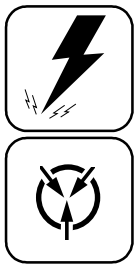
4009 IDNet™ NAC Extender Installation Instructions

Cautions and Warnings

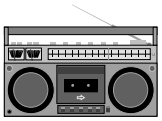
DO NOT INSTALL ANY SIMPLEX PRODUCT THAT APPEARS DAMAGED. Upon unpacking your Simplex product, inspect the contents of the carton for shipping damage. If damage is apparent, immediately file a claim with the carrier and notify Simplex.



ELECTRICAL HAZARD - Disconnect electrical power when making any internal adjustments or repairs. Servicing should be performed by qualified Simplex Representatives.

STATIC HAZARD - Static electricity can damage components. Therefore, handle as follows:

1. Ground yourself before opening or installing components (use the 553-484 Static Control Kit).
2. Keep components not mounted in the panel wrapped in anti-static material.



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

Introduction

The 4009-9201 (120VAC) or 4009-9301 (220/240VAC) IDNet™ Notification Appliance Circuit (NAC) Extender is a self-contained adjunct panel for use with Simplex Fire Alarm Control Panels (FACPs). The base version of the 4009 IDNet NAC Extender **(4009 IDNet)** is a single-board system consisting of four NACs, a power supply and charger, an IDNet slave interface, and two conventional NAC inputs for hardwired control (not applicable to the 4009 IDNet as an IDNet device). Option cards are available to provide the following additional capabilities:

- 4009-9808 Class A Adapter Option Card - allows fault tolerance in the case of open circuit wiring faults on the NACs.
- 4009-9807 NAC Option Card - adds four conventional Notification Appliance Circuits.
- 4009-9809 IDNet Repeater Option Card - regenerates and provides a power and distance boost for the IDNet channel. When IDNet Repeater Option Card is used, the fiber option is not available to the 4009 IDNet.
- 4009-9810 (Class B)/4009-9811 (Class A) Fiber Optic Receiver - receives IDNet communication over a fiber optic channel and regenerates the IDNet signal. The fiber option is used with the 4090-9105 (Class B)/4090-9107 (Class A) Fiber Optic Transmitter to form an IDNet fiber link.

In this Publication

Introduction, *continued*

The 4009 IDNet connects as an end-of-line device to a compatible notification appliance circuit from the host panel. It provides eight amperes of DC signaling power to either four or eight supervised reverse-polarity NACs, style Y or style Z. Alarms from the host panel signal the four (or eight) 4009 IDNet NACs to extend the alarm.

The 4009 IDNet can also minimize transmission line losses associated with sending large currents long distances within buildings. In a fire alarm system with the 4009 IDNet power supply and batteries for notification appliances are located near the actual notification appliances, saving system power and battery capacity while minimizing line losses.

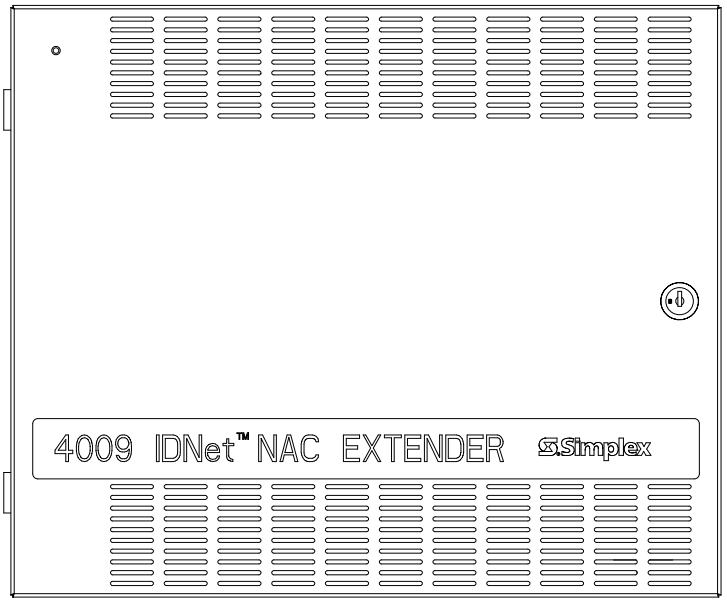


Figure 1. Simplex 4009 IDNet NAC Extender (4009 IDNet)

4009 IDNet Configuration

When the desired options have been installed in the 4009 IDNet, set the Hardware Configuration Switch SW1 to match the installed options (see Table 1). If the 4009 is not connected to IDNet, set SW1/Position 8 to **ON** for hardwire control (see paragraph "Hardwired 4009 IDNet Control"). The desired control options for the 4009 IDNet are set by the Software Configuration DIP Switch SW2 (see Tables 2 and 3).

When the 4009 IDNet is connected to IDNet, set the Hardware Configuration Switch SW1 (see Table 1) to match the installed options; and set SW1/Position 8 to **OFF** for IDNet addressable control (see paragraph "Addressable 4009 IDNet IDNet Control"). Set the IDNet address on SW2 using Figure 5 as a reference.

