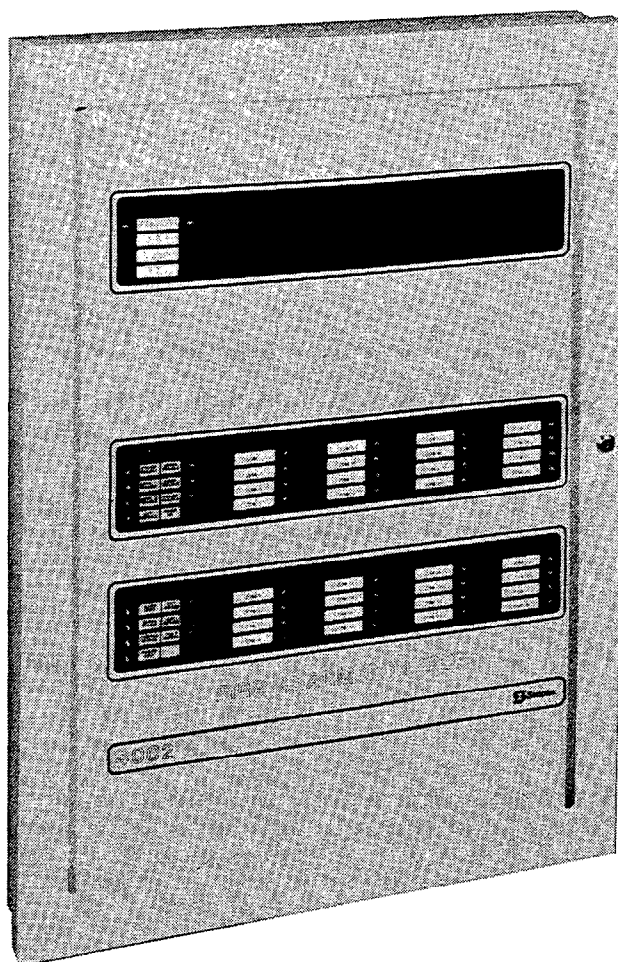9388

S.Simplex

4002 Fire Alarm

Installation and Operating Instructions

WARRANTY

Contact your local
Simplex Time Recorder Co.
branch office listed in the
Yellow Pages for Warranty
Registration & Information.

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Walk Test™ is protected by U.S. Patent No. 4.725,818.

Figure 1 – 4002 Fire Alarm System

SYSTEM OPERATION DESCRIPTION

The 4002 is a battery-backed, U.L. listed, power-limited, electrically-supervised fire alarm system that, depending on its size, can operate up to six notification appliance (signal) circuits and monitor up to 32 zones of initiating device circuits. In addition, a 4002 can automatically control equipment such as fire doors, smoke dampers, fans and elevators during a fire condition.

The 4002 provides audible and visual indications during trouble or alarm (fire) conditions. Should either of the above occur, the system sounds the applicable notification device(s) and flashes the applicable LED (one of the yellow LEDs for trouble, one of the red LEDs for alarm). The indications continue until someone appropriately acknowledges the condition (presses the TROUBLE SILENCE or the ALARM SILENCE push button).

• Acknowledging the condition silences the notification device(s), causes the flashing LED to illuminate steadily and, in the case of an alarm, illuminates the ALARM SILENCED LED.

Note 1: If, following a trouble or alarm acknowledgement, another circuit or zone goes into trouble or alarm, the applicable LED flashes and, in the case of an alarm, the alarm notification device(s) resound.

Note 2: Once in alarm, the system remains in alarm until (1) the device that initiated the alarm is restored to normal and (2) the panel is reset.

The user interface with the system consists of controls and indicators which are mounted in the control panel. The purposes of these controls and indicators are as follows, and are shown on Figure 2.

4002 CONTROL PANEL
OPERATOR SWITCHES AND INDICATORS

a. **PUSH BUTTONS**

   1. **SYSTEM RESET** – Used to reset the system following an alarm condition.

   2. **ALARM SILENCE** – Used to stop alarm signal operation during an alarm condition.

   3. **TROUBLE SILENCE** – Used to stop the panel trouble signal from sounding during trouble conditions.

   4. **MANUAL EVAC** – Causes the alarm signals to operate. (Does not activate control relays or city disconnect). This pushbutton must be held in for 3 seconds to activate indicating appliances.

b. **TOGGLE SWITCHES**

   1. **CITY BYPASS** – In the "UP" position, prevents the system from reporting an alarm condition to the municipal fire department and causes both the "system trouble" and "city trouble" LEDs along with the trouble signal to activate.

   2. **AUX 1 BYPASS** – **A.** The UP position, prevents alarm relay #1 from energizing during an alarm condition and causes the "SYSTEM TROUBLE" LED and trouble signal to activate.

      B. Becomes inoperative if jumper JW12 is removed. The Aux 1 relay will operate like the piezo during a trouble condition. The "System Trouble" LED will illuminate when a trouble condition exists. Outputs of Aux 1 relay are silenced with the Trouble Silence push button.

   3. **AUX 2 BYPASS** – The "UP" position, prevents alarm relay #2 from energizing during an alarm condition and causes the "system trouble" LED and the trouble signal to activate.

c. **INDICATORS** (amber LED's)

   1. **SYSTEM TROUBLE** – Used to indicate abnormal conditions in the system.

   2. **SIGNAL 1 TROUBLE** – Indicates a wiring fault (open or short) or a defective device in signal circuit #1.

   3. **SIGNAL 2 TROUBLE** – Indicates a wiring fault (open or short) or a defective device in signal circuit #2.

   4. **CITY TROUBLE** – Indicates either the "City Bypass" toggle switch in the bypass position or a wiring fault (open) between the panel and the municipal fire reporting system.

   5. **ANNUN TROUBLE** – Indicates a problem within the annunciator or a wiring fault (open) between the panel and the annunciator.

   6. **POWER TROUBLE** – Indicates either total or partial loss of AC power (brown out conditions) or battery is disconnected.

   7. **GROUND TROUBLE** – Indicates a ground fault in the system.

   8. **POWER ON** – Indicates AC power is applied to system. This is a **green** LED.

   9. **ALARM SILENCED** – Indicates Alarm Evacuation Signals have been silenced.

   10. **ZONE** – From 8 to 32 **red "ALARM"** LEDs and an equal number of **amber "TROUBLE"** LEDs.

     • Each "ZONE ALARM" LED indicates an alarm condition (fire) in its zone; each "ZONE TROUBLE" LED indicates a trouble in its zone.

ANNUNCIATOR TROUBLE

ZONE 1 ALARM

POWER TROUBLE

ZONE 2 ALARM

SYSTEM TROUBLE

SIGNAL 1 TROUBLE

SIGNAL 2 TROUBLE

CITY TROUBLE

ZONE 1 TROUBLE

ZONE 2 TROUBLE

ZONE 3 TROUBLE

ZONE 4 TROUBLE

GROUND TROUBLE

ZONE 3 ALARM

POWER ON

ZONE 4 ALARM

AUX 1 BYPASS

ZONE 5 ALARM

ZONE 6 ALARM

CITY BYPASS

SYSTEM RESET

ALARM SILENCE

TROUBLE SILENCE

MANUAL EVACUATION

ZONE 5 TROUBLE

ZONE 6 TROUBLE

ZONE 7 TROUBLE

ZONE 8 TROUBLE

AUX 2 BYPASS   ALARM SILENCED

ZONE 7 ALARM

ZONE 8 ALARM

Figure 2 – 4002 Operator Switches And Indicators

5

4002 PANEL DISPLAYS
NORMAL, TROUBLE AND ALARM CONDITIONS

● **Normal Condition**

 − Green "POWER ON" LED on.

 − All other panel indicators off.

● **Trouble Condition**

 − System Trouble buzzer sounds continually.

 − One or more amber "TROUBLE" LEDs on.

● **Alarm Condition (Non-ESP)**

 − All signals sound.

 − AUX and city relays activate.

 − One or more "ALARM" LEDs flash.

 − System trouble buzzer sounds at a march time cadence (120 pulses per minute).

Note: The following Software functions will affect the ALARM SILENCE operation.

 a. *Selective coded station input* − Indicating appliances cannot be silenced when zone 1 is in alarm. The indicating appliances will be silenced automatically when coding is complete. The flashing zone LED will change to a steady state when the code is completed.

 b. *Waterflow Sprinkler On Zone 7* − Indicating appliances cannot be silenced if water is flowing in the sprinkler system.

 c. *Alarm Silence Inhibit* − Programmed for 1, 3, or 5 minutes.

 d. *Signal Cutoff* - After 10 minutes of continuous operation, signals silence automatically.

 • Signals can be manually silenced at any time.

OPERATING 4002 OPTIONAL EQUIPMENT

● **ESP Programming Option (See Appendix A)**

 − System programmed to meet customer requirements.

 − Provides 23 additional functions.

● **Fan Control Module (See Appendix B)**

 − Provides hand/OFF/automatic (HOA) operations for climate and smoke control.

4002 FIRE ALARM SYSTEM OPERATING INSTRUCTIONS FOLLOWING AN ALARM/TROUBLE CONDITION

> **YOUR SAFETY AND THE SAFETY OF THOSE AROUND YOU ALWAYS COMES FIRST!**
> Actions taken during a fire depend upon local practices. Be sure you know what to do.
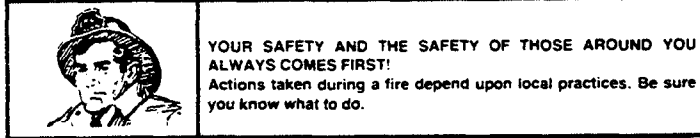
HOW TO OPERATE THE PANEL DURING AN ALARM SITUATION:

- Identify the zone in alarm via the control panel indicators. Follow Local Procedure to investigate that zone to determine the cause of the alarm. (Pull station activated, smoke detector activated etc.)
- After all occupants are evacuated, unlock and open the panel door.
- To silence signals, press the alarm silence push button.

  - Audible signals are silenced, alarm silenced LED illuminates, and any red zone indicator that was flashing comes on steady. If another alarm is reported from another zone, the alarm signals sound again, the alarm silenced LED turns OFF, and the red indicator representing the zone in alarm flashes until the audible signals are again silenced.

HOW TO RESET THE FIRE ALARM SYSTEM FOLLOWING AN ALARM CONDITION:

- When the alarm situation has been cleared, restore or replace all affected alarm-initiating devices (pull stations and detectors) in accordance with the instructions provided with each device.
- Press and hold the SYSTEM RESET switch until LEDs illuminate (see Note below).
  - The trouble buzzer sounds for 2 seconds and LEDs illuminate for approximately 5 seconds.

WHAT TO DO IN CASE OF TROUBLE:

- Notify appropriate personnel.

NAME _____ ADDRESS _____ **PHONE NUMBER** _____

- Unlock and open panel door.
- If tone device is sounding, press the trouble silence push button.
- Refer to the 4002 Customer Instructions manual for additional instructions or call a local Simplex Branch Office for assistance.

  Note: The following options affect the system as follows:

  - Waterflow/Sprinkler – you cannot silence an alarm or reset the system if water is flowing in the sprinkler system.

  - Coded Input On Zone 1 – the signals cannot be silenced while a code is being transmitted.

  - ESP (Expanded Simplex Programming)

  - Silence Inhibit – you cannot silence an alarm or reset the system until the specified time period has elapsed.

  - Custom Project Specific Software Programming

THESE INSTRUCTIONS ARE INTENDED TO BE FRAMED AND MOUNTED ADJACENT TO THE CONTROL PANEL FOR READY REFERENCE.

Refer to the Customer's Instructions for a detailed description of system operation.

HOW TO OPERATE THE PANEL 4002 CONTROL PANEL DURING AND AFTER SPRINKLER SYSTEM ACTIVATION

The panel, when programmed in software for this function, indicates one or more sprinkler water flow devices connected to zone 7 are in alarm by:

a. Flashing zone 7 red "ALARM" LED.

b. Sounding the "sprinkler alarm" (general alarm signals) and designated signal circuit 2.

c. Piezo sounds "FAST MARCH TIME" signal.

