



# Installation and Operation Instructions

## GENERAL

The Network Access Module (NAM) is used to communicate with the Carrier Comfort Network (CCN) either from a remote network site via a modem and a PC or locally via a PC. The NAM provides access to the CCN for the purpose of data inquiry, troubleshooting, and configuration modification.

NOTE: When the NAM is used in conjunction with a modem, the following field-supplied modems are recommended: Hayes Ultra 96, Hayes Optima 96, Hayes Optima 2400, Hayes Accura 33.6, Hayes Accura 28.8, Hayes Accura 14.4, or Hayes 1200 (used in retrofit applications).

NOTE: The NAM does not support manual or automatic alarm dial-out capability. The NAM device operates in an answer-only mode.

The contents of the NAM kit package are listed in Table 1.

**Table 1 – NAM Contents**

ITEM	QUANTITY	PART NUMBER
NAM Circuit Board	1	CEAS230196
PC/Modem Cables (DB-9, DB-25)	1	956-410010-1
Metal Enclosure Base	1	—
Metal Enclosure Top	1	—
6-32 x 1/4-in. Slot Screw (self tapping)	4	—
6-20 x 1/4-in. Slot Screw (self tapping)	2	—
6-20 x 1-in. Oval Head Screw (self tapping)	2	—
Gasket/Grommet, Black Nylon	4	—
Shim/Standoff, Screw Mount	4	—

## INSTALLATION

### ⚠ WARNING

Do not wire NAM or modem with power connected. Do not connect power to NAM before installation is complete. Electrical shock could result.

To install the NAM, perform the following procedure:

- Mount 4 standoffs provided. Place the standoffs over the four holes in the enclosure base. See Fig. 1. Using the four 6-32 x 1/4-in. self tapping slot screws provided, screw into the standoffs to secure the standoffs to the enclosure base.

NOTE: Do not secure screws tight until after circuit board has been mounted onto the standoffs.

- Push 4 rubber grommets provided into holes in enclosure base until tabs lock the grommets in place. The flat edge of the grommet should be on the outside face

of the enclosure base and the grommets should protrude inward.

- Align the circuit board with standoffs. Push firmly until circuit board clicks into place. See Fig. 2. Tighten stand-off screws.
- For optional wall mounting, mount the enclosure base to the wall using the two 6-20 x 1-in. self tapping oval head slot screws provided. Make sure the base is mounted within 1.5 feet of the modem. The connection cord between the NAM and the modem is 1.5 feet long.
- Run power, communications, and modem/PC cables into enclosure base. Refer to Fig. 3 and 4 for cable installations. The DB-9 cord is used for local connections to the PC. The DB-25 cord is used for modem connections. Both cords can be connected, but only one can be used at a time. To minimize wiring reconnections, it is recommended that both cables be wired to the NAM (J3). See Fig. 3-5. See Tables 2 and 3 for pin connections.

In most applications, the modem connection will be the normal operating mode. When the system or site is being serviced locally, the modem cable should be disconnected from the servicing PC. These connections must be exclusive. Following the local service, the PC cable should be disconnected from the PC and the modem cable should be reconnected.

NOTE: When switching cable connections, the mode switch must be properly selected on switch block C, SW-6.

- With 24 VAC power wiring unconnected**, make wiring connections as shown in Fig. 3 and 4.
  - Connect network wiring or device bus wiring to network port on NAM (J2). Refer to correct wiring diagram (Fig. 3 or 4) for wiring network port.
  - Connect power wiring to AC power port on NAM (J1). The AC power LED should light when power is applied to the device. The ground should be connected to a suitable system ground.