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4009 IDNet Configuration, *continued*

Hardwired 4009 IDNet Control

There are two hardwired NAC control inputs to the 4009 IDNet (when used as an IDNet device on a 4010 these inputs are not used). The hardwired NAC control inputs provide backward compatibility with other Simplex panels. In the hardwired mode, the 4009 IDNet is non-addressable and controlled via two DIP switches (Hardware Configuration Switch SW1 and Software Address/Configuration Switch SW2). Each input simulates a typical hardwired notification appliance, as seen from the host panel. When a fault occurs on the 4009 Addressable NAC system or on any of the outputs controlled by Input 1, the panel causes an open condition on the host NAC that is connected to Input 1. Any faults on the outputs controlled by Input 2 are reflected on the host panel's NAC in the same fashion. A power loss condition at the 4009 IDNet causes Input 1 to indicate a fault (open) condition.

Inputs 1 and 2 can be configured either as EOL devices on the host NAC or as appliances on that NAC, based on whether an end-of-line load is presented to the host. Up to four 4009 IDNet NAC Extenders can be attached to the FACP(s) NAC.

Addressable 4009 IDNet (IDNet Control)

The 4009 IDNet is addressable when configured as an IDNet peripheral; this mode is also configured via DIP switches SW1 and SW2. In the IDNet mode, SW2 (see Figure 5) sets the address of the NACs connected to the 4009 IDNet which are controlled and configured by the 4010 FACP. The 4009 IDNet monitors each output NAC. If a trouble occurs, faults (including NAC supervision, power, battery integrity, and earth) are communicated to the host panel 4010 FACP as IDNet messages.

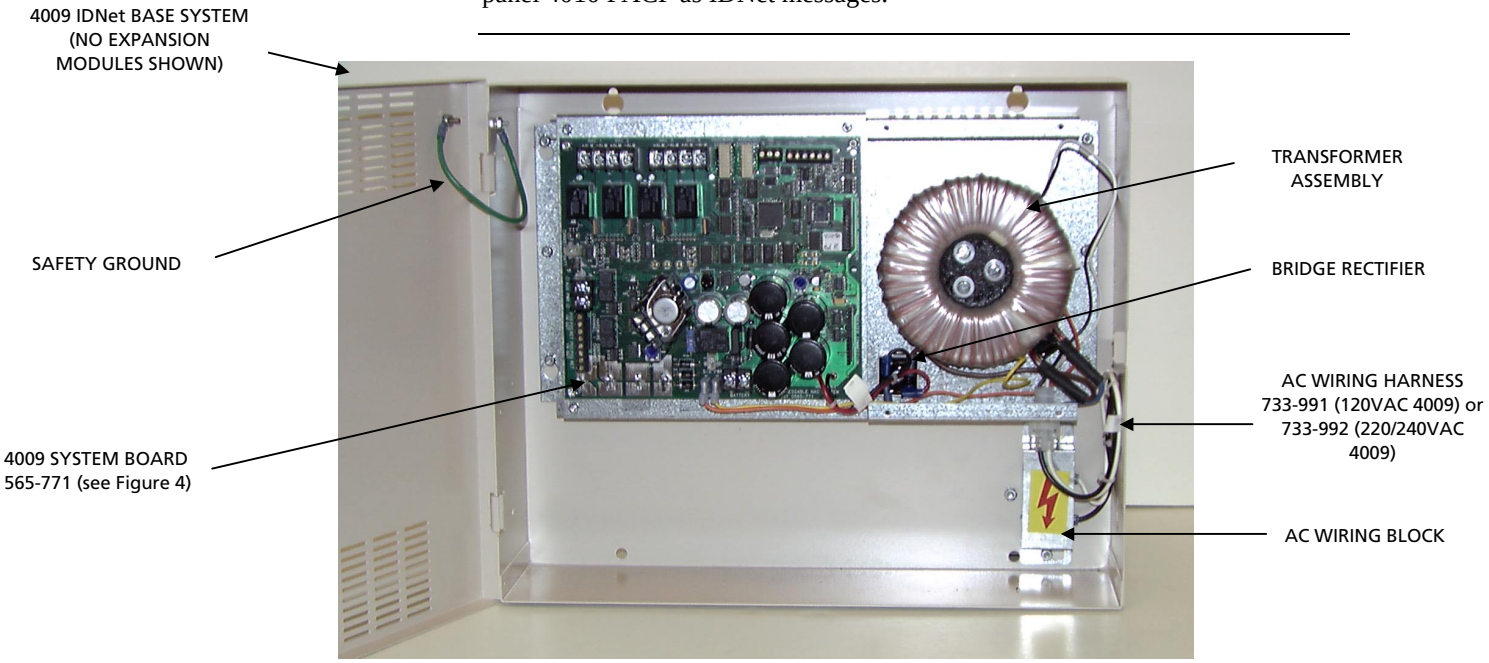

Figure 2. 4009 IDNet System Components

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Hardware Components

NAC (Notification Appliance Circuit) Outputs

The 4009 IDNet system board provides 4 hardwired NACs. NACs 1 through 4 are Class B, reverse polarity Notification Appliance Circuits. Each circuit has one polarity for supervision state and the opposite polarity for alarm state. Field wiring terminations are provided for 12 AWG - 18 AWG wire. Refer to the 842-068 Field Wiring Diagram for complete wiring, compatible appliances, current, and line distance information. Each circuit is capable of being independently controlled by the 4009 IDNet, as commanded by the host panel.