> **Note:** The designated sprinkler alarm signal(s) on signal circuit #2 cannot be silenced while the sprinkler system is active.

Actions to take:

a. Investigate the cause of the sprinkler system alarm. It could be a fire. **If NO FIRE or WHEN THE FIRE IS OUT, continue.**

b. Turn off the water supply valve for the sprinkler system.

c. Zone 8 "ALARM" LED flashes.

d. Press the "ALARM SILENCE" push button to silence signals.

   - "ALARM SILENCED" LED illuminates

   - The general alarm signals and piezo are silenced.

   - Zone 7 red "ALARM" LED goes on steady.

   - Zone 8 red "ALARM" LED goes on steady until someone turns the sprinkler system water supply valve back on, then it will automatically go off.

e. Restore or replace sprinkler heads in accordance with the instructions provided with the devices.

f. Recharge the sprinkler system in accordance with the directions provided with the sprinkler system.

   - During the recharging period, zone 7 "ALARM" LED glows steady.

g. When the sprinkler system is fully charged, press the "SYSTEM RESET" push button.

   - The "ALARM" LEDs go off.

Note: Until the sprinkler system is fully charged, waterflow may be **detected by the panel and the fire alarm system may go into alarm again. You may have to repeat this procedure several times while recharging the sprinkler system.**

4002 FIRE ALARM SYSTEM
TEST PROCEDURE

Note: This procedure should be followed when the system is installed during periodic tests required by code. Check with local codes to determine how frequently your system should be tested. Inform appropriate personnel that you will be testing the fire alarm system. Then unlock and open the panel door. Remove the panel retainer plate (two "squeeze clips" hold it in place).

BATTERY TEST

a. Check battery power as follows:

1. Remove AC power from panel by disconnecting the main power feed.

2. Silence the trouble signals by pressing the "TROUBLE SILENCE" push button.

3. Wait five minutes.

4. Activates the "MANUAL EVAC" switch. Allow the system to sound for 2 minutes.

5. Using a meter, read across the pins of P5 (found on the bottom-left of the CPU board [see Figure 4, page 15]).

   ● Voltage must exceed 20VDC (if less than 20VDC, call your local Simplex Branch office).

6. Apply AC power to the panel.

Note: See Appendix C for additional battery testing information.

WALK TEST™

a. Put the panel in its *Walk Test™* mode as follows:

1. (See Figure 3) Transfer program DIP switch SW2-1 to OFF.

   • For location of SW2, see Figure 4 (page 15).

2. Press the SYSTEM RESET push button. The panel's LEDs will all light (except POWER and GROUND TROUBLE) then the panel will indicate SYSTEM TROUBLE and CITY TROUBLE. The city circuit is disabled during the walk test.

PROGRAM SWITCHES
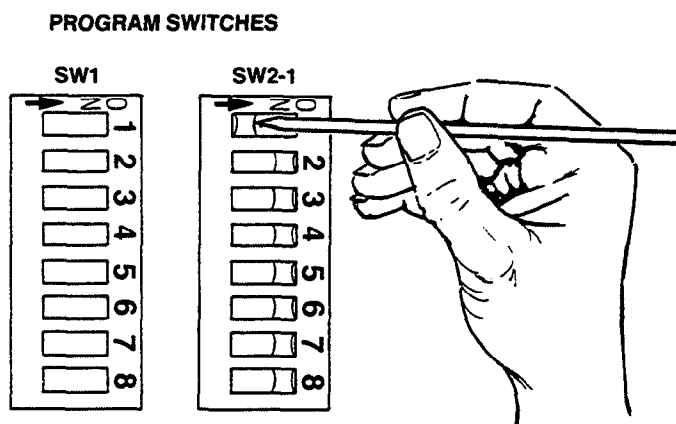
Figure 3 – DIP Switch SW2 Position 1

3. Activate each of the system's alarm initiating devices (pull stations, smoke detectors, heat detectors etc.).

   ● The signals will sound a "zone identification" code following the activation of any alarm initiating device (See CODE CHART ON PAGE 11).

   ● After the code, the system resets itself in approximately 5 seconds.

   Note: Smoke detector and rate-of-rise heat detectors may require more than five seconds to clear, and hence may cause the system to reissue the previous code.

4. Test for electrical supervision of wiring to each device as follows:

1. Disconnect a wire from each device (in the case of a smoke detector, remote it from its base).

2. Reconnect the wire or reinstall the smoke detector head.

- The signals should sound for four seconds each time a wire is disconnected or a smoke detector head is removed.

Note: Failure of the signals to sound indicates an improperly wired zone circuit, signal circuit or smoke detector base.

IMPORTANT: *Upon completing the system Walk Test™:*

- Return DIP switch SW2-1 to its ON position.

- Install the panel frontplate.

- Press the SYSTEM RESET push button.

- Notify appropriate personnel that the test has been completed.

LED AND TROUBLE BUZZER TEST

Press the SYSTEM RESET push button for approximately two seconds.

- The trouble buzzer will sound for approximately 2 seconds.

- Except for the "POWER TROUBLE," "GROUND TROUBLE," and those for signal circuits 3 and above, all panel LEDs must light for about 5 seconds.

MANUAL EVACUATION TEST (DRILL)

a. Perform "Manual Evacuation Test" as follows:

1. Inform appropriate personnel that you will be testing the fire alarm system.

2. Unlock and open the fire alarm panel door.

3. Press and hold the "MANUAL EVAC" push button IN for 3 seconds.

The notification appliances will sound to alert personnel within the building. The notification appliance will continue to sound until silenced by pressing the "ALARM SILENCE" or the "SYSTEM RESET" push button.

Note: Manual evacuation tests do not activate the auxiliary relays or the municipal fire department city connections.

• Should a valid alarm initiation occur during a manual evacuation test, the auxiliary relays and the city circuit connections activate.

GRAPHIC REPRESENTATION OF AUDIBLE ZONE CODES

a. If *"simple coding"* is programmed in your system to identify the zone where a fire condition exists, a zone code repeats on the alarm signals until the alarm is silenced.

b. If a *Walk Test™* is being performed, a zone code sounds once on the alarm signals before the panel automatically resets itself.

c. Each long dash (—) represents a half-second-long signal pulse.

d. Each short dash (–) represents a quarter-second-long signal pulse.

Zone No.	Zone Identification Code	Description
1 =	—	1 long
2 =	— —	2 long
3 =	— — —	3 long
4 =	— — — —	4 long
5 =	— — — — —	5 long
6 =	— — — — — —	6 long
7 =	— — — — — — —	7 long
8 =	— — — — — — — —	8 long
9 =	— — — — — — — — —	9 long
10 =	— – –	1 long, pause, 2 short
11 =	— —	1 long, pause, 1 long
12 =	— — —	1 long, pause, 2 long
13 =	— — — —	1 long, pause, 3 long
14 =	— — — — —	1 long, pause, 4 long
15 =	— — — — — —	1 long, pause, 5 long
16 =	— — — — — — —	1 long, pause, 6 long
17 =	— — — — — — — —	1 long, pause, 7 long
18 =	— — — — — — — — —	1 long, pause, 8 long
19 =	— — — — — — — — — —	1 long, pause, 9 long
20 =	— — – –	2 long, pause, 2 short
21 =	— — —	2 long, pause, 1 long
22 =	— — — —	2 long, pause, 2 long
23 =	— — — — —	2 long, pause, 3 long
24 =	— — — — — —	2 long, pause, 4 long
25 =	— — — — — — —	2 long, pause, 5 long
26 =	— — — — — — — —	2 long, pause, 6 long
27 =	— — — — — — — — —	2 long, pause, 7 long
28 =	— — — — — — — — — —	2 long, pause, 8 long
29 =	— — — — — — — — — — —	2 long, pause, 9 long
30 =	— — — – –	3 long, pause, 2 short
31 =	— — — —	3 long, pause, 1 long
32 =	— — — — —	3 long, pause, 2 long

WHAT TO DO IN CASE OF TROUBLE

a. Notify appropriate personnel that the system is in trouble.

b. Unlock and open the panel door. Then press the TROUBLE SILENCE push button.

c. Check to see what the panel's symptoms are. Then perform the action which applies to those symptoms as described in the SYSTEM TROUBLESHOOTING CHART. See Figure 4 (page 15) for location of components identified on the troubleshooting chart. The troubleshooting chart is located on pages 12 through 14.

SYSTEM TROUBLESHOOTING CHART

> **IMPORTANT**
>
> **Corrective actions which follow asterisks should be performed only by a Simplex technician or a qualified electrician.**

Symptom	Probable Cause	Corrective Action
# 1. Zone "ALARM" LED is on, and system cannot be reset	● Pull station activated	Restore pull station.
	● Smoke detector alarm indicator on steady	Reset or replace smoke detector.
	● Duct smoke detector alarm indicator on steady	Reset or replace duct detector.
	● Heat detector activated	Restore or replace heat detector.
	● Waterflow device activated	Restore waterflow device.
	● Zone circuit shorted	* Clear shorted line condition. (The E.O.L. resistor's 3.3K ohms should be read between the zone terminals.)
# 2. Both "SYSTEM TROUBLE" and one or more "ZONE" Trouble LEDs are on.	● Alarm initiating device (smoke det, pull station) removed from zone	Replace alarm initiating device.
	● Open connection in zone wiring	* Repair the open line condition. (The E.O.L. resistor's 3.3K ohms should be read between the zone terminals.)
	● Defective module in fire alarm panel	Call Simplex
# 3. "POWER ON" LED is off	● Fire alarm 120VAC circuit breaker tripped	Reset breaker.
	● Fuse F2 in panel open	Replace fuse F2 (8 Amp) (see page 15, Figure 4).
	● Low AC voltage or "brownout" condition (brown-out voltage is 102 VAC or less)	* Check power distribution in building.

Symptom	Probable Cause	Corrective Action
# 4. "SYSTEM TROUBLE" LED in on (all other trouble LEDs are off)	• Manual switch(es) are not in the normal position.	Restore switch(es) to normal position.
	• A remote annunciator's RESET or SILENCE switch not in the normal position	Restore to normal position.
	• Transformer connection P4 not connected	Connect the transformer cable to P4.
	• Open card supervisory loop	Ensure all interconnecting harnesses are connected.
# 5. Both "SYSTEM TROUBLE" and "POWER TROUBLE" LEDs are on	• Battery fuse F3 open	Replace F3 (8 amp) fuse.
	• Battery connections are not connected	Check battery connection at batteries and connector P5.
# 6. Both "SYSTEM TROUBLE" and one or more "SIGNAL" Trouble LEDs are on	• Alarm notification device removed from circuit (bell, horn, A/V unit)	Replace alarm notification device.
	• Open connection on signal circuit	* Repair the open line condition. (The E.O.L. resistor's 10K ohms should be read between the signal terminals).
	• Electrical short in signal circuit	* Repair the short circuit condition. (The E.O.L. resistor's 10K ohms should be read between the signal terminals).
	• Defective fuse F7	Replace Fuse F7 (3 amp).
# 7. Both "SYSTEM TROUBLE" and CITY TROUBLE LEDs are on	• CITY BYPASS switch not in its normal position	Restore to normal position.
	• Configuration jumpers incorrectly set	Set jumper correctly.
	• Open in city circuit field wiring	* Repair the open line condition.
# 8. Both "SYSTEM TROUBLE" and "GROUND TROUBLE" LEDs are on	One or more conductors are shorted to ground	* Remove field wiring from connectors one pair at a time until ground fault clears.
# 9. Both "SYSTEM TROUBLE" and "ANNUN TROUBLE" LED's are on	• Burned out LED in annunciator	* Depress SYSTEM RESET to check annunciator LEDs.
	• Open connection between panel and annunciator	* Repair open line condition.
	• Serial annunciator not installed in system	Set SW3 to all closed positions.
	• DIP switch SW3 settings incorrect	Set SW3 to indicate correct number of serial annunciators in system.
	• DIP switch SW11 settings incorrect	Set SW11 to indicate correct number of supervised annunciators. See Wire Diagrams.
	• Defective annunciator	Call Simplex
	• Defective module in fire alarm panel	Call Simplex

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Symptom	Probable Cause	Corrective Action
#10. System fails to go into alarm	• Defective alarm initiating device	Replace device.
	• Zone circuit incorrectly wired (electrical open between panel and initiating device)	* Correct wiring fault in zone circuit.
	• Defective module in fire alarm panel	Call Simplex
#11. No output to devices connected to AUX relay(s) on TB4	• Defective device	Repair or replace device.
	• N.O. or N.C. wiring incorrect	Correct wiring.
	• Defective fuse(s)	Replace Fuse F4 or F5 (3 amps).
	• Incorrectly programmed.	* Program correctly.
#12. "SYSTEM TROUBLE" and several "Zone trouble" LEDs are flashing	• Defective 24 volt power supply	Call Simplex
	• Fuse F9 defective	Replace fuse F9 (3 amps).
#13. "SYSTEM TROUBLE" and "Signal 2 Trouble" LEDs are flashing and the Piezo is sounding.	• Defective notification appliance	* Repair or replace defective device.
	• Fuse F6 defective	Replace fuse F6 (3 amps).

