The following diagram illustrates how the N-500 is connected to keypads.



## **Door Position Contacts/ Egress Devices/Door Strikes**

The N-500 Reader Module provides door position contacts, egress device contacts and DPDT relay contacts for two doors. A twisted pair, 18-20 gauge cable is recommended for each, which enable runs up to 2500 feet.

The terminations are as follow:

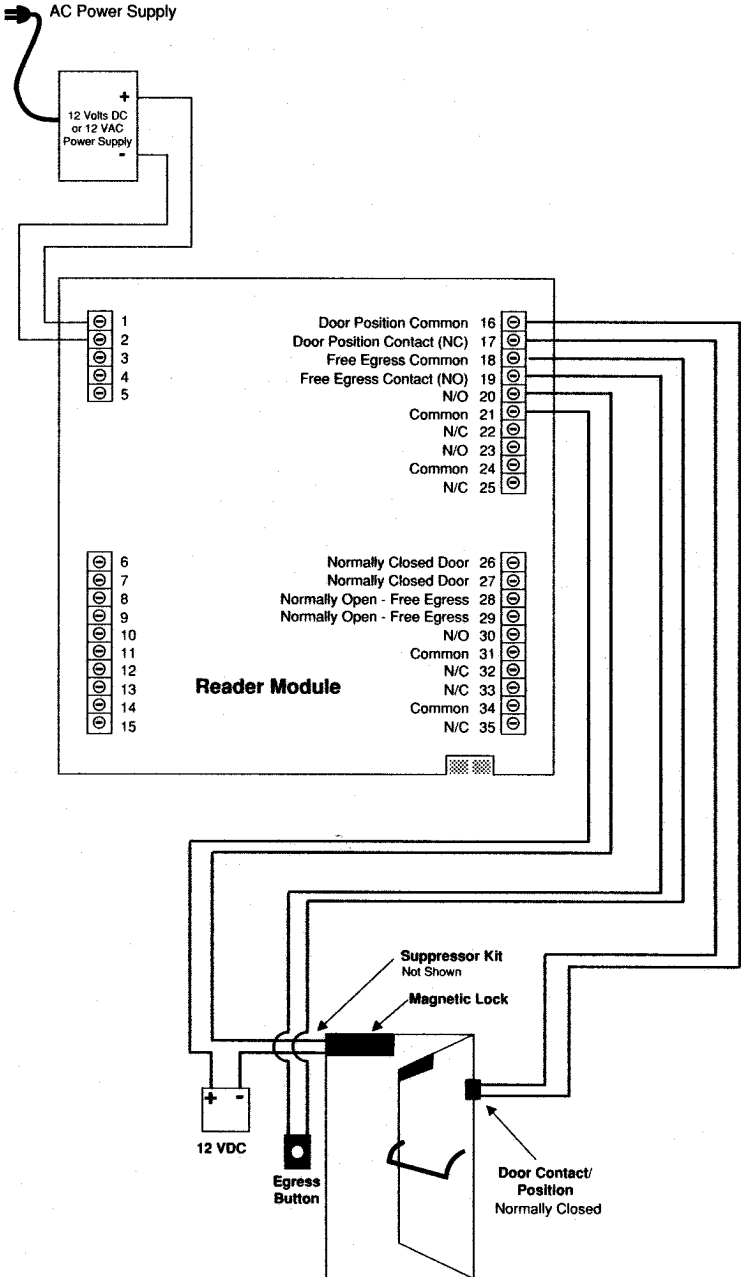
### *Door #1*

<b>N-500 Terminal</b>	<b>Function</b>
16	Door Position Common
17	Door Position Contact (N/C)
18	Free Egress Common
19	Free Egress Contact (N/O)
20	Relay-N/O
21	Relay-Common
22	Relay-N/C
23	Relay-N/O
24	Relay-Common
25	Relay-N/C

### *Door #2*

<b>N-500 Terminal</b>	<b>Function</b>
26	Door Position Common
27	Door Position Contact (N/C)
28	Free Egress Common
29	Free Egress Contact (N/O)
30	Relay-N/O
31	Relay-Common
32	Relay-N/C
33	Relay-N/O
34	Relay-Common
35	Relay-N/C

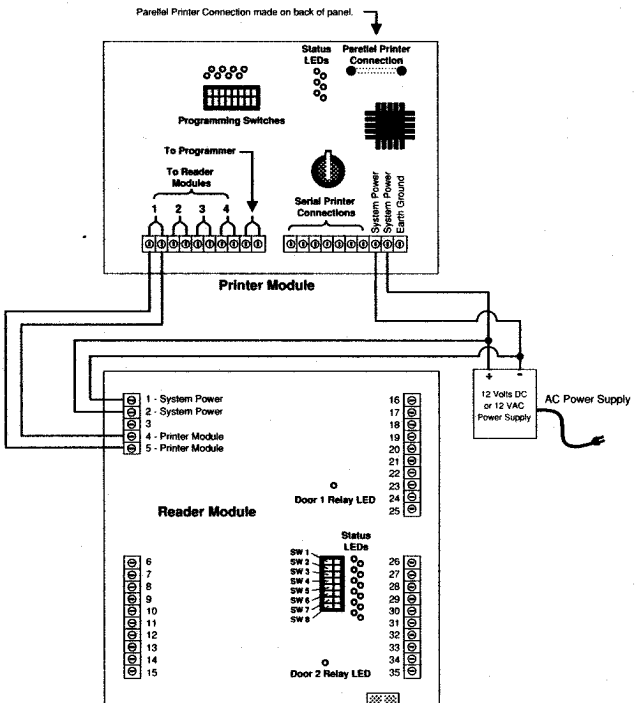
*An illustration is on the following page.*



## N-500 to Printer Module

If printer logging is required a Printer Module can be added to the N-500 system. The Printer Module is connected to the N-500 Reader Module via a twisted pair cable. 18 gauge cable is recommended, which enables the Printer Module to be located up to 2500 feet away from the N-500. The connections are made from the N-500 Reader Module to the Printer Module as shown below:

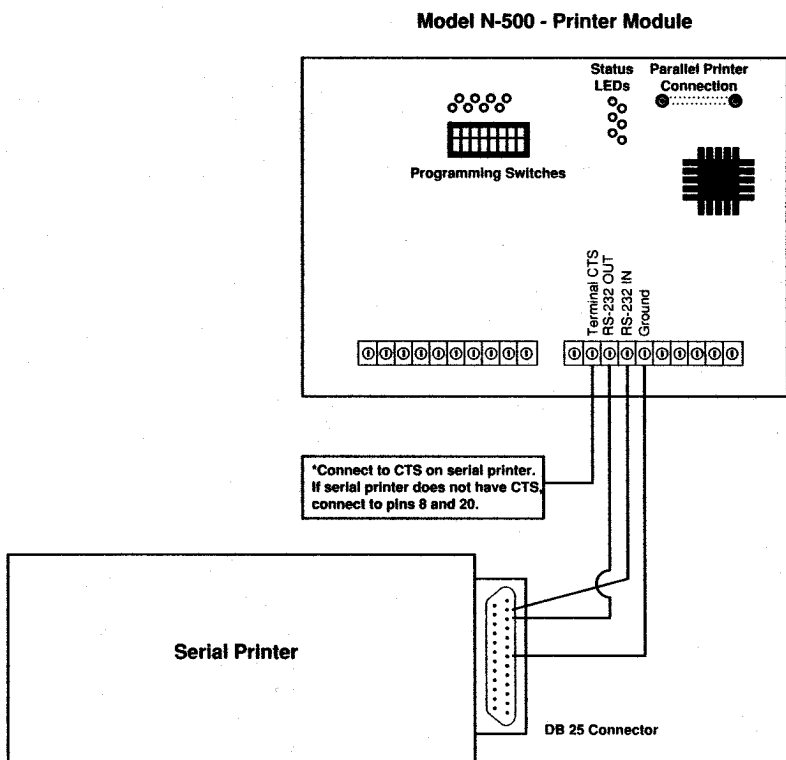
N-500 #	N-500 Terminal	Printer Module Terminal
1	4	RCM 1
	5	RCM 1
2	4	RCM 2
	5	RCM 2
3	4	RCM 3
	5	RCM 3
4	4	RCM 4
	5	RCM 4



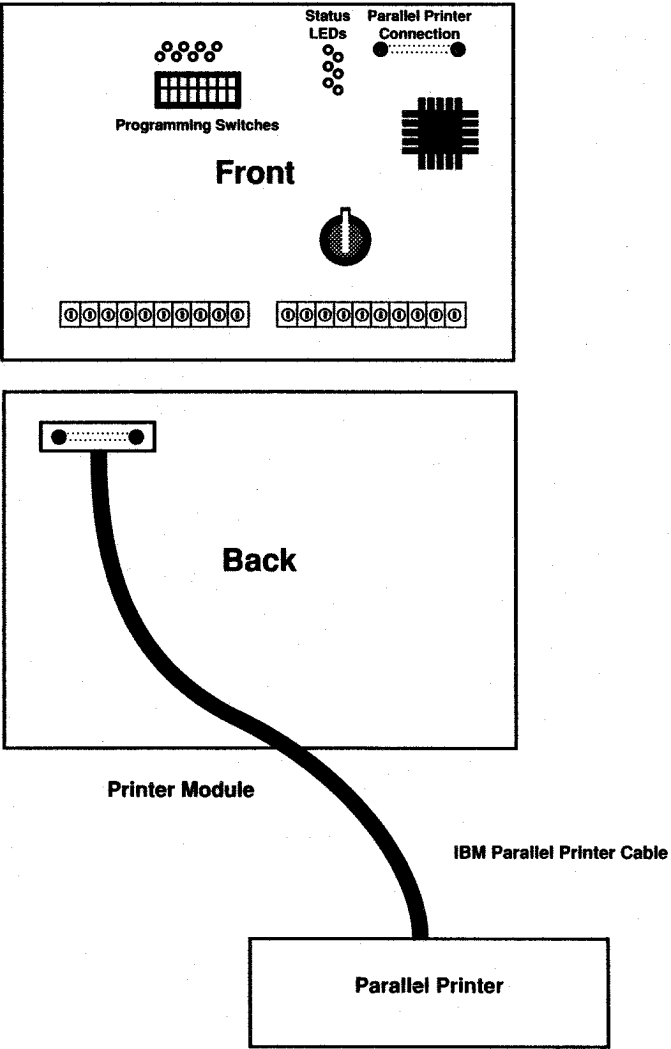
## Printer Module to Printer

The Printer Module supports either a serial printer or a parallel printer. Four conductor, 20 gauge shielded cable is recommended between the Printer Module and a serial printer. This allows the printer to be located up to 100 feet away from the Printer Module. If a parallel printer is used, a Centronics parallel printer cable is required to connect the printer to the Printer Module. This allows the printer to be located up to 100 feet away from the Printer Module.

*Connections between a Printer Module and a serial printer are shown below.*

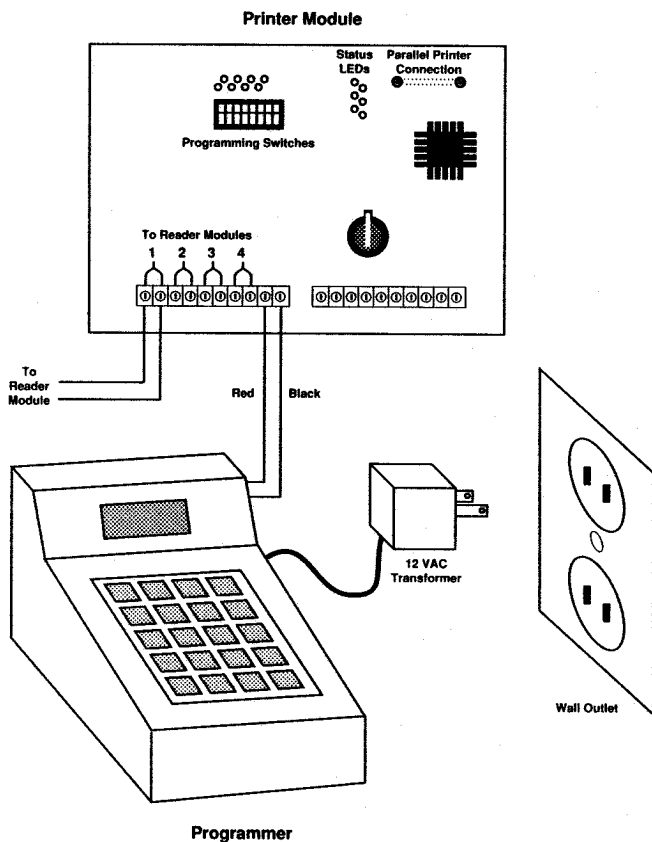


*Connections between a Printer Module, using the DB-25 pin plug, and a parallel printer are shown below.*



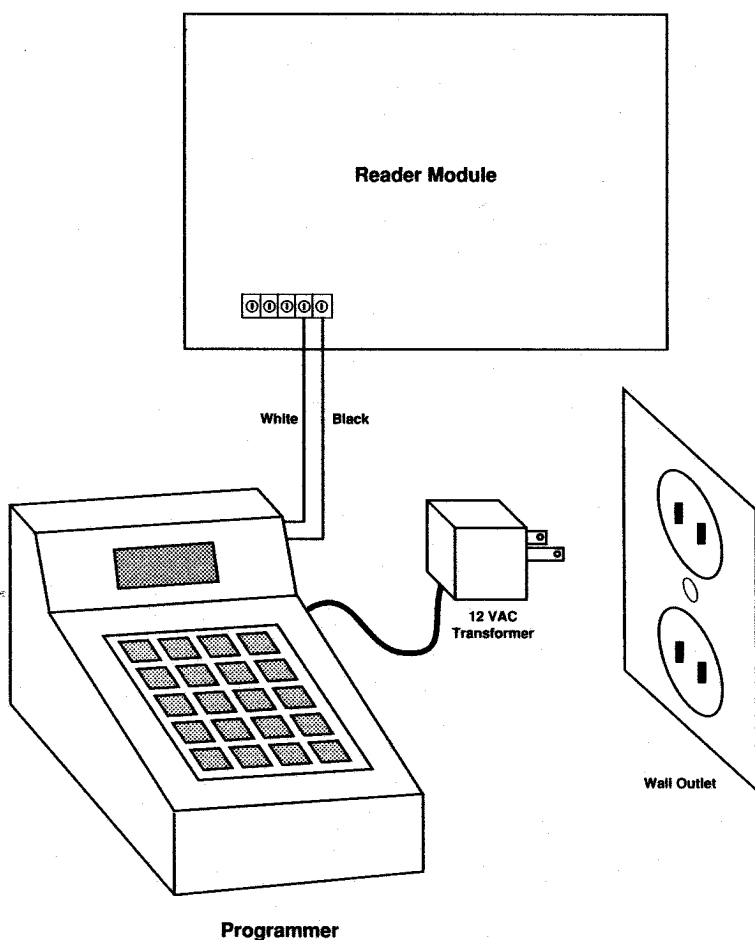
## Printer Module to Programmer Module

A Programmer Module can control up to four N-500 Reader Modules via the Printer Module. The Programmer Module is connected to the Printer Module using a twisted pair cable. 18 gauge cable is recommended, which enables the Programmer Module to be located up to 2500 feet away from the Printer Module. The connections are made from the Printer Module to the Programmer Module as shown below:



## N-500 to Programmer Module

A Programmer Module can be directly connected to one N-500 Reader Module, without using a Printer Module. The Programmer Module is connected to the N-500 Reader Module via a twisted pair cable. 18 gauge cable is recommended, which enables the Programmer Module to be located up to 2500 feet away from the N-500.