The notification circuits use a 10k end-of-line resistor for supervision. The circuit is monitored for short and open circuit line faults when in the standby (not energized) condition. In the event of a short circuit, the 4009 IDNet will not activate the NAC while the short circuit fault is present. During coded signal operation, the 4009 IDNet checks for a short during each "off", and holds the circuit off if a short is detected. Short and open circuit faults are reported to the host panel via the command channel (either IDNet or hardwired, depending on configuration) and can be identified by a blinking trouble LED on the 4009 IDNet during supervisory state.

The NACs are configurable as "Class A" circuits with the addition of an option card that plugs onto the base board. The option card also provides the additional field wiring terminations needed for Class A. The 4009 IDNet monitors for insertion of the Class A Option Card. The presence of the Class A Adapter Option Card must match the Hardware Configuration Switch (SW1) for proper operation (see Table 1).

In addition, when configured as an IDNet peripheral, each NAC has the ability, under software control, to disconnect its supervision, allowing earth fault isolation (this operation is also performed automatically as part of the power-up sequence).

Battery Charger

The battery charger charges lead acid batteries up to 18AH. Batteries are supervised for low/missing battery and depleted battery. The battery charger output remains disabled until a battery is sensed.

Battery Cutout Module (Canadian Version only)

The Canadian version of the 4009 IDNet NAC Extender includes a low battery cutout module and harness. The factory installed battery cutout module replaces the standard (US version) battery harness. The module disconnects the batteries if the terminal voltage drops below 19.3VDC during battery standby operation. Connection to the batteries is restored on resumption of AC power.

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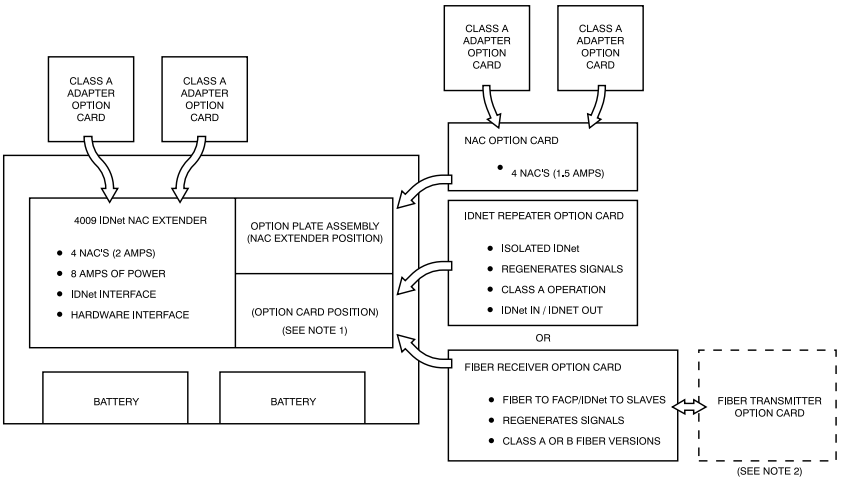
System Configuration

A functional block diagram depicting the interconnections between modules is shown in Figure 3. Alarm signal and 0V connections provide alarm and trouble operation. The host FACP can detect EARTH faults on any NAC signal.



Notes:

1. This option card position is for the IDNet Repeater Option Card or the Fiber Receiver Option Card.
2. The Fiber Transmitter Option Card is a remote connection and not part of the 4009 cabinet assembly.

Figure 3. 4009 IDNet Functional Block Diagram

System Switches and Indicators

Hardware Configuration DIP Switch SW1

The 8-position Hardware Configuration DIP Switch (SW1) is used to configure what hardware is present and supervised by the 4009 IDNet. For proper 4009 IDNet operation, SW1 must correspond with the hardware installed. The hardware configuration switch is located at the top edge of the system board (see Figure 4). The "ON" position of the switch indicates that the associated hardware (see Table 1) is configured to the 4009 IDNet. A trouble condition is reported to the FACP if hardware is configured, but not present or hardware is present but not configured. Dip Switch SW1/Position 8 controls how the 4009 IDNet receives it commands. When SW1/Position 8 is "ON", the 4009 IDNet receives commands from the control inputs. When SW1/Position 8 is "OFF", the 4009 IDNet receives commands from the IDNet channel.