**Table 2 – Pin Connections, NAM to Modem Cable**

MODEM CONNECTIONS FOR DB-25 CABLE			
Connector J3 On NAM		DB-25 Cable	
Pin	Function	Pin	Wire Color
1	Transmit	2	Green
2	Receive	3	Red
3	Signal Ground	7	Black
4	DTR	20	Orange
5	Carrier Detect	8	Grey

LEGEND

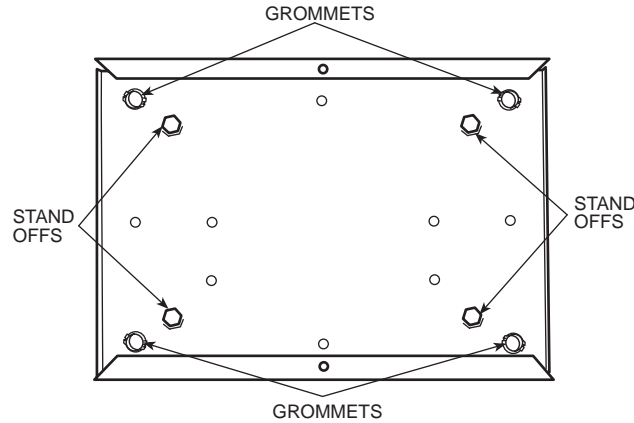
DTR — Data Terminal Ready

**Table 3 – Pin Connections, NAM to PC**

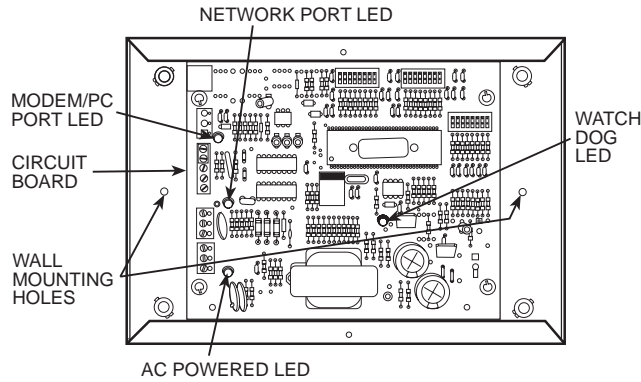
PC CONNECTIONS FOR DB-9 CABLE			
Connector J3 On NAM		DB-9 Cable	
Pin	Function	Pin	Wire Color
1	Receive	2	Green
2	Transmit	3	Red
3	Signal Ground	5	Black
4	DTR	Not Used	Not Used
5	Carrier Detect	Not Used	Not Used

**LEGEND**

**DTR** — Data Terminal Ready



**Fig. 1 — Standoff and Grommet Installation**



**LEGEND**

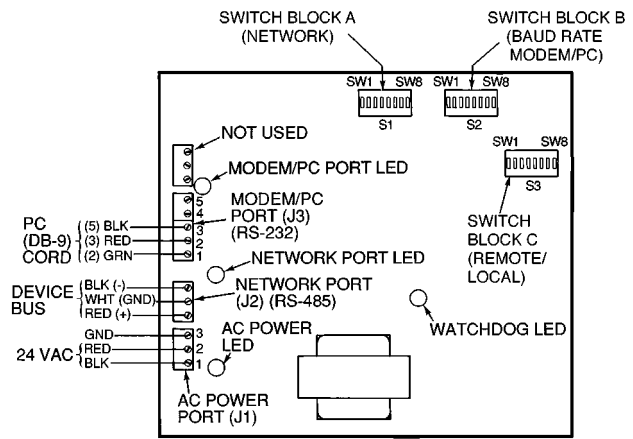
**LED** — Light-Emitting Diode

**Fig. 2 — Circuit Board Installation**

**7. Configure switch block settings of the NAM.**

**NOTE:** Switch block settings can be changed while the NAM is powered up. Changes will take effect immediately. Power does not need to be cycled after a switch block configuration change.

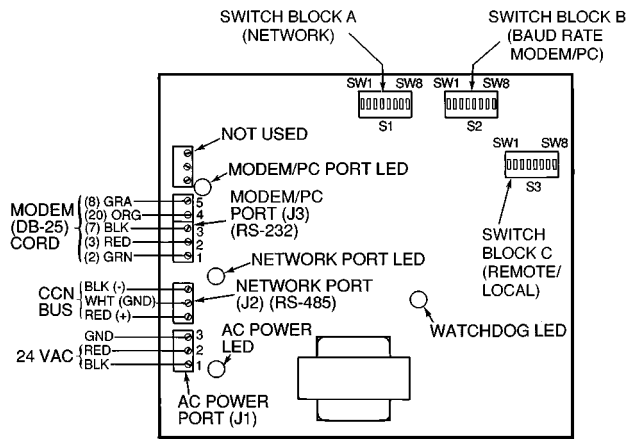
- a. Switch block A configures the network address and baud rate of the network connection. Switch block A has 8 switches. The 6 left switches configure the network address (SW1-SW6). The default is address 1. The 2 right switches configure the CCN network baud rate (SW7-SW8). The only valid network baud rate is 9600 baud. The default is 9600 baud. See Table 4 to