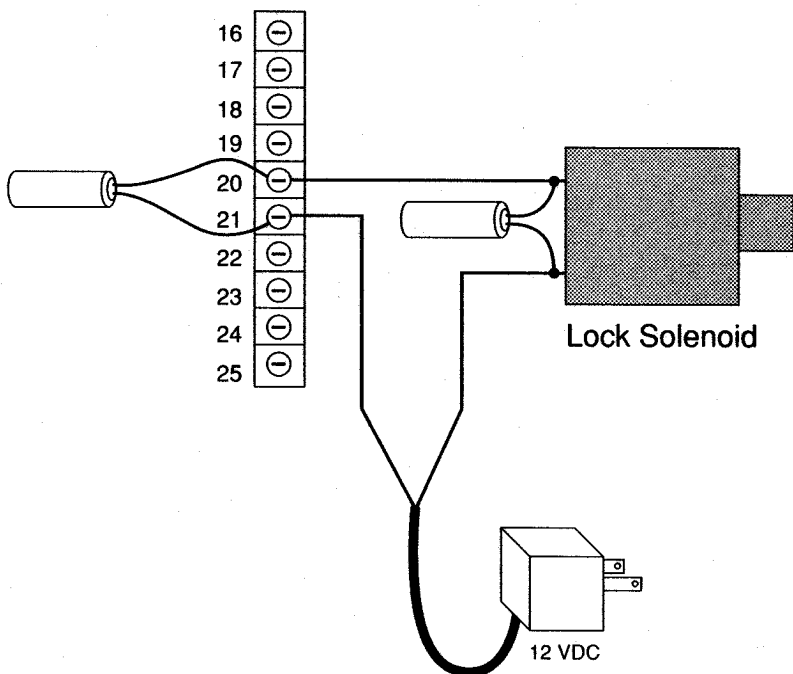


## Section 5: Locks and Suppression

An S-4 Suppressor Kit must be installed with every electrical switching device run through a relay contact on the N-500. The Suppressor Kit protects the N-500 from the power generated by the collapsing electrical field of an electrical switching device. When properly installed, the Suppressor Kit provides the collapsing electrical field a proper path to ground, protecting the N-500 from interruption and damage.

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 of the electrical switching device, without regard to polarity.

*The installation of Suppressor Kits is shown below*



## **Section 6: Grounding**

It is important to ground the N-500 system properly. 18 gauge cable must be connected from terminal #3 of the Reader Module directly to earth ground. The shields from the card reader or keypad cables must be grounded at the panel end only. The shield from reader/keypad #1 is wired to terminal #10. The shield from reader/keypad #2 is wired to terminal #15. These are the ground terminals for the respective reader/keypads.

After grounding the Reader Module and the cable shields properly, measure the voltage between the panel ground terminal (terminal #3) and the reader/keypad ground terminals (terminals #10 and #15). There must be 0 volts between these terminals.

If a Printer Module is used, it must be grounded from the "Earth" terminal on TB2 of the Printer Module directly to earth ground with 18 gauge cable.

## **Section 7: Power**

The N-500 Reader Module requires a 12 volt AC or DC power supply. It is possible to power the N-500 with the same source that is supplying power to the door strikes. The power supply is wired to terminals #1 and #2 of the N-500, without regard to polarity.

The Printer Module and the Programmer Module also require 12 volts AC or DC, making it possible to power both with the same supply. The power supply is connected to the "SYSP-WR" terminals, on TB2 of the Printer Module, without regard to polarity.

One 12 VDC power supply with battery back-up, large enough to supply current to the Reader Module and door strikes, is recommended.

**WARNING**  
**Connecting 120 VAC damages the N-500**  
**and voids the warranty.**

# III. Operation/Programming

## Section 8: Stand Alone System

The N-500 Reader Module functions as a stand alone unit, if printer logging and special programming are not required. The Reader Module stores up to 500 codes per reader and can be configured to accept cards by site code group and/or unique card numbers. Cards can be loaded via Site Code Programming mode and/or Unique Code Programming mode, in any combination. Each code loaded into the system occupies one of the 500 available locations in memory, regardless of the programming mode used.

The N-500 code memory layout is shown below:

### Reader #1

Memory Slot	Card Number Site Code	Programmed Via: Unique Code Site Code
1		
2		
3		
4		
5		
↓		
500		

### Reader #2

Memory Slot	Card Number Site Code	Programmed Via: Unique Code Site Code
1		
2		
3		
4		
5		
↓		
500		

The following is an example of a memory layout for an N-500 Reader Module:

**Card Reader/Keypad #1**

Memory Slot	Card		Programmed Via:	
	Number	Site Code	Unique Code	Site Code
1	2000	25	X	
2	2001	25	X	
3	2002	25	X	
4	600	100		X
5	5000	150		X
↓				
500				

**Explanation:**

- Card #2000 is valid at Reader #1
- Card #2001 is valid at Reader #1
- Card #2002 is valid at Reader #1
- All Site Code 100 cards are valid at Reader #1
- All Site Code 150 cards are valid at Reader #1

**Card Reader/Keypad #2**

Memory Slot	Card		Programmed Via:	
	Number	Site Code	Unique Code	Site Code
1	800	300		X
2	4000	500		X
3	700	80		X
4	6500	40	X	
5	6501	40	X	
↓				
500				

**Explanation:**

- All Site Code 300 cards are valid at Reader #2
- All Site Code 500 cards are valid at Reader #2
- All Site Code 80 cards are valid at Reader #2
- Card #6500 is valid at Reader #2
- Card #6501 is valid at Reader #2

The Reader Module is configured by setting the Options DIP Switches according to the application desired. The functions of the switches are as follow:

### **Switch 1: Site Code Programming**

On = Program Mode

Off = Operating Mode

Site code programming allows site codes to be bulk loaded into memory. When a site code is programmed into the system, all cards with that site code are valid.

### **To load site codes with the Reader Module:**

1. Set Switch 1 to the ON position.
2. Set Switch 2 (used for unique code programming) to the OFF position. The Reader Module then begins pulsing the card reader LED at 1 second intervals.
3. While the LED is pulsing, run a card through the reader. When the Reader Module recognizes a valid site code, the card reader LED remains on for 5 seconds. Any card with this site code is then valid at this card reader.
4. When the LED begins pulsing again, another site code can be programmed.
5. To begin normal access control operation, set Switch 1 to the OFF position. The Reader Module then turns the card reader LED on, and normal operation begins.

Site codes are deleted by running a card with the desired site code through the reader a second time, while in the Site Code Programming mode. When a card is run through a reader while in Site Code Programming mode, it is added to the system, if that site code is not already in memory. It is deleted from the system if that site code is already in memory.

### **To delete site codes with the Reader Module:**

1. Set Switch 1 to the ON position.
2. Set Switch 2 (used for unique code programming) to the OFF position. The Reader Module then begins pulsing the card reader LED at 1 second intervals.

3. While the LED is pulsing, run a card with the desired site code through the reader. When the Reader Module recognizes a valid site code, the card reader LED remains on for 2 seconds. All cards with this site code are then invalidated at this reader.
4. When the LED begins pulsing again, another site code can be deleted.
5. To begin normal access control operation, set Switch 1 to the OFF position. The Reader Module then turns the card reader LED on, and normal operation begins.

*A site code is only validated or invalidated at the reader the card is run through, when programming in this mode. See Section 10 instructions for programming cards for both readers with a Programmer Module.*

## **Switch 2: Unique Code Programming**

On = Program Mode

Off = Operating Mode

Unique code programming allows unique cards/keycodes to be programmed into the system. With unique code programming, each code must be programmed individually.

### **To program unique codes with the Reader Module:**

1. Set Switch 2 to the ON position.
2. Set Switch 1 (used for site code programming) to the OFF position. The Reader Module then begins pulsing the card reader LED at 1 second intervals.
3. While the LED is pulsing, run a card through the reader. If keypads are used, enter the desired keycode followed by the “#” key. When the Reader Module recognizes a valid code, the LED remains on for 5 seconds. The unique code is then valid at this card reader/keypad.
4. When the LED begins pulsing again, another code can be programmed.
5. To begin normal access control operation, set Switch 2 to the OFF position. The Reader Module then turns the LED on, and normal operation begins.

Unique codes are deleted by running the card through the reader or entering the keycode a second time, while in the Unique Code Programming mode. When a code is entered via Unique Code Programming mode, it is added to the system, if it is not already in memory. It is deleted from the system if the code is already in memory.

### **To delete unique codes with the Reader Module:**

1. Set Switch 2 to the ON position.
2. Set Switch 1 (used for site code programming) to the OFF position. The Reader Module then begins pulsing the card reader LED at 1 second intervals.
3. While the LED is pulsing, run the desired card through the reader. If keypads are used, enter the desired keycode followed by the “#” key. When the Reader Module recognizes a valid code, the card reader LED remains on for 2 seconds. The unique code is then invalidated at this reader/keypad.
4. When the LED begins pulsing again, another code can be deleted.
5. To begin normal access control operation, set Switch 2 to the OFF position. The Reader Module then turns the card reader LED on, and normal operation begins.

*A unique code is only validated or invalidated at the reader/keypad programmed into, when programming in this mode. See Section 10 instructions for programming codes for both readers with a Programmer Module.*

*If Switch 1 and Switch 2 are both set to the ON position, the Reader Module will not read or program cards.*

*Examples of site code/unique card programming can be found in Appendix B.*



### **Switch 3 and Switch 4: Relay Pulse Times/Shunt Times**

<b>Switch 3</b>	<b>Switch 4</b>	<b>Pulse time</b>	<b>Shunt time</b>
Off	Off	2 seconds	4 seconds
On	Off	10 seconds	20 seconds
Off	On	30 seconds	60 seconds
On	On	60 seconds	120 seconds

Switches 3 and 4 set the pulse time for both relays and the shunt time for both door position input points on the Reader Module. The shunt time is automatically twice as long as the pulse time. When a valid card or keycode is read by the Reader Module, or when an egress device is triggered, the corresponding relay will activate for its programmed pulse time and the corresponding door position input point will be shunted for its shunt time.

*The card reader LED pulse time is identical to the relay pulse time.*

### **Switch 5: Timed Anti-Passback**

On = Anti-Passback Mode

Off = Standard Mode

With Switch 5 set to the ON position, the Reader Module will not accept two card reads from the same card, at the same reader, for 10 minutes. When a card is run through a reader for the first time, the same card cannot be run through the same reader until 10 minutes pass. The same conditions apply to keycode entry with keypads.

*The timed Anti-Passback mode should not be enabled when using Site Code Programmed cards. If a Site Code Programmed card is run through a reader with timed Anti-Passback enabled, all other cards with the same site code will be invalid for 10 minutes at that reader.*

## **Switch 6: Reader Module to Printer Module Baud Rate**

On = 1200 Baud  
Off = 9600 Baud

If the Reader Module is hardwired to the Printer Module, set Switch 6 to the OFF position, to configure the system for 9600 baud. If the Reader Module is connected to the Printer Module via modems, set Switch 6 to the ON position, to configure the system for 1200 baud.

*Set Switch 3 on the Printer Module to match the baud rate selected with Switch 6 of the Reader Module.*

## **Switch 7: Printer Module Enable**

On = Enable  
Off = Disable

If a printer is used with the system, set Switch 7 to the ON position, to enable the Printer Module. When enabled, the Reader Module will transmit the day, date, time, card number and error code to the printer for logging. If no printer is used, set Switch 7 to the OFF position.

## **Switch 8: Programmer Module Enable**

On = Enable  
Off = Disable

If a Programmer Module is used with the system, set Switch 8 to the ON position. When enabled, the Programmer Module allows up to four Reader Modules to be programmed for unique card numbers, timezones and current time and date. If no Programmer Module is used, set Switch 8 to the OFF position.

*Set Switch 5 of the Printer Module to the ON position if a Programmer is used.*

## Reader Module LEDs

*The N-500 Reader Module LEDs have the following functions:*

LED	Color	Function
CR6	Red	<b>Communication Loop Indicator:</b> Lit indicates communication from the Reader Module to the Printer Module is established.
CR14	Red	<b>Door #1 Relay Indicator:</b> Lit indicates Door #1 relay is ON (N/O relay contacts become closed and N/C relay contacts become open). Not lit indicates relay is OFF (N/O and N/C contacts are in normal state).
CR15	Red	<b>Site Code Programming Indicator:</b> Lit indicates DIP Switch 1 is in the ON position, which puts the N-500 into the site code programming mode.
CR16	Red	<b>Unique Card Programming Indicator:</b> Lit indicates DIP Switch 2 is in the ON position, which puts the N-500 into the unique card programming mode.

*If CR15 and CR16 are both lit, the Reader Module will not read or program cards and pulses the card reader LED at five second intervals.*

CR17	Red	<b>Relay Pulse Time Indicator</b>
CR18	Red	<b>Relay Pulse Time Indicator:</b> CR17 indicates position of DIP Switch 3 and CR18 indicates position of DIP Switch 4. The switches set the relay pulse time/door contact shunt time as shown below:

CR17	CR18	Pulse time	Shunt time
Not lit	Not lit	2 seconds	4 seconds
Lit	Not lit	10 seconds	20 seconds
Not lit	Lit	30 seconds	60 seconds
Lit	Lit	60 seconds	120 seconds

LED	Color	Function (cont.)
CR19	Red	<b>Timed Anti-Passback Indicator:</b> Lit indicates DIP Switch 5 is in the ON position, which puts the N-500 into the Timed Anti-Passback mode. Not lit indicates DIP Switch 5 is in the OFF position, which puts the N-500 into the standard mode.
CR20	Red	<b>Reader Module to Printer Module Baud Rate Indicator:</b> Lit indicates DIP Switch 6 is in the ON position, which sets the N-500 to 1200 baud, for modem use. Not lit indicates DIP Switch 6 is in the OFF position, which sets the N-500 to 9600 baud, for use when the Reader Module is hardwired to the Printer Module.
CR21	Red	<b>Printer Module Enable Indicator:</b> Lit indicates DIP Switch 7 is in the ON position, which enables the Printer Module option on the N-500.
CR22	Red	<b>Programmer Module Enable Indicator:</b> Lit indicates DIP Switch 8 is in the ON position, which enables the Programmer Module option on the N-500.
CR23	Yellow	<b>Programmer Module Connect Indicator:</b> Lit indicates communication between the Programmer and the N-500 is established.
CR24	Yellow	<b>Printer Module Connect Indicator:</b> Lit indicates communication between the Printer Module and the Reader Module is established.
CR25	Red	<b>Operation Indicator:</b> Pulsing indicates the N-500 is operating properly. Not pulsing or not lit indicates N-500 is not functioning properly.

LED	Color	Function <i>(cont.)</i>
CR26	Green	<b>+5 VDC Indicator:</b> Lit indicates the N-500 is supplying +5 VDC output for reader/keypad power.
CR28	Red	<b>Door #2 Relay Indicator:</b> Lit indicates Door #2 relay is ON (N/O relay contacts become closed and N/C relay contacts become open). Not lit indicates relay is OFF (N/O and N/C contacts are in normal state).

## **Section 9: N-500 With Printer Module**

The Printer Module supports up to four Reader Modules for printer logging. Input from the Reader Module is directed to a serial or parallel printer. The Printer Module converts error codes from the Reader Module to full text messages for print-out. The Printer Module is configured by setting the Options DIP Switches according to the application desired. The functions of the switches are shown below:

### **Switch 1: Printer Type**

On = Serial

Off = Parallel

If a serial printer is used with the system, set Switch 1 to the ON position. If a parallel printer is used, set Switch 1 to the OFF position.