Table 1. Hardware Configuration Switch SW1

Switch Number	Configured Hardware "ON" = Present
1	Class A Adapter for NAC 1 & 2
2	Class A Adapter for NAC 3 & 4
3	Class A Adapter for NAC 5 & 6
4	Class A Adapter for NAC 7 & 8
5	IDNet Repeater/Fiber
6	Not Used
7	NAC Option Card
8	Hardwired Control ("OFF" = IDNet Control)

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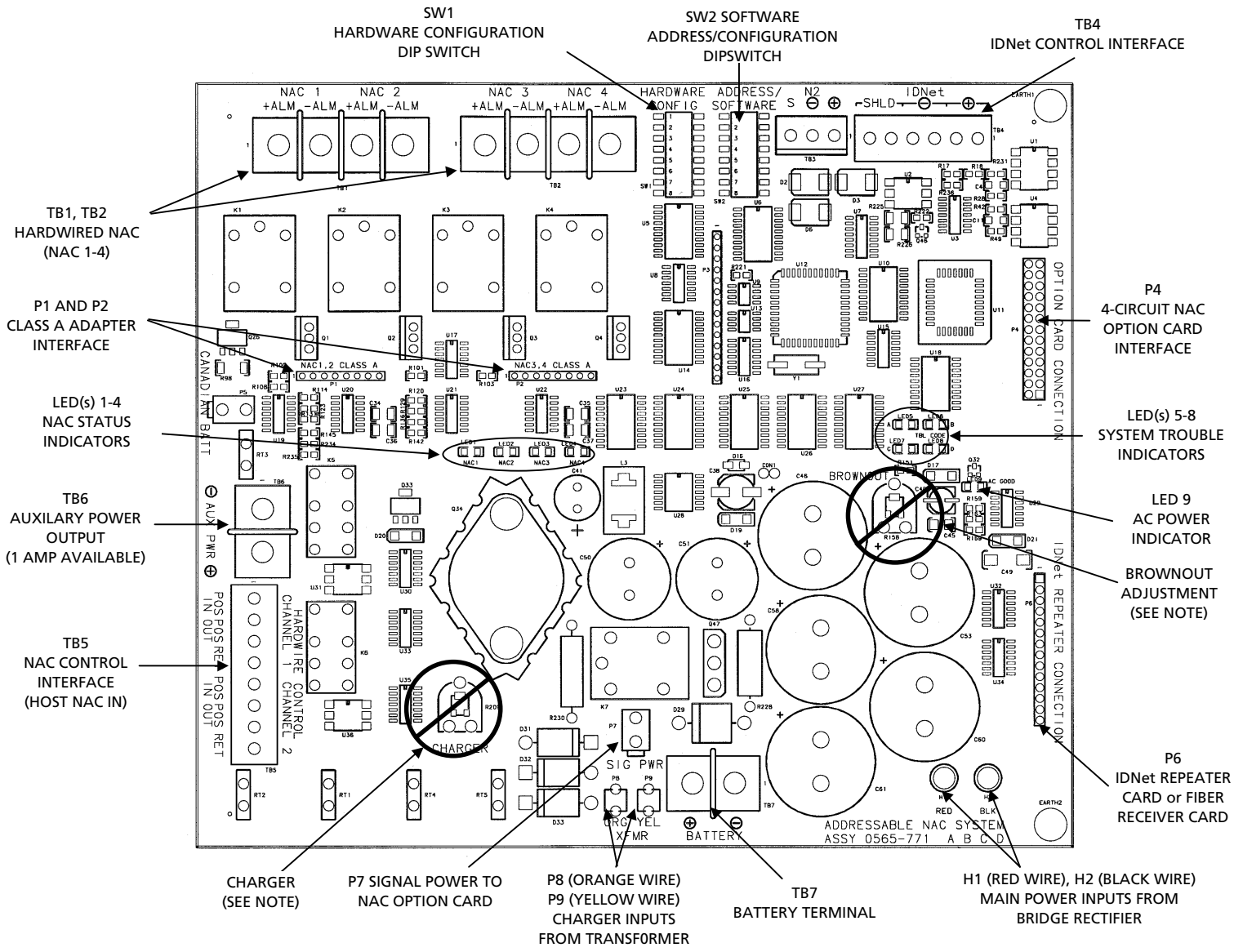

NOTE: BROWNOUT AND CHARGER ARE FACTORY ADJUSTMENTS, DO NOT MAKE FIELD ADJUSTMENTS ON THESE COMPONENTS.

Figure 4. 4009 IDNet System Board

System Switches and Indicators, *continued*

Software Address/Configuration DIP Switch SW2

The Software Address/Configuration Switch (SW2) is an 8-position DIP switch. The Software Configuration/Address Switch is located at the top edge of the system board. When the 4009 IDNet is operating as a addressable IDNet peripheral, this switch sets the IDNet address to which the 4009 IDNet responds. Each 4009 IDNet has a unique address (1 through 250). The address of the 4009 IDNet is set via the eight-position dip switch SW2, DIP switch position 1 is the least significant bit (LSB) and position 8 is the most significant bit (MSB). Set the 4009 IDNet address using Figure 5 as reference. Use a small screwdriver or pen to set the switches.