**LEGEND**

**CCN** — Carrier Comfort Network  
**LED** — Light-Emitting Diode  
**SW** — Switch

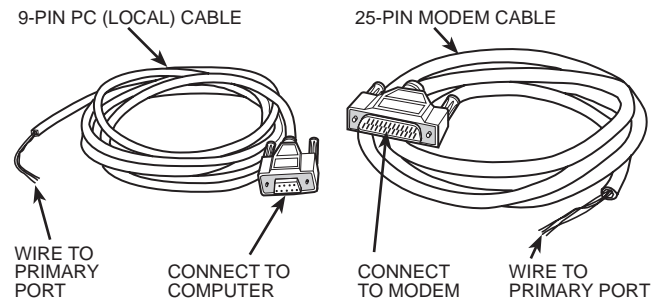
**Fig. 3 — Local (PC) Connections**



**LEGEND**

**CCN** — Carrier Comfort Network  
**LED** — Light-Emitting Diode  
**SW** — Switch

**Fig. 4 — Modem Connections**



**Fig. 5 — NAM Cables**

configure SW7-SW8 for the correct baud rate of the network connection. See Table 5 to configure the correct network address (1-63).

**NOTE:** All switches off (address 0), is not a valid network address.

**NOTE:** The NAM must be on the primary (bus = 0) bus of the CCN.

- b. Switch block B configures the access password and the PC/modem baud rate. Switch block B has 8 switches. The 6 left switches configure the network password (SW1-SW6). The default password is all switches set to OFF. The 2 right switches configure the secondary baud rate (SW7-SW8). The default is 2400 baud. See Table 4 to configure the correct baud rate. See Table 5 to reference valid password settings. This password must be configured to match the password configured in the Building Supervisor, ComfortWorks™, or Service Tool software. For the password, an OFF corresponds to 0, and an ON corresponds to 1, therefore a password of 110110 would be On, On, Off, On, On, Off.

NOTE: The password configured from the network access software will have 6 digits. The NAM password is limited to 6 digits.

- c. Switch block C is used to select the mode of operation. Switches SW1-SW5 and SW7, SW8 are not used. SW6 is used to set the mode (either modem or local mode). When SW6 is set to on, the NAM is in local mode. When SW6 is set to off, the NAM is in modem mode. The default is modem mode.
8. The modem associated with the NAM can be set up either by using the Comfort System software or terminal emulation software (such as Windows Terminal, Windows 95 Hyperterminal, or Procomm).
    - a. To send the modem configuration information using Comfort System software, select System Set Up. Select the Modem Configuration function and select Setup. The driver configuration screen will be displayed.

Configure the Remote Communications parameters. Set the COM port attached to the modem. Select the baud rate. The baud rate must match the baud rate configured on NAM switch block B, switches 7 and 8. Select Save to save the configured parameters and return to the Modem Configuration screen.

Enter the appropriate modem initialization string for the application, then select Initialize. This will send the strings to the modem. Use one of the following strings for 9600 baud operation:

AT&FENV1&C1&D2S0 = 1S37 = 9&W

or

AT&FE0N0V1&C1&D2S0 = 1S37 = 9&W

- b. To send the modem configuration information using terminal emulation software, first configure the terminal emulation software to the baud rate of the NAM. The baud rate must match the baud rate configured on NAM switch block B, switches 7 and 8. Make sure the modem COM port has been selected.

Type ATE1 and press enter. If the characters do not appear on the screen as they are typed, just continue to type the command and press enter. The ATE1 command will fix the display problem. After the command has been typed, a 0 or OK will be displayed. If the modem has been connected properly, the typed characters will now appear on the screen.