NEED HELP?

CALL YOUR LOCAL SIMPLEX BRANCH OFFICE, WHICH IS LISTED IN THE YELLOW PAGES, FOR ALL MALFUNCTIONS NOT LISTED IN THE ABOVE TROUBLESHOOTING CHART, OR IF YOU WOULD LIKE A QUALIFIED SIMPLEX TECHNICIAN TO ASSIST YOU WITH INSTALLATION, TESTING, AND TROUBLESHOOTING THE SYSTEM.

4002 MAIN C.P.U.

COMPONENT LOCATIONS

Fuse F1, 3 Amp
Annunciator
Voltage (+24VDC)

Fuse F9, 3 Amp
+24 Volts

DIP Switch, SW11
Annunciator
Supervision

DIP Switch, SW3
Serial Annunciator
Program Switch

DIP Switch, SW2
Program Switch

DIP Switch, SW1
Program Switch

Fuse F2, 8 Amp
Main Power

Fuse F5, 3 Amp
Aux 1 Relay

Fuse F3, 8 Amp
Battery Fuse

Fuse F4, 3 Amp
AUX 2 Relay

Connector P4
Transformer Cable

Connector P5
Battery Cable
Pins + and −

Fuse F6, 3 Amp
Signal Circuit 2

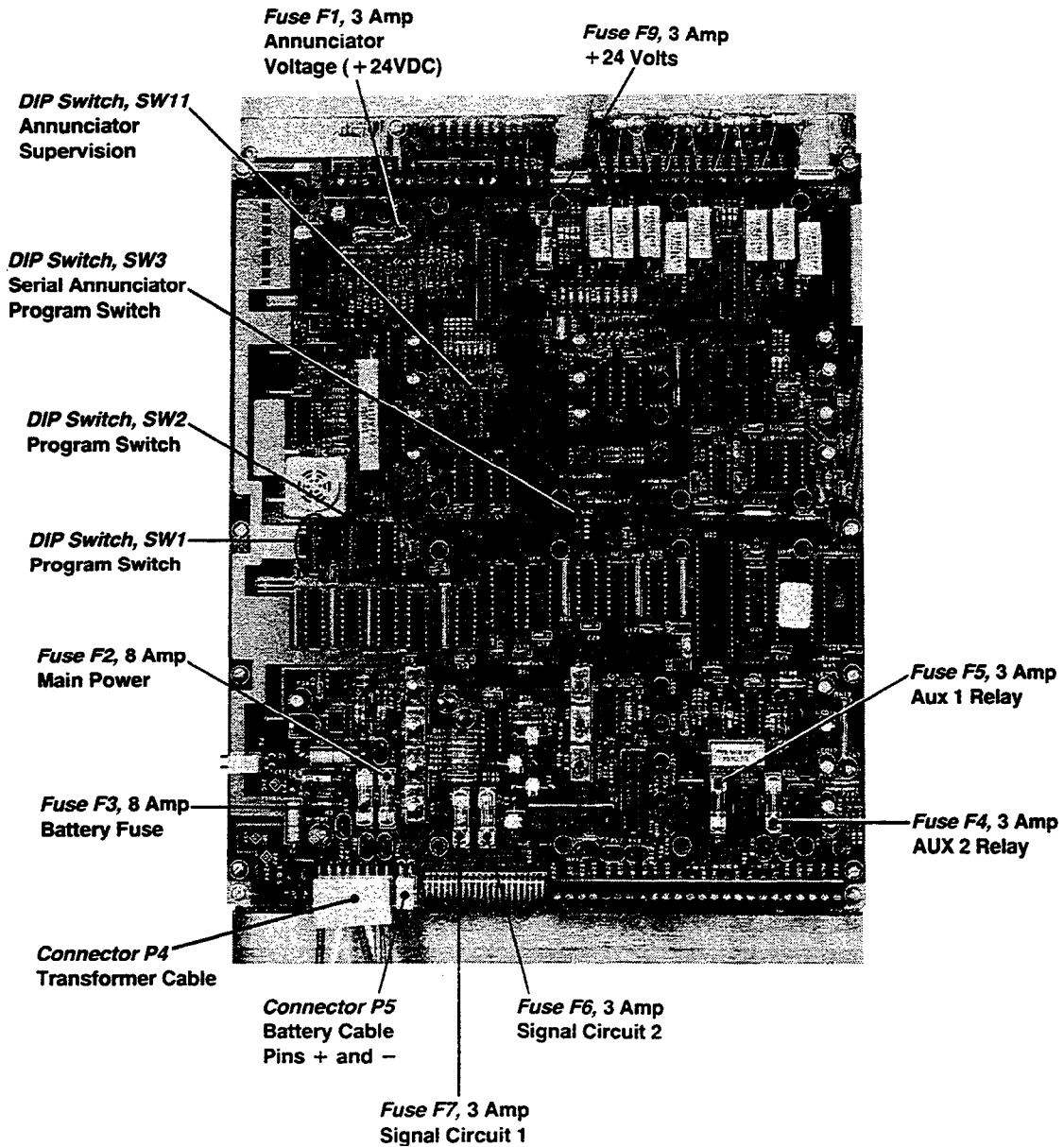**Fuse F7, 3 Amp**
Signal Circuit 1

Figure 4 – Component Locations

15

CAUTION

NEVER REMOVE OR REPLACE CABLES OR WIRES WITH POWER APPLIED TO THE SYSTEM

To power down the system:

1. Disconnect either of the battery's terminals.
2 Turn off system power at the AC breaker.

To power up the system:

1. Turn on system power at the AC breaker.
2 Apply battery power.

INSTALLATION INSTRUCTIONS

INTRODUCTION

This section provides both information and instructions on the 4002 fire alarm system wiring. It is important that you read this section and utilize the 4002 field wiring diagrams 841-669 and 841-687 which accompany the control panel to install your fire alarm system.

- To help you in the installation of this and other Simplex fire alarm systems, the following publication has been made available for general reference: **How to Wire a Building for a Fire Alarm System** (Simplex Publication No. FA2-91-001).

General Notes

a. When running wires to the control panel, identify and tag all wires appropriately: 120 VAC or 220/240 VAC power; signal circuit 1; zone 1, zone 5 etc.; and identify all "+" and "-" wires by color code or numerical sequence.

b. The panel's terminal strips are labeled with a terminal strip number (TB1, TB2, etc.), and each terminal is designated by a terminal number (1, 2, 3, etc.). Therefore, TB1-1 is terminal 1 on terminal strip 1, TB3-2 is terminal 2 on terminal strip 3, etc. In addition, each terminal is identified by an abbreviation of the circuit function to be connected. For example, zone 1 = ZN1+, ZN1−, signal circuit 2 = S2B+, S2B−; annunciator output from zone 5 = ANN 5−.

c. Use the color code shown in Figure 5 to determine E.O.L. resistor values. E.O.L. resistors are provided as part of the System Support Material when shipped. A 1,000 ohm (1k, 1 W) resistor is provided for the city relay termination, and should be installed when city connections are not required. Terminate all unused zone circuits with 3.3k ohm resistors. Terminate all unused signal circuits with 10K ohm resistors.

ORANGE	BROWN
ORANGE	BLACK
RED	ORANGE
GOLD	GOLD

Zone Circuit E.O.L. Resistor
3,300 ohm (3.3k, 1 W)

Signal Circuit E.O.L. Resistor
10,000 ohm (10k, 1/2 W)
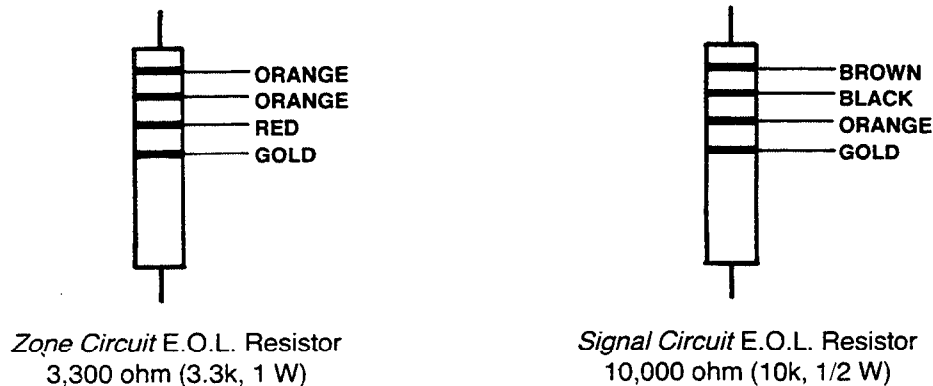
Figure 5 – E.O.L. Resistors

d. All wiring should be done in accordance with local codes and the National Electrical Code, Article 760.

e. **Remember:** A neatly wired panel helps assure accurate inspection of terminal connections and simplifies troubleshooting.

INSTALLATION CHECKLIST

● This section provides a systematic 10 step method for installing a 4002 fire alarm system.

● Use the field wiring diagram *#841-669* and *841-687* as reference.

● Upon completion of a step, check the appropriate box.

● Detailed instructions for each installation step can be referenced on the pages noted.

● Common hand tools and a volt/ohm meter are required to perform this installation.

STEP #	ACTION REQUIRED	FOR DETAIL, REFER TO PAGE NUMBER
☐ 1.	Mount Control Panel Back Box (Less internal electronic subassemblies)	18
☐ 2.	Install System Wiring throughout building for zone, signal, control and input power circuits (including system ground connection). Tag each wire at the control panel location.	19
☐ 3.	Install all peripheral devices (stations, detectors, horns, bells, etc.) and end-of-line resistors.	21
☐ 4.	Check all system wiring with a volt/ohm meter for shorts, opens, grounds or extraneous voltages.	22
☐ 5.	Re-mount electronic sub-assemblies in the control panel back box. Re-make all factory harness connections.	23
☐ 6.	Terminate all system wiring at the specified terminal locations.	24
☐ 7.	Program basic system functions via DIP switch SW1 and SW2.	25
☐ 8.	Perform a complete system test of all device using "walk-test" mode.	31
☐ 9.	Mount retainer panel and door on cabinet. Connect door ground wire to box.	31
☐ 10.	Instruct owner's representative on system operation.	31

BACK BOX INSTALLATION

4002 Back Boxes may be shipped with or without their electronic components, and come in three different sizes. The procedures listed below should be used when installing a back box with electronic components. Details for mounting a back box without electronic components are shipped with the empty back boxes.