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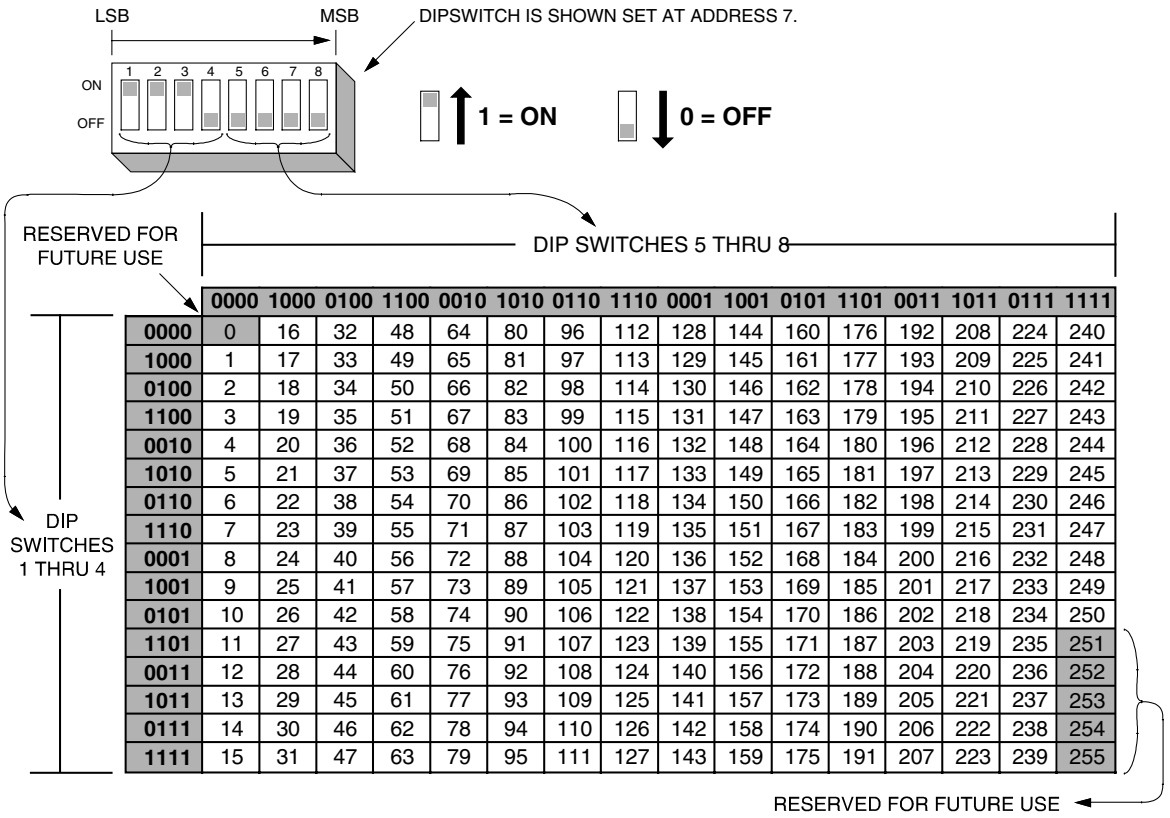
System Switches and Indicators, *continued*

Note: DIP switch in "1" position is "ON" while DIP switch in "0" position is "OFF".



	0000	1000	0100	1100	0010	1010	0110	1110	0001	1001	0101	1101	0011	1011	0111	1111
0000	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
1000	1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
0100	2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
1100	3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
0010	4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
1010	5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
0110	6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246
1110	7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
0001	8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
1001	9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
0101	10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
1101	11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
0011	12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
1011	13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
0111	14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
1111	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255

Figure 5. 4009 IDNet (IDNet Addressable Mode) Address Chart

When operating as a 4009 non-addressable NAC Extender (conventional 4009 mode), this switch (SW2) configures the operation of the output NACs, based on the state of the two NAC control inputs. Refer to table 2 and 3 for switch settings for NAC control operation.

Table 2. Software Configuration/Address Switch SW2

Switch Number	Mode of Operation (When "ON")
1-3	Control Mapping (See Table 3)
4	Insert Synchronized Strobe Signal onto NAC
5	Locally Generated Code Pattern: ON = March Time OFF = Temporal Code
6	Control Input 2: ON = Track, OFF = Code
7	Control Input 1: ON = Track, OFF = Code
8	ON = TrueAlert Non-Addressable NAC Operation OFF = Conventional NAC

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System Switches and Indicators, *continued*

Table 3. Control Mapping Switch Settings

DIP Switch SW2 Position			Host NAC Input	Power Distribution to NAC Circuits
1	2	3		
OFF	OFF	OFF	1	1,2 (5 & 6)
OFF	OFF	OFF	2	3, 4 (7 & 8)
ON	OFF	OFF	1	1 – 4
ON	OFF	OFF	2	5 – 8
OFF	ON	OFF	1	1 – 8
OFF	ON	OFF	2	None

NAC Status Indicators (LED(s) 1-4)

Each output NAC has a yellow LED (see Figure 4 for location of LEDs) to indicate a trouble condition or the active state of that NAC. The condition/state for the NACs are as follows:

- IN ALARM = NAC (1-4) LED "ON"
- IN SUPERVISORY = LED "OFF" (OK)
- SLOW FLASH (1 flash per second) = SHORT
- FAST FLASH (2 flashes per second) = OPEN

System Trouble Indicators (LED(s) 5-8)

The system trouble indicators consist of a bank of four yellow LEDs (see Figure 4 for location of LEDs) that are used to signify various trouble conditions within the 4009 IDNet system. Only one trouble at a time is indicated, highest trouble state indicated first. When that trouble clears, additional troubles, if present, will be indicated. Table 4 lists system troubles from highest trouble state (invalid configuration) to lowest trouble state (Normal).