### **Switch 2: Printer Module to Printer Baud Rate**

On = 300 Baud

Off = 1200 Baud

*Switch 2 is only applicable if a serial printer is used.*

Switch 2 selects the baud rate for communication between the Printer Module and the serial printer. The baud rate selected with Switch 2 must match the baud rate of the serial printer.

### **Switch 3: Printer Module to Reader Module Baud Rate**

On = 1200 Baud

Off = 9600 Baud

Switch 3 selects the baud rate for communication between the Printer Module and the Reader Module. If the Printer Module is hardwired to the Reader Module, set Switch 3 to the OFF position, to configure the system for 9600 baud. If the Printer Module is connected to the Reader Module via modems, set Switch 3 to the ON position, to configure the system for 1200 baud.

*Switch 6 on the Reader Module must be set to match the baud rate selected with Switch 3 of the Printer Module.*

#### **Switch 4: Printer Module to Programmer Module Baud Rate**

On = 1200 Baud

Off = 9600 Baud

Switch 4 selects the baud rate for communications between the Printer Module and the Programmer Module. If the Printer Module is hardwired to the Programmer Module, set Switch 4 to the OFF position, to configure the system for 9600 baud. If the Printer Module is connected to the Programmer Module via modems, set Switch 4 to the ON position, to configure the system for 1200 baud.

#### **Switch 5: Programmer Module Enable**

On = Enable

Off = Disable

If a Programmer Module is used with the system, set Switch 5 to the ON position. If no Programmer Module is used, set Switch 5 to the OFF position.

*Switch 8 of the Reader Module must also be set to the ON position if a Programmer is used.*

#### **Switch 6: Reserved**

#### **Switch 7: Reserved**

#### **Switch 8: Printer Test**

On = Operational Test

Off = Standard Mode

To verify the printer is operating properly, set Switch 8 to the ON position, then jump the restart pads on the Printer Module. The Printer Module then sends operational test information to the printer. Set Switch 8 to the OFF position to stop this self-test.

## Printer Module LEDs

*The N-500 Printer Module LEDs have the following functions:*

LED	Color	Function
RUN	Green	Operation Indicator: Pulsing indicates the Printer Module is operating properly. Not pulsing or not lit indicates the Printer Module is not functioning properly.
+5V	Green	+5VDC Indicator: Lit indicates the Printer Module is powered properly.
PGM	Green	Programmer Module Indicator: A very short pulse (less than one second) indicates communication between the Printer Module and the Programmer Module is established. A one second pulse indicates communication is not established.
PRINT FAIL	Red	Lit indicates the printer is not on-line, not powered or out of paper.
RCM1	Green	Reader Module #1 Indicator: A very short pulse (less than one second) indicates communication between the Printer Module and Reader Module #1 is established. A one second pulse indicates communication is not established.
RCM2	Green	Reader Module #2 Indicator: Indicates communication has been established between the Printer Module and Reader Module #2.
RCM3	Green	Reader Module #3 Indicator: Indicates communication has been established between the Printer Module and Reader Module #3.
RCM4	Green	Reader Module #4 Indicator: Indicates communication has been established between the Printer Module and Reader Module #4.



## Printer Module Messages

The following are the Printer Module text messages:

### Printer Module power-up:

Time=hh:mm      Date=mm/dd/yy

RCM=1      Reader=

RCM Initialized

RCM=2      Reader=

RCM Initialized

RCM=3      Reader=

No Response

RCM=4      Reader=

No Response

*In the above example, Reader Module #1 and Reader Module #2 are connected to the Printer Module.*

### Adding or deleting a code:

RCM=#      Reader=#

No Response

### Forced entry:

Time=hh:mm      Date=mm/dd/yy

RCM=#      Reader=#      DOOR OPEN ILLEGALLY \*\*\*

### Invalid code:

Time=hh:mm      Date=mm/dd/yy

RCM=#      Reader=#      Card=SITE CODE      CARD NUMBER  
INVALID ACCESS ERROR\*\*\*

### **Valid code and entry:**

Time=hh:mm      Date=mm/dd/yy

RCM=#    Reader=#    Card=SITE CODE    CARD NUMBER  
Valid Access

Time=hh:mm      Date=mm/dd/yy

RCM=#    Reader=#    Door Open

Time=hh:mm      Date=mm/dd/yy

RCM=#    Reader=#    Door Closed

### **Door left open after valid code:**

Time=hh:mm      Date=mm/dd/yy

RCM=#    Reader=#    Card=SITE CODE    CARD NUMBER  
Valid Access

Time=hh:mm      Date=mm/dd/yy

RCM=#    Reader=#    Door Open

Time=hh:mm      Date=mm/dd/yy

RCM=#    Reader=#    DOOR OPEN TOO LONG    \*\*\*

### **Normal egress:**

Time=hh:mm      Date=mm/dd/yy

RCM=#    Reader=#    Egress

Time=hh:mm      Date=mm/dd/yy

RCM=#    Reader=#    Door Open

Time=hh:mm      Date=mm/dd/yy

RCM=#    Reader=#    Door Closed

### **Door left open after egress:**

Time=hh:mm      Date=mm/dd/yy

RCM=#    Reader=#    Egress

Time=hh:mm      Date=mm/dd/yy

RCM=#    Reader=#    Door Open

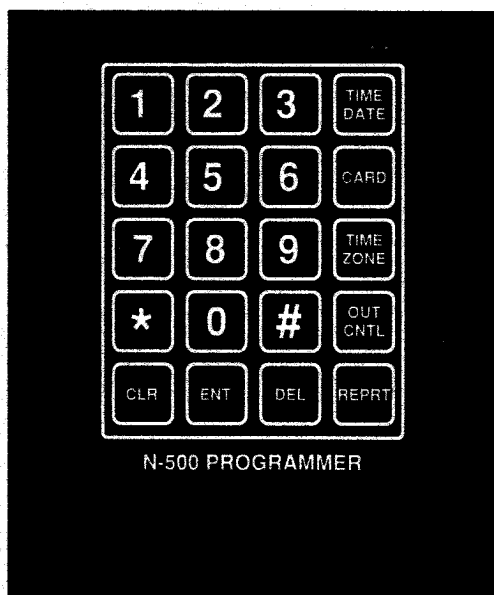
Time=hh:mm      Date=mm/dd/yy

RCM=#    Reader=#    DOOR OPEN TOO LONG    \*\*\*

## Section 10: N-500 With Programmer Module

A Programmer Module can be added to the N-500 System to allow timezone programming for doors and cards. The Programmer Module supports up to four Reader Modules via the Printer Module, or one Reader Module without a Printer Module. The Reader Modules are addressed as units #1 through #4.

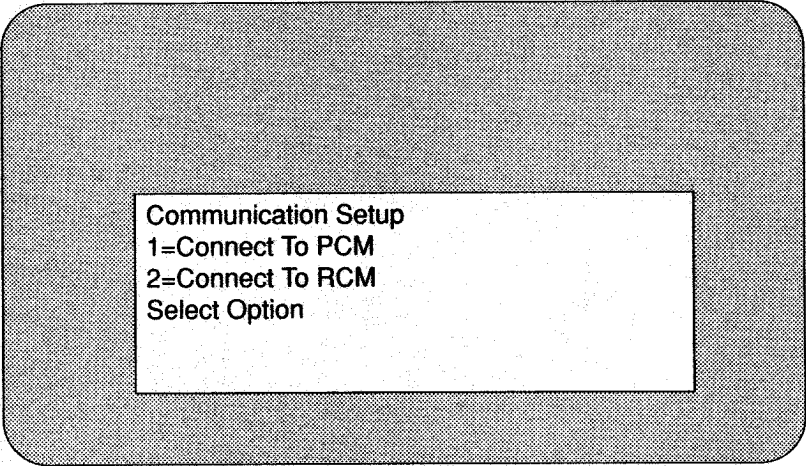
*The Programmer Module uses a numeric keypad, as shown below:*



The five programming functions are as follow:

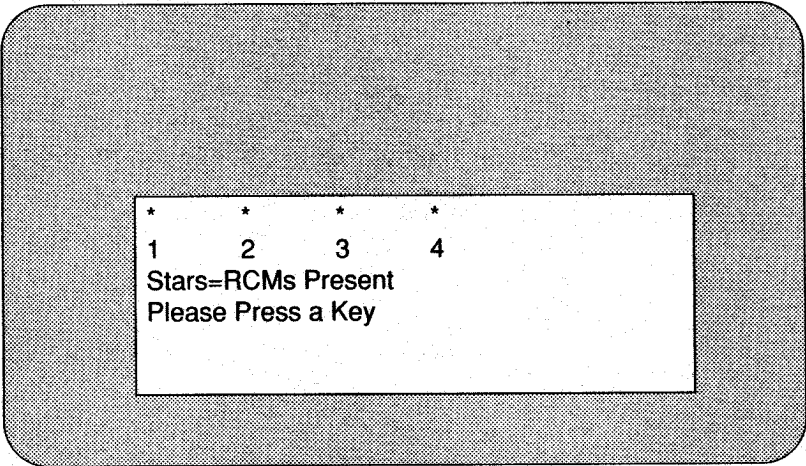
1. **Set Time and Date**
2. **Timezone Programming**
3. **Card Programming**
4. **Output Control**
5. **Report**

Upon power-up, the Programmer Module displays the following prompt:



Press the “1” key if the Programmer is connected to a Printer Module. Press the “2” key if the Programmer is connected directly to a Reader Module.

The Programmer Module then displays the following Main Menu:

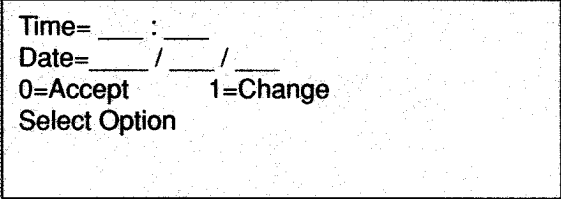


Stars indicate Reader Modules present and communicating with the Programmer Module.

## Set Time and Date

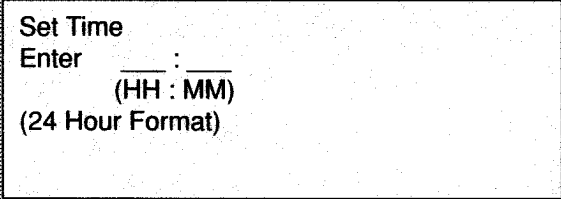
To set the time and date in the Reader Module(s):

1. Press the “Time/Date” key on the Programmer. The menu then displays the current time and date as follows:



Time= \_\_\_\_ : \_\_\_\_  
Date= \_\_\_\_ / \_\_\_\_ / \_\_\_\_  
0=Accept      1=Change  
Select Option

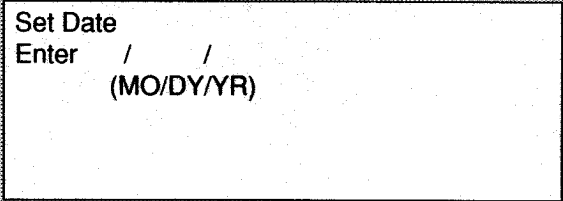
2. Press the “1” key to change the time and date.
3. The menu then displays the following prompt:



Set Time  
Enter \_\_\_\_ : \_\_\_\_  
(HH : MM)  
(24 Hour Format)

Enter the time in 24 hour format.

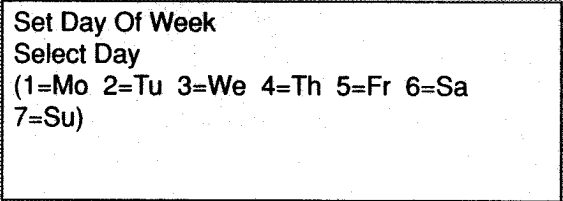
4. The menu displays the following prompt:



Set Date  
Enter    /       /  
          (MO/DY/YR)

Enter the month number, the day of the month and the year.

5. The menu then displays the following prompt:



Set Day Of Week  
Select Day  
(1=Mo 2=Tu 3=We 4=Th 5=Fr 6=Sa  
7=Su)

Enter the appropriate number for day of week.

6. The Programmer then returns to the Main Menu.

## Timezone Programming

Each Reader Module can store four user-defined timezones as shown below:

**Reader #1:** 1. Cards for Door #1.  
2. Door #1 open time.  
(Relay #1 energize time)

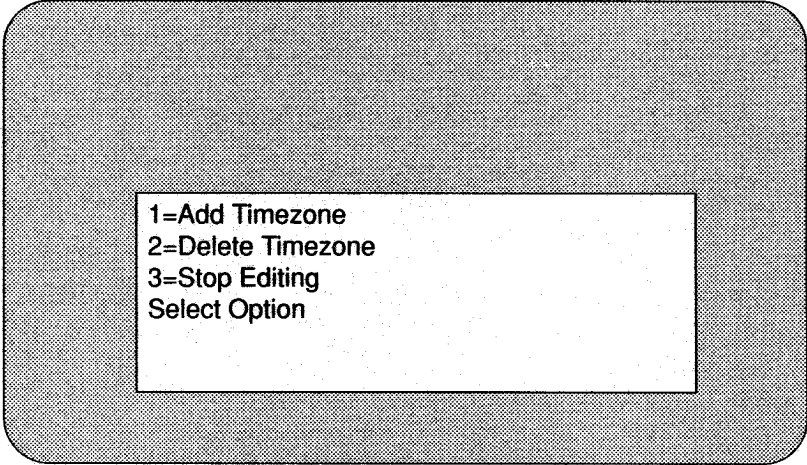
**Reader #2:** 1. Cards for Door #2.  
2. Door #2 open time.  
(Relay #2 energize time)

In addition, a 24 hour "Supercard" timezone is available for cards. A card assigned Supercard status for a given Reader Module has access to both readers, 24 hours a day.

Doors are normally LOCKED (relays de-energized). A timezone assigned to a door (relay) defines the block of time the door is OPEN (relay energized).

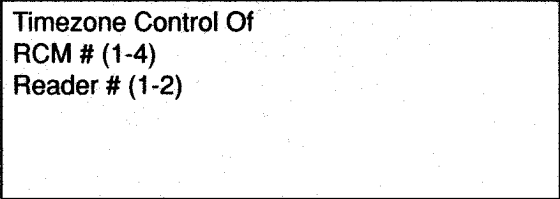
### To add a timezone:

1. Press the "Timezones" key on the Programmer. The Timezone Select menu then displays the following prompt:



1=Add Timezone  
2=Delete Timezone  
3=Stop Editing  
Select Option

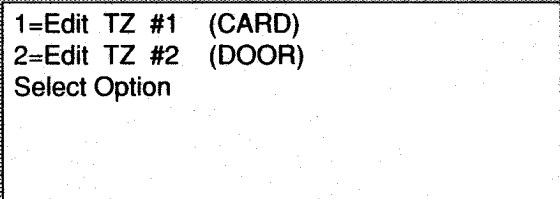
2. Press the "1" key on the Programmer for "Add Timezone."  
The menu then displays the following prompt:



Timezone Control Of  
RCM # (1-4)  
Reader # (1-2)

Enter the number of the desired Reader Module. Pressing the "Enter" key gives a default of all Reader Modules. Enter the number of the desired reader. Pressing the "Enter" key gives a default of both readers.