A. *Systems With Electronic Components*

1. Carefully open the shipping container.
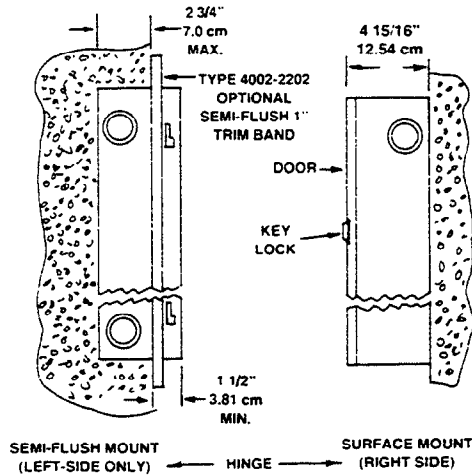
2. Inventory the contents of the shipping container to ensure complete shipment of the required materials. (See packing list.)

3. Remove the panel door box from the shipping container.

4. Remove the back box from the shipping container and lay the unit on a flat surface.

5. Remove the retainer (internal door) by squeezing and pulling the two black plastic tabs located on the upper center of the retainer. Lift the retainer from the back box.

6. Carefully *mark* one end of each interconnection cable.

7. Remove *one end* of all interconnection cables from the electronic assemblies.

8. *Loosen* the screws holding the small upper and lower rack sets and remove them from the back box (none in #2 units). *Loosen* the screws holding the large rack set that contains the CPU module (located on the left side of the back box) and remove the large rack set from back box. The electronic assemblies and one end of the cables and wiring harness should remain mounted to these rack sets.

Note: The use of a grounded wrist strap is recommended when removing/replacing the rack sets.

9. Store the electronic assemblies in the shipping container.

10. Place the retainer in the shipping container.

11. Place the panel door box in the shipping container.

12. Store the shipping container in a safe, clean, and dry location until the back box installation and the system field wiring is completed, and you are ready to reassemble the control panel as instructed on page 23.

13. Mount the back box as shown in Figure 6.

Note: For semi-flush mounting, the back box must be extended 1 1/2 inches from the finished wall. Page 23 of this manual contains details for remounting the electronic components into the back box.


```
                                              4 15/16"
     2 3/4"                                   12.54 cm
     7.0 cm
     MAX.
                    TYPE 4002-2202
                    OPTIONAL
                    SEMI-FLUSH 1"
                    TRIM BAND
                    DOOR

                    KEY
                    LOCK

     1 1/2"
     3.81 cm
     MIN.

SEMI-FLUSH MOUNT                    SURFACE MOUNT
(LEFT-SIDE ONLY)    HINGE           (RIGHT SIDE)
```

NOTE: USE TOP SMALL KNOCKOUTS FOR SEMI-FLUSH MOUNTING AND LEFT HAND HINGE ONLY.


```
      (TOP)
           25 3/4"
           (65.4 cm)

(H)        USE 4 HOLES PROVIDED
HEIGHT     TO SECURE BACK BOX
           TO WALL

           THIS SPACE MUST BE KEPT
           FREE OF WIRING FOR
           BATTERY INSTALLATION

4 1/8"
(10.47 cm)        (BOTTOM)
```
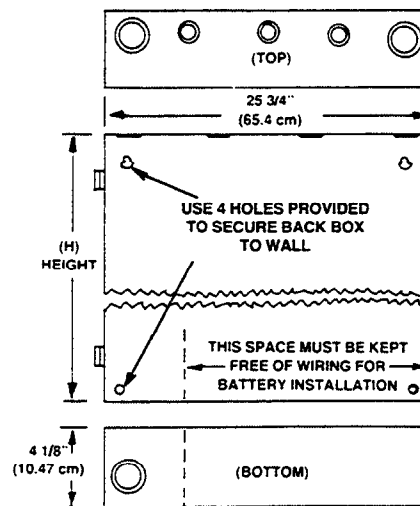
Figure 6 – Back Box Mounting Instructions

PRODUCT IDENTIFICATION NUMBER	DESCRIPTION		HEIGHT (H)
	SIZE	WEIGHT	
2975-9184	2 UNIT	55.50	20 3/4" (52.7 cm)
2975-9185			
2975-9186	4 UNIT	78.50	36 1/4" (92.1 cm)
2975-9187			
2975-9188	6 UNIT	106.50	52 1/8" (132.4 cm)
2975-9189			

NOTE: WEIGHT IS IN POUNDS, AND DOES NOT INCLUDE BATTERIES.

GENERAL REQUIREMENTS FOR FIRE ALARM WIRING

Note: These wiring specifications are subject to local codes, and are not intended to circumvent any required codes, laws, or regulations.

- Only copper conductors may be used.

- All wiring, except ground connection wiring, must be free from shorts and have a minimum resistance of one megohm to ground.

- Metallic conduit, metallic raceway, plastic pipe, plastic raceway or approved fire alarm cable may be used.

Note: When using metallic conduit, and the continuity of the conduit is not maintained, a 12 AWG drain wire (ground) must be connected between the break in the conduit installation.

- Only fire alarm system wiring may be run in the same conduit, raceway or multiconductor cable.

- Each peripheral device (pull station, detector, horn, bell, etc.) must have its own enclosure (back box, outlet box, etc.) per instructions provided with each device.

- All wiring shall be terminated with U.L. listed devices (wire nuts, pressure connectors, etc.). Wiring terminated with only electrical tape is not permitted. All splicing (free ends of conductors) shall be covered with an insulation equivalent to that of the conductors.

REQUIREMENTS WHEN USING PLASTIC PIPE, PLASTIC RACEWAY, OR APPROVED FIRE ALARM CABLE

- When a system wire is adjacent and parallel to other building wire runs, a minimum of 6 in. shall be maintained between the different wire runs.

- When a system wire is to cross over other building wires, the system wires shall cross at a 90° angle and have a minimum of 6 in. separation.

- All fire alarm cables entering an electrical box must be provided with a connector that provides strain relief and protection for the cable.

- All fire alarm cables shall be separated by at least 3 ft. from every heat-radiating recessed fixture (for example, a high-hat fixture). Furthermore, cables shall not be installed in direct contact with lay-in fixture ballasts.

- Where fire alarm cables are exposed to the weather, the cables shall be shielded or run in metallic raceway with approved weatherproof or rain-tight fittings.

SYSTEM WIRING SPECIFICATIONS

Initiating Device Wiring (Zone Circuits) Use Field Wiring Diagrams #841-687 and 841-669.

Devices connected: Pull Stations, Heat Detectors, Smoke Detector, etc.

Wiring: – Up to 32 circuits with either two wires (for Style B operation) or four wires (for Style D operation) per circuit. Each Style B, 2 wire circuit terminates with a 3.3K ohm E.O.L. resistor at the last device.

Zone wire resistance must not exceed 50 ohms, and its total wire length must not exceed *5,000* ft. Style B or *2,500* ft. Style D.

Notification Appliance Wiring (Signal Circuits) Use Field Wiring Diagrams #841-687 and 841-669.

Examples: Horns, bells, visual units, etc.

The chart below should be used to determine the wire lengths in a 2-wire parallel DC signal circuit.

Note 1: Calculate the total current for all devices to be powered by a circuit. This is accomplished by adding current requirements for each device on a circuit. Then use the "TOTAL CURRENT IN CIRCUIT" column to determine wire length.

Note 2: Current draw of typical indicating appliances are:

Lamp – .075 A
Bell – .110 A
Horn – .035 A
Visual Devices – .070 A

NOTE 3.
Line distance was determined based on .11A per device and the devices spaced at equal distances. (For circuits where all devices are located at end of the circuit, contact your local Simplex Field Office)

NOTE 4.
Wiring distance is 1/2 distance for Style D, 4-wire notification appliance circuits.

	DISTANCE TO LAST DEVICE FROM THE PANEL IN FEET		
TOTAL CURRENT	18 AWG	16 AWG	14 AWG
0.11A	2349	3735	5940
0.22A	1566	2494	3960
0.33A	1198	1904	3029
0.44A	995	1518	2415
0.55A	783	1245	1980
0.66A	681	1083	1722
0.77A	602	958	1524
0.88A	526	836	1330
0.99A	479	761	1211
1.10A	438	697	1108
1.21A	400	636	1012
1.32A	374	595	945
1.43A	335	534	849
1.54A	314	500	795
1.65A	293	466	472
1.76A	281	448	712
1.87A	266	423	673
1.98A	253	403	641

CONTROL CIRCUITS

- *AUXILIARY ALARM RELAYS* (Activate on system alarm) Use Field Wiring Diagrams #841-687 and 841-669.

  Devices controlled: Lights, fans, door release, dampers, etc.

  Contacts: Form C dry contacts rated 2 amps @ 30 VDC/30 VAC or 0.5 amps @ 120 VAC resistive.*

  Wiring: From 14 to 18 AWG wire may be used.

- *TROUBLE RELAY* (Not Silenceable – Activates on system trouble) Use Field Wiring Diagrams #841-687 and 841-669.

  Devices controlled: Trouble horns, bells, lights, etc.

  Contacts: Form C dry contacts rated 2 amps @ 30 VDC/30 VAC or 0.5 amps @ 120 VAC resistive.*

  Wiring: From 14 to to 18 AWG wire may be used.

- *TROUBLE RELAY* (Silenceable – Activates on system trouble) Use Field Wiring Diagrams #841-687 and 841-669. Change AUX 1 alarm relay from alarm to trouble by removing Jumper JW12. When this jumper is removed, the trouble silence push button disconnects the relay.

CAUTION
Use of external power may void power limited U.L. Listing on that circuit.

- *Incoming Power* (See W.D. #841-669, [sheet 22 for 120 VAC; sheets 36, 37 and 38 for 220/240 VAC]

    Source: Dedicated fire alarm power circuit with a 10 amp fused disconnect *or as required by local codes.*

    Wiring: Use two 14 AWG wires or 14 AWG cable.

- *Earth Detection* (Ground) (See W.D. #841-669)

    Source: Connection must be made to an approved dedicated earth ground per NEC Article 250 (NFPA 70).

IMPORTANT

Terminate ground wire on green ground lug screw inside fire control back box.

STEP #3

MOUNTING AND WIRING PERIPHERAL DEVICES

**(Refer to Wiring Diagrams 841-687 and
Instructions Provided with Each Device.)**

- *Style B*

    Install all peripheral devices (detectors, horns, pull stations, etc.) and connect them to the appropriate wires. Connect a 3.3K ohm end-of-line resistor (EOLR) across the terminals of the last device in the initiating device circuits and mark the device accordingly (see Figure 7). Connect a 10k-ohm EOLR across the terminals of the last device in the notification appliance circuits and mark the device accordingly (see Figure 8).

Note: **(X) = Zone Circuit #**
          (Y) = Signal Circuit #
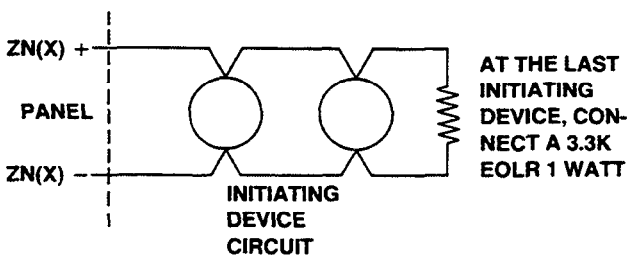
Style B Initiating Device Circuit – Style Y Notification Appliance Circuit
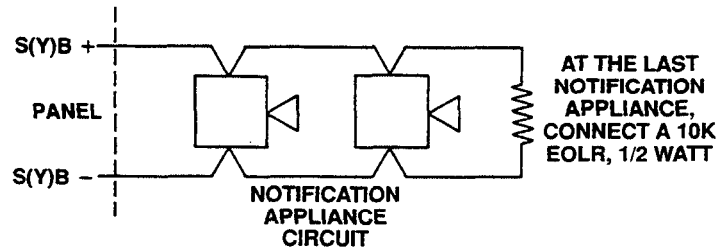
Figure 7   **Figure 8**

• **Style D**

Same as class B, except both ends of every circuit terminate at the panel (see Figure 9 for typical initiating device circuit and Figure 10 for typical notification appliance circuit).