Enter the appropriate modem initialization string for the application. Press enter. The LEDs on the modem should flash and a 0 or OK will be displayed on the screen.

Use the following string:

AT&FN&C1&D2S0 = 1S37 = 9&W

With terminal emulation software, the proper transmission of the initialization string can be verified by sending an AT&V command to a Hayes compatible modem or an ATI4 command to a US Robotics compatible modem. This will cause the modem to send an active profile to the screen. The current configuration will be shown.

NOTE: If the baud rate is incorrect, the modem will still answer, but a "Gateway Not Responding" error will occur.

9. Install enclosure cover and secure using the two 6-20 x 1/4-in. self tapping slot screws provided.

**Table 4 – Baud Rate Switch Settings**

BAUD RATE	SWITCH BLOCK A AND B SWITCH SETTINGS	
	SW7	SW8
1200*	Off	Off
2400*	Off	On
4800*	On	Off
9600	On	On

\*For local mode, these settings are invalid.

**Table 5 – Device Address Switch Setting**

DEVICE ADDRESS	ADDRESS SWITCH SETTINGS (Block A) OR PASSWORD SWITCH SETTINGS (Block B)					
	SW1	SW2	SW3	SW4	SW5	SW6
1	On	Off	Off	Off	Off	Off
2	Off	On	Off	Off	Off	Off
3	On	On	Off	Off	Off	Off
4	Off	Off	On	Off	Off	Off
5	On	Off	On	Off	Off	Off
6	Off	On	On	Off	Off	Off
7	On	On	On	Off	Off	Off
8	Off	Off	Off	On	Off	Off
9	On	Off	Off	On	Off	Off
10	Off	On	Off	On	Off	Off
11	On	On	Off	On	Off	Off
12	Off	Off	On	On	Off	Off
13	On	Off	On	On	Off	Off
14	Off	On	On	On	Off	Off
15	On	On	On	On	Off	Off
16	Off	Off	Off	Off	On	Off
17	On	Off	Off	Off	On	Off
18	Off	On	Off	Off	On	Off
19	On	On	Off	Off	On	Off
20	Off	Off	On	Off	On	Off
21	On	Off	On	Off	On	Off
22	Off	On	On	Off	On	Off
23	On	On	On	Off	On	Off
24	Off	Off	Off	On	On	Off
25	On	Off	Off	On	On	Off
26	Off	On	Off	On	On	Off
27	On	On	Off	On	On	Off
28	Off	Off	On	On	On	Off
29	On	Off	On	On	On	Off
30	Off	On	On	On	On	Off
31	On	On	On	On	On	Off
32	Off	Off	Off	Off	Off	On

DEVICE ADDRESS	ADDRESS SWITCH SETTINGS (Block A) OR PASSWORD SWITCH SETTINGS (Block B)					
	SW1	SW2	SW3	SW4	SW5	SW6
33	On	Off	Off	Off	Off	On
34	Off	On	Off	Off	Off	On
35	On	On	Off	Off	Off	On
36	Off	Off	On	Off	Off	On
37	On	Off	On	Off	Off	On
38	Off	On	On	Off	Off	On
39	On	On	On	Off	Off	On
40	Off	Off	Off	On	Off	On
41	On	Off	Off	On	Off	On
42	Off	On	Off	On	Off	On
43	On	On	Off	On	Off	On
44	Off	Off	On	On	Off	On
45	On	Off	On	On	Off	On
46	Off	On	On	On	Off	On
47	On	On	On	On	Off	On
48	Off	Off	Off	Off	On	On
49	On	Off	Off	Off	On	On
50	Off	On	Off	Off	On	On
51	On	On	Off	Off	On	On
52	Off	Off	On	Off	On	On
53	On	Off	On	Off	On	On
54	Off	On	On	Off	On	On
55	On	On	On	Off	On	On
56	Off	Off	Off	On	On	On
57	On	Off	Off	On	On	On
58	Off	On	Off	On	On	On
59	On	On	Off	On	On	On
60	Off	Off	On	On	On	On
61	On	Off	On	On	On	On
62	Off	On	On	On	On	On
63	On	On	On	On	On	On

## OPERATION

After all the devices on the communication network have been addressed correctly, the computer or modem is connected and configured, and the power has been applied, verify proper operation of the NAM by performing the appropriate following procedures.

