SK-4224

Fire Control Panel

Installation and Operation Manual

Part Number 151068D, 02/02

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Section 1
Overview

1.1 SK-4224 Description

The Model SK-4224 is a four zone, 24-volt fire alarm control panel having the following features:

- Zone inputs can be configured as:

  Four Class B zones

  Or

  Two Class A zones
- 2.5 amp power supply
- Two notification appliance circuits rated at 2.5 amp total.
- Dedicated alarm and trouble relays
- Auxiliary power output (.5 amp max.) for powering special applications, such as door holders.
- Enhanced Verification Mode, a built-in feature that distinguishes two-wire smoke detectors from pull stations.
- Housed in a 12-13/16"W x 15-1/8"H x 3-3/8"D metal cabinet
- Cabinet supports two 7.0 AH backup batteries

1.2 How to Contact Silent Knight

If you have a question or encounter a problem not covered in this manual, contact Silent Knight Technical Support at 800-328-0103 (or 612-493-6455). To order parts, contact Silent Knight Sales at 800-446-6444 (or 612-493-6435).

Section 2
Agency Requirements

2.1 FCC Warning

This device has been verified to comply with FCC Rules Part 15. Operation is subject to the two following conditions: (1) This device may not cause radio interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

2.2 Underwriters Laboratories (UL)

The SK-4224 is UL listed as a control unit for use in NFPA 72 systems. If the SK-4224 and its accessories are to be used as part of a UL certificated installation, carefully read the UL requirements in this section. For more information on NFPA 72 standards, refer to the *NFPA National Fire Alarm Code*.

2.2.1 Requirements for All Installations

General requirements are described in this section. When installing an individual device, refer to the specific section of the manual for additional requirements.

1. All field wiring must be installed in accordance with NFPA 70 National Electric Code.
2. Use UL listed smoke detectors and notification appliances compatible with the SK-4224 from those specified in the Appendix to this manual.
3. If you are using the smoke verification feature:
   - Do not use smoke detectors with built-in alarm verification.
   - Select "Enhanced Mode" if the installation includes pull stations or water flow switches.
4. A full system checkout must be performed any time the panel is programmed.
5. UL installations using Class B wiring require the use of a Model 7628 EOL resistor assembly.

2.2.2 Requirements for Protected Premises (Local) Fire Alarm Systems

At least one UL listed supervised notification appliance must be used.

Section 3
Before You Begin Installing

3.1 What's in the Box?

The Model SK-4224 ships with the following hardware:

Table 3-1: Contents of Shipping Box

Main Part	Containing		Number
	Part	Quantity/Item	
1 Cabinet			122509
	Panel Bag	1 Control Board	204224
		1 Installation Manual	151068
	Hardware Bag	2 #8 Screws	119152
		2 #8 Nuts	119538
		3 Self-tapping Screws	119296
		1 Earth Ground Wire	140668
		1 Battery Wire Harness	130420
		1 battery Jumper	140694
1 Transformer	120 Vrms @ 60Hz		115061
	or a		
	230 Vrms at 50Hz		115031
1 Viewing Bezel			122508
6 End-of-line Resistors			111682

Note: See Section 3.7 for assembly instructions.

3.2 Optional Accessories

Table 3-2 is a list of optional accessories that can be used with the Model SK-4224 Fire Alarm Control Panel.

Table 3-2: Option Accessories for the SK-4224

Model Number	Name	Description
SK-2884	Serial Driver Board	Used to interface all SK-4224 expansion devices to the SK-4224 panel. Supports1 DACT (Model SK-2104) and any combination of 4 LED Annunciators (Model SK-2866) or I/O Modules (Model SK-2880).
*SK-2880	Input/Output (I/O) Module	Used to drive customized annunciators and interface devices.
*SK-2866	LED Annunciator	Remote LED annunciator with Silence and Reset keyswitch inputs.
*SK-2104	DACT	Used to communicate alarms, trouble and supervisories to central station. Offers 5 different reporting formats 3/1, 4/2, BFSK, SIA, and Contact ID.
Model 7628	UL listed End-of-line (EOL) Resistor.	EOL resistor required for UL installations.

* *Require a SK-2884 to operate with the SK-4224 control panel.*

3.3 SK-4224 Board Layout

Figure 3-1 shows the SK-4224 circuit board including location of terminals, connectors, DIP switches, and LEDs.

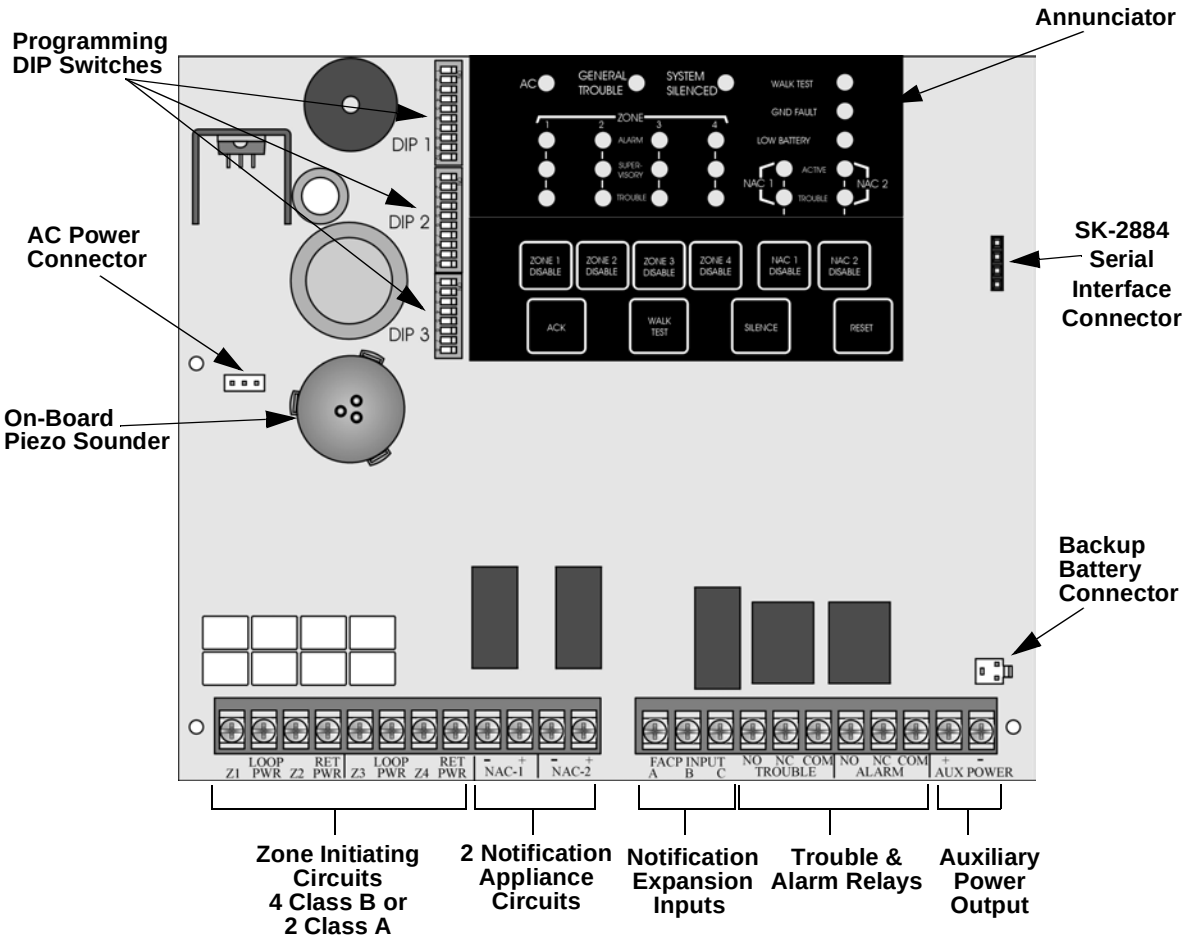


Figure 3-1 Model SK-4224 Layout

3.4 Electrical Specifications

Table 3-3: Electrical Specifications

Circuit	Rating
Primary AC	*120 Vrms at 60 Hz, or 230 Vrms at 50 Hz @ 1.5 amps
Total External DC Load	2.5A @ 24 VDC
+24V Auxiliary Power	19.8 V to 28.0 V, 0.5 A max.
Trouble & Alarm Relays	2.5 A @ 30 VDC resistive
Notification Appliance Power	19.8 V to 28.0 V, 2.5 A max.
Smoke Detector Power	19.8 V to 28.0 V, 1.0 A max.
Battery Charging Voltage	27.0 - 27.6 V
Maximum Battery Charging Current	750 mA
Minimum Low Battery Detect	20.4 V
Minimum Low AC Detect	100 Vrms at 60 Hz, full load

*Note: * When ordering, specify your voltage requirements.*

3.5 Environmental Specifications

Table 3-4: Environmental Specifications

Storage Temperature:	-4° - 167° F (-20° - 75 ° C)
Operating Temperature:	32° - 120° F (0° - 49 ° C)
Humidity:	10 - 85% non-condensing

It is important to protect the SK-4224 control panel from water. To prevent water damage, the following conditions should be AVOIDED when mounting the units:

- Do not mount directly on exterior walls, especially masonry walls (condensation)
- Do not mount directly on exterior walls below grade (condensation)
- Protect from plumbing leaks
- Protect from splash caused by sprinkler system inspection ports
- Do not mount in areas with humidity-generating equipment (such as dryers, production machinery)

3.6 Mounting the SK-4224

Read the environmental specifications in Section 3.5 before mounting the cabinet.

The panel should be accessible to main drop wiring runs. It should be mounted as close to the center of the building as possible and located within a secured area, but should be accessible for testing and service. End-users responsible for maintaining the panel should be able to hear alarms and troubles. When selecting a location, keep in mind that the panel itself is the main source of alarm and trouble annunciation.

Mount the cabinet so it is firmly secured to the wall surface. When mounting the cabinet on concrete, especially when moisture is expected, attach a piece of 3/4-inch plywood to the concrete surface and then attach the cabinet to the plywood. Also mount any other modules to the plywood.

Follow these steps to mount the control panel cabinet:

1. Place the cabinet on the mounting surface, level the cabinet and mark the top two mounting holes.
2. Screw the top two mount screws about 3/4 of the way into the mounting surface.
3. Hang the control panel cabinet on the top mounting screws through the top mounting screw keyholes.

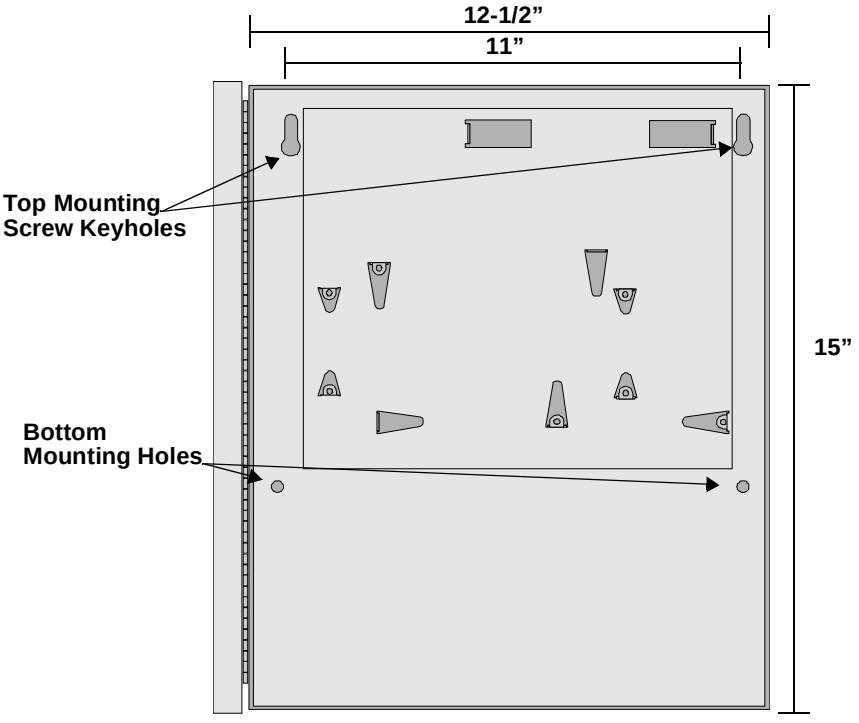


Figure 3-2 Cabinet Mounting Holes

4. Insert the bottom two mounting screws into the cabinet’s bottom mounting holes.
5. Tighten all four mounting screws until the cabinet is properly secured.
6. Insert all cabinet components. See Section 3.7.