Style D Initiating Device Circuit – Style Z Notification Appliance Circuit
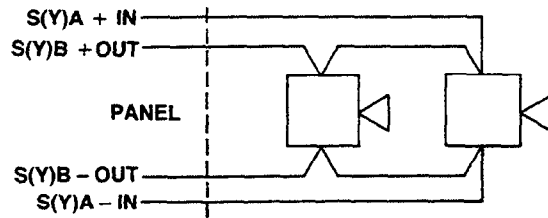
Figure 9   **Figure 10**

STEP #4

CHECKING SYSTEM WIRING

• At the control panel, use a volt/ohm meter to check each wiring circuit. Use the green grounding lug in the control panel for all measurements to station ground. Each measurement has a tolerance of + or − 10%.

• Each circuit must test free of grounds and extraneous voltages.
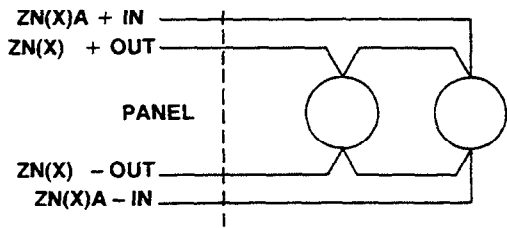
• Each of the following circuit types must have the following resistance readings.

Circuit Type	Meter Reading
Style B Initiating Device (Zone) Circuit	
From zone + to zone − (each zone)	3.3K ohms
From zone + to station ground	Infinity
From zone − to station ground	Infinity
Style D Initiating Device (Zone) Circuit	
From zone + to zone − (each zone)	Infinity
From zone + to station ground	Infinity
From zone − to station ground	Infinity
From zone +OUT to +IN	Less than 50 ohms
From −OUT to −IN	Less than 50 ohms
Sprinkler Tamper Switch Circuit (zone 8)	
From + to station ground	Infinity
From − to station ground	Infinity
From + to − across circuit	560 ohms
Style Y Notification Appliance Circuit (each signal circuit)	
From + to station ground	Infinity
From − to station ground	Infinity
Resistance across circuits	
In one direction	10K ohms
In opposite direction	Less than 200 ohms

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Style Z Notification Appliance Circuit (each signal circuit)

From + to station ground	Infinity
From – to station ground	Infinity
From + OUT to + IN	Less than 50 ohms
From – OUT to – IN	Less than 50 ohms
Resistance across circuits	
In one direction	Infinity
In opposite direction	Less than 200 ohms

STEP #5

RE-MOUNTING ELECTRONIC COMPONENTS IN BACK BOX

Note: Care must be taken to avoid contact and potential static damage to the printed circuit boards during the following procedures. A grounding wrist strap is recommended.

● Make sure system ground wire is attached to the green lug screw in the back box.

Re-mount the transformer first.

● Re-mount electronic sub-assemblies complete with rails using screws provided in the same relative box position as they were shipped from the factory (see F.W. diagrams 841-669).

● Connect *ALL* cables and wiring harness in original locations as shipped from the factory and previously marked during back box installation.

TERMINATIONS OF SYSTEM WIRING
AT THE 4002 CONTROL PANEL

Note: Terminate all system wiring as specified in the Field Wiring Diagrams (841-669). **Refer to sheets and figures listed below.**

	SHEET #	FIG. #
a. **Initiating device (zone) circuits**		
● Style B	6/ 7	N/A
● With zone disconnect/suppressor board	10	N/A
● Style D with 4-wire detectors.	8/ 9	N/A
● With zone disconnect/suppressor board.	11/12	N/A
● 2 unit, Class B suppression.	24	N/A
● 4 and 6 unit, Class B suppression.	25	N/A
b. **Notification appliance (signal) circuits**		
● Style Y	13/15	14
● Style Z	14	15
c. **Control relay circuits**		
● From AUX and TBL relay contacts (on CPU board).	16	16
● From AUX relay contacts (on AUX relay board).	16	17
● From relay contacts (on relay boards).	17	18
● 10 Amp relay module.	26	N/A
d. **Annunciator output circuits**		
· LED annunciators (with remote trouble, acknowledge or reset).	18	11
· LED annunciators (w/o remote trouble, acknowledge or reset).	18	11
· Incandescent lamp annunciators.	19	12
· A Auxiliary	32	N/A
· B Auxiliary	33	N/A
· D Auxiliary	34	N/A
e. **City circuit**		
● Connections, programming, Reverse polarity, Local energy, Shunt, Form C.	20	19
f. **Special zone inputs**		
● Coded input on zone 1.	21	8
● Waterflow switch on zone 7.	21	9
● Sprinkler tamper switch on zone 8.	21	9
g. **Connect Power to system**		
● AC Power.	22	20
● System Batteries.	22	21
● 4 unit Expansion Power Supply.	29	N/A
● 6 unit Expansion Power Supply.	30	N/A
● To silence signals press the TROUBLE and SYSTEM RESET push buttons.		
● Use the harnesses provided with the system.		

h. 2120 Connections

• Transponder.	23	N/A
• Interface Module (set DIP switch SW1-8 OFF)	28	N/A

i. SCU/RCU Wiring (See Note 3)   27   N/A

j. Fan Control Module (See Note 3)   31   N/A

Notes: 1. Wire devices according to Field Wiring Diagrams 841-687.

           2. If the system continues to display trouble, follow the troubleshooting procedures on page 12.

           3. DIP Switch SW3 on the CPU module must be set in accordance with Table 2 on page 26. A wire length chart is found on page 40.

STEP #7

SETTING PROGRAM DIP SWITCH SW1, SW2, AND SW3

DIP Switch, SW1 and SW2 are used to select a variety of functions which are required for alarm operations. The locations of these switches are shown on Figure 4, page 15, or Field Wiring Diagrams 841-669, sheet 2.

Information on all basic programmable functions can be found on pages 25 through 30.

The installer must select the alarm operations/functions required for each system installation. Use a pointed, non-metallic object for selecting switches. See Figure 11 below for details of DIP Switches SW1 and SW2.

• Press SYSTEM RESET after making changes to SW1 and SW2 settings.

Use the information in Table 1, on next page, (also shown on sheet #2 of wiring diagrams) to determine exact DIP Switch settings required for this installation.

DIP switch SW3 is used for supervisory modules connected to the serial annunciator port on the CPU module (TB4 COM and REC). Use the information in Table 2, on next page, to determine required settings for this installation.

Note: When shipped, the system contains *NO* special programmed functions and normal operation is general alarm.
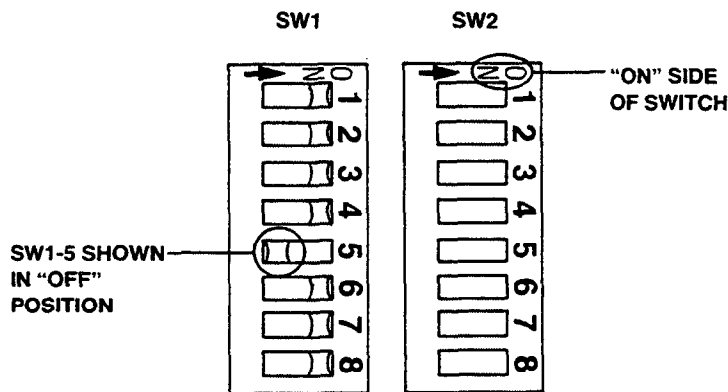
Figure 11 – DIP Switches, SW1 and SW2

Normal Operation: The following represents normal system operation when DIP Switch, SW1 and SW2 are set to the *ON* position.

a. The activation of any alarm initiating device on any zone immediately causes all signals throughout the system to operate continuously.

b. Pressing the "ALARM SILENCE" push button immediately stops all signal operations.

c. All push buttons and switches in the fire alarm panel are enabled.

STEP #7 cont.

PROGRAMMING BASIC SYSTEM FUNCTIONS
VIA DIP SWITCH PACKAGES SW1 AND SW2

TABLE 1

DIP Switch SW1

SW1-1 = **Alarm Verification**
   On.....Normal operation
   Off.....Alarm Verification

SW1-2 = **Coded Input (Zone 1)**
   On.....Normal operation
   Off.....Coded input on Zone 1 (cut JW11)

SW1-3 = **Waterflow**
   On.....Normal operation
   Off.....Waterflow on Zone 7 (signal 2 not silencable)

SW1-4 = **Sprinkler Supervision** (Tamper)
   On.....Normal operation
   Off.....Sprinkler supervision on Zone 8

SW1-5 = **Time Limit Cut Off**
   On.....Normal operation
   Off.....Signal Cutout after 10 minutes

SW1-6	SW1-7 = **Silence Inhibit**
On	On.....Normal operation
Off	On.....One minute signal silence inhibit
On	Off.....Three minutes signal silence inhibit
Off	Off.....Five minutes signal silence inhibit

SW1-8 = **2120 Connection**
   On.....Normal operation
   Off.....2120 connection is present in system

DIP Switch SW2

SW2-1 = **System Test**
   On.....Normal operation
   Off.....Walk Test™ mode

SW2-2 = **Manual Evacuation**
   On.....MANUAL EVAC switch enabled
   Off.....MANUAL EVAC switch disabled

SW2-3	SW2-4	SW2-5 = **Signal Coding**
On	On	On.....Normal operation
Off	On	On.....March time
On	Off	On.....Slow march time
Off	Off	On.....Temporal coding
On	On	Off.....Simple coding
Off	On	Off.....California code (one minute)
On	Off	Off.....California code, three minutes
Off	Off	Off.....California code, (five minutes)

SW2-6	SW2-7 = **Selective Signalling**
On	On.....Normal operation
Off	On.....March time on signal circuit 1 until reset
On	Off.....Signal circuit 1 on steady until reset
Off	Off.....Signal circuits 1 and 2 on steady until reset

SW2-8 = **Expanded Simplex Programming (ESP)**
   On.....Normal operation
   Off.....ESP program mode

SETTING DIP SWITCH SW3 FOR SERIAL PORT SUPERVISION

TABLE 2

DIP SWITCH SW3

Switch Number	Number of Modules in System															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SW3-1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
SW3-2	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF
SW3-3	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF
SW3-4	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

STEP #7 cont.
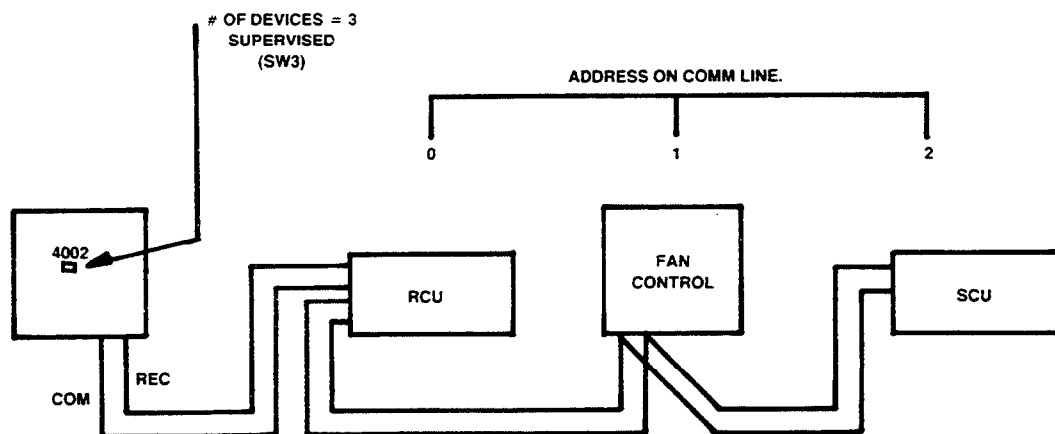
Notes:

1. **Normal Operation** – Indicates that a special function is NOT selected and DIP Switches, SW1 and SW2 are in the ON position.