3. The menu then displays the following prompt:

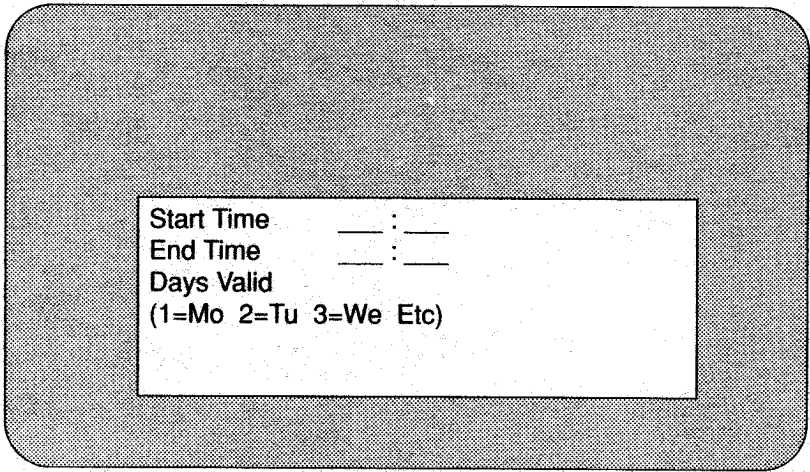


1=Edit TZ #1 (CARD)  
2=Edit TZ #2 (DOOR)  
Select Option

4. Press the "1" key to define a timezone for card use. Press the "2" key to define a timezone for door open time.



5. The menu then displays the following prompt:



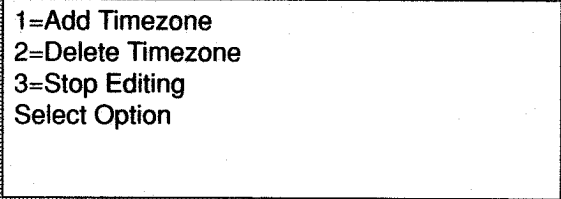
Start Time    \_\_\_ : \_\_\_  
End Time     \_\_\_ : \_\_\_  
Days Valid    \_\_\_  
(1=Mo 2=Tu 3=We Etc)

Enter the appropriate times and days, followed by the “Enter” key.

6. The Programmer then returns to the Timezone Select menu. Press the “3” key to return to the Main Menu.

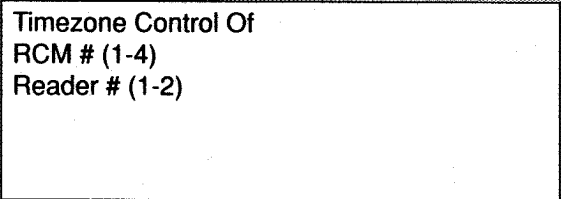
## **To delete a timezone:**

1. Press the “Timezones” key on the Programmer. The Timezone Select menu then displays the following prompt:

A screenshot of a menu titled "Timezone Select" with three options: "1=Add Timezone", "2=Delete Timezone", and "3=Stop Editing". Below the options is the prompt "Select Option".

1=Add Timezone  
2=Delete Timezone  
3=Stop Editing  
Select Option

2. Press the “2” key on the Programmer for “Delete Timezone.” The menu then displays the following prompt:

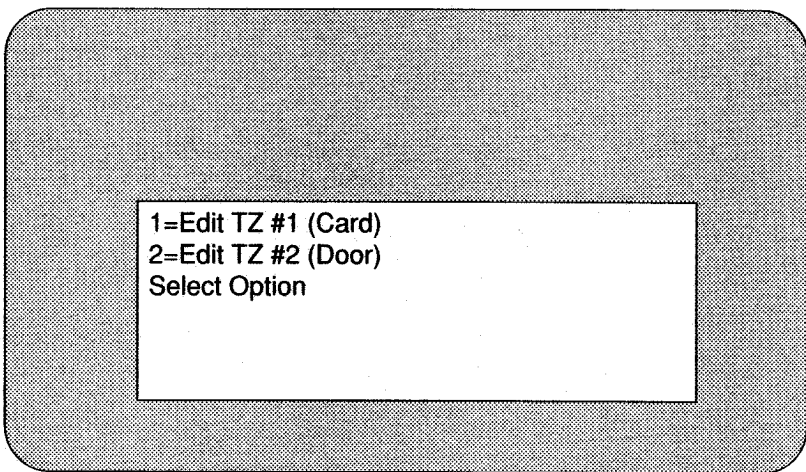
A screenshot of a menu titled "Timezone Control Of" with two prompts: "RCM # (1-4)" and "Reader # (1-2)".

Timezone Control Of  
RCM # (1-4)  
Reader # (1-2)

Enter the number of the desired Reader Module. Pressing the “Enter” key gives a default of all Reader Modules. Enter the number of the desired reader. Pressing the “Enter” key gives a

default of both readers.

3. The menu then displays the following prompt:



1=Edit TZ #1 (Card)  
2=Edit TZ #2 (Door)  
Select Option

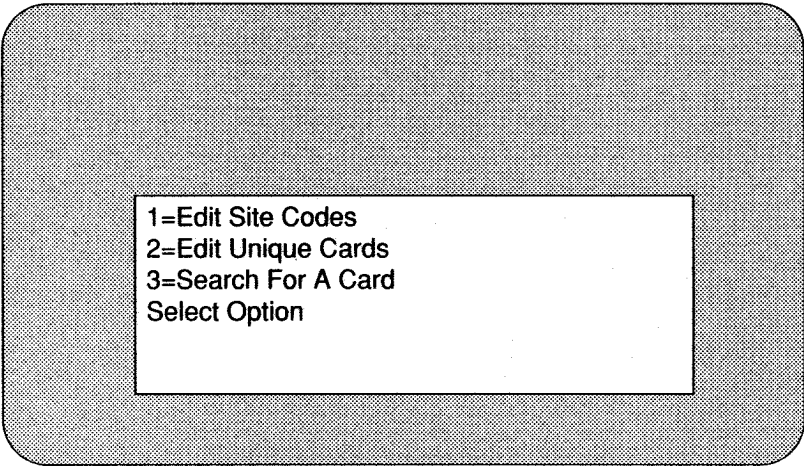
4. Press the “1” key to delete the timezone for card use. Press the “2” key to delete the timezone for door open time.

5. The Programmer then returns to the Timezone Select menu. Press the “3” key to return to the Main Menu.

## Card Programming

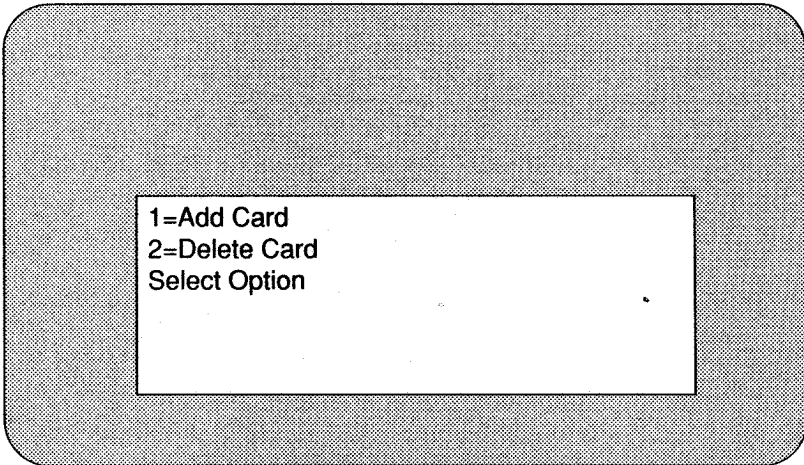
### To add a card:

1. Press the “Card” key on the Programmer. The Card Select menu then displays the following prompt:



1=Edit Site Codes  
2=Edit Unique Cards  
3=Search For A Card  
Select Option

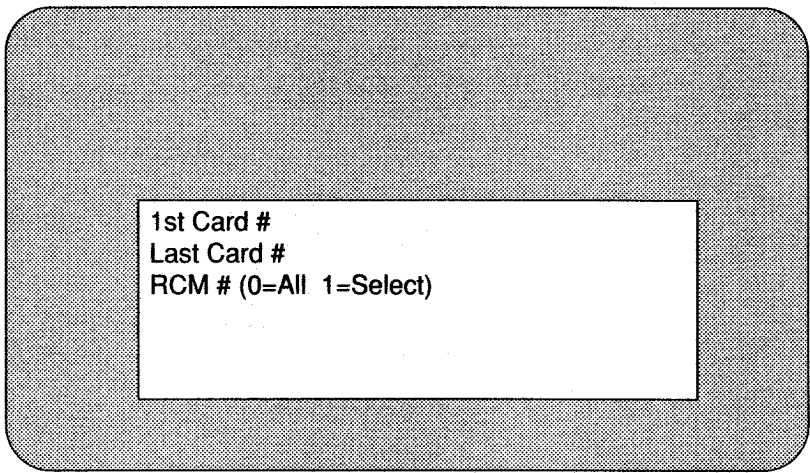
2. Press the “2” key on the Programmer for “Edit Unique Cards.” The menu then displays the following prompt:



1=Add Card  
2=Delete Card  
Select Option

3. Press the “1” key on the Programmer for “Add Card.”

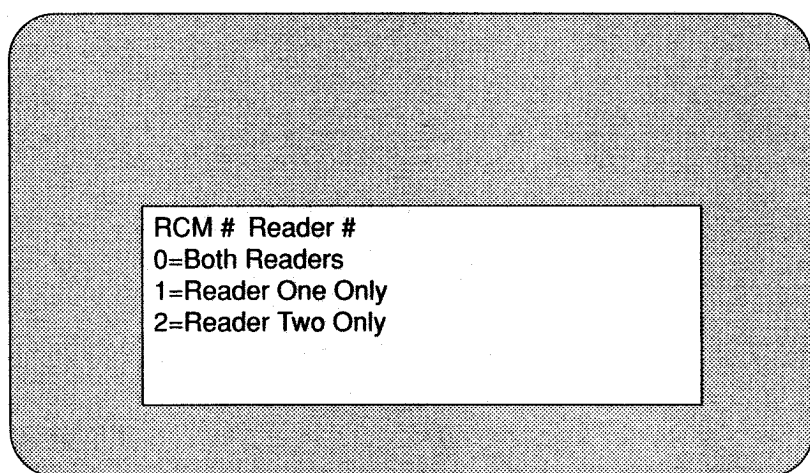
The menu then displays the following prompt:



1st Card #  
Last Card #  
RCM # (0=All 1=Select)

Specify a single card number to add one card or a first/last card range to bulk load a group of cards. Press the “0” key to enter the card(s) into all Reader Modules. Press the “1” key to enter the card(s) into specific Reader Modules.

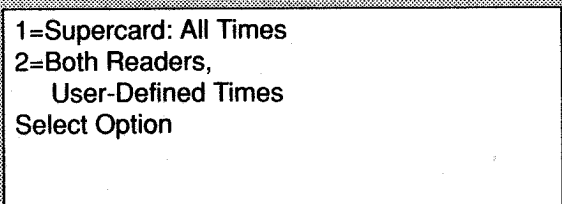
4. The menu then displays the following prompt:



RCM # Reader #  
0=Both Readers  
1=Reader One Only  
2=Reader Two Only

5. Enter the number of the desired Reader Module. Enter the desired reader. If “Reader One Only” is selected, the card(s) will only be valid at reader #1, during the user-defined card

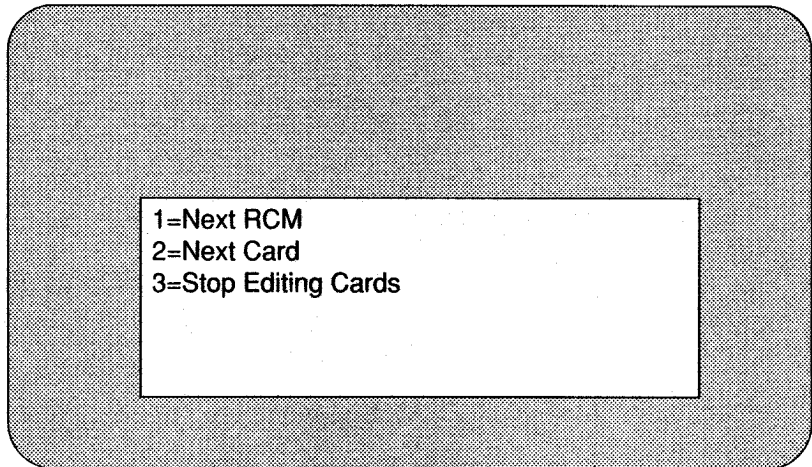
timezone for reader #1. If “Reader Two Only” is selected, the card(s) will only be valid at reader #2, during the user-defined card timezone for reader #2. If “Both Readers” is selected, the menu then displays the following prompt:



1=Supercard: All Times  
2=Both Readers,  
User-Defined Times  
Select Option

6. Press the “1” key to enter the card(s) for Supercard status. A Supercard has access to both readers on a given Reader Module 24 hours a day. Press the “2” key to enter the card(s) for user-defined status. A card with user-defined status will be valid at reader #1, during the user-defined timezone for reader #1 and at reader #2, during the user-defined timezone for reader #2.

The menu then displays the following prompt:

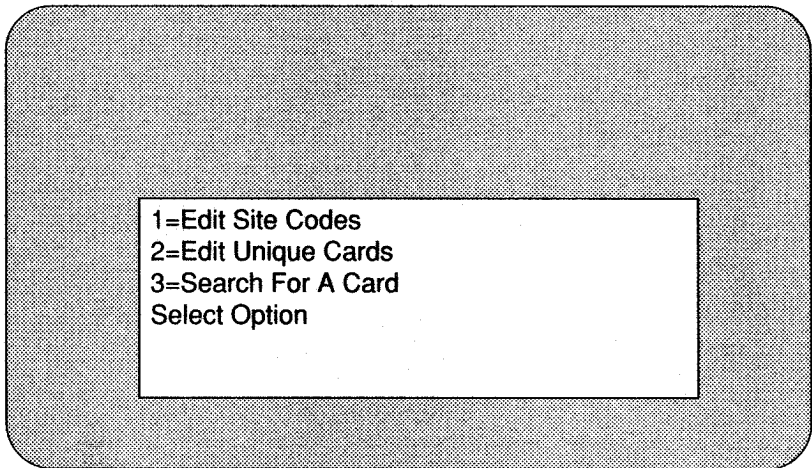


1=Next RCM  
2=Next Card  
3=Stop Editing Cards

7. Press the “1” key to enter the card(s) into another Reader Module. Press the “2” key to enter another card. Press the “3” key to return to the Main Menu.