3.7 Assembly

The components listed in Table 3-1 are all packed with in the cabinet and require some assembly. Follow these steps to assemble the components within the cabinet:

1. Remove keys from the envelope taped to the top of the cabinet.
2. Unlock the cabinet door.
3. Remove the packing material and the SK-4224 components.
4. Snap the bezel into the opening in the front of the cabinet. See Figure 3-3.

Note: The bezel will fit in only one way.

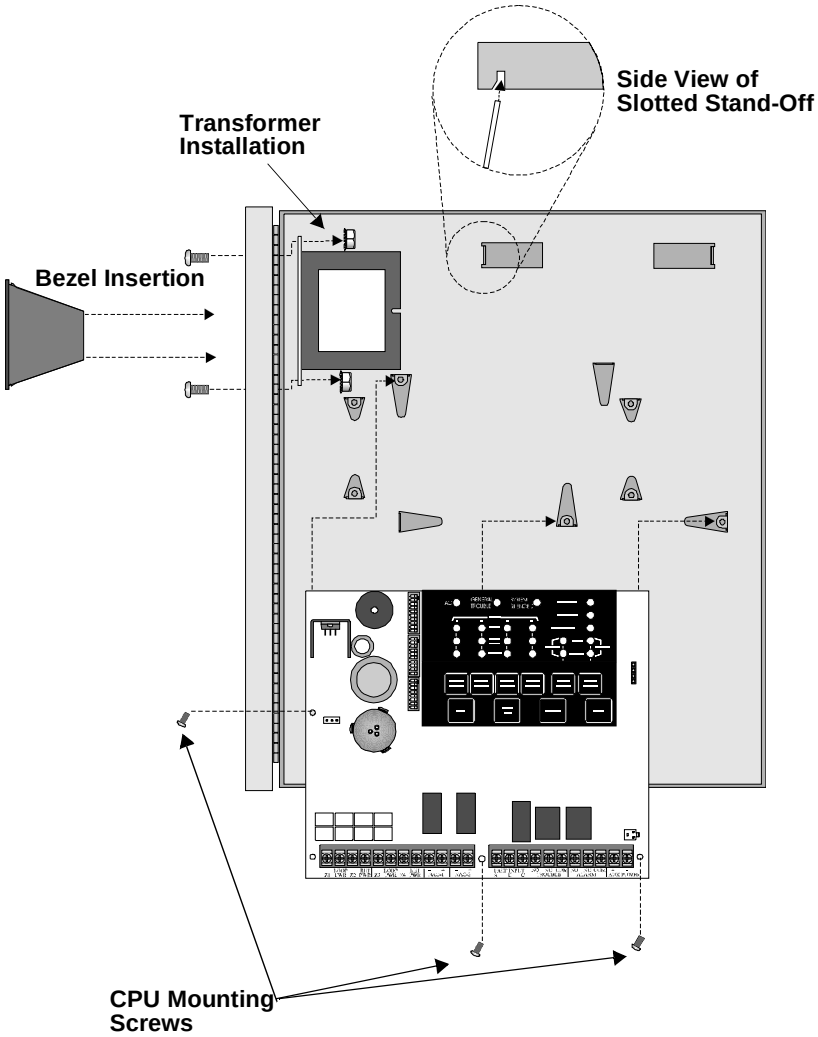


Figure 3-3 Assembly Diagram for the SK-4224

5. With the two #8 screws and nuts (with built in washers), mount the transformer in the holes in the upper left hand corner of the cabinet. See Figure 3-3.
6. With the three self-tapping screws, mount the control board on the cabinet stand-offs.

Note: See Section 4 for transformer connections and battery connections.

3.8 Wiring Specifications

Induced noise (transfer of electrical energy from one wire to another) can cause false alarms or interfere with control panel operation in other ways.

To avoid induced noise, follow these guidelines:

- Isolate input wiring from high current output and power wiring. Do not pull one multi-conductor cable for the entire panel. Instead, separate the wiring as follows:

Important!	Do not run 120 VAC line voltage in fire alarm raceways.

High current input/output: AC power and notification appliance wiring

Low current input/output: Annunciator and zone circuit wiring

- Do not pull wires from different groups through the same conduit. If you must run them together, do so for as short a distance as possible or use shielded cable. Connect the shield to circuit ground at the panel. You must route high and low voltages separately.
- Route the wiring within the cabinet around the perimeter of the cabinet. It should not cross the printed circuit board where it could induce noise into the sensitive microelectronics or pick up unwanted RF noise from the high speed circuits. See Figure 3-4 for an example.
- High frequency noise, such as that produced by the inductive reactance of a speaker or bell, can also be reduced by running the wire through ferrite shield beads or by wrapping it around a ferrite toroid.

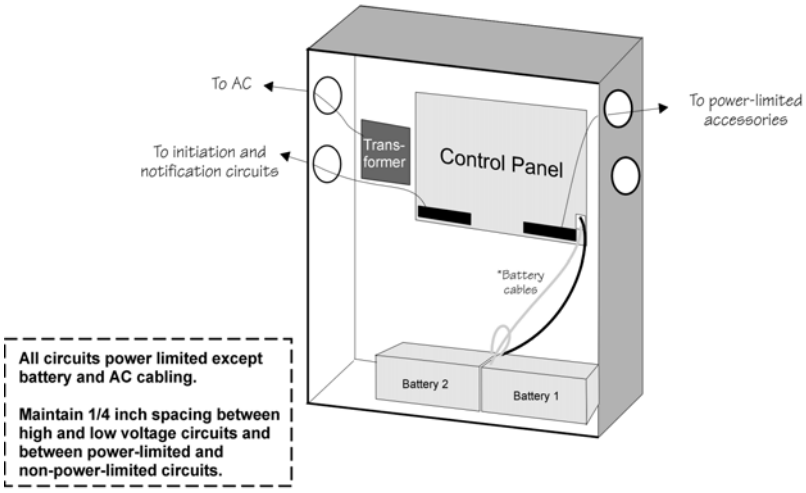


Figure 3-4 Wire Routing Example

3.9 Calculating Current Draw and Standby Battery

This section is for helping you determine the current draw and standby battery needs for your installation.

3.9.1 Worksheet Requirements

The following steps must be taken when determining SK-4224 current draw and standby battery requirements.

Filling in the Current Draw Worksheet, Table 3-6 (Section 3.9.3)

1. For the SK-4224, the worst case current draw is listed for the panel and is recorded in the table at Line A.
2. Add up the current draw for all smoke detectors and record in Line B.
3. Add up all notification appliance loads and record in Line C.
4. Any additional devices should be recorded at Line D.
5. Make sure that the alarm current without the panel (Lines B-D) does not exceed 2.5 A. The total alarm current (including the panel, Lines A-D) should not exceed 2.75 A.
6. Complete the remaining instructions in Table 3-6 for determining battery size requirements.

3.9.2 Maximum Battery Standby Load

Table 3-5 shows the maximum battery standby load for the SK-4224 based on 24 and 60 hours of standby. The standby load calculations of line G in the Current Draw Calculation Worksheet (Table 3-6) must be less than the number shown in Table 3-5 for the battery size used and standby hours required.

Table 3-5: Maximum Battery Standby Load

Rechargeable Battery Size	Max. Load for 24 hrs. Standby, 5 mins. Alarm	Max. Load for 60 hrs. Standby, 5 mins. Alarm
7 AH	270 mA	110 mA
12 AH	425 mA	170 mA

Note: Batteries greater than 7 AH must be installed in a Silent Knight AB-33 or any enclosure UL listed for Fire Protective Signaling.

3.9.3 Current Draw Worksheet

Use this worksheet to determine current requirements during alarm/battery standby operation. (Copy this page if additional space is required.)

Table 3-6: Current Draw Calculations

	Device	Number of Devices	Current per Device	Standby Current	Alarm Current
	For each device, use this formula:	This Column X	This column =	Current per number of devices	
	SK-4224 Panel	1	Standby: 65 mA	65 mA	
			Alarm: 250 mA		250 mA
A			**Current Subtotals:**	65 mA	250 mA
	Smoke Detectors	Refer to device manual for current ratings. See Appendix to this manual for max. # per loop.			
			Standby: mA	mA	
			Alarm: mA		mA
			Standby: mA	mA	
			Alarm: mA		mA
			Standby: mA	mA	
			Alarm: mA		mA
			Standby: mA	mA	
			Alarm: mA		mA
B			**Current Subtotals:**	mA	mA
	Notification Devices	Refer to device manual for number of devices and current ratings.			
			Alarm: mA		mA
			Alarm: mA		mA
			Alarm: mA		mA
			Alarm: mA		mA
C			**Current Subtotals:**	mA	mA
	Accessory Devices				
	SK-2884		Standby: 10 mA	mA	
			Alarm: 10 mA		mA
	SK-2866		Standby: 35 mA	mA	
			Alarm: 85 mA		mA
	SK-2880		Standby: 35 mA	mA	
			Alarm: 660 mA		mA
	SK-2104		Standby: 33 mA	mA	
			Alarm: 70 mA (while dialing)		mA
D			**Current Subtotals:**	mA	mA
	***Additional Devices**				
			Standby: mA	mA	
			Alarm: mA		mA
			Standby: mA	mA	
			Alarm: mA		mA
E			**Current Subtotals:**	mA	mA
F	Total current rating of all devices in system (add TOTALS OF A-E) X .001:			A	A
G	Number of standby hours. (24 or 60 for NFPA 72, chapter 1, 1-5.2.5):			H	
H	Multiply lines F (standby current) and G:		**Total standby AH**	AH	
I	Alarm sounding period in hours. (For example, 5 minutes = .0833 hours)				H
J	Multiply lines F (alarm current) and I:		**Total alarm AH**		AH
K	Add lines H and J. (AH = Ampere Hours)		**Total AH required**	AH	

**Note:* *If you are using door holders, you do not need to consider door holder current for alarm current because power is removed during that time. However, during normal operation, door holders draw current and must be included in the total standby current that can be drawn from the panel.*

Note: Total standby current must not exceed maximum Battery standby load listed in Table 3-5.

Section 4
Hardware Installation

4.1 AC Power

At installation, connect the transformer AC inputs to the AC power source as shown in Figure 4-1. It may be necessary for a professional electrician to make this connection.

The AC inputs are rated as 120 VAC, 60 Hz (for transformer P/N 115061) or 230 VAC, 50 Hz (for transformer P/N 115031). See Table 3-1 for more information.