2. For a complete description of each system function, see pages 27 through 30.

3. The "SYSTEM RESET" switch must be pressed after DIP switches are set.

4. See page 15 for location of DIP Switches SW1, SW2 and SW3.

BASIC DEFINITIONS OF DIP SWITCH SELECTABLE SYSTEM FUNCTIONS

● **Normal Operation:** The following represents normal system operation and all DIP switches are set to the ON position.

   a. The activation of any alarm initiating device on any zone immediately causes all signals throughout the system to operate continuously.

   b. Pressing the ALARM SILENCE push button immediately stops all signal operation.

   c. All push buttons and toggle switches on the panel's front are enabled.

● **Alarm Verification (DIP Switch SW1-1 OFF)**

The alarm verification feature is used to reduce unwanted alarms in smoke detectors. It allows smoke detectors to be verified while residing in the same zone with heat detectors and manual stations that are not verified. Operation is as follows:

   a. If a smoke detector senses an alarm, the 4002 will start a 30 second timer and ignore the alarm.

   b. At the end of the 30 second timer, if no other zones or contact devices have alarmed, the zone is reset for 5 seconds.

   c. After power is restored to the detectors, the 4002 begins a 120 second confirmation period. If, during this time, the detector re-alarms (or another detector alarms), the signals are sounded and alarm functions occur as programmed.

STEP #7 cont.

    d. If no alarms occur during the 120 second confirmation period, the 4002 returns automatically to the normal mode.

        Note: If, any time during the alarm cycle, an alarm is sensed from another zone or contact device (heat detector or manual station), the 4002 alarms immediately.

● *Coded Input on Zone 1 (DIP Switch SW1-2 OFF and JW11 Cut)*

The coded input operation is used for either coded stations or coded systems. When selected, this feature allows the 4002 to connect to devices that input a specific code for their location. These devices must be wired to zone 1. The coded input feature bypasses the normal latch circuit on zone 1 and allows the signals to follow the input code. All other alarm functions remain the same (e.g., auxiliary relays and city circuit operation). The coded input signal takes priority over other signals while the code device is pulsing. The 4002 will turn priority over to the other alarm functions after 30 seconds of silence from the coded input device.

● *Waterflow on Zone 7 (DIP Switch SW1-3 OFF)*

Zone 7 may be used for connecting to the waterflow contacts on a sprinkler system. When selected, zone 7 will monitor normally-open waterflow contacts for closure to indicate an alarm. Notification appliance circuit 2 will turn on and cannot be silenced as long as the waterflow contacts are closed. When the flow contacts are restored to normal, notification appliance circuit 2 can then be silenced by the system reset push button.

● *Sprinkler Tamper Switch Supervision on Zone 8 (DIP Switch SW1-4 OFF)*

By setting DIP Switch SW1-4 to off, Zone 8 may be used for monitoring the position of sprinkler gate valves. It can be connected to normally-closed sprinkler-tamper contacts. The 4002 allows up to five normally-closed contacts, and the circuit is supervised for opens and shorts. When a contact opens, the following sequence occurs.

1. Zone 8 Alarm LED flashes.

2. The Auxiliary Trouble Relay and Piezo activates until silenced.

3. Activating the ALARM SILENCE push button silences the trouble circuit.

4. Restoring the valve to the normal position causes the zone LED to extinguish.

Notes:

1. The 4002 can be reset while a supervisory circuit is still open (not normal). If the circuit is still open when reset, the sequence will again start at step 1 above.

2. ESP must be provided if operation of an Auxiliary Alarm Relay from Zone 8 is required.

● *Signal Cutoff Time Limit After 10 Minutes (DIP Switch SW1-5 OFF)*

The signal cutoff feature provides an automatic signal silence function. When an alarm occurs, the signals will sound for 10 minutes and then be silenced.

Note: If the signal silence inhibit feature (see below) is selected in conjunction with this option, the signals will automatically silence 10 minutes after the conclusion of the signal silence inhibit time.

STEP #7 cont.

- **_Signal Silence Inhibit (DIP Switches SW1-6 and SW1-7 OFF)_**

The signal silence inhibit feature prevents the operator from silencing the signals until the inhibit duration expires. Available inhibit durations are:

    No delay (normal operation)
    1 Minute delay
    3 Minutes delay
    5 Minutes delay

- **_2120 Connection is Present in System (DIP Switch SW1-8 OFF)_**

    An option that, when selected, allows the Control Panel to communicate with a Simplex 2120 Multiplex System via the 2120 Communication Module.

- **_Walk Test™ Mode (DIP Switch SW2-1 OFF)_**

    When selected, the following occurs:

    a. The system Trouble LED illuminates.

    b. The city alarm relay is bypassed.

    c. The auxiliary alarm relays are bypassed.

    > *Note:* The auxiliary relays connected to the annunciator outputs still follow the zone alarm LEDs.

    d. The system is ready for a Walk Test™ (see page 9)

IMPORTANT: The system **DOES NOT** provide fire protection when in the Walk Test™ mode.

- **_MANUAL EVAC Switch Enabled or Disabled (DIP Switch SW2-2)_**

    The "manual evacuation" switch is standard on all systems.

    When enabled, (SW2-2 ON) activating the switch will turn on all indicating appliance circuits while leaving the auxiliary alarm relays and city circuit in their normal position. The manual evacuation signal is terminated by pressing either the signal silence or system reset switch.

    When disabled, (SW2-2 OFF) the switch has no effect on the system whatsoever.

- **_Signal Coding (DIP Switches SW2-3, SW2-4 and SW2-5)_**

    The signal coding option uses three DIP switch positions to allow 8 different selections. Only one code selection can be used. This feature is common to the operation of all indicating appliances in the system. The coding choices are:

    a. *Normal operation* – When selected, the signals will sound continuously.

    b. *March time* – When selected, the signals will sound a march time code of 120 beats a minute.

    c. *Slow march time* – When selected, the signals will sound a march time code of 20 beats a minute.

STEP #7 cont.

d. *Temporal code* – When selected, the signals will repeat a code pattern consisting of 0.5 sec on, 0.5 sec off, 0.5 sec on, 0.5 sec off, 0.5 sec on, 2.5 sec off.

e. *Simple coding* – When selected, the signals will sound a code that represents the area in alarm.

f. *California code (one minute)* – When selected, the signals will sound a special code used in L.A. county for one minute and then stop.

g. *California code (three minutes)* – When selected, the signals will sound the above code for three minutes and then stop.

h. *California code (five minutes)* – When selected, the signals will sound the above code for five minutes and then stop.

● **Selective Signal Circuit Operation (DIP Switches SW-6 and SW2-7)**

The selective signal circuit feature provides one of four operating modes for notification appliance circuits 1 and 2 as follows:

a. *Normal operation* – Both signal circuit 1 and signal circuit 2 silence when the alarm silence switch is activated.

b. *March time on signal circuit 1 until reset* – Causes notification appliance circuit 1 to code a march time signal while the other notification appliance circuits follow the coding selection DIP switch settings. Notification appliance circuit 1 remains on until the system is reset while all other appliance circuits can be silenced by the alarm silence switch. This mode of operation can be used to flash incandescent lamps after the audible signals have been reset.

c. *Signal circuit 1 on steady until reset* – Causes notification appliance circuit 1 to operate continuously while appliances in other circuits follow the coding selection DIP switch settings. Notification appliance circuit 1 remains on until the system is reset while all other appliance circuits can be silenced by the alarm silence switch. This mode of operation can be used to flash strobe lamps after the audible signals have been silenced.

d. *Signal zones 1 and 2 on steady until reset* – Same as the above, except that it also applies to signal circuit 2.

● **ESP Program Mode (DIP Switch SW2-8)**

The ESP program mode allows qualified Simplex personnel to custom-program the system by entering ESP (Expanded Simplex Programming) equations into system memory.

IMPORTANT

DIP switch SW2-8 must *never* be left in its OFF (Program) position (except when performing ESP Programming procedures).

● When DIP switch SW2-8 is in its On (Normal) position, the panel functions as a fire control unit — a device which provides fire protection; when DIP switch SW2-8 is in its Off (Program) position, the panel functions as a program entry device — a device which provides *no* fire protection.

STEP #8

WALK TEST™

Perform a complete Walk Test™ to ensure proper system operations. These procedures are located on page 9 in this manual.

STEP #9

RE-MOUNTING RETAINER AND DOOR

a. Mount the lock bracket to the back box.

b. Insert the lip located on the lower portion of the retainer (interior door) over the lip at the bottom of the back box.

c. Squeeze the two black plastic locking tabs at the top of the retainer, then insert them into the two slots at the top of the back box. This will secure the retainer to the back box.

d. Place the door on the two back box hinges. The door should open freely to allow access to operator controls.

> **IMPORTANT**

e. Ground the door by attaching the green ground wire and the ground screw lugs to both the door and the back box.

STEP 10.

CUSTOMER INFORMATION

Provide the owner with a complete system orientation to include operating instructions. These procedures start on page 3 in this manual. Leave all documentation with the customer including electrical drawings of the system and 4002 Field Wiring Diagrams.

GLOSSARY OF 4002 FIRE ALARM SYSTEM TERMS

Alarm Verification Option: A field-programmed option that causes the CPU to verify (double-check) all alarm initiations originated by smoke detectors before sounding the signals.

Annunciator: A remotely-located, electrically-powered display, separate from the control panel, containing LEDs or lamps to indicate the status of the fire alarm system.

Auxiliary (AUX) Relays: Control relays that normally energize during alarm conditions, and that are used to either apply power to or remove power from other equipment during an alarm condition. An auxiliary relay can also be programmed for activation during a trouble condition rather than an alarm condition.

City Remote Station Connection Circuit: Circuitry contained on the CPU board, which allows the 4002 fire alarm system to be tied either indirectly (via leased telephone lines) or directly (via a shunt or local energy master box) to a municipal fire station.

Class A Circuit: An initiating device (Style D) or notification appliance circuit (Style Z) within which all components remain fully functional even though a single open or ground exists in the circuit.

Class B Circuit: An initiating device (Style B) or notification appliance circuit (Style Y) within which some or all components may be disabled when a single open or ground exists in the circuit.

CPU (Central Processing Unit): That portion of the fire alarm panel which processes alarm and trouble information received from throughout the system, and acts on that information in an appropriate manner.

CPU Board: A panel-mounted module consisting of (among other things) the CPU itself, eight zone [circuit] monitors, two signal [circuit] monitors and two AUX relays.

End-of-Line (E.O.L.) Resistor: A resistor installed at the electrically farthermost point in a signal or zone circuit.

Fan Control Module: A panel-mounted module that consists of manual switches which allow fan or damper control circuits to be turned on, turned off, or operated automatically.

Fire Alarm Control Panel: The portion of the fire alarm system which provides the power and contains the circuitry needed for system operation.

Notification Appliance (Signal) Circuit: A circuit consisting of one or more notification appliances.

Notification Appliance (Signaling Device): A device which produces an audible and/or visual signal in response to a fire condition.

- Horn, bell, chime, flashing light, etc.

Initiating Device: A manual or automatic device which, when activated, initiates an alarm.

- Pull station, heat or smoke detector, waterflow switch, etc.

Initiating Device (Zone) Circuit: A circuit consisting of one or more initiating devices.

Local Energy Master Box: A municipal fire department connection box, mounted external to the panel, that uses electrical energy from the fire alarm panel to energize its (the master box's) electromagnetic tripping mechanism.

Power Supply Module: That portion of the fire alarm panel which provides the power needed to operate all panel modules, as well as that needed to operate all electrically-powered initiating devices and all notification appliances.

Shunt Master Box: A municipal fire department connection box, mounted external to the panel, that uses electrical energy from the municipal fire alarm system to energize its (the master box's) electromagnetic tripping mechanism.

Signal Module: A panel-mounted module which supervises two notification appliance (signal) circuits.

Silence Inhibit Option: A field-programmed option which, when entered, prevents all alarm-notification appliances from being silenced, and the system from being reset, until the delay's duration expires.