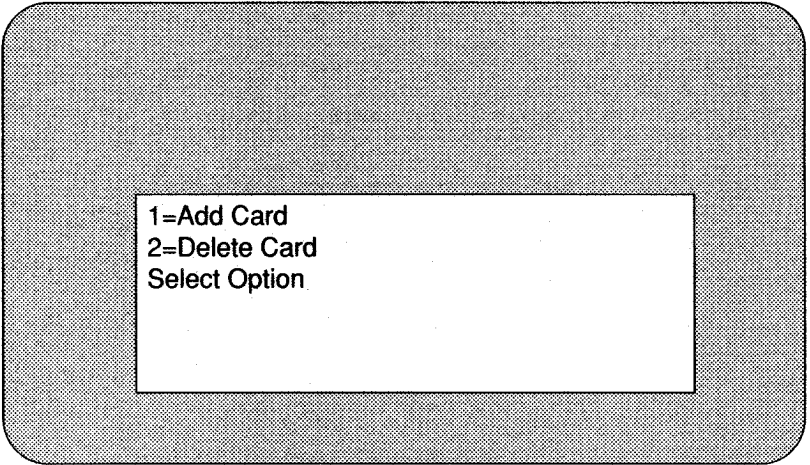
**To delete a card:**

1. Press the “Card” key on the Programmer. The Card Select menu then displays the following prompt:



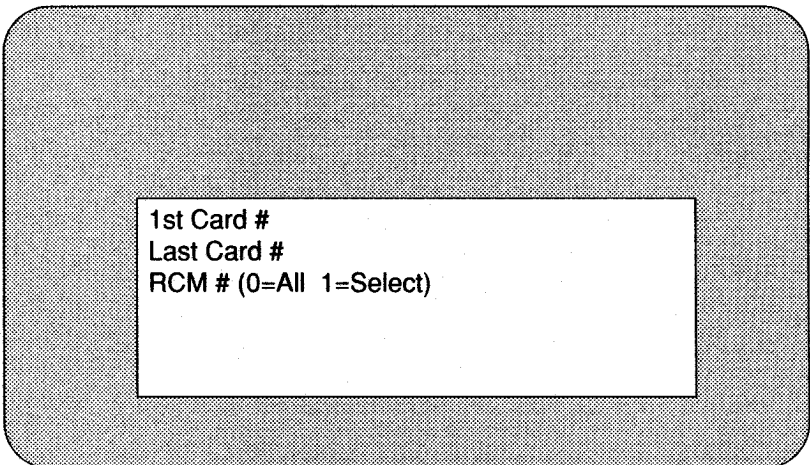
1=Edit Site Codes  
2=Edit Unique Cards  
3=Search For A Card  
Select Option

2. Press the “2” key on the Programmer for “Edit Unique Cards.” The menu then displays the following prompt:



1=Add Card  
2=Delete Card  
Select Option

3. Press the “2” key on the Programmer for “Delete Card.” The menu then displays the following prompt:

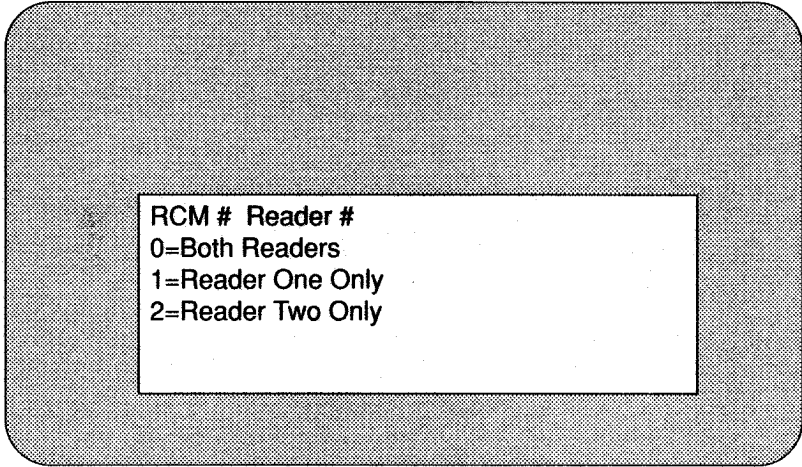


1st Card #  
Last Card #  
RCM # (0=All 1=Select)

Specify a single card number to delete one card or a first/last card range to bulk delete a group of cards. Press the “0” key to delete the card(s) from all Reader Modules. Press the “1” key to delete the card(s) from specific Reader Modules.



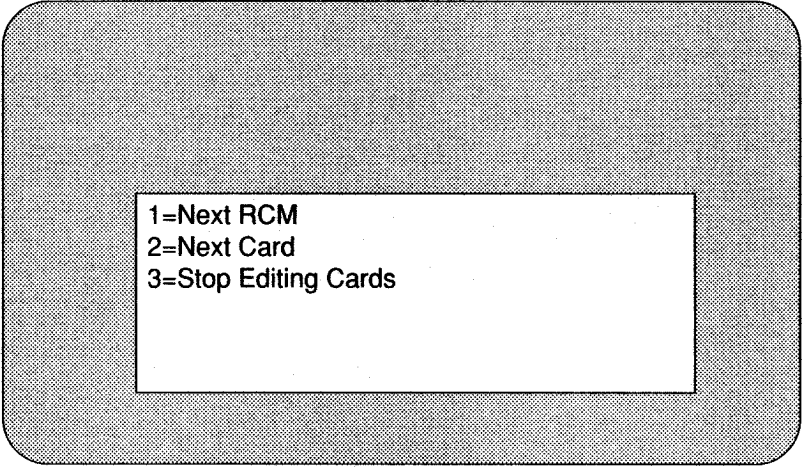
4. The menu then displays the following prompt:



RCM # Reader #  
0=Both Readers  
1=Reader One Only  
2=Reader Two Only

5. Enter the number of the desired Reader Module. Enter the desired reader(s) from which to delete the card(s).

6. The menu then displays the following prompt:

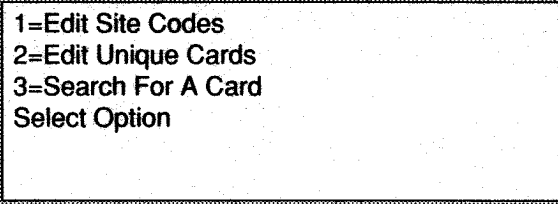


1=Next RCM  
2=Next Card  
3=Stop Editing Cards

7. Press the "1" key to delete the card(s) from another Reader Module. Press the "2" key to delete another card. Press the "3" key to return to the Main Menu.

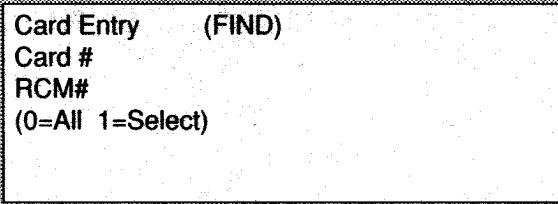
**To search for a card:**

1. Press the “Card” key on the Programmer. The Card Select menu then displays the following prompt:

A screenshot of a menu displayed on a screen. The menu is enclosed in a white rectangular box with a black border, which is itself centered within a larger, rounded gray rectangle. The text inside the box is as follows:

1=Edit Site Codes  
2=Edit Unique Cards  
3=Search For A Card  
Select Option

2. Press the “3” key on the Programmer for “Search For A Card.” The menu then displays the following prompt:

A screenshot of a menu displayed on a screen. The menu is enclosed in a white rectangular box with a black border, which is itself centered within a larger, rounded gray rectangle. The text inside the box is as follows:

Card Entry (FIND)  
Card #  
RCM#  
(0=All 1=Select)

3. Enter the desired card number. Press the “0” key to find the card in all Reader Modules. The menu then displays the status of the card in all Reader Modules and returns to the Main Menu. Press the “1” key to find the card in specific Reader Modules.

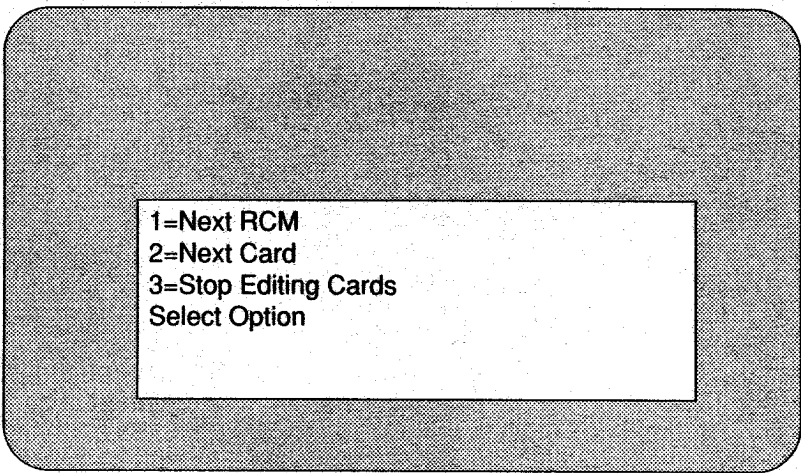
4. The menu then displays the following prompt:



RCM#

Enter the number of the desired Reader Module. The menu then displays the status of the card in the specified Reader Module.

5. The menu then displays the following prompt:



1=Next RCM  
2=Next Card  
3=Stop Editing Cards  
Select Option

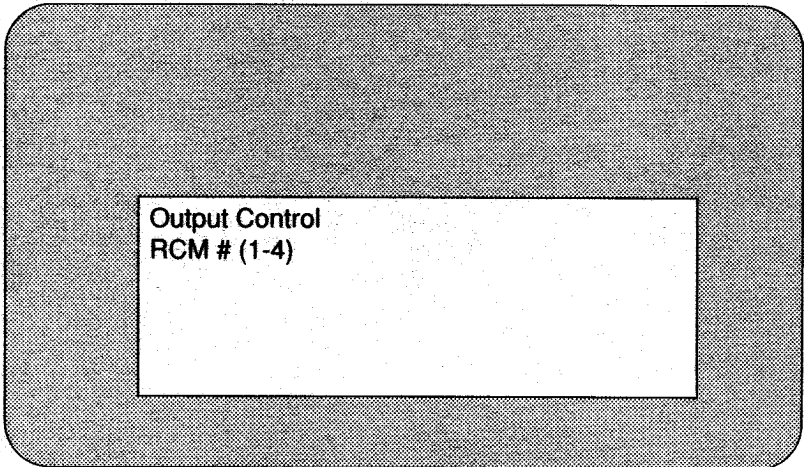
6. Press the “1” key to find the card in another Reader Module. Press the “2” key to find another card. Press the “3” key to return to the Main Menu.

## **Output Control**

To change the state of both relays on a Reader Module:

1. Press the “Output Control” key on the Programmer.

The menu then displays the following prompt:



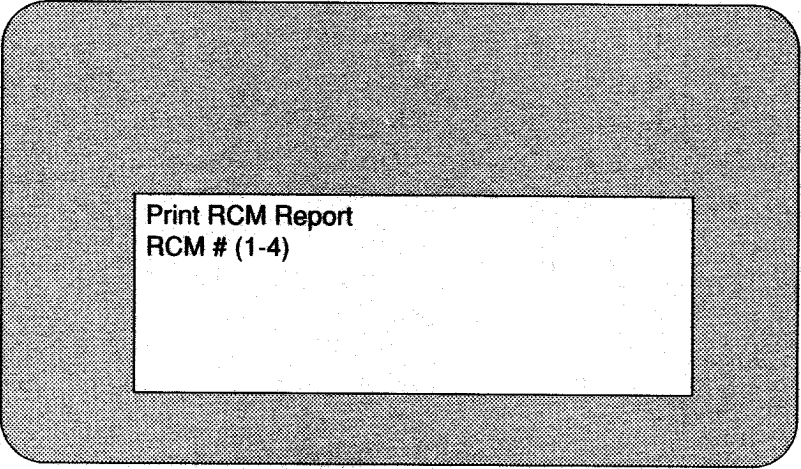
Output Control  
RCM # (1-4)

2. Enter the number of the desired Reader Module. Pressing the “Enter” key gives a default of all Reader Modules. The state of both relays on the Reader Module(s) then change.
3. The Programmer then returns to the Main Menu.

## Reports

To generate a card and timezone report for a Reader Module:

1. Press the "Report" key on the Programmer. The menu then displays the following prompt:



Print RCM Report  
RCM # (1-4)

2. Enter the number of the desired Reader Module. Pressing the "Enter" key gives a default of all Reader Modules. A card and timezone report is then sent to the printer.

3. The Programmer then returns to the Main Menu.

The following is an example of a card report for Reader Module #1:

### Card Report

Reader=	Site Code	Code Number	RCM=1
1	00010	*	
2	00020	*	
Both	00030	*	
1	*	06000	
2	*	07000	
Both	*	08000	

### Explanation:

- All Site Code 10 cards are valid at Reader #1
- All Site Code 20 cards are valid at Reader #2
- All Site Code 30 cards are valid at both readers

- Card #6000 is valid at Reader #1
- Card #7000 is valid at Reader #2
- Card #8000 is valid at both readers

The following is an example of a timezone report for Reader Module #1:

### **Time-Zone Report**

	Reader=	Start-time	Stop-time	RCM=1
<b>Card Time Zone:</b>	1	07:00	20:00	
Valid days: / Sunday / Monday / Tuesday / Wednesday / Thursday / Friday / Saturday				
<b>Door Time Zone:</b>	1	08:00	17:00	
Valid days: / Monday / Tuesday / Wednesday / Thursday / Friday				
<b>Card Time Zone:</b>	2	06:00	22:00	
Valid days: / Sunday / Monday / Tuesday / Wednesday / Thursday / Friday / Saturday				
<b>Door Time Zone:</b>	2	09:00	18:00	
Valid days: / Monday / Tuesday / Wednesday / Thursday / Friday				

### ***Explanation:***

-Door #1 is OPEN (unlocked) from 8:00 AM to 5:00 PM Monday through Friday.

-Door #2 is OPEN (unlocked) from 9:00 AM to 6:00 PM Monday through Friday.

2. The Programmer then returns to the Main Menu.

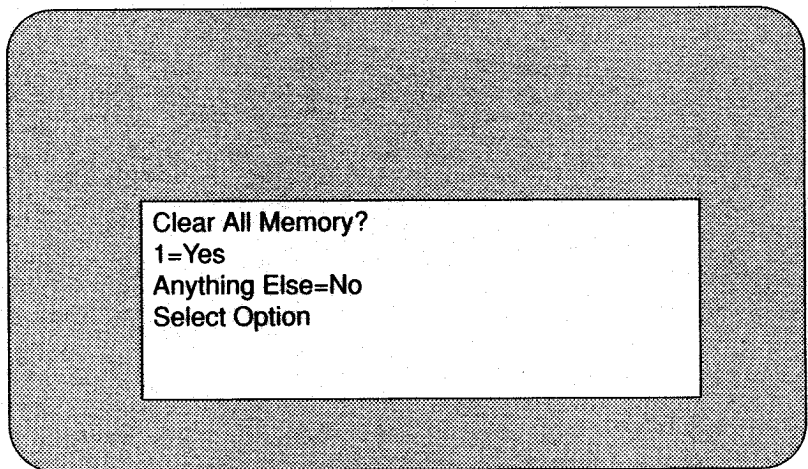
**The “Clear,” “Delete” & “\*” keys have the following functions:**

**Clear:**

From the Main Menu, press the “Clear” key to return to the Communication Setup display. When selected from any other menu, the “Clear” key returns the user to the previous menu.