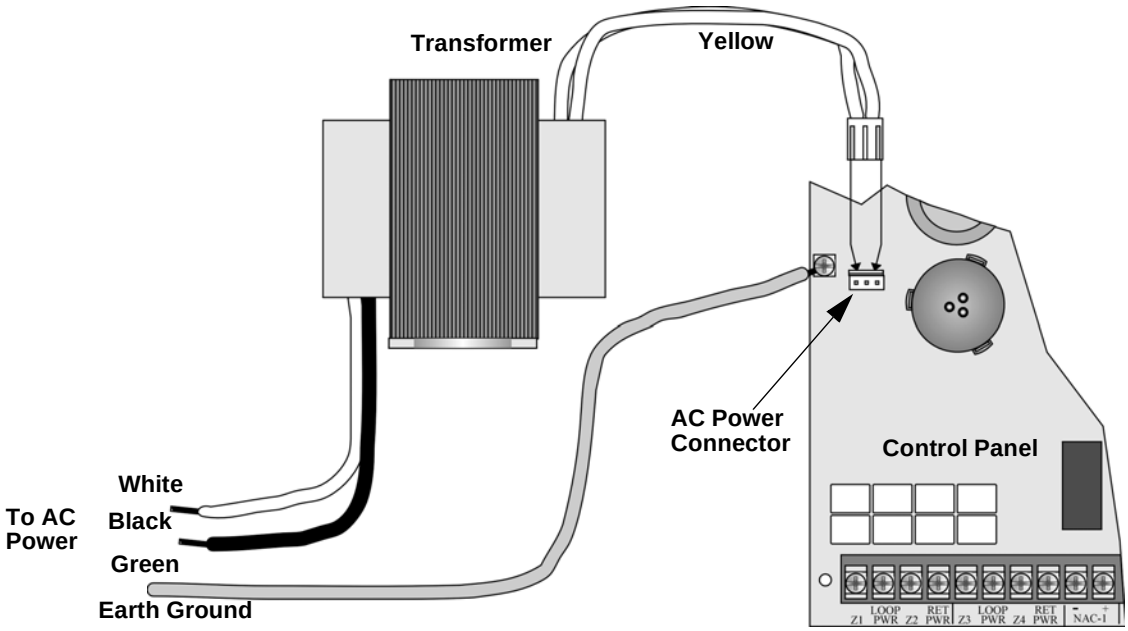


Figure 4-1 AC Power Connection

4.2 Battery Connection

The SK-4224 battery charge capacity is 7.0 AH. Use two Model 12 VDC batteries of the same AH rating. Determine the correct AH rating as per your current load calculation (see Table 3-6).

Wire batteries in series to produce a 24-volt equivalent. Do not parallel batteries to increase the AH rating.

Note: The SK-4224 cabinet supports two 7.0 AH batteries.

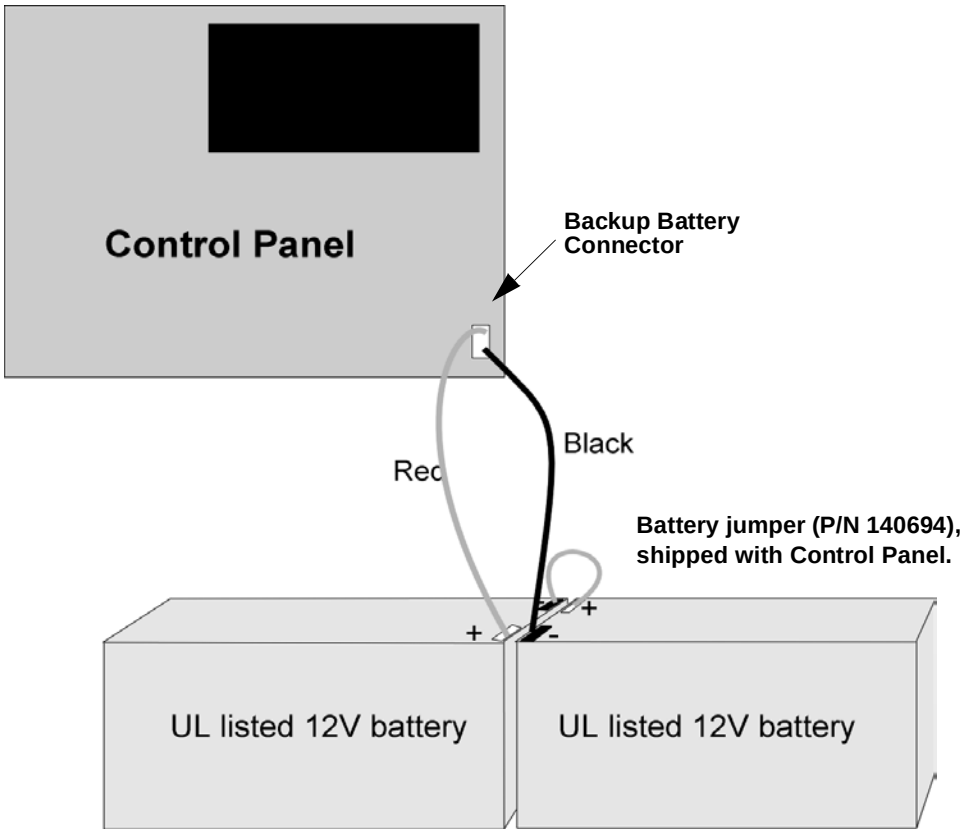


Figure 4-2 Battery Connection

4.3 Initiating Circuit Installation

4.3.1 Contact Wiring

Wire normally open contacts as shown in Figure 4-3. This is the type of wiring that would typically be used for manual stations, heat detectors and other normally open devices.

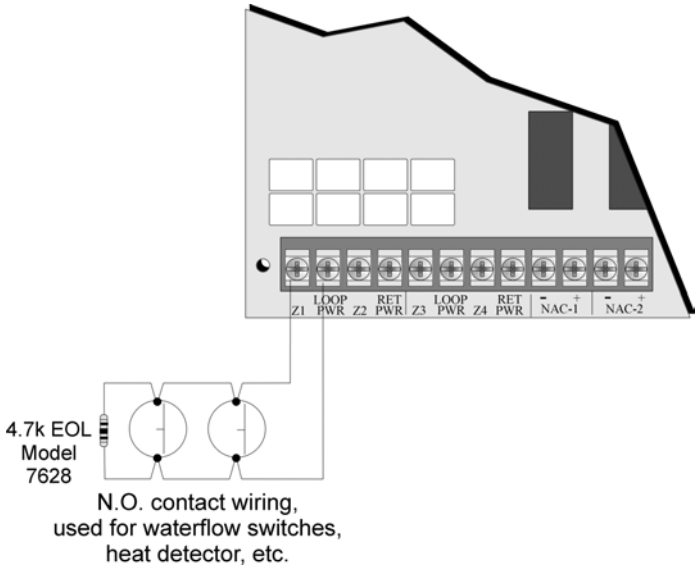


Figure 4-3 N.O. Contact Wiring

4.3.2 Two-Wire Smoke Detector Wiring

Figure 4-4 shows how to connect two-wire smoke detectors to the SK-4224 initiating circuits. The figure uses Silent Knight's SLK-24F with HSB-224 base as an example. You can use any detector that has been UL listed for compatibility with the SK-4224. Refer to the Appendix for a list of compatible devices. Refer to Section 6 for configuration options.

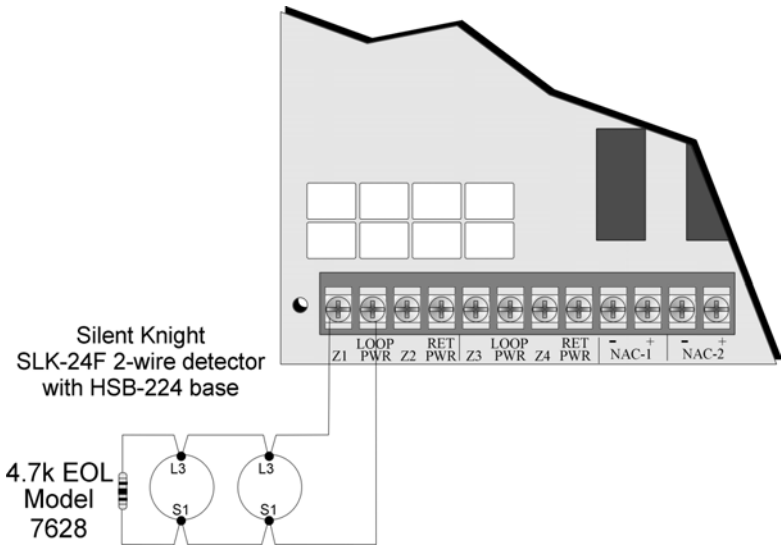


Figure 4-4 Two-Wire Smoke Detector Wiring

4.3.3 Class A Smoke Detector Installation

Figure 4-5 illustrates how to connect a UL listed smoke detector to the SK-4224 in a Class A configuration. Refer to the Appendix for a list of compatible devices. Information on selecting zone configuration options is in Section 6.

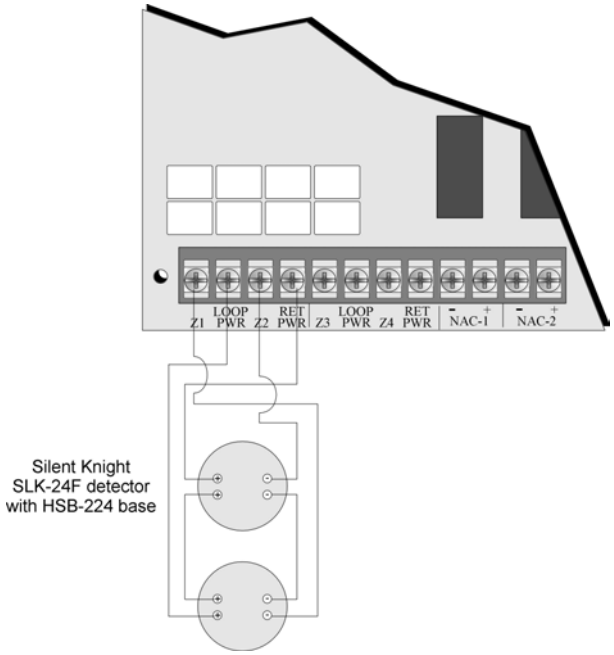


Figure 4-5 Class A Smoke Detector Wiring

4.3.4 Four-Wire Smoke Detector

Figure 4-6 shows how to connect four-wire smoke detectors to the SK-4224 initiating circuits. The figure uses Silent Knight's SLK-24F with HSC-4R base as an example. You can use any UL listed device. Refer to the Appendix for a list of compatible devices. Information on selecting zone configuration options is in Section 6.