### Modem Mode

1. Verify 24 VAC is supplied to the NAM. Light-emitting diode (LED) D17 (red) should be illuminated. If LED D17 is not on, connect power before proceeding.
2. Verify the D4 (red) LED indicator on the NAM is blinking. If the LED is not flashing (about once per second) the NAM module has failed.
3. Verify the mode switch, block "C," SW6 is set to OFF for modem mode operation.
4. Verify the NAM address switches, block "A," SW1-SW6, are set to a valid (1-63) and unique address on the CCN to which the NAM is connected.

NOTE: All switches configured to OFF (0), is NOT a valid network address.

5. Verify the CCN network baud rate switches, block "A," SW7 and SW8, and modem baud rate switches block "B," SW7 and SW8 are set to the proper baud rate. Refer to Table 4. Valid baud rates for the secondary port in modem mode are 1200, 2400, 4800, and 9600. The network baud rate must be set to a 9600 baud rate. The secondary port must be configured to the same baud rate as the connected modem, or the NAM will not respond.
6. If network access software is available and connected to the same network as the NAM, verify the NAM is communicating by attempting to add/upload the NAM. If the NAM uploads successfully, the NAM is properly communicating on the network.

NOTE: The Control ID table of the NAM is the only table visible with the software.

7. Before connecting a modem to the NAM's secondary port, be sure the modem is properly configured.
  - a. The NAM must be configured to the same baud rate as the modem. Modem initialization strings must be sent to the modem at the same baud rate as the NAM configured baud rate.
  - b. For a typical Hayes modem (14.4 or 28.8 baud), the following string is recommended to configure the modem to receive calls with a NAM at 9600 baud.

AT&F

ATE0&C1&D2&K0S0 = 1S37 = 9

The E0 setting configures the modem not to echo any characters sent by the NAM to the modem.

The &C1 setting configures the modem for Carrier Detect (CD). When the modem synchronizes signals with another modem and a good carrier signal is reached, the CD LED on the modem will light. The &C1 configures the modem to report a CD condition to the terminal. The signal is reported via the grey wire connected to terminal 5. To check operation, measure voltage with a voltmeter between terminals 5 and 3. The voltmeter should measure + 10.0 VDC with no CD and -10.0 VDC with CD. A setting of &C0 will send -10.0 VDC continuously.

The &D2 setting configures the modem to look for the Data Terminal Ready (DTR) on the orange wire at pin 20. This signal indicates that the modem has a terminal attached. The TR LED on the modem will light. When switch 6 in terminal block C of the NAM is off, the NAM puts 8 VDC to the orange wire through terminal 4. This signal can be measured with a voltmeter between terminals 4 and 3. To test, toggle switch 6 of terminal block C on and off. The TR LED should light up and turn off.

The &K0 setting disables error checking on the modem.

The S0= 1 configures the modem to answer on the first ring.

The S37= 9 command configures the modem to operate and synchronize with other modems at 9600 baud.

Use the &W0 command to save the active modem configuration in the user profile. Use the &Y0 command to specify this user profile as the configuration to recall when the modem is powered up.

Be sure to record the final settings of the modem so they can be recalled in the event the modem loses this configuration.

Ensure the phone line is connected to the modem.

Test the phone line and NAM/modem configuration by calling the modem.

8. Connect the configured modem to the NAM. Verify the NAM secondary baud rate switches (block B, SW7 and SW8) match the configured baud rate the modem.
  9. Set the NAM password switches (block B, SW1-SW6) as required. This password must match the correct password in the Building Supervisor, ComfortWorks™, or Service Tool software. Read access is permitted regardless of a password match.
- NOTE: If all password switches are configured OFF, the password is 000000. An identical password match will allow write access to the network. The password configured from the Building Supervisor or Service Tool will have 6 digits. The NAM password is limited to 6 digits.
10. With a Building Supervisor and an Autodial Gateway or Service Tool with modem, initiate a call to the NAM. The modem should answer and a connection should be established. If the modem answers, but a connection is not established, check the following: baud rate configuration or a cabling error between the modem and the NAM.