Table 4. System Trouble Indicators

LED 5	LED 6	LED 7	LED 8	TROUBLE DESCRIPTION
OFF	OFF	OFF	ON	Invalid Configuration
ON	ON	ON	OFF	Diagnostic Test Fail
OFF	ON	ON	OFF	Software Failure
OFF	ON	OFF	OFF	Running on Depleted Battery
ON	OFF	OFF	OFF	Low/Missing Battery
ON	OFF	ON	OFF	Earth Ground Fault
ON	OFF	OFF	ON	NAC Trouble
OFF	OFF	ON	OFF	AC Power Loss
OFF	OFF	OFF	OFF	Normal

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System Switches and Indicators, *continued*

AC Power Indicator (LED 9)

This green LED indicates that AC power is present and is being used as the 4009 IDNet power source. The 4009 IDNet is switched to batteries whenever the green LED is "OFF".

CAUTION: The green AC LED indicates "Good AC Power". In the event of a brownout condition, the unit will switch to battery power but lethal voltages may still exist. DISCONNECT POWER BEFORE SERVICING.

4009 IDNet Option Interfaces

The 4009 IDNet supports several optional add-on cards. Connectors are provided on the base assembly of the 4009 IDNet System Board (565-771) to support the available option cards. Optional hardware **must be** configured with the Hardware Configuration DIP Switch SW1 for proper system operation.

Class A Adapter Option Card (565-789)

The Class A Adapter Option Cards (see Figure 4) plug into connectors P1 and P2 located on the 4009 IDNet system Board (see Figure 4). One Class A Adapter Option Card provides Class A/Style Z functionality on two NACs. Refer to the *4009-9808 Class A Adapter Option Card Installation Instructions (574-326)* for detailed information on installing this option card.

NAC Option Card (565-828)

The 4-ciruit NAC Card is an option card for the 4009 IDNet. Refer to the *4009 9807 NAC Option Card Installation Instructions (574-325)* for detailed information on installing this option card. The NAC option card provides four additional hardwired NACs to the 4009 IDNet base configuration of four NACs. Each of the four NACs on the NAC option card is functionally equivalent to the NACs on the 4009 system board, except that the option NACs are rated at 1.5 amps. The NAC option card plugs into connector P4 (see Figure 4) on the 4009 system board. The NACs are configurable as "Class A" circuits with the addition of Class A Adapter Option Cards that connect to the two Class A adapter connector interfaces located on the NAC Option Card. The NAC Option Card signal power for the four NACs is received from 4009 IDNet system board connector P7 (see Figure 4) using wiring harness 733-972.

IDNet Repeater Option Card (565-773)

The IDNet Repeater Card is an option card for the 4009 IDNet. The IDNet Repeater Option Card takes the IDNet signal that the 4009 IDNet receiver has received, and retransmits it on its output side at host panel IDNet levels. The IDNet Repeater Option Card is used in IDNet mode only (SW1/Position 8 OFF). Refer to the *4009 IDNet Repeater Option Card Installation Instructions (574-327)* for detailed information on installing this option card. The IDNet Repeater Option Card connects via a 14-pin header to 4009 IDNet system board connector P6 (see Figure 4).

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4009 IDNet Option Interfaces, *continued*

Fiber Receiver Card (565-903 Class B or 565-902 Class A) and Fiber Transmitter Card (565-901 Class B or 565-900 Class A)

The IDNet Fiber Transmitter and 4009 IDNet Fiber Receiver work together to form a fiber optic link from an IDNet run to a remote 4009 Addressable NAC. Refer to the *4009 Fiber Optic Link Installation Instructions (574-182)* for detailed information on installing this option card. The primary intent of the fiber optic link is to allow remote buildings (within 3,000ft.) to be connected to the IDNet channel, but to minimize susceptibility to electrical transients. The fiber optic link is made up of these two boards and the optical fibers. The 4009 IDNet Fiber Receiver Card receives power from, and communicates with the 4009 IDNet through 14-pin connector P6 (on the 4009 IDNet system board). The fiber receiver regenerates the IDNet channel for connection to other IDNet peripherals at the remote site.

The IDNet Fiber Transmitter is located on the FACP end of the fiber optic link and receives power (24VDC) from the host panel.

System Installation

General Information

Important: Notify the appropriate personnel (building occupants, fire department, monitoring facility, etc.) of the installation.

The following paragraphs contain material which is applicable to all 4009 IDNet systems. Be sure that you are thoroughly familiar with this material before installing your 4009 IDNet.

To help you with installation of this and other Simplex Fire Alarm equipment, the following publication is available for general reference: **How to Wire a Building for a Fire Alarm System (FA2-91-001 or 575-892)**.

Tools and Equipment Required

The following tools and equipment are required to install the 4009 IDNet:

- 1/4-inch flat-tip screwdriver, 8-inches long
- 1/8-inch flat-tip screwdriver, 4-inches long
- Volt-Ohmmeter
- Diagonal cutting pliers
- Wire strippers
- Listed end-of-line resistors (ordered seperately)
  10K resistor (733-804)
- Field Wiring Diagram 842-068.