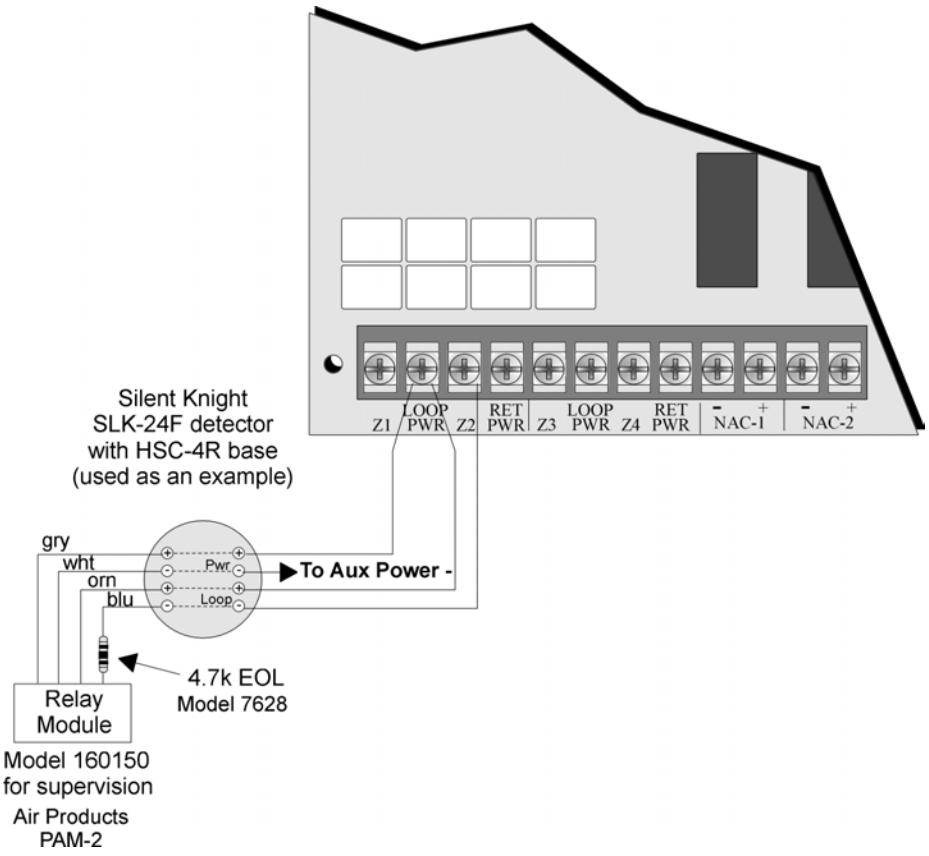


Figure 4-6 Four-Wire Smoke Detector Wiring

4.3.5 Notification Appliance Circuit Installation

Notification appliances used with the SK-4224 must be UL listed for compatibility with the SK-4224. Refer to the Appendix at the end of this manual for a list of compatible appliances.

For proper operation, you must use polarized notification appliances with a model 7628 4.7k ohm end-of-line (EOL) resistor on each circuit. Select ANSI output pattern, if desired. Output is configured as steady (continuous sound) at the factory. See Section 6 for information on changing the pattern.

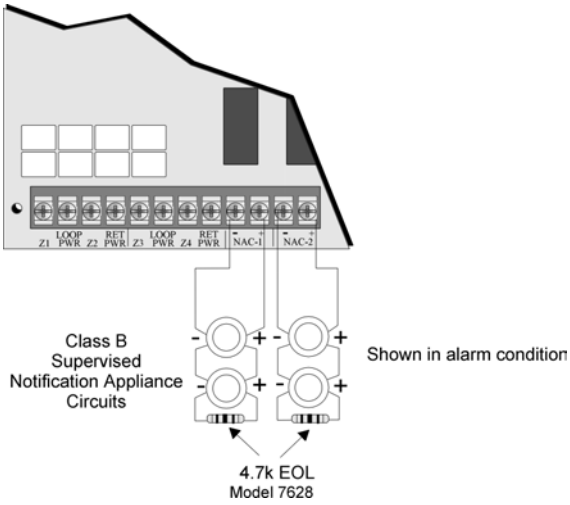


Figure 4-7 Notification Appliance Circuit Installation

4.3.6 Class A Notification Appliance Circuit Installation

For proper operation, you must use polarized notification appliances. Select ANSI output pattern, if desired. Output is configured as steady (continuous sound) at the factory. See Section 6 for information on changing the pattern.

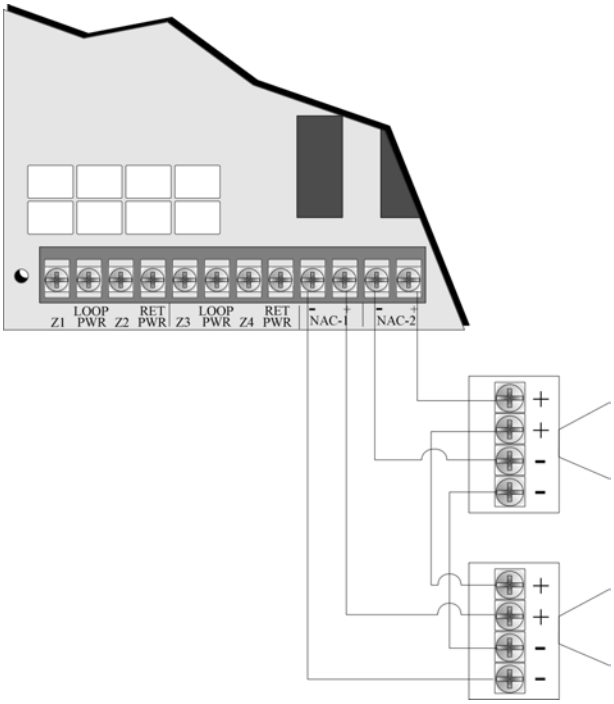


Figure 4-8 Class A Notification Circuit

4.4 Alarm and Trouble Relays

The SK-4224 has built-in relays for alarm and trouble. The alarm relay is energized during any alarm condition. The trouble relay is energized during any trouble or supervisory trouble condition. Each relay has three terminals (N.O., Common, and N.C.). Refer to Figure 3-1 for location of these terminals.

4.5 Auxiliary Power Circuit

The SK-4224 has a power limited auxiliary power circuit which can source up to .5A. The terminal is labeled “AUX PWR”. Refer to Figure 3-1 for location of this terminal.

4.6 Door Release Wiring

Figure 4-9 shows how to configure a door release using an ESL DH series door holder.

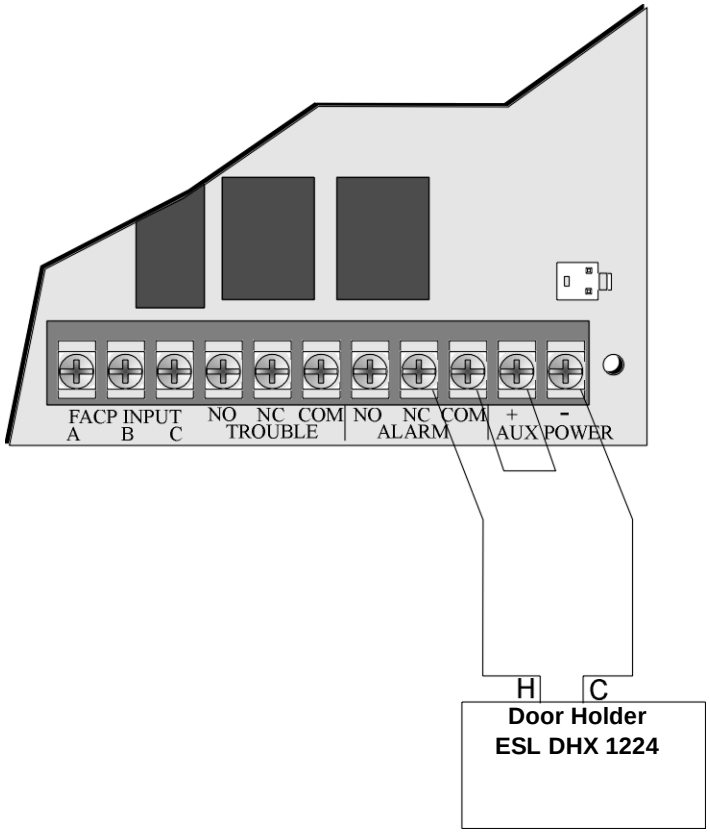


Figure 4-9 Door Release Wiring

4.7 Optional Accessories Installation

This section describes how to install the optional accessories compatible with the SK-4224 control panel.

4.7.1 Installing the Serial Driver Board (Model SK-2884)

The SK-2884 is required if the installation uses any SK-4224 expansion devices such as Model SK-2880 (I/O Module), Model SK-2866 (LED Annunciator), or Model SK-2104 (DACT). The SK-2884 interfaces all the expansion devices to the SK-4224 control panel.

Follow these steps to install the SK-2884 Serial Driver Board:

1. Unplug the AC power connector from the SK-4224 control panel. See Figure 4-1.
2. Unplug the battery connector from the SK-4224 control panel. See Figure 4-2.
3. Plug the SK-2884 Serial board on SK-4224 control panel by aligning the 4-pin connector and the three stand-offs with their respective receptors. See Figure 4-10.

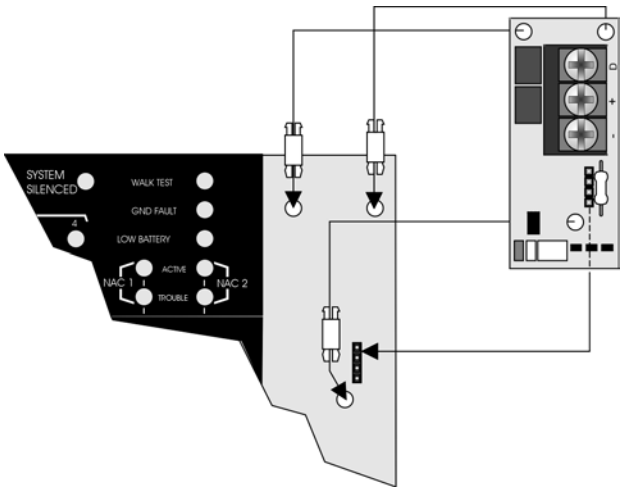


Figure 4-10 SK-2884 Connector and Stand-off alignment

4. Reconnect the AC power connector to the SK-4224 control panel. See Figure 4-1.
5. Reconnect the battery connector to the SK-4224 control panel. See Figure 4-2.

Wiring the SK-2884 to an Expansion Device

The SK-2884 uses a three wire connection to all of the SK-4224 compatible expansion devices (see Table 3-2).

Connect all the expansion devices to the SK-2884 as follows:

Table 4-1: SK-2884 Wiring Connections

SK-2884 Terminals	To SK-4224 Expansion Device Terminal
-	-
+	+
D (Data)	D (Data)

4.7.2 SK-2866 LED Annunciator Installation

This section describes how to install the SK-2866 LED annunciator. The SK-2866 is used as a remote LED annunciator unit for the SK-4224.

SK-2866 Electrical Specification

Circuit		Rating
Max Loop Resistance:	Data	50Ω
	-	50Ω
	+	50Ω
Max. Current:	Alarm:	85 mA
	Standby:	35 mA
Operating Voltage:		24 VDC

Wiring the SK-2866 to the SK-2884

Follow these steps to properly wire the SK-2866 to the SK-2884:

1. Unplug the AC power connector from the SK-4224 control panel. See Figure 4-1.
2. Unplug the battery connector from the SK-4224 control panel. See Figure 4-2.

3. Terminate the wiring as shown in Figure 4-11. See also Table 4-2.

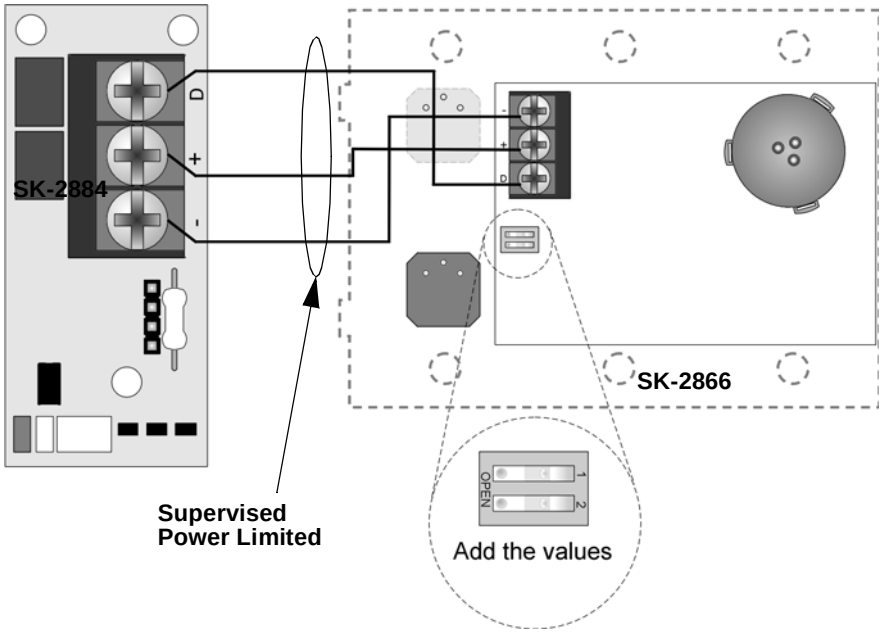


Figure 4-11 SK-2866 Connection to the SK-2884

Table 4-2: SK-2866 Wiring Connections

SK-2866 Terminals	SK-2884 Terminals
D (Data)	D (Data)
+	+
-	-

Setting the SK-2866's address

The range of valid addresses is 0-3. Each device requires a unique address. Set the DIP switches as shown in Table 4-3. See also Figure 4-11.

Table 4-3: SK-2866 Addresses Per DIP Switch Setting

DIP Switch	Position	Equivalent Address
Both	Open (off)	0
One	Closed (on)	1
Two	Closed (on)	2
Both	Closed (on)	3

Mounting the SK-2866

The SK-2866 mounts into a standard standard 3-gang electrical box.

Follow these steps to mount the SK-2866:

1. Make sure that the SK-2866 is properly wired to the control panel. See Figure 4-11.
2. Slide the printed annunciator label into place on the SK-2866. The label fits in between the LEDs and the clear plastic plate.
3. Place the SK-2866 into the standard 3-gang electrical box. See Figure 4-12.

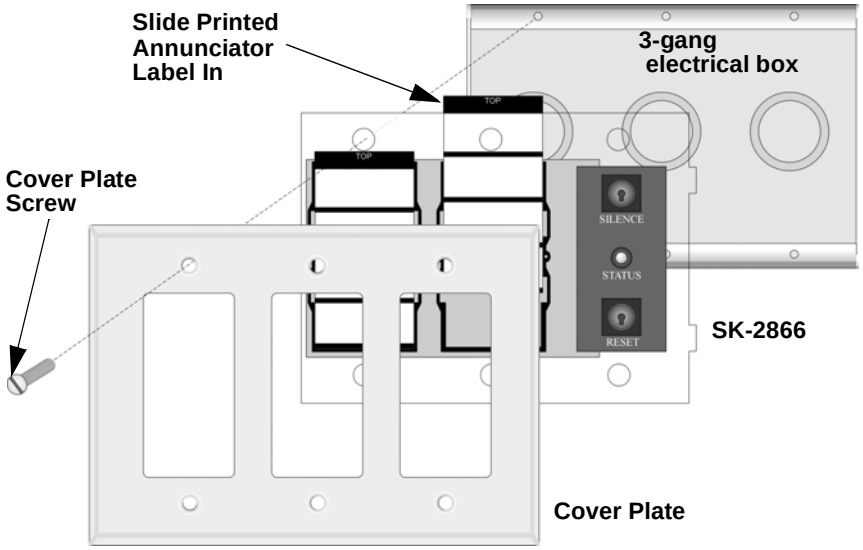


Figure 4-12 Mounting the SK-2866

4. Place the cover plate over the top of the SK-2866 and align the holes. See Figure 4-12.
5. Insert the four cover plate screws into the four screw holes on the 3-gang electrical box.
6. Screw the four cover plate screws into the cover plate until the cover plate fits firmly against the SK-2866 and the electrical box. Do not over tighten.

4.7.3 SK-2880 Installation

The SK-2880 is an Input/Output module. The SK-2880 has 34 pre-defined open collector outputs (see Table 4-6) that can be used to drive LEDs, interface with other controls or systems, or control one of the three built-in Form C relays. See Figure 4-13, Figure 4-15 and Figure 4-16.

The SK-2880 also has two supervised inputs used for Reset and Silence. See Figure 4-16.

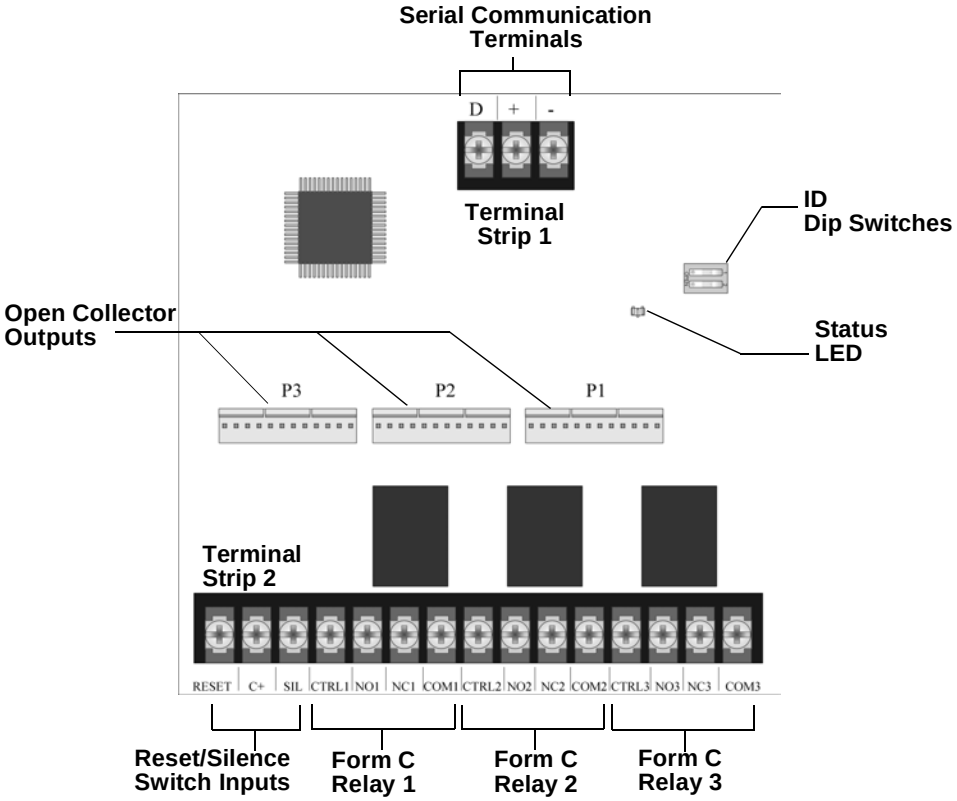


Figure 4-13 Components of the SK-2880 I/O Module

SK-2880 Specifications

Table 4-4: Specifications

Circuit		Rating
Max. Circuit Resistance:	Data	25Ω
	-	25Ω
	+	25Ω
Max. Current:	Alarm:	35 mA
	Standby:	35 mA
	Open Collector:	20 mA each or 680 mA total
Operating Voltage:		24 VDC
Operating Temperature:		32° - 120° F (0° - 49° C)
Form C Relays		2.5 A @ 30 VDC Resistive
Silence/Reset Inputs	Max. Short circuit current:	2.8 mA

4.7.3.1 Connecting the SK-2880 to the SK-2884

The control panel communicates to the I/O module through the Serial Interface Board (see also Section 4.7.1). Figure 4-14 illustrates how to properly wire the I/O module to the Serial Interface Board.

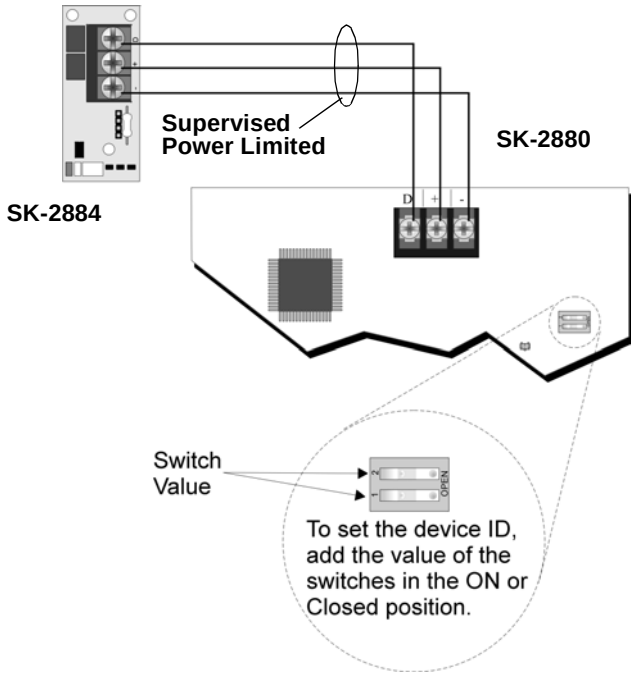


Figure 4-14 I/O Module Wiring

4.7.3.2 Setting the SK-2880 Address

The range of valid addresses is 0-3. Each serial device (SK-2866 included) requires a unique address. Set the DIP switches as shown in Table 4-5. See Figure 4-14 for DIP switch location.

Table 4-5: SK-2880 Addresses Per DIP Switch Setting

DIP Switch	Position	Address
Both	Open (off)	0
One	Closed (on)	1
Two	Closed (on)	2
Both	Closed (on)	3

4.7.3.3 Open Collector Outputs (P1, P2, and P3)

Each pin on the Pin Connectors (P1, P2, and P3) have a predefined output. Table 4-6 lists the Pin Connectors and describes what each pin outputs.

Table 4-6: Pin-outs for Open Collector Outputs

Pin Connector	Pin Number	Output	Description
P1	Pin 1	Zone 1 Alarm/Supervisory	Outputs when there is an alarm or supervisory on Zone 1.
	Pin 2	Zone 1 Trouble	Outputs when a trouble condition exists on Zone 1.
	Pin 3	Zone 1 Clean-Me Trouble	Outputs when a “Clean-Me” type detector indicates a Clean-me trouble on Zone 1.
	Pin 4	Zone 2 Alarm/Supervisory	Outputs when there is an alarm or supervisory on Zone 2.
	Pin 5	Zone 2 Trouble	Outputs when a trouble condition exists on Zone 2.
	Pin 6	Zone 2 Clean-Me Trouble	Outputs when a “Clean-Me” type detector indicates a Clean-me trouble on Zone 2.
	Pin 7	Zone 3 Alarm/Supervisory	Outputs when there is an alarm or supervisory on Zone 3.
	Pin 8	Zone 3 Trouble	Outputs when a trouble condition exists on Zone 3.
	Pin 9	Zone 3 Clean-Me Trouble	Outputs when a “Clean-Me” type detector indicates a Clean-me trouble on Zone 3.
	Pin 10	Zone 4 Alarm/Supervisory	Outputs when there is an alarm or supervisory on Zone 4.
	Pin 11	Zone 4 Trouble	Outputs when a trouble condition exists on Zone 4.
	Pin 12	Zone 4 Clean-Me Trouble	Outputs when a “Clean-Me” type detector indicates a Clean-me trouble on Zone 4.
P 2	Pin 1	Zone 5 Alarm/Supervisory	Outputs when there is an alarm or supervisory on Zone 5.
	Pin 2	Zone 5 Trouble	Outputs when a trouble condition exists on Zone 5.
	Pin 3	Zone 5 Clean-Me Trouble	Outputs when a “Clean-Me” type detector indicates a Clean-me trouble on Zone 5.
	Pin 4	Zone 6 Alarm/Supervisory	Outputs when there is an alarm or supervisory on Zone 6.
	Pin 5	Zone 6 Trouble	Outputs when a trouble condition exists on Zone 6.
	Pin 6	Zone 6 Clean-Me Trouble	Outputs when a “Clean-Me” type detector indicates a Clean-me trouble on Zone 6.
	Pin 7	Zone 1 & 2 Pre-Alarm	Outputs when zones 1 or 2 is in alarm (not both), and cross alarm for zones 1 and 2 is enabled.
	Pin 8	Zone 3 & 4 Pre-Alarm	Outputs when zones 3 or 4 is in alarm (not both), and cross alarm for zones 3 and 4 is enabled.
	Pin 9	Zone 5 & 6 Pre-Alarm	Outputs when zones 5 or 6 is in alarm (not both), and cross alarm for zones 5 and 6 is enabled.
	Pin 10	System Status	On when system is operating normally.
	Pin 11	+24 VDC	Positive 24 DC voltage output.
	Pin 12	GND	Circuit Ground

Table 4-6: Pin-outs for Open Collector Outputs

Pin Connector	Pin Number	Output	Description
Pin 3	Pin 1	NAC 1 Trouble	Outputs when a trouble condition exists on NAC 1.
	Pin 2	NAC 2 Trouble	Outputs when a trouble condition exists on NAC 2.
	Pin 3	NAC 3 Trouble	Outputs when a trouble condition exists on NAC 3.
	Pin 4	DACT Trouble	Outputs when any type of trouble occurs with the dialer, such as, no line voltage or a communication failure.
	Pin 5	Expander Trouble	Outputs when one of the Serial Devices connected to the control panel is in trouble.
	Pin 6	Alarm Silenced	Outputs when an alarm has been silenced.
	Pin 7	Low AC	Outputs if the control panel looses AC power or AC power drops below the control panels low AC threshold.
	Pin 8	Low Battery	Outputs when the backup battery voltage drops below 20.4 VDC.
	Pin 9	Ground Fault	Outputs when the control panel detects a ground fault condition.
	Pin 10	Walk Test Active	Outputs when the control panel is in walk test mode.
	Pin 11	Piezo Output	Outputs correspond to any trouble condition output from the control panel.
	Pin 12	Local Trouble	Outputs if the end-of-line resistor on the Reset or silence inputs not detected or if a serial communication problem occurs between this device and the control panel.

Wiring SK-2880 Open Collector Outputs

Figure 4-15 illustrates examples of how to configure the open collector outputs on the I/O module for your uses.

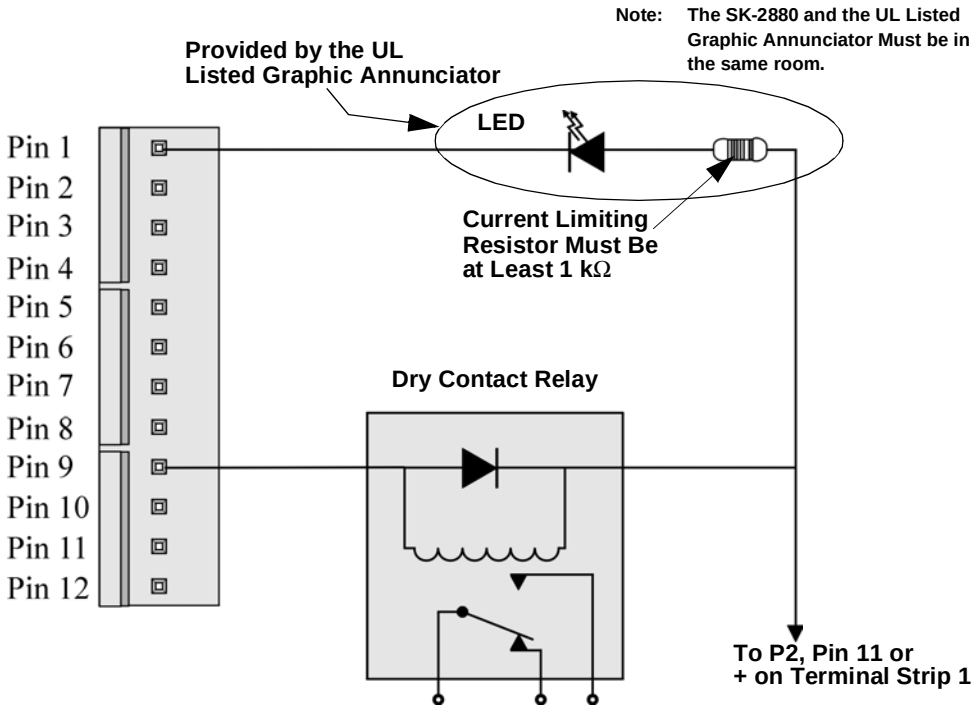


Figure 4-15 Output Configurations

4.7.3.4 SK-2880 Input Switches and Relay Wiring

This section describes the components of terminal strip 2 (see Figure 4-13) on the SK-2880. Terminal strip 2 provides two input switches (Reset & Silence) and three Form C relays. Figure 4-16 illustrates how to configure the inputs switches and the Form C Relays.

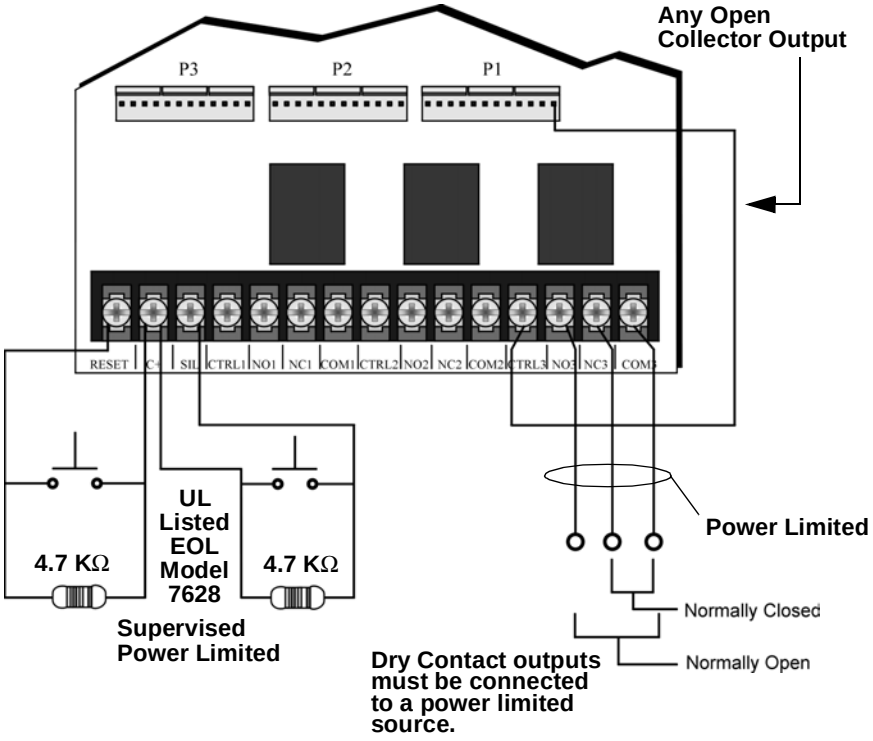


Figure 4-16 Wiring Examples for Input Switches and Form C Relays

Note: Reset and Silence switches must be UL Recognized switches. Reset and Silence switches must be in the same room as the UL Listed Graphic Annunciator.

4.7.3.5 Mounting the SK-2880

The I/O module must be mounted by itself inside a UL Listed (for Fire Protective Signal) accessory cabinet.

Follow these steps to mount the SK-2880:

1. Remove the SK-2880's cover. A small screw driver can be used.
2. Remove the SK-2880 circuit board from the base by pushing outward on the base retaining tabs and lift the circuit board out. See Figure 4-17.

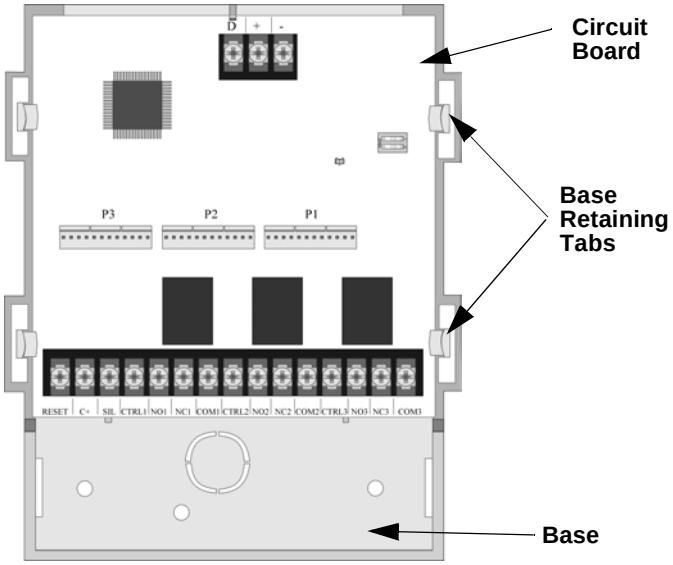


Figure 4-17 Circuit Board and Plastic Base Components

3. Mount the plastic base in a UL listed enclosure using any of the mounting holes in the plastic base. See Figure 4-18 for locations of base mounting holes.

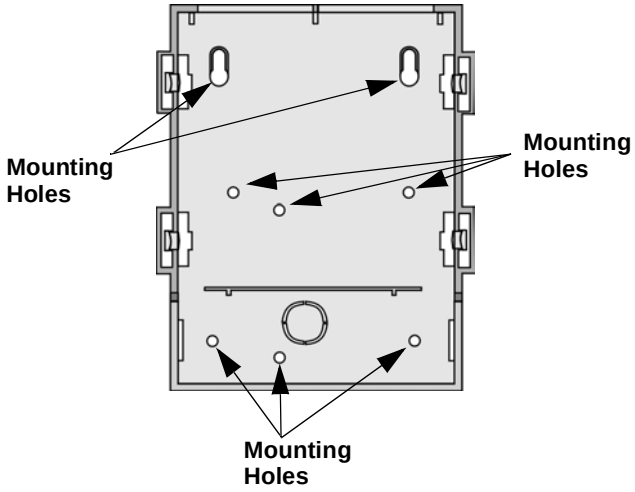


Figure 4-18 Base Mounting Holes

4. Replace the SK-2880 circuit board back into the base.
5. Verify the proper wire termination and then snap the I/O module cover in place.

Section 5
Notification Expansion Mode

The SK-4224 can be used to expand the power capabilities of an existing system's notification appliance circuits. The SK-4224 does this by connecting the notification appliance circuits of an existing or host fire alarm control panel to the FACP input of the SK-4224, which can trigger the SK-4224 circuits when the host panel goes into alarm.

Note: The SK-4224 does not go into the alarm state when the host control panel triggers the SK-4224's notification appliance circuits.

5.1 Class A Notification Expansion Wiring

Figure 5-1 shows Class A supervised wiring from a host panel to the SK-4224 control board. Observe the proper polarity when making wire connections and follow these requirements:

- When wiring to terminal B on the SK-4224, you must use two separate wires. Do not loop a single wire or twist two conductors together.
- FACP input 20.4 VDC to 26.4 VDC.
- Do not use notification appliances on Class A circuits connected to the SK-4224 FACP input. The SK-4224 will detect voltage across the input circuits, but is not designed to pass the added current load from the notification appliances.

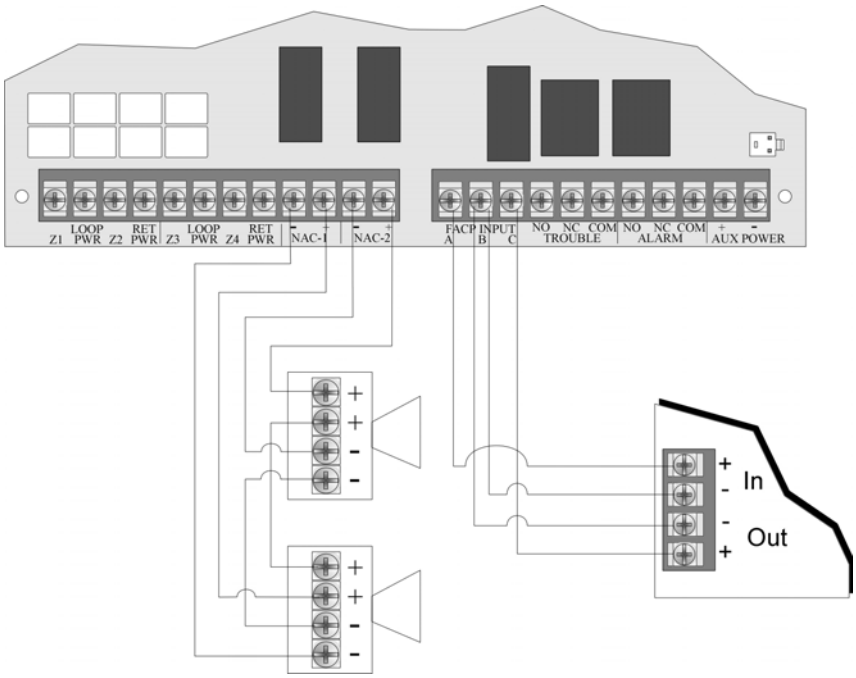


Figure 5-1 Class A Supervised Notification Expansion Configuration

5.2 Class B Notification Expansion Wiring

Figure 5-2 shows Class B supervised wiring from a host fire alarm control panel to the SK-4224 control panel. Use an EOL resistor as shown in Figure 5-2 to supervise the FACP input. The host fire alarm control panel may use an EOL with a value other than 4.7 KΩ, used by the SK-4224. In this case, use an UL listed EOL for the host panel you are using.

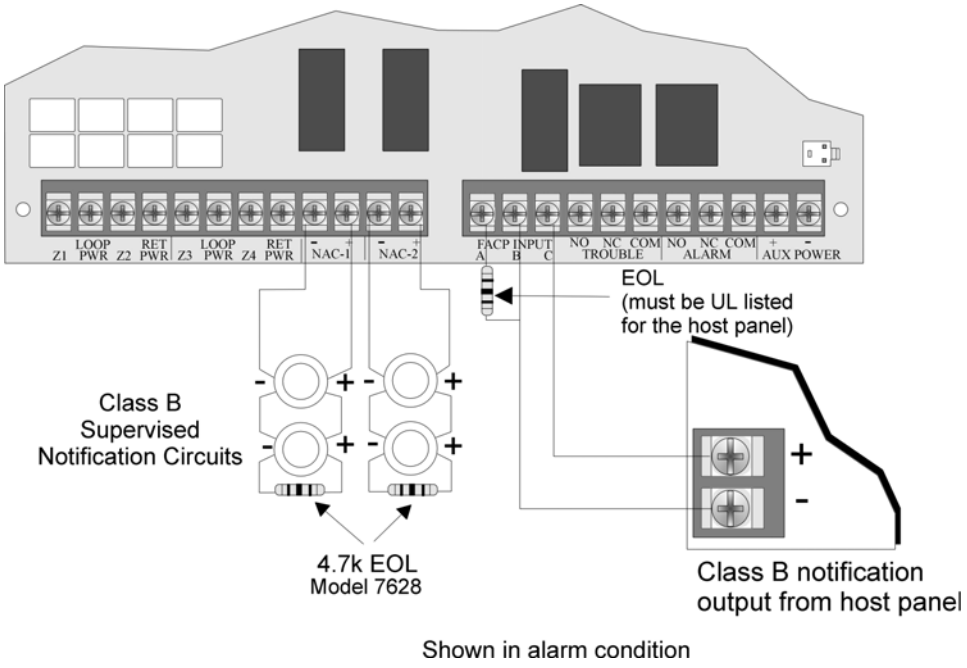


Figure 5-2 Class B Supervised Notification Expansion Configuration

Section 6
System Configuration

To configure the SK-4224 system set the DIP switch that controls the option you want to select. The following chart shows how to program the DIP switches that control system, zone, and notification appliance operation. Refer to Figure 3-1 for location of the DIP switches.

Important!

When you change a DIP switch, be sure to power down the panel. DIP switch changes will be recognized on power up only.

Table 6-1: System Configuration

To Enable		DIP Switch 1		DIP Switch 2		
		For Zone 1	For Zone 2	For Zone 3	For Zone 4	DIP Position
Enhanced mode (DIP switch ON). Use when both pull stations and detectors will be used in the same zone. Normal mode (DIP switch OFF). Use when 4-wire smoke detectors and smoke verification are used in the same zone.		SW1	SW6	SW1	SW6	ON = Enhanced OFF = Normal
Alarm verification **Note:** Do not use with smoke detectors that have verification built-in.		SW 2	SW 7	SW 2	SW 7	ON = Verification zone OFF = No verification
Zone Type	Fire alarm	SW 3	SW8	SW 3	SW8	OFF
	Supervisory	SW 3	SW8	SW 3	SW8	ON
Alarm delay options **Note:** Alarm delay options is to be used with water flow devices only. If the device has a built-in delay time the total delay time (device delay + programmed delay) can not exceed 120 seconds.	No delay	SW4 SW5	SW9 SW10	SW4 SW5	SW9 SW10	OFF OFF
	30 second delay	SW4 SW5	SW9 SW10	SW4 SW5	SW9 SW10	ON OFF
	60 second delay	SW4 SW5	SW9 SW10	SW4 SW5	SW9 SW10	OFF ON
	90 second delay	SW4 SW5	SW9 SW10	SW4 SW5	SW9 SW10	ON ON
To Enable		**For NAC 1 (DIP 3)**		**For NAC 2 (DIP 3)**		**DIP Position**
Silencing		SW 1		SW 3		ON = Can be silenced OFF = No silence
ANSI pattern		SW 2		SW 4		ON = ANSI Off = Steady

Table 6-1: System Configuration

To Enable	For Entire Panel (DIP 3)	DIP Position
Serial Accessory Devices	SW5	ON = Serial Annunciator connected to the control panel. OFF = No Serial Annunciator connected to the control panel.
	SW6	ON = Serial DACT connected to the control panel OFF = No Serial DACT connected to the control panel.
AC loss report delay	SW7	ON = 6 hour delay on AC loss report. OFF = No delay on AC. **Note:** If there is not a serial DACT connected to the control panel this should be set to the OFF position.
Input Output Circuits Class A / Class B Enable	SW8	ON = Class A configuration for both the input and output circuits. OFF = Class B configuration for both the input and output circuits.

Section 7
System Operation

The annunciator on the SK-4224 board is used for all system operation. It contains the switches for enabling silencing, resetting, and so on. The LEDs that indicate system status are also located on the annunciator.

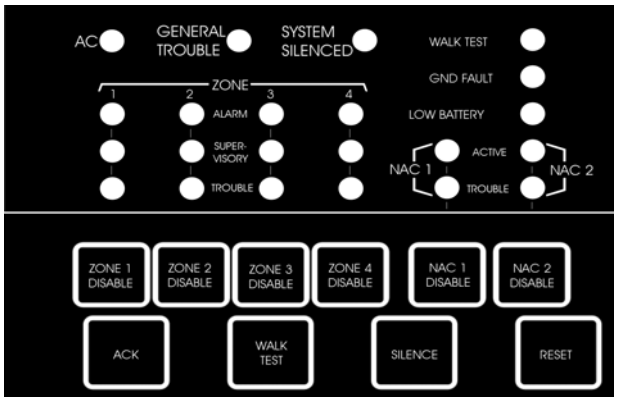


Figure 7-1 On-Board Annunciator

7.1 Meaning of LEDs

The chart below explains the meaning of LEDs on the system board.

Table 7-1: Meaning of LEDs

LED (Color)	Function	Comments
AC (green)	ON = Good AC OFF = Low AC trouble condition and it was acknowledged FLASHING = Unacknowledged AC Low trouble condition	If flashing, press the ACK button to acknowledge the condition.
GENERAL TROUBLE (yellow)	ON = System trouble OFF = System OK FLASHING = At least one serial device is in trouble DOUBLE FLASHING = Two types of serial devices are in trouble.	
WALK TEST (yellow)	ON = Walk test is in progress OFF = Walk test is off. FLASHING = Walk test is on and at least one zone is not ready	Allow approximately 47 seconds between detector tests. In walk, test when a detector is tripped, it will cause an alarm for two seconds, then the control panel will drop power to the loop for seven seconds to reset the detector. Then an additional 38 seconds is needed to restore the detector. If verification is used, the time between detector test will be about 2 minute and 30 seconds.

Table 7-1: Meaning of LEDs

LED (Color)		Function	Comments
GND FAULT (yellow)		ON = Ground fault condition exists and was acknowledged OFF = No fault FLASHING = A ground fault condition detected	If flashing, press the ACK button to acknowledge the condition.
LOW BATTERY (yellow)		ON = Battery low condition that has been acknowledged OFF = Good battery condition FLASHING = Battery low condition	If flashing, press the ACK button to acknowledge the condition.
ZONE 1 Through ZONE 4	ALARM (red)	ON = Zone in alarm which has been acknowledged OFF = No Alarm FLASHING = Zone in alarm has not yet been acknowledged	If flashing, press the ACK button to acknowledge the condition.
	SUPERVISORY (yellow)	ON = Zone has a supervisory condition which has been acknowledged (self-restoring condition) OFF = No supervisory condition exists FLASHING = Supervisory trouble detected on that zone that has not yet been acknowledged	If flashing, press the ACK button to acknowledge the condition.
	TROUBLE (yellow)	ON = Zone has a trouble condition which has been acknowledged OFF = No zone trouble FLASHING = Zone has a trouble condition not yet acknowledged DOUBLE FLASHING = Zone was disabled CLEAN ME FLASHING = Indicates that the smoke detector needs cleaning	If flashing, press the ACK button to acknowledge the condition. A “Clean Me Flash” is a flash with a long LED “on” Time and a short LED “off” time indicating that the smoke detector needs cleaning. Applies only to smoke detectors with the CLEAN ME feature. The “Clean Me” flash starts after the trouble condition has been acknowledge.
NAC 1 and NAC 2	ACTIVE (yellow)	ON = NAC is active during an alarm OFF = NAC is not active during alarm	
	TROUBLE (yellow)	ON = NAC has a trouble condition and was acknowledged OFF = No trouble condition FLASHING = NAC is in trouble DOUBLE FLASHING = Circuit was disabled	If flashing, press the ACK button to acknowledge the condition.
SYSTEM SILENCED (yellow)		ON = System audible output has been silenced OFF = Nothing silenced FLASHING = Partially silenced	Audible trouble activations will clear automatically when the condition resets. Audible alarm signals have to be manually reset. ***Note:*** Silencing an alarm will cause a general trouble condition.

7.2 Operation Keys (Switches)

All system operations are performed from the on-board keys (switches) as described in the chart below.

Table 7-2: Operations and Instructions

Operation	Keystrokes
Disable notification appliance circuit. To re-enable the circuit, press [NAC DISABLE] again.	Press the appropriate [NAC DISABLE] key. The NAC circuit will be disabled and the corresponding TROUBLE LED will Double Flash. This function is not available during an alarm condition.
Disable a zone To re-enable the circuit, press [ZONE DISABLE] again.	Press the appropriate [ZONE DISABLE] key. The zone will be disabled and the corresponding TROUBLE LED will Double Flash. This function is not available during an alarm or supervisory condition.
Begin Walk Test	Press [WALK TEST]. Walk Test LED turns on. ***Note:*** Walk test will not activate if the control panel has a trouble, alarm, or supervisory condition.
End Walk Test (The test ends automatically after 10 minutes of no system activity.)	Press [WALK TEST]. NOTE: The Walk Test feature is not operational during an alarm, supervisory or any system trouble condition.
Acknowledge condition (alarm, supervisory, trouble)	Press [ACK]. The corresponding LED will change from blinking to steady for the duration of the condition. Except for CLEAN ME trouble indications.
Silence Panel	Press [SILENCE]. This will silence the on-board PZT and all active NAC circuits that have been configured as "silenceable".
Perform system reset	Press [RESET]. Resets alarms, supervisories, troubles and all LEDs.
Manual Dialer Test.	Press the [ACK] and [SILENCE] buttons at the same time.
Dialer Reset.	Press the [RESET] and [WALK TEST] buttons at the same time.

Appendix A
Compatible Devices

This section of the manual lists devices (smoke detectors and notification appliances) that are compatible with the SK-4224. Contact Silent Knight if you have a question about whether a device not listed here is compatible.

A.1 Smoke Detectors

This section of the manual contains information about smoke detectors that are compatible with the SK-4224.

	SK-4224
Identifier	24F for Class B zones
Voltage Range	16.2-27.3 VDC

Note: The maximum number of smoke detectors per zone is determined by both the current draw and the impedance of the smoke detector. If too many smoke detectors are used on any zone, false alarms could occur.

Warning! ***Do not mix different models or manufacturers of smoke detectors on the input loops.***

A.1.1 Enhanced Mode

Enhanced mode allows the installer to use pull stations on a circuit that has been programmed for Enhanced Alarm Verification. If a single detector goes into alarm it will start the alarm verification cycle. If a pull station is activated any time during the alarm verification cycle and after the control panel re-applies circuit power (power will drop for seven seconds to restore detector during verification), the panel will go into immediate alarm and discontinue the verification cycle.

A.1.2 Two-Wire Smoke Detectors

The table below lists two-wire smoke detectors that are compatible with the SK-4224. The columns show the number of detectors per circuit that can be used. The two-wire compatibility identifier is 24F.

Note: The check mark indicates that this device can be used in enhanced mode.

Table A-1: Compatible Two-Wire Smoke Detectors

Manufacturer	Enhance Mode Compatible	Model Name or Number *(Base model name or number in parentheses.)*	Compatibility ID		# per Circuit
			Head	Base	
Kidde-Fenwal		CDP 7051 (2-Wire, 70-201000-001	CDP 7051, I51FE1	FE51A, FE01A	32 / loop
		PSD 7155 (2-Wire, 70-201000-001)	P55FE1	FE51A, FE01A	28
		PSD 7156 (2-Wire, 70-201000-001)	P56FE1	FE51A, FE01A	28
Apollo	4	55000-350 (45681-200)	55000-350	45681-200	24
	4	55000-250 (45681-200)	55000-250	45681-200	24
Detection Systems		DS250 (MB2W or MB2WL)	B	A	18
		DS250HD (MB2W or MB2WL)	B	A	18
		DS250TH (MB2W or MB2WL)	B	A	18
		DS283 (MB2W or MB2WL)	B	N/A	30
		DS283TH (MB2W or MB2WL)	B	N/A	30
ESL	4	429C (S10A)	N/A	S10A	30
	4	429CRT (S11A)	N/A	S11A	30
	4	429CST (S11A)	N/A	S11A	30
	4	429CT (S10A)	N/A	S10A	30
	4	609U01-11	S10	S00	40
	4	609U02-11	S10	S00/S03	40
	4	611U (601U or 602U)	S10	S00/S03	40
	4	611UD (601U or 602U)	S10	S00/S03	40
	4	611UT (601U or 602U)	S10	S00/S03	40
	4	612U (601U or 602U)	S10	S00/S03	40
	4	612UD (601U or 602U)	S10	S00/S03	40
	4	711U (701E or 701U)	N/A	S10A	25
	4	712U (701E or 701U)	N/A	S10A	25
	4	713-5U (702E or 701U)	N/A	S10A	25
	4	713-6U (702E or 701U)	N/A	S10A	25
	4	721-U (S10A)	N/A	S10A	30
	4	721-UT (S10A)	N/A	S10A	30

Table A-1: Compatible Two-Wire Smoke Detectors

Manufacturer	Enhance Mode Compatible	Model Name or Number *(Base model name or number in parentheses.)*	Compatibility ID		# per Circuit
			Head	Base	
Falcon		525	FDT1	N/A	17
		525T	FDT1	N/A	17
FCI		301I-DH (301DH-2)	A	N/A	20
		301I (301B)	A	N/A	20
		301IL (301BL / SS B401BH)	A	N/A	20
		301P (301B)	A	N/A	20
		301P (301DH-2)	A	N/A	20
		301PL (301BL / SS B401BH)	A	N/A	20
		301PT (301B)	A	N/A	20
		CPD-7051 (2WB / 2WRLT / 2WRB)	CPD 7051, I51FE1	FE51A, FE01A	32
		CPD-7051 (CPD-001/ -002 / -003 / -005)	CPD 7051, I51FE1	FE51A, FE01A	32
		DH100P	N/A	N/A	30
		PSD-7155 (2WB / 2WRLT / 2WRB)	P55FE1	FE51A, FE01A	28
		PSD-7155 (CPD-001/ -002 / -003 / -005)	P55FE1	FE51A, FE01A	28
		PSD-7156 (2WB / 2WRLT / 2WRB)	P56FE1	FE51A, FE01A	28
		PSD-7156 (CPD-001/ -002 / -003 / -005)	P56FE1	FE51A, FE01A	28
		SBS-1101	A	N/A	20
		SBS-1201	A	N/A	20
		SBS-1201T	A	N/A	20
System Sensor		1100	A	N/A	20 / loop
		1100T	A	N/A	20 / loop
		1100TB	A	N/A	20 / loop
		1151 (110LP)	A	A	20 / loop
		1400	A	N/A	20 / loop
		1451 (B401B)	A	A	20 / loop
		1800	A	N/A	20 / loop
		1851B (B101B)	A	N/A	20 / loop
		1851DH (DH1851DC)	A	N/A	20 / loop
		2100	A	N/A	20 / loop
		2100T	A	N/A	20 / loop
		2100TB	A	N/A	20 / loop
		2151 (B110LP or B110LRP)	A	A	20 / loop
		2300T	A	N/A	20 / loop

Table A-1: Compatible Two-Wire Smoke Detectors

Manufacturer	Enhance Mode Compatible	Model Name or Number *(Base model name or number in parentheses.)*	Compatibility ID		# per Circuit
			Head	Base	
System Sensor (Cont.)		2300	A	N/A	20 / loop
		2300TB	A	N/A	20 / loop
		2400	A	N/A	20 / loop
		2400 (DH400)	A	N/A	20 / loop
		2400AIT	A	N/A	20 / loop
		2400AT	A	N/A	20 / loop
		2400TH	A	N/A	20 / loop
		2451 (B401B)	A	N/A	20 / loop
		2451DH (DH 400)	A	N/A	20 / loop
		2451TH (B401B)	A	N/A	20 / loop
		2800	A	N/A	20 / loop
		2800TH	A	N/A	20 / loop
		2851B (B101B)	A	A	20 / loop
		2851BTH (B101B)	A	A	20 / loop
		2851DH	A	A	20 / loop
		2851TH (B101B)	A	A	20 / loop

Table A-1: Compatible Two-Wire Smoke Detectors

Manufacturer	Enhance Mode Compatible	Model Name or Number *(Base model name or number in parentheses.)*	Compatibility ID		# per Circuit
			Head	Base	
Thorn		612H (4B, 6B, M612/912)	612H	4B, 6B, M612/912	20
		612HP (4B, 6B, M612/912)	612HP	4B, 6B, M612/912	20
		612I (4B, 6B, M612/912)	612I	4B, 6B, M612/912	20
		612P (4B, 6B, M612/912)	612P	4B, 6B, M612/912	20
		622HP (4B, 6B, M612/912)	622HP	4B, 6B, M612/912	20
		632H (4B, 6B, M612/912)	632H	4B, 6B, M612/912	20
		MD612 (4B, 6B, M612/912)	MD612	4B, 6B, M612/912	20
		MD622 (4B, 6B, M612/912)	MD622	4B, 6B, M612/912	20
		MD632 (4B, 6B, M612/912)	MD632	4B, 6B, M612/912	20
		MF612 (4B, 6B, M612/912)	MF612	4B, 6B, M612/912	20
		MR612 (4B, 6B, M612/912)	MR612	4B, 6B, M612/912	20
		MR612T (4B, 6B, M612/912)	MR612T	4B, 6B, M612/912	20
		ISC-350I (IBC-350, 351, 353)	ISC-350I	IBC-350, 351, 353	24
		ISC-350P (IBC-350, 351, 353)	ISC-350P	IBC-350, 351, 353	24

Four-Wire Smoke Detectors

Table A-2: Compatible Four-Wire Smoke Detectors

Manufacturer	Model
Silent Knight	SD-P24F with SD-B4@ base
Detection Systems	DS200/DS200HD MB200
ESL	445 Series 449 Series
Gentex	624 824 2040-24 Power Supervision Unit
System Sensor	1851B 2851/2851BTH DH200ADCD

A.2 Notification Appliances

The chart below lists notification appliances compatible with the SK-4224.

Note: Units that operate at 12 or 24 VDC must be selected for 24 VDC operation.

Table A-3: Compatible Notification Appliances

Manufacturer	Model	Type
Faraday	446X 12/24VDC	Vibrating Bell
	476X 12/24VDC	Vibrating Bell
	477X 12/24VDC	Single Stroke Bell
	5303B-0-14-( )-DC	Chime (flush)
	5304B-0-14-( )-DC	Chime (surface)
	5305B-0-4-( )-DC	Chime (ceiling)
	5306B-0-14-( )-24-DC	Chime/Strobe (flush)
	5307B-0-14-( )-24-DC	Chime/Strobe (surface)
	5308B-0-4-( )-24-DC	Chime/Strobe (ceiling)
	5333B-0-14-24-DC	Multi-Tone Horn (flush)
	5334B-0-14-24-DC	Multi-Tone Horn (surface)
	5336B-( )-14-24-DC	Multi-Tone Horn/Strobe (flush)
	5337B-( )-14-24-DC	Multi-Tone Horn/Strobe (surface)
	5338B-( )-4-24-DC	Multi-Tone Horn/Strobe (ceiling)
	5343B-0-14-24-DC	Single Tone Horn/Strobe (flush)
	5344B-0-14-24-DC	Single Tone Horn/Strobe (surface)
	5345B-0-4-24-DC	Single Tone Horn/Strobe (ceiling)
	5348B-( )-4-24-DC	Single Tone Horn/Strobe (ceiling)
	5373B-0-14-24-DC	8-Tone Horn/Strobe (flush)
	5374B-0-14-24-DC	8-Tone Horn/Strobe (surface)
	5375B-0-4-24-DC	8-Tone Horn/Strobe (ceiling)
	5376B-0-14-24-DC	8-Tone Horn/Strobe (flush)
	5377B-0-14-24-DC	8-Tone Horn/Strobe (surface)
	5378B-0-4-24-DC	8-Tone Horn/Strobe (ceiling)