11. If a connection is successfully established, devices on the remote network may be accessed by control software. If an attempt to write data to a device on the remote network fails, but data from the device can be read, the problem is probably an incorrect password match.
12. Modem connections will be as reliable as the phone lines and modems which are used. If a connection is lost (e.g., noise on the line, loss of Carrier Detect, or hang up issued from the initiating modem), the NAM will reset the modem and be ready to receive the next incoming call immediately. In the unlikely event of a major malfunction, the NAM's internal logic will time out in approximately 5.4 minutes. If a difficulty is experienced connecting to a NAM, wait 6 minutes and try again.

**Local Mode** – Local mode is used to connect a computer directly to the network to service or monitor devices. The NAM serves as a protocol converter (RS-232 to RS-485), allowing the computer to connect to the network via its serial port.

1. If a modem is connected to the NAM, disconnect the NAM modem cable from the modem. Connect the NAM PC cable to the computer's DB-9 port. If the computer has a 25-pin serial port, then a 9-pin to 25-pin adapter is required. The 25-pin modem cable cannot be used.
2. Verify 24 VAC is supplied to the NAM. Light-emitting diode (LED) D17 should be illuminated. If LED D17 is not on, connect power before proceeding.
3. Verify the D4 LED indicator on the NAM is blinking. If the LED is not flashing (about once per second) the NAM module has failed.
4. Verify the mode switch, block "C," SW6 is set to ON for local mode operation.
5. Verify the primary and secondary network baud rate switches, block "A," SW7 and SW8, are set to the proper baud rate. Switch block "A" will control the CCN network baud

rate. The only valid baud rate for local mode operation is 9600. Improperly configured units default to 9600 baud operation. Refer to Table 4.

6. Verify the NAM's R-232 communication ports are connected via the supplied DB-9 connector cable. **The modem should not be connected to the DB-25 connector.** Make sure the DB-9 connector cable is properly installed.
7. Attempt to communicate with the local network. The D1 and D2 LEDs should flash green intermittently as communications are attempted. If the LEDs do not flash, check cables and the baud rate settings of the NAM, PC, and network.

NOTE: The address of the NAM is not important in local mode because the NAM will be invisible to the network. The address of the software (running on the computer that the NAM is connected to) is used for network communications. The default address of the service tool is Bus 0), Element 231. Each element (including software elements) should have a unique address.

# TROUBLESHOOTING

Refer to Tables 6 and 7 for Troubleshooting information.

**Table 6 – LED Indications**

LED CIRCUIT BOARD DESIGNATION	COLOR	NORMAL OPERATION		FAILED OPERATION	
		Status	Indicates	Status	Indicates
<b>D1 (CCN Network Port)</b>	Green	Lit.	Ability to transmit to network.	Off	No communication
<b>D2 (Modem/PC Port)</b>	Green	Lit.	Ability to transmit to remote modem/network.	Off	No communication
<b>D4 (Watchdog)</b>	Red	Blinking about once per second.	Circuit board is functioning properly.	On	Software failure
<b>D17 (Power)</b>	Red	Lit.	Power is applied to NAM.	Off	No power to circuit board

LEGEND

**LED** — Light-Emitting Diode

**Table 7 – NAM Troubleshooting**

SYSTEM MODE	PROBLEM	SOLUTION
<b>REMOTE CONNECTION</b>	Modem TR light does not come on.	Check cable to NAM and verify power and D4 watchdog LEDs operating correctly.
	Jobsite does not answer call.	Verify modem set to Auto-answer (S0= 1) and that NAM is operating correctly.
	Can communicate with jobsite devices, but cannot change configurations.	Check password. Incorrect password will result in read-only ability.
<b>LOCAL AND REMOTE CONNECTIONS</b>	Can communicate to NAM and see it on network, but cannot see other network devices.	Check network baud rate setting. Typically baud rate should be set at 9600 baud. All devices are set to 9600 baud default from factory.

LEGEND

**LED** — Light-Emitting Diode