**Delete:**

The “Delete” key returns the following prompt when selected from the Main Menu:

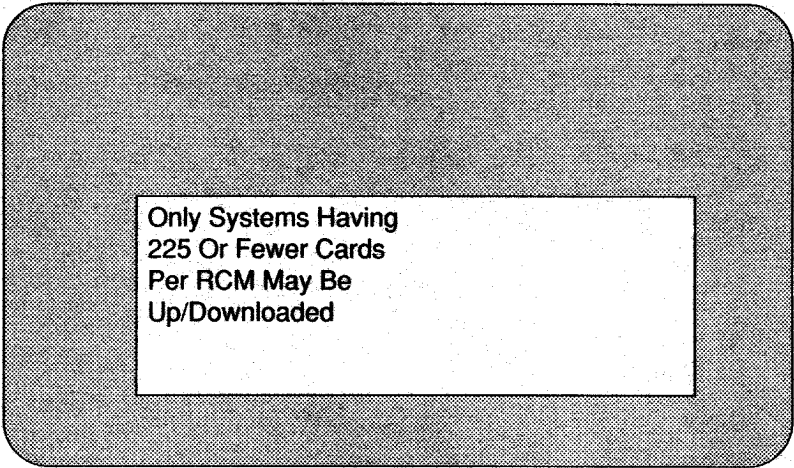
A screenshot of a device screen with a dark, textured background. In the center, there is a white rectangular box containing the following text:

Clear All Memory?  
1=Yes  
Anything Else=No  
Select Option

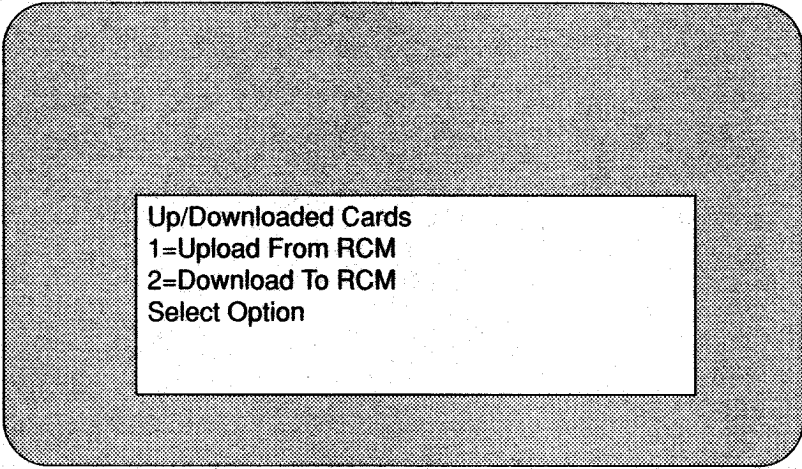
Press the “1” key to delete all memory from the Programmer.

**\*:**

The “\*” key returns the following prompts when selected from the Main Menu:



Only Systems Having  
225 Or Fewer Cards  
Per RCM May Be  
Up/Downloaded

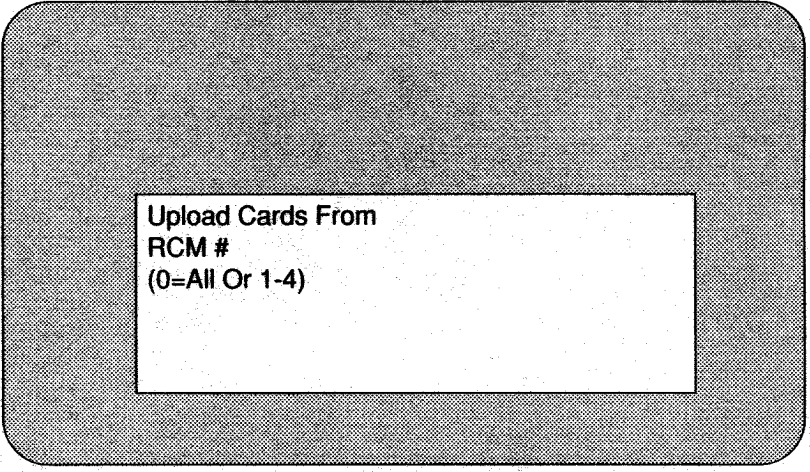


Up/Downloaded Cards  
1=Upload From RCM  
2=Download To RCM  
Select Option

Press the “1” key to upload data from the Reader Module(s) to the Programmer Module.



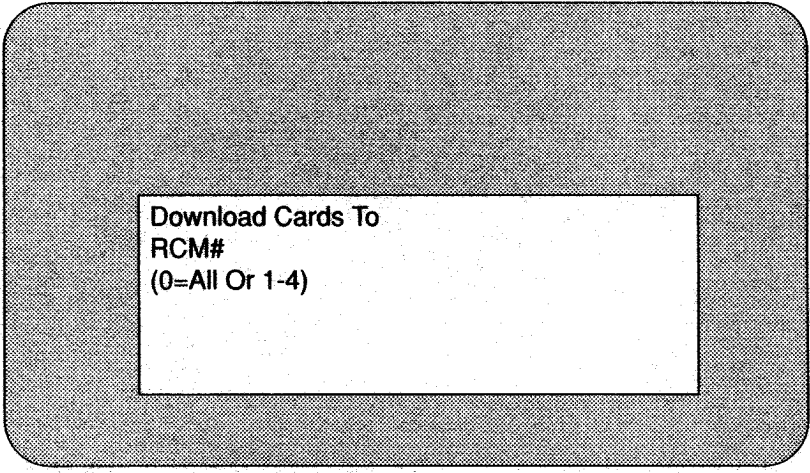
The menu then displays the following prompt:

A screenshot of a menu prompt displayed on a screen. The prompt is contained within a white rectangular box with a black border, which is itself centered within a larger, rounded rectangular frame with a gray, textured background. The text inside the box is as follows:

Upload Cards From  
RCM #  
(0=All Or 1-4)

Enter the number of the desired Reader Module.

Press the “2” key to download data from the Programmer Module to the Reader Module(s). The menu then displays the following prompt:

A screenshot of a menu prompt displayed on a screen. The prompt is contained within a white rectangular box with a black border, which is itself centered within a larger, rounded rectangular frame with a gray, textured background. The text inside the box is as follows:

Download Cards To  
RCM#  
(0=All Or 1-4)

Enter the number of the desired Reader Module.

# Appendix A

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## Distance Tables

**Reader Module to Printer Module, or  
Printer Module to Programmer Module, or  
Reader Module to Programmer Module, or  
Door Position Contacts/Egress Devices:**

<b>Gauge Cable</b>	<b>Distance</b>
18.....	2500 feet maximum
20.....	1400 feet maximum
22.....	800 feet maximum
24.....	500 feet maximum

**Reader Module to Reader/Keypad:**

<b>Gauge Cable</b>	<b>Distance</b>
18.....	500 feet maximum

**Printer Module to Printer:**

<b>Printer Type</b>	<b>Cable</b>	<b>Distance</b>
Serial .....	20 gauge, computer grade.....	100 feet max.
Parallel .....	Centronics parallel printer cable...	100 feet max.

# Appendix B

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## Card Programming Examples

### *Example #1:*

#### *Site code programming - adding site code*

- Given: -Want all site code 100 cards to be valid at reader #1  
-500 free memory locations at reader #1
- Method: -Set Switch 1 = ON  
-Set Switch 2 = OFF  
-Run any site code 100 card through reader #1
- Results: -All site code 100 cards are valid at reader #1  
-499 free memory locations at reader #1

### *Example #2:*

#### *Site code programming - deleting site code*

- Given: -Want to invalidate all site code 200 cards at reader #2  
-499 free memory locations at reader #2
- Method: -Set Switch 1 = ON  
-Set Switch 2 = OFF  
-Run any site code 200 card through reader #2
- Results: -All site code 200 cards are invalid at reader #2  
-500 free memory locations at reader #2

### *Example #3:*

#### *Unique code programming - adding unique code*

- Given: -Want card #900 to be valid at reader #1  
-400 memory locations at reader #1
- Method: -Set Switch #1 = OFF  
-Set Switch #2 = ON  
-Run card #900 through reader #1
- Results: -Card #900 is valid at reader #1  
-399 free memory locations at reader #1

### ***Example #4:***

#### ***Unique code programming - deleting unique code***

**Given:** -Want to invalidate card #800 at reader #2  
-100 free memory locations at reader #2

**Method:** -Set Switch 1 = OFF  
-Set Switch 2 = ON  
-Run card #800 through reader #2

**Results:** -Card #800 is invalid at reader #2  
-101 free memory locations at reader #2

### ***Example #5:***

#### ***Changing site code loaded cards to unique cards***

**Given:** -Cards #50-59 (all site code 700) valid at reader #1  
by site code  
-Want cards #50-59 to be valid at reader #1 by unique  
code  
-200 free memory locations at reader #1

**Method:** -Set Switch 1 = ON  
-Set Switch 2 = OFF  
-Run any site code 700 card through reader #1  
-Set Switch 1 = OFF  
-Set Switch 2 - ON  
-Run cards #50-59 through reader #1, one at a time

**Results:** -Cards #50-59 are valid at reader #1 by unique code  
-191 free memory locations at reader #1.

### ***Example #6:***

#### ***Changing unique cards to site code loaded cards***

- Given:**
- Cards #1800-1809 (all site code 50) valid at reader #2 by unique code
  - Want cards #1800-1809 to be valid at reader #2 by site code (50)
  - 400 free memory locations at reader #2
- Method:**
- Set Switch 1 = OFF
  - Set Switch 2 = ON
  - Run cards #1800-1809 through reader #2 one at a time
  - Set Switch 1 = ON
  - Set Switch 2 = OFF
  - Run any site code 50 card through reader #2
- Results:**
- All site code 50 cards are valid at reader #2
  - 409 free memory locations at reader #2

# Appendix C

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## **“Start to Finish” Installation Examples**

### **Example #1**

#### **Given:**

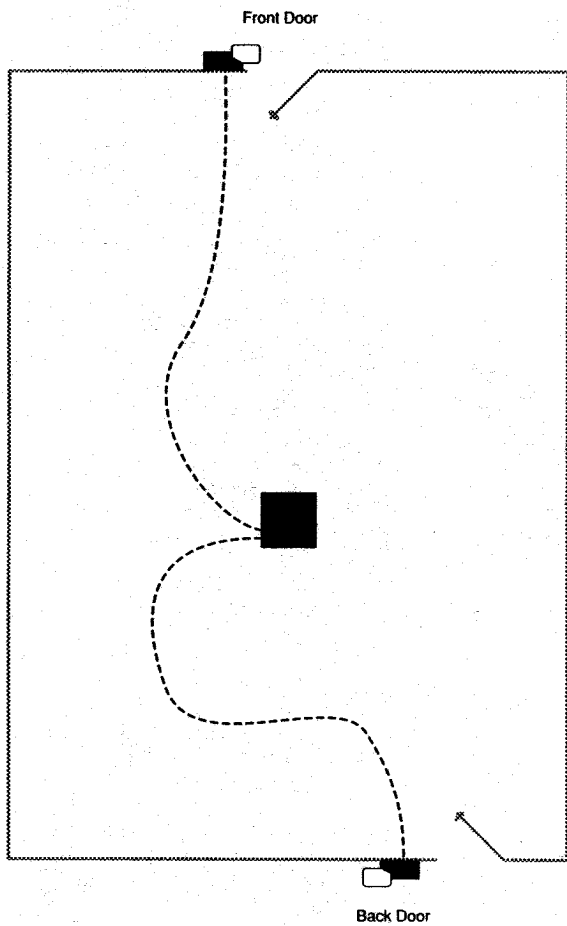
One building with front and back doors. Want to control access through each door with NR-1 card readers. Want 50 card holders to have access, 24 hours every day. Want to program cards by site code. No printout is needed. Want 10 second relay pulse and 20 door contact shunt time.

#### **Step 1: Equipment**

- 1 N-500 Reader Module
- 1 12 Volt AC or DC power supply (for N-500 and door strikes)
- 2 NR-1 card readers
- 50 NC-2 cards
- 2 Door position switches
- 2 Egress devices
- 2 Door locks
- Cable (see wiring diagrams for types)

## Step 2: Wiring

### Card Readers to Reader Module



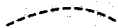
#### Legend



= NR-1 Card Reader

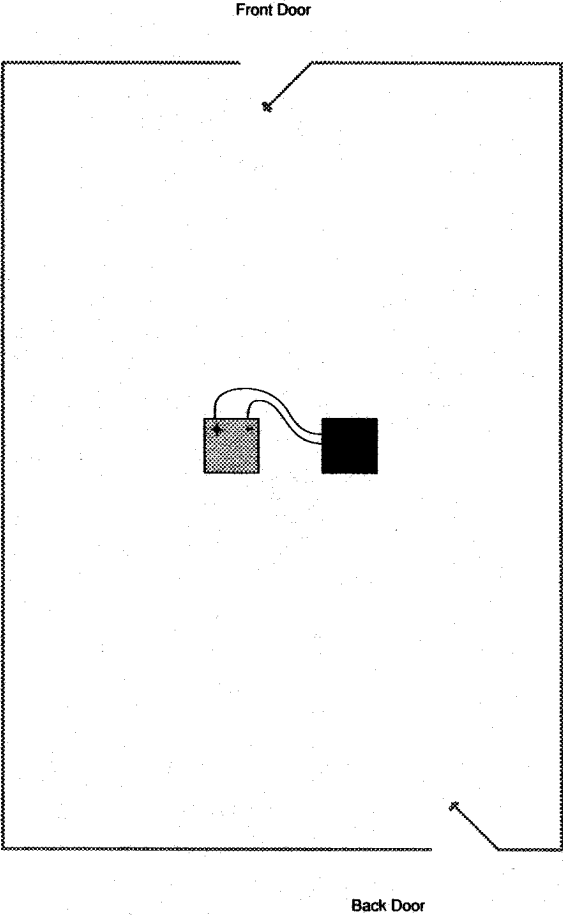


= Reader Module






= 5 Conductor 18 Gauge Shielded Cable

# 12VDC Power Supply to Reader Module

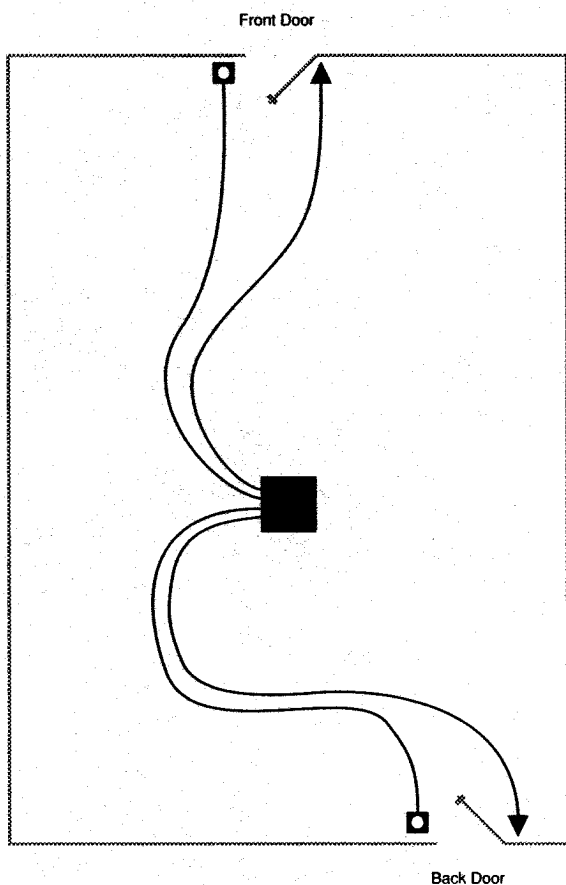


**Legend**

	= 12 VDC Power Supply		= Reader Module
		= Single-wire - 18 to 20 gauge	



## Egress Buttons & Door Position Switches to Reader Module

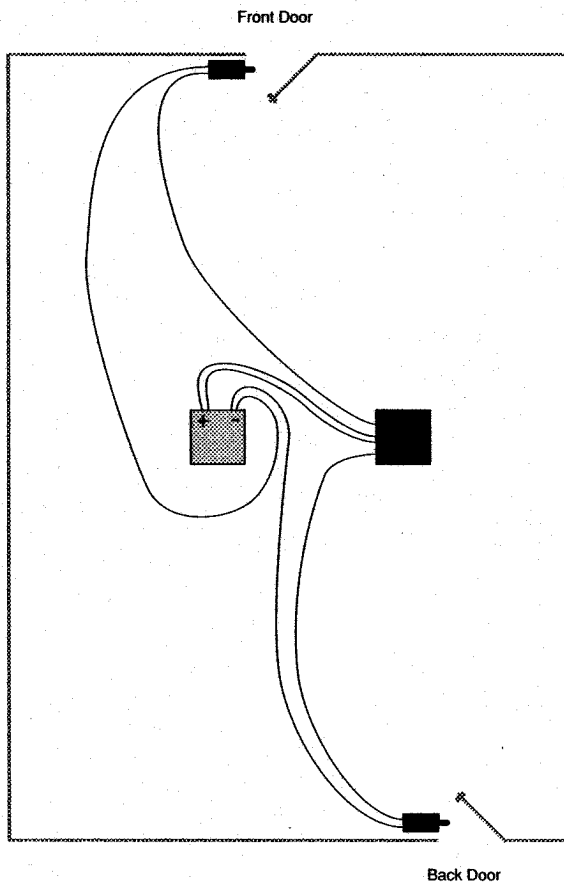


### Legend

□ = Egress Button    ▲ = Door Position Switch    ■ = Reader Module

— = Twisted Pair - 18 to 20 gauge cable

## Door Locks to Reader Module



### Legend



= 12 VDC Power Supply



= Door Lock



= Single-wire - 18 to 20 gauge

### **Step 3: Set Pulse/Shunt Times**

Set Switch 3 = ON

Set Switch 4 = OFF

Relay pulse time is now 10 seconds and door contact shunt time is 20 seconds.