General Notes

1. All wiring must be installed in accordance with local codes.
2. A minimum of 6 inches of free conductor is required at each electrical box to facilitate terminations.
3. A 12-inch service loop of cable is required for all continuous pulls through an electrical box.
4. All system wiring subject to physical damage must be mechanically protected based on the environment to which the cable is subjected.
5. A neatly wired system helps assure an accurate inspection of all connections and simplify troubleshooting.

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Mounting the 4009 IDNet

Note: The following pages provide a detailed description of the installation. If you experience problems that cannot be resolved, call your local Simplex Branch Office.

Use the following procedure when mounting a 4009 IDNet.

CAUTION: Read all instructions carefully before cutting conduit/service entrances and installing back box. Failure to comply with all installation requirements may result in a violation of UL or FCC regulations.

1. Carefully open the shipping container.
2. Remove the 4009 IDNet from the shipping container and lay the unit on a flat surface.
3. Unlock and open the panel door. Remove the electronic card cage assembly and store it in a safe dry area. Disconnect the AC wiring harness from the card cage before removing it from the box.
4. Determine the amount and proper location of conduit/service entrances (see Figure 6). Make all appropriate entrances into the back box.

   Power-Limited and Non-Power Limited wiring must enter through separate conduit/service entrances. AC power entrance into the back box is recommended at the bottom right side of the back box.

   Maximum intrusion into back box for conduit is ½ -inch.

Recommended Conduit Locations
Locate conduit entry approximately where shown.

- **A.** Class B or Class A Fiber Feed and AC Power
- **B.** Notification Appliance Circuits and IDNet
- **C.** Class A Fiber Return
- **D.** Notification Appliance Circuits and IDNet or Class A Fiber Return
- **E.** Control Inputs: IDNet or Notification Appliance Circuits

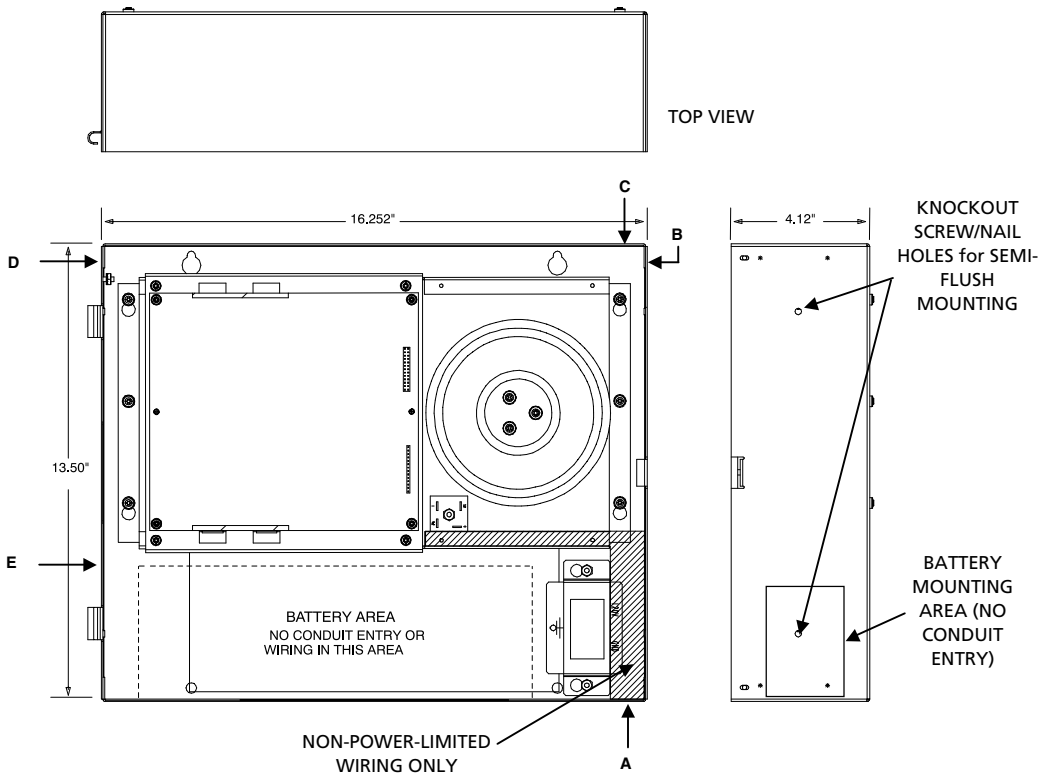

Figure 6. Installing the 4009 IDNet Back Box

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Mounting the 4009 IDNet, *continued*

5. Mount back box to wall. Back box must be level and plumb. For surface mounting use the teardrop and clearance holes located in the rear of the box and screw to wall.

6. Wire Non-Power-Limited wiring in the shaded areas only (see Figure 6), this includes AC input and battery connections. All other wiring is Power-Limited. Maintain at least ¼-inch spacing between all Power-Limited and Non-Power-Limited wiring.