Supervision: The continuous electrical checking of fire alarm circuits and components for troubles (opens and, in some cases, shorts).

- For example, 4002 signal circuits are supervised for both opens and shorts, while 4002 zone circuits are supervised for opens only (a zone circuit short causes an alarm condition).

Zone Module: A panel-mounted module containing the circuitry needed to supervise either four or eight zone circuits for both trouble and alarm conditions.

APPENDIX A

ESP Programming Option

Normally the 4002 is used as a general alarm system. Activation of any monitor point will energize all signal circuits, relays (to include the city relay), and the piezo. A number of DIP switch selectable functions may also be used to enhance the general alarm operation.

When more sophisticated project specific operations are required, Expanded Simplex Programming (ESP) Option must be installed. This option allows the operation of the system to be tailored to meet your specific requirements and perform up to 23 additional special operations. These special operations are defined by the user and may be modified at any time by qualified SIMPLEX personnel. ESP programs are defined for each desired operation, then programmed at the local SIMPLEX branch office. SIMPLEX personnel must install the ESP option, then test each ESP programmed operation.

Once programmed, the system will handle its ESP controlled inputs and outputs differently, while the rest of the system will operate general alarm. SIMPLEX personnel will demonstrate the operation and provide detailed instructions on each ESP programmed function. These tailored instructions are not included in any reference manual and must be used as required.

a. **Selective Signal Circuit Operation**

One or more selected monitor point inputs will act upon one or more signal output circuits.

Selective signal operations may be used for various applications.

Three specific selective signal operations are as follows:

1. Selective signals by floor — Evacuation signals sound on the floor of the alarm initiation; other signals may sound on other floors.

2. Selective signals by zone — Evacuation signals sound in the zone or area of the alarm initiation; other signals may sound on other areas.

3. Floor above and floor below — Evacuation signals sound on the floor of the alarm initiation, and on the floor above and the floor below the floor of the alarm initiation; other signals may sound on other floors.

b. **Selective Relay Control Operation**

One or more selected monitor point inputs will act upon one or more general purpose output relay control circuits.

c. **Selective Fan/Damper Control Relay Operation**

One or more selected monitor point inputs will act upon one or more relay circuits which control fan/damper circuits.

d. Selective Door Holder Relay Control

One or more selected monitor point inputs will act upon one or more relay circuits which control door holder circuits.

e. Selective Bypass Control Switch Operation

One or more selected inputs (monitor or control) will selectively bypass control circuits.

f. Selective Switch Operation

One or more selected switch inputs will selectively control output circuits.

g. Multiple Tamper Zones

One or more selected monitor point inputs (connected to sprinkler gate valves, N/O or N/C) which activate specific tamper signals.

h. Stage 1/Stage 2 Operation or Presignal Operation

Stage 1/Stage 2 — Zone activation alerts in-house personnel and starts a delay timer. If the timer is not reset before the delay expires, evacuation signals sound automatically.

Presignal — Zone activation alerts in-house personnel. A second (manual) action is required before evacuation signals sound.

i. Cross Zoning

A method of operation by which two or more monitor points must be activated before an output action can occur.

j. Timing Functions

One or more selected monitor point inputs may cause a selected output to activate *for* a predetermined time period or *after* a time period elapses.

k. Master Code

One or more selected monitor point inputs will cause a selected coded pulse pattern to be outputted to selected control outputs. (Usually the notification appliance circuits or city circuit).

l. Non-Alarm Monitor Point Operation

A method of removing one or more selected monitor points from the 4002 general alarm program. The monitor point alarm LED will flash when activated, but no control outputs will occur unless specified in an E.S.P. equation.

m. Non-latching Monitor Point Operation

A method of allowing one or more selected monitor point to "track" a peripheral device contact closing or opening.

• Only non-alarm contacts should be non-latching.

n. Piezo Signal Operation

The ability to control the Piezo selectively using any function statement in E.S.P.

o. AC Power Fail (Control)

The ability to control any output during an AC power loss or brownout condition at the 4002 panel.

p. **2120 Non-Default Operation**

The 2120 communicator module has a standard operation consisting of:

1. Zone alarm and trouble reporting to the 2120 CPU.
2. The ability for the 2120 to initiate 4002 system reset, alarm silence, trouble silence and manual evacuation.

Should an operation other than the default program be required, an ESP equation must be written and the data base may have to be changed.

q. **RCU Switch Non-Default Operation**

The 4602 Serial Annunciator RCU switches have a standard default operation consisting of:

1. System Reset
2. Alarm Silence
3. Trouble Silence
4. Manual evacuation

Should an operation other than the default program be required, an ESP equation must be written and the data base must be changed.

r. **SCU Point Matrix (Zone Grouping)**

A method by which zones may be grouped in ESP memory points and assigned to a specified 4602 Serial Annunciator LED.

s. **Elevator Recall w/Alternate Floor**

A method that alters the recall of the elevator to ground level during an alarm situation. If the alarm is initiated from ground level the elevator may be recalled to an alternate floor.

t. **System Reset (Special Operation)**

A method of changing the state of an output circuit when the system is reset.

u. **Point Sensing**

A method of changing an initiating device circuit (zones) to detect inputs other than normally open contact devices. (i.e., current limited and normally closed devices).

v. **PNIS Zone Coding**

A specified pulsed signal is sounded by the indicating appliances to audibly indicate where the alarm was initiated. ESP Data Base and ESP Equations are used to define the type of codes and their use.

APPENDIX B

FAN CONTROL MODULE (Figures 12 and 13)

A. *Features*

A 4002 system may include up to four fan control modules, each of which consists of two fan control circuits.

Each fan control module includes:

- Two 3-position maintained toggle switches (SW2 and SW3).
- Two DIP switch packages (SW1 and SW4).
- Two P connectors (P1 and P2).
- Two red LEDs (fan OFF).
- Two green LEDs (fan ON).
- Two yellow LEDs (fan circuit TBL).
- One terminal block (TB1).

B. *Panel Connections*

P1 = 24VDC input power (2-wire harness) from any of the following:

    P6 on CPU module
    P2 of another fan control module
    P3 of a signal expansion module
    P2 on a 2120 interface module

P2 = 24VDC output power

Figure 12

TB1-1 = REC (from TB4-20 [REC] on the CPU [or from TB1-1 on another fan control module]).
TB1-2 = COM (from TB4-21 [COM] on the CPU [or from TB1-2 on another fan control module]).

C. *Field Connections*

TB1-3 = ON1 (0V out to pick fan 1 ON relay).
TB1-4 = OFF1 (0V out to pick fan 1 OFF relay).
TB1-5 = ON2 (0V out to pick fan 2 ON relay).
TB1-6 = OFF2 (0V out to pick fan 2 OFF relay).
TB1-7 = TK1 (+24 [feedback] from 1st fan circuit via vane, sail or pressure differential switch in 1st air duct).
TB1-8 = TK2 (+24 [feedback] from 2nd fan circuit via vane, sail or pressure differential switch in 2nd air duct).

D. *Switches*

DIP Switch SW1

Switches SW1-1 and SW1-2 (Control the red and green LEDs.)

SW1-1 OFF = Green LED lit when +24 present on TB1-8.
              Red LED lit when +24 absent from TB1-8.
SW1-1 ON = Green LED lit when SW2 in ON position.
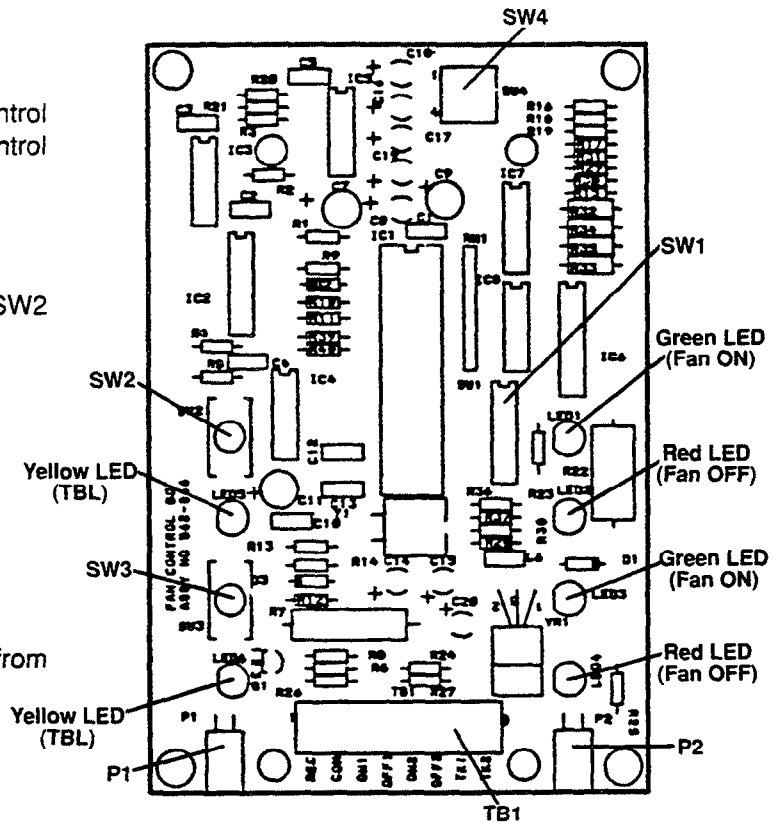   Red LED ON when SW2 in OFF position.

SW1-2 OFF = Green LED lit when +24 present on TB1-7.
 Red LED lit when +24 absent from TB1-7.
SW1-2 ON = Green LED lit when SW3 in ON position.
 Red LED lit when SW3 in OFF position.

Switches SW1-3 and SW1-4 (Functions depend on whether or not the 4002 has ESP.)

If the panel *lacks* ESP, the module responds to the issuance of any alarm message as follows:

SW1-3   SW1-4

ON   ON   =   Leaves fans in their current state.
ON   OFF   =   Turns both fan circuits OFF.
OFF   ON   =   Turns both fan circuits ON.
OFF   OFF   =   Turns fan circuit 1 ON, turns fan circuit 2 OFF.

If the panel *has* ESP, switches SW1-3 and SW1-4 identify the fans under the module's control as follows:

SW1-3   SW1-4

ON   ON   =   Module controls fans 1 and 2.
ON   OFF   =   Module controls fans 3 and 4.
OFF   ON   =   Module controls fans 5 and 6.
OFF   OFF   =   Module controls fans 7 and 8.

Note: ESP allows the CPU to turn individual fans ON or OFF, depending on which of the system's zones is in alarm.

Switches SW1-5 thru SW1-8 (Set the fan control module's address.)

SW1-5	SW1-6	SW1-7	SW1-8	Address
ON	ON	ON	ON	0
ON	ON	ON	OFF	1
ON	ON	OFF	ON	2
ON	ON	OFF	OFF	3
ON	OFF	ON	ON	4
ON	OFF	ON	OFF	5
ON	OFF	OFF	ON	6
ON	OFF	OFF	OFF	7
OFF	ON	ON	ON	8
OFF	ON	ON	OFF	9
OFF	ON	OFF	ON	10
OFF	ON	OFF	OFF	11
OFF	OFF	ON	ON	12
OFF	OFF	ON	OFF	13
OFF	OFF	OFF	ON	14
OFF	OFF	OFF	OFF	Not valid

Layout,
Switch SW1
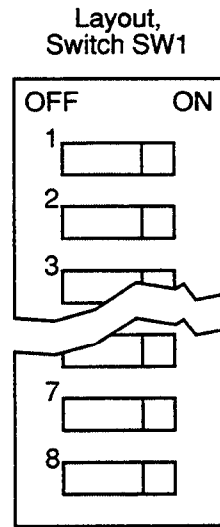
Switch SW2 (Position determines the presence or absence of 0V on terminals TB1-3 and TB1-4)

Up position   = Applies 0V to TB1-3 (ON1), energizing fan control relay K1.
Center position = Presence or absence of 0V determined by the fan control module's microprocessor.
Down position   = Applies 0V to TB1-4 (OFF1), energizing fan control relay K2.