### **Step 4: Set Switches 5 - 8**

Set Switch 5 = OFF      Anti-passback not used.

Set Switch 6 = OFF      No Printer Module.

Set Switch 7 = OFF      No Printer Module.

Set Switch 8 = OFF      No Programmer Module.

### **Step 5: Load Cards**

Set Switch 1 = ON

Set Switch 2 = OFF

Run any one of the 50 cards through reader #1.

Run any one of the 50 cards through reader #2.

Set Switch 1 = OFF to return to operating mode.

All 50 cards are now valid at both readers, 24 hours every day.

## Example #2

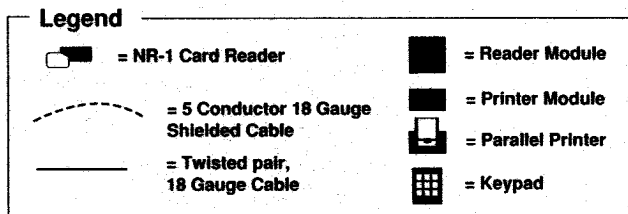
### Given:

One building with front and back exterior doors. One interior door to a computer room and one interior door to a storage room. Want to control access to exterior doors with NR-1 card readers. Want to control access to interior doors with keypads. Want 10 supervisors to have access to all four doors, 24 hours every day. Want 90 regular employees to only have access to the exterior doors, 24 hours every day. Want to program cards by unique code. Want 30 second relay pulse time and 60 second door contact shunt time on exterior doors. Want 2 second relay pulse time and 4 second door contact shunt time on interior doors. Activity logging is required.

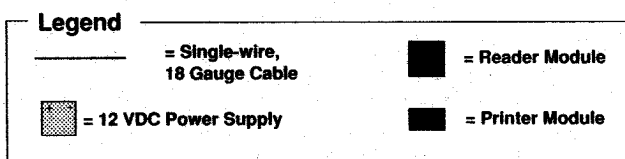
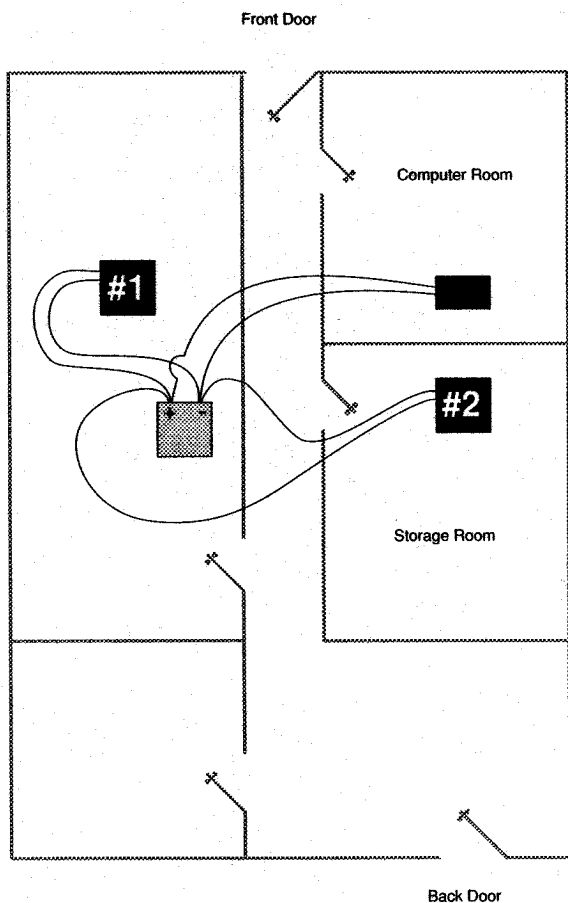
### Step 1: Equipment

- 2 N-500 Reader Modules
- 1 Printer Module
- 1 Parallel Printer
- 1 12 Volt AC or DC power supply
- 2 NR-1 card readers
- 2 KP-6 keypads
- 100 NC-2 cards
- 4 Door position switches
- 4 Egress devices
- 4 Door locks
- Cable (see wiring diagrams for types)

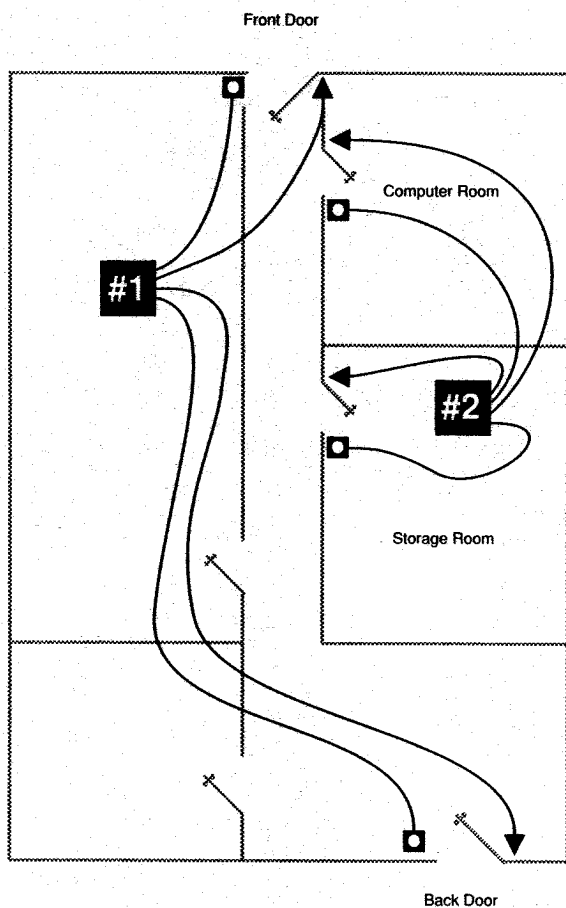
**Reader Modules to Printer Module,  
Printer Module to Printer  
Card Readers to Reader Module #1  
and Keypads to Reader Module #2**







# 12 VDC Power Supply to Reader Module and Printer Module



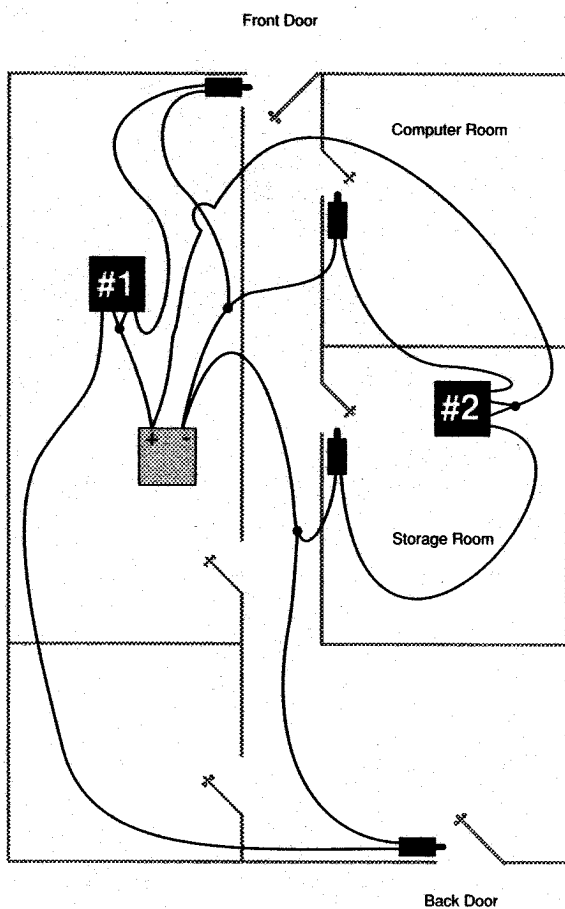
# Egress Buttons and Door Position Switches to Reader Modules



## Legend

-  = Egress Button
-  = Door Position Switch
-  = Reader Module
-  = Twisted Pair - 18 to 20 gauge cable

# Door Locks to Reader Modules



## Legend

— = Twisted pair,  
18 Gauge Cable

■ = 12 VDC Power Supply

■ = Reader Module

■ = Door Lock



### **Step 3: Set Pulse/Shunt Times**

**On Reader Module #1:**

Set Switch 3 = OFF

Set Switch 4 = ON

Relay pulse time is now 30 seconds and door contact shunt time is 60 seconds

**On Reader Module #2:**

Set Switch 3 = OFF

Set Switch 4 = OFF

Relay pulse time is now 2 seconds and door contact shunt time is 4 seconds.

### **Step 4: Set Reader Module Switches 5 - 8**

**On Reader Modules #1 and #2:**

Set Switch 5 = OFF      Anti-passback not used.

Set Switch 6 = OFF      Set Reader Module to Printer Module  
baud rate to 9600.

Set Switch 7 = ON      Enable Printer Module.

Set Switch 8 = OFF      No Programmer Module.

### **Step 5: Set Printer Module Switches**

Set Switch 1 = OFF      for a parallel printer.

Switch 2 not used.

Set Switch 3 = OFF      Set Reader Module to Printer Module  
baud rate to 9600.

Set Switch 4 = OFF      No Programmer Module.

Set Switch 5 = OFF      No Programmer Module.

Switch 6 not used.

Switch 7 not used.

Set Switch 8 = ON and jump restart pads on the Printer Module. The Printer Module then sends operational test information to the printer, to verify operation. Then return Switch 8 to the OFF position to return to Standard Mode.

## **Step 6: Load Codes**

### **On Reader Module #1:**

Set Switch 1 = OFFSet Switch 2 = ON

Run all 100 cards through reader #1, one at a time.

Run all 100 cards through reader #2, one at a time.

Set Switch 2 = OFF to return to operating mode.

All 100 cards are now valid at both readers, 24 hours every day, at Reader Module #1.

### **On Reader Module #2:**

Set Switch 1 = OFF

Set Switch 2 = ON

Enter 10 unique keycodes on keypad #1, each followed by the # key.

Enter the same 10 unique keycodes on keypad #2, each followed by the # key.

Set Switch 2 = OFF to return to operating mode.

These 10 keycodes are now valid at both keypads, 24 hours every day, at Reader Module #2.

## **Example #3**

### **Given:**

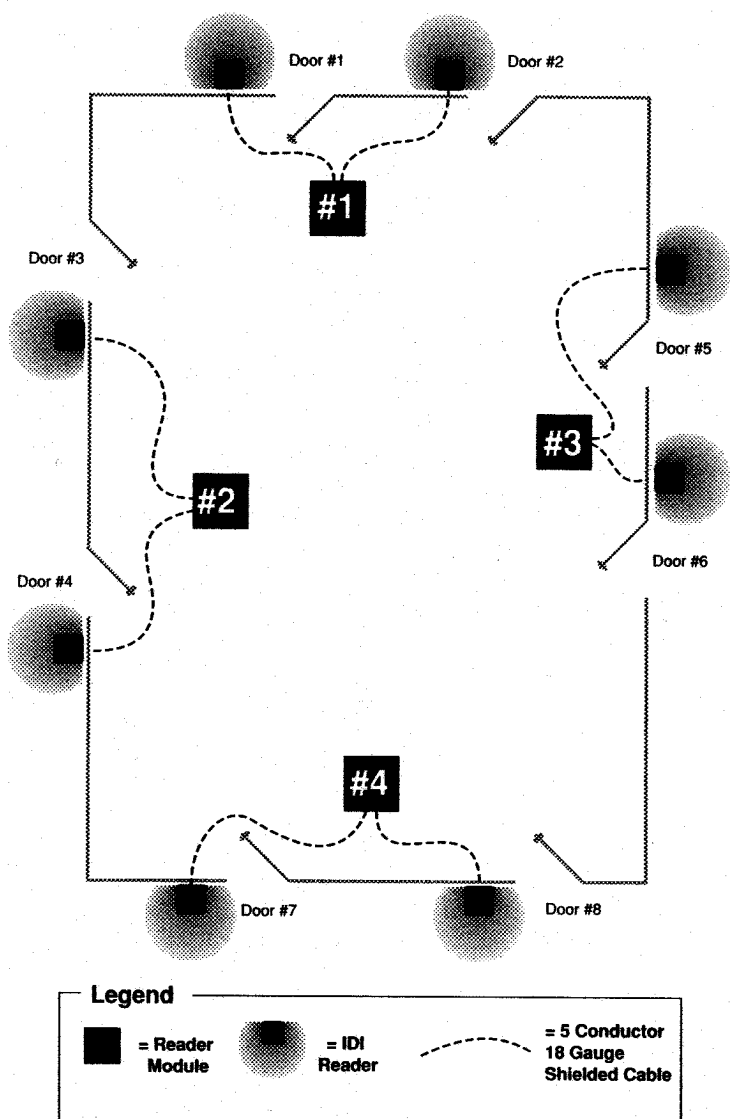
One building with eight exterior doors. Want to control access through each door with IDI proximity readers. Want 100 employees to have access through each door between the hours of 9:00 AM and 5:00 PM, Monday through Friday. Want 10 second relay pulse time and 20 second door contact shunt time on all doors. Activity logging is required.

### **Step 1: Equipment**

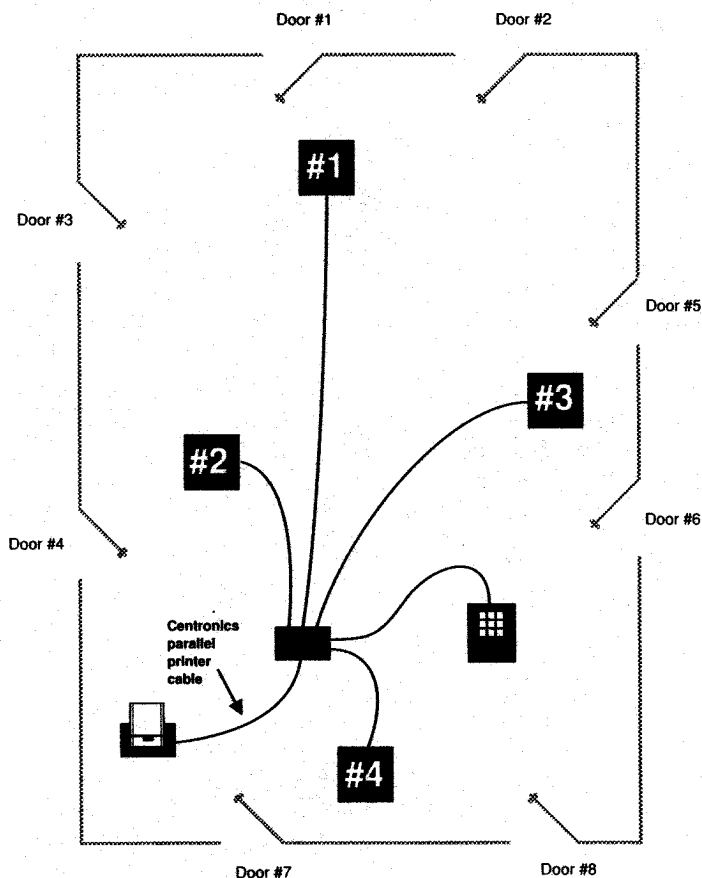
- 4 N-500 Reader Modules
- 1 Printer Module
- 1 Parallel Printer
- 1 Programmer Module
- 1 12 Volt AC or DC power supply
- 8 IDI proximity readers
- 100 PX-2-D IDI cards
- 8 Door position switches
- 8 Egress devices
- 8 Door locks
- Cable (see wiring diagrams for types)

## Step 2: Wiring

### Card Readers to Reader Module



# **Reader Module to Printer Module** **Printer Module to Printer and** **Printer Module to Programmer Module**



## **Legend**



= Reader Module



= Printer Module



= Parallel Printer

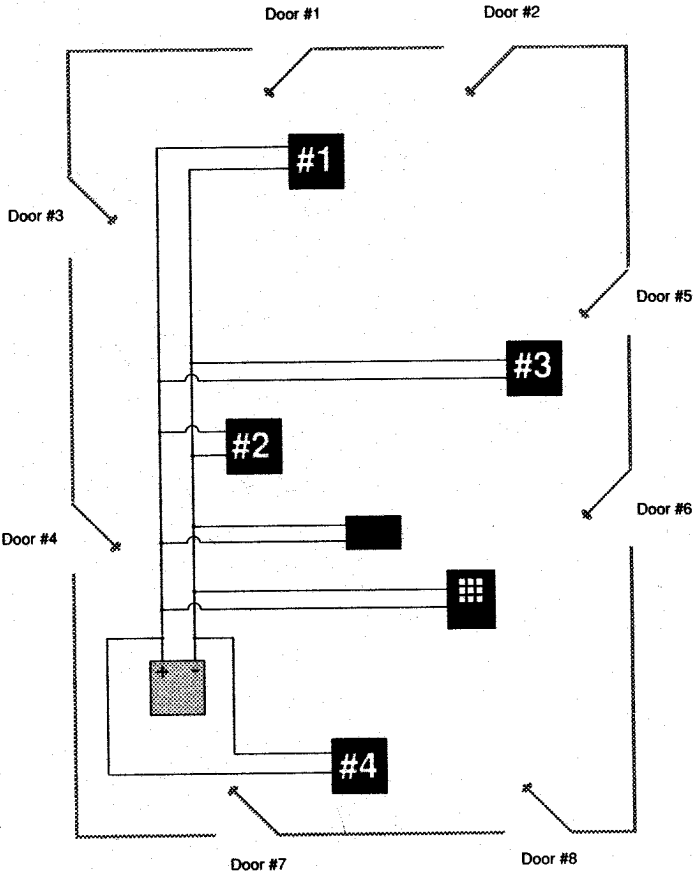


= Programmer Module



= Twisted Pair,  
18 Gauge Cable

# 12 VDC Power Supply to Reader Modules, Printer Module and Programmer Module



## Legend



= Reader Module



= Printer Module



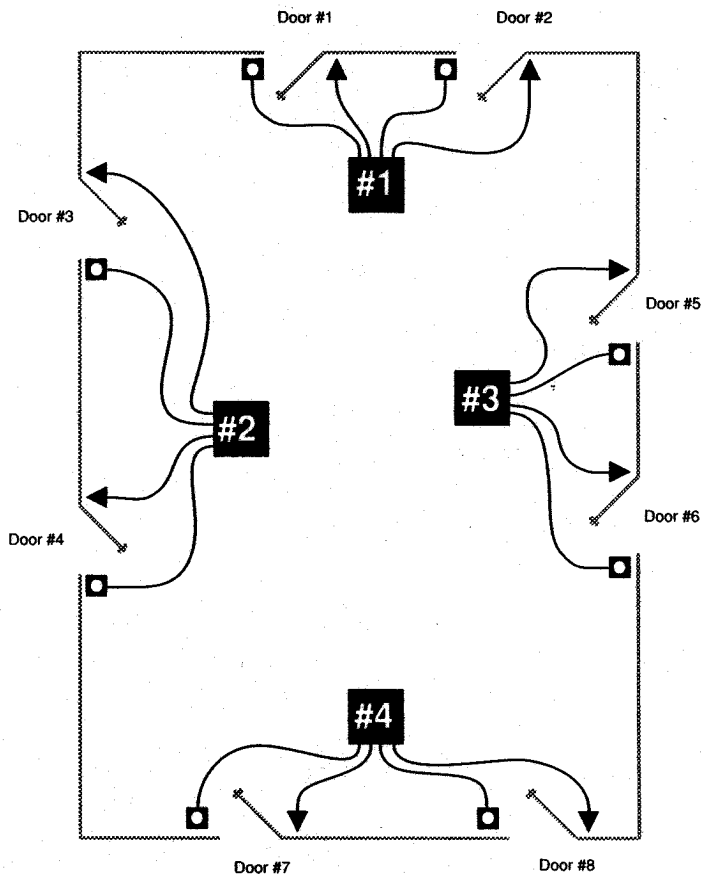
= 12 VDC Power Supply



= Programmer  
Module

= Single-wire,  
18 to 20 gauge cable

# Egress Buttons and Door Position Switches to Reader Modules



## Legend



= Reader Module



= Egress Button

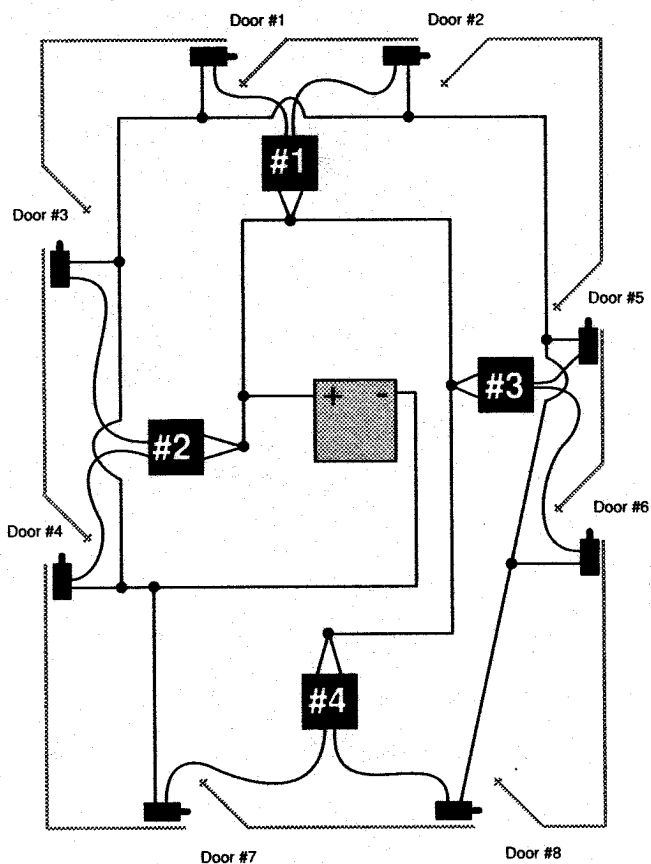


= Twisted Pair - 18 to 20 gauge cable



= Door Position Switch

# Door Locks to Reader Modules



## Legend



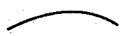
= Reader Module



= Door Lock



= 12 VDC Power Supply



= Single-wire  
18 to 20 gauge



### **Step 3: Set Pulse/Shunt Times**

On Reader Modules #1-4:

Set Switch 3=ON

Set Switch 4=OFF

Relay pulse time is now 10 seconds and door contact shunt time is 20 seconds.

### **Step 4: Set Reader Module Switches 5-8**

On Reader Modules #1-4:

Set Switch 5 = OFF      Anti-passback no used.

Set Switch 6 = OFF      Set Reader Module to Printer Module  
                                 baud rate to 9600.

Set Switch 7 = ON      Enable Printer Module.

Set Switch 8 = ON      Enable Programmer Module.

### **Step 5: Set Printer Module Switches**

Set Switch 1 = OFF for a parallel printer.

Switch 2 not used.

Set Switch 3 = OFF      Set Reader Module to Printer Module  
                                 baud rate to 9600.

Set Switch 4 = OFF      Set Printer Module to Programmer  
                                 Module baud rate to 9600.

Set Switch 5 = ON      Enable Programmer Module.

Switch 6      *Not used.*

Switch 7      *Not used.*

Set Switch 8 = ON and jump restart pads on the Printer  
Module.

The Printer Module then sends operational test information to the printer, to verify operation. Then return Switch 8 to the OFF position to return to Standard Mode.

### **Step 6: Set Time and Date**

Press the "Time/Date" key on the Programmer.

Enter the current time and date, as prompted by the menus.

### **Step 7: Set Timezone**

Press the “Timezone” key on the Programmer. Enter a 9 AM to 5 PM, Monday through Friday timezone, as prompted by the menus, as the “Card Timezone” for all eight readers.

### **Step 8: Load Cards**

Press the “Card” key on the Programmer. Enter all 100 cards for the “User-defined” timezones, at all eight readers, as prompted by the menus.

# Appendix D

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## Common Questions & Answers

**Question:** Which devices can be used with the N-500 Reader Module?

**Answer:** All Northern Computers, Inc. devices are compatible with the N-500 Reader Module, except KP-2 and KP-3 key-pads. See Section 3, "Hardware Specifications" for a complete list.

**Question:** Can I put two different types of devices on the same N-500 Reader Module?

**Answer:** Yes, any combination of compatible devices can be used with an N-500 Reader Module.

**Question:** Can the N-500 Reader Module supply power for my proximity readers?

**Answer:** No, the N-500 Reader Module only supplies +5VDC output. All proximity readers require a 12 Volt DC regulated power supply.

**Question:** Are format commands required to enable reader devices?

**Answer:** No, the N-500 Reader Module does not require any software commands to enable the reader devices. Upon initial power-up, the N-500 Reader Module recognizes cards when they are presented to the reader device, although they are invalid until programmed into memory.

**Question:** What is the code capacity of the N-500 Reader Module?

**Answer:** The N-500 Reader Module stores up to 500 codes per reader and can accept cards by site code group and/or unique card numbers, in any combination. See Section 8, "Stand Alone System" for N-500 memory description.

**Question:** What is the maximum number of cardholders for a single door?

**Answer:** An unlimited number of cardholders can be given access to a given door, if Site Code Programming is used. For example, if site code 50 is programmed for a given door, all cards with site code 50 will have access to the door.

**Question:** Can I adjust the relay pulse times and door position shunt times?

**Answer:** The relay pulse times and door position shunt times can be adjusted with Switches 3 and 4 of the Reader Module.

**Question:** How many doors can I control with one Programmer Module?

**Answer:** The Programmer Module supports up to four Reader Modules, via the Printer Module, allowing control of eight doors.

**Question:** Does jumping the restart pads on the Reader Module alter memory?

**Answer:** No, jumping the restart pads on the Reader Module only restarts the microprocessor and has no effect on memory.

**Question:** Are suppressor kits needed?

**Answer:** It is important to install suppressor kits with every electrical switching device run through a relay contact on the N-500 Reader Module. See Section 5, "Locks and Suppression" for installation information.

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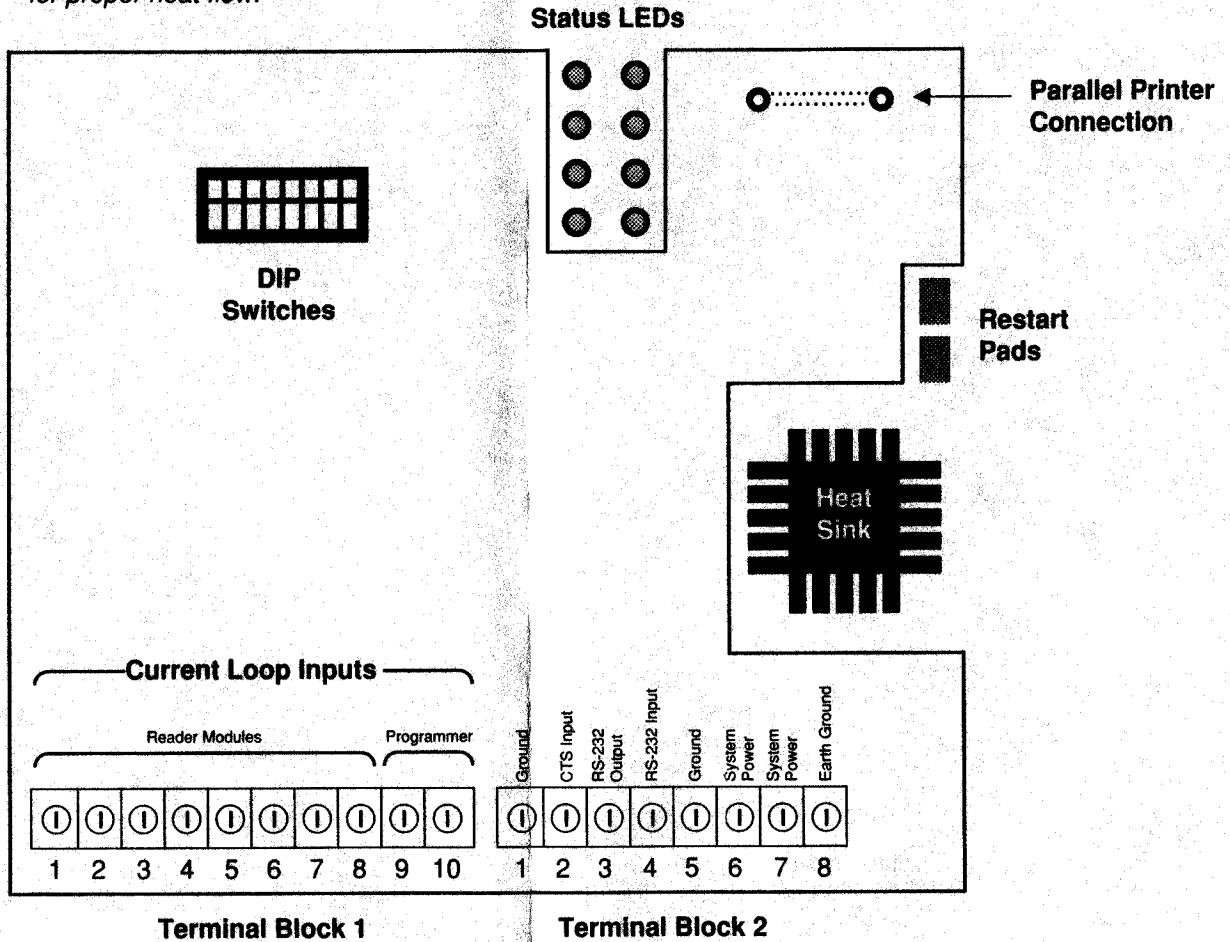
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# Printer Module Board Detail

*Board must be mounted with this end up for proper heat flow.*



# Reader Module Board Detail