7. Connect the AC wiring harness and install the electronic card cage assembly to the 4009 IDNet cabinet.

Wiring the 4009 IDNet

When wiring the 4009 IDNet, refer to the 842-068 Field Wiring Diagram, the 4009 IDNet NAC Extender Connection Diagram (Figure 7), and the following system wiring requirements.

- All wiring, except incoming power and ground connecting wires, must be free from grounds or shorts and have a resistance of one megohm, or higher, to EARTH.
- All wires are to be copper conductors only, except fiber cables. All equipment must be installed in accordance with the manufacturer's recommendations and the specifications and standards of the Authority Having Jurisdiction (AHJ). The installation of all wiring, cable, and equipment must be in accordance with NFPA 70.
- If shielded wire is used, the metallic continuity of the shield must be maintained and insulated throughout the entire length of the cable. The entire length of the cable must have a resistance of one megohm to earth.
- Splicing is permitted in accordance with NFPA 70. All wiring must be terminated with UL listed devices (e.g., wire nuts, pressure connectors). Wiring terminated with only electrical tape is not permitted. All splicing (free ends of conductors) must be covered with an insulation equivalent to that of the conductors.
- An appropriate system ground must be provided for earth detection and lighting protection devices. This connection shall be made to an approved dedicated earth connection per NFPA 70.
- When running wires to the 4009 IDNet, identify the wires appropriately: Only system wiring can be run in the same conduit which includes dedicated NAC wiring, IDNet wiring, 24V AUX wiring, and the four NAC circuits (an additional four NAC circuits are available as a field-installed option).

  Input power and external battery power are Non-Power-limited and cannot be run with Power-Limited system wiring.

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System Power Requirements

Model 4009-9201 NAC (120VAC System)

AC Input - 120VAC, 3 amperes, 60Hz

Battery Input - 24VDC, 8 amperes

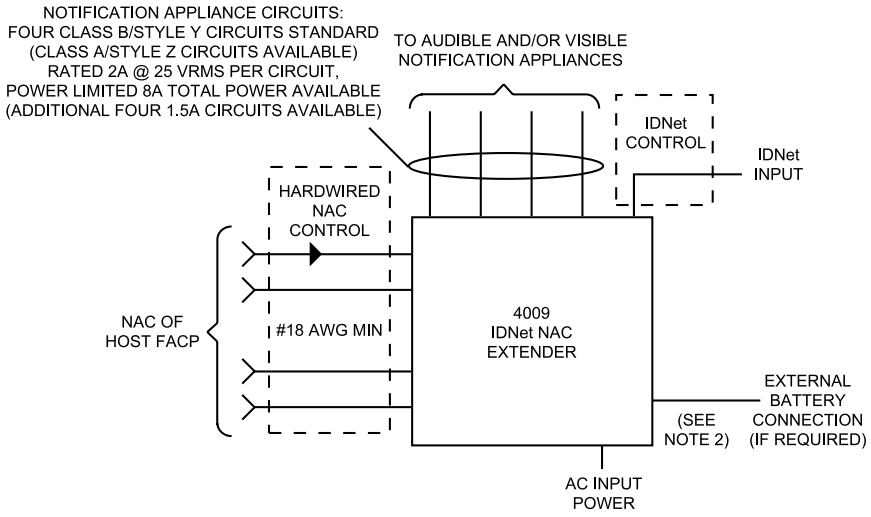
Notification Appliance Power Output - 24VDC, 8 amperes

Model 4009-9301 NAC (220/240 System)

AC Input - 220/240VAC, 1.5 amperes, 50/60Hz

Battery Input - 24VDC, 8 amperes

Notification Appliance Power Output - 24VDC, 8 amperes



Notes:

1. Refer to 842-068 Field Wiring Diagram for detailed information on 4009 IDNet System Wiring Configurations.
2. External Battery requires splicing into existing Battery harness (733-945), see Note 1.

Figure 7. 4009 IDNet NAC Extender Connection Diagram

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Mounting and Wiring Peripheral Devices

Refer to the 842-068 Field Wiring Diagram for detailed information, and the procedure listed below when installing the 4009 IDNet peripheral devices.

1. Determine the mounting locations of the peripheral devices and install system wires from the mounting location of each peripheral device to the 4009 system board. All wiring to be minimum 18 AWG, supervised, and Power-Limited.
2. Install all peripheral devices and connect them to appropriate wires. (Refer to the installation instructions packed with the devices.)
3. For 2-wire Class B/Style Y and 4-wire Class A/Style Z devices, a 10K, 1/2 W (Brown/Black/Orange) End-of-Line Resistor (EOLR) is provided. Refer to Field Wiring Diagram 842-068.

System Wiring Configurations

The base 4009 IDNet NAC Extender has the following system wiring configurations:

- 2-wire Class B/Style Y NAC (reverse polarity)
- 4-wire Class A/Style Z NAC (reverse polarity)
- Hardwired NAC Control Inputs from host FACP (Class A/Style Z & Class B/Style Y)
- Addressable IDNet Slave Interface (Class B/Style 4 and Class A/Style 6)
- Addressable IDNet Repeater Interface (Class B/Style 4 and Class A/Style 6)
- Addressable IDNet Fiber Receiver/Transmitter Interface (Class B/Style 4 and Class A/Style 6)