**Note:** Relays K1 and K2 must mount within 3 ft. of 1st fan motor.

Switch SW3 (Position determines the presence or absence of 0V on terminals TB1-5 and TB1-6)

Up position   = Applies 0V to TB1-5 (ON2), energizing fan control relay K3.
Center position = Presence or absence of 0V determined by the fan control module's microprocessor.
Down position = Applies 0V to TB1-6 (OFF2), energizing fan control relay K4.

Note: Relays K3 and K4 must mount within 3 ft. of 2nd fan motor.

DIP Switch SW4 (Allows for supervision of a fan control relay's wiring during the relay's de-energized state.)

SW4-1 = OFF to supervise wiring to ON1 fan control relay. ON if circuit lacks ON1 fan control relay (or if supervision not wanted).

Layout,
Switch SW4

SW4-2 = OFF to supervise wiring to OFF1 fan control relay. ON if circuit lacks OFF1 fan control relay (or if supervision not wanted).

SW4-3 = OFF to supervise wiring to ON2 fan control relay. ON if circuit lacks ON2 fan control relay (or if supervision not wanted).

SW4-4 = OFF to supervise wiring to OFF2 fan control relay. ON if circuit lacks OFF2 fan control relay (or if supervision not wanted).
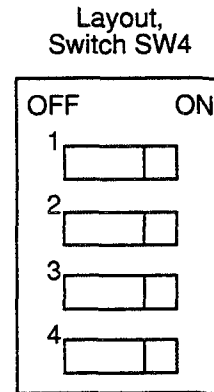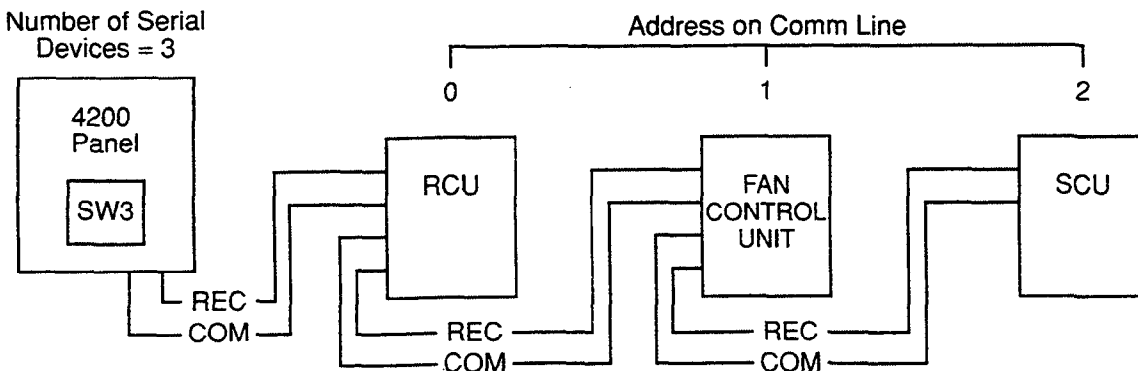
Note: If an SW4 switch is turned OFF, the appropriate TBL (yellow) LED on the fan control module illuminates — and the 4002 panel indicates trouble — when an open exists in the fan control relay circuit.
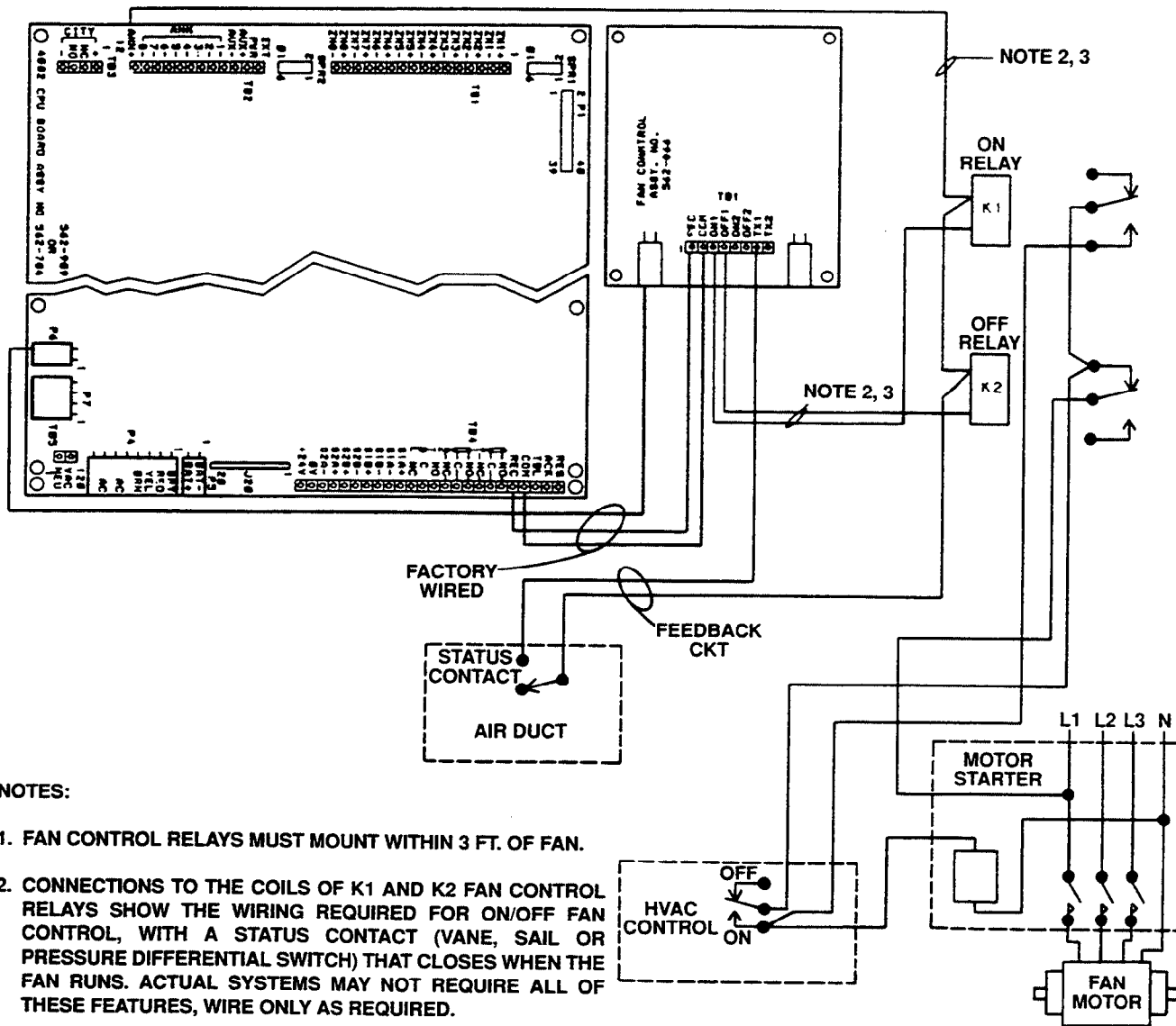
E. *DIP Switch SW3 on the CPU Module* (Figure 4 - page 15)

Set the switches on switch package SW3 as shown below

Switch Number	Number of devices (SCUs/RCUs, fan control units, etc.) in system															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
SW3-1	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
SW3-2	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF
SW3-3	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF
SW3-4	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Number of Serial
Devices = 3

Address on Comm Line

0   1   2

4200
Panel

SW3

RCU

FAN
CONTROL
UNIT

SCU

REC
COM

REC
COM

REC
COM

F. Interconnection Diagram

NOTES:

1. FAN CONTROL RELAYS MUST MOUNT WITHIN 3 FT. OF FAN.

2. CONNECTIONS TO THE COILS OF K1 AND K2 FAN CONTROL RELAYS SHOW THE WIRING REQUIRED FOR ON/OFF FAN CONTROL, WITH A STATUS CONTACT (VANE, SAIL OR PRESSURE DIFFERENTIAL SWITCH) THAT CLOSES WHEN THE FAN RUNS. ACTUAL SYSTEMS MAY NOT REQUIRE ALL OF THESE FEATURES, WIRE ONLY AS REQUIRED.

3. ALL WIRING IS SUPERVISED, EXCEPT THE WIRE THAT CONNECTS THE STATUS CONTACT TO TERMINAL TK1 (TB1-7).

4. THE MODULE CONTAINS TWO IDENTICAL FAN CONTROL OUTPUTS. WIRE ON2, OFF2, AND TK2 TO OPERATE THE SAME AS THE CIRCUIT SHOWN.

5. ELECTRICAL RATINGS:
   ON1, OFF1, ON2, OFF2 = 150 mA @ 24 VDC
   TK1, TK2 = 24 VDC @ 0.1 mA
   ANN+ = 1.2 Amps @ 24 VDC

6. FAN CONTROL RELAYS K1 AND K2 MUST BE 24VDC THAT OPERATE BETWEEN 0-150 mA.

7. ALL CONDUCTORS MUST TEST FREE OF GROUNDS.

Figure 13

G. *Wire Length Chart in Feet* (for 2-Wire Fan Control Relay Circuits)

Total Current in Amps	Wire Size			
	#12	#14	#16	#18
0.050	10,000	10,000	6,716	4,225
0.075	10,000	6,923	4,477	2,816
0.100	8,437	5,192	3,358	2,112
0.150	5,625	3,461	2,238	1,408
0.200	4,218	2,596	1,679	1,056
0.300	2,812	1,730	1,119	704
0.400	2,109	1,298	839	528
0.500	1,687	1,038	671	422
0.600	1,406	865	559	352
0.700	1,205	741	479	301
0.800	1,054	649	419	264
0.900	937	576	373	234
1.000	843	519	335	211
1.100	766	471	305	192
1.200	703	432	279	176

Figure 14

APPENDIX C

ATTERY TESTING INFORMATION

eneral Information

sealed lead-acid batteries in fire alarm service should be tested annually.

Replace all sealed lead-acid batteries that have been in service for four or more years.

It is recommended that a battery tester made specifically for checking sealed lead-acid batteries be used.

Such a tester is available under Service Part No. 553-602.

a battery tester is unavailable, the "voltage response test" described below can be used to detect batteries with ry low capacity or shorted cells.

PORTANT: A defective battery charger circuit can cause battery failure. Check the condition of the battery charger when either a battery tester or a voltage response test reveals weakened batteries.

sting

Connect a digital voltmeter across the battery.

Connect the appropriate sized resistor(s) (see Chart 1) across the battery's terminals for the listed test time.

Record the end voltage reading.

Treat the battery as described in Chart 2.

CHART 1

VOLTAGE	AMP HR	RESISTOR (OHMS)	WATTS	PART NUMBER AND DESCRIPTION	TEST TIME
12	5.2	8.0	50	380-008 (2 in parallel)	2 Seconds
12	6.2	6.0	50	380-031	2 Seconds
12	8	4.5	50	380-031 (adj to 4.5 Ohm)	2 Seconds
12	10	4.0	50	380-031 (adj to 4 Ohm)	2 Seconds
12	18	2.0	100	380-031 (3 in parallel)	2 Seconds
12	20	1.5	100	382-090 (2 in parallel)	2 Seconds
12	33	1.0	150	382-090 (3 in parallel)	2 Seconds
6 *	50	1.0	150	382-090 (3 in parallel)	4 Seconds
12	110	1.0	150	382-090 (3 in parallel)	4 Seconds

* Test 2 batteries in series for 12V

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* * * CAUTION * * *

Resistors will get hot during test!

Use 12AWG wire for battery-to-resistor hookup.
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CHART 2

IF END VOLTAGE READING OF BATTERY IS:	INSTRUCTIONS
11.8V or more	Put in Service
11.7V to 11.0V	Charge Battery *
10.9 or less	Discard Battery

* Retest battery after charging.

Note 1: Discard if battery has been in service for four or more years (dispose of properly).

Note 2: Dispose of properly.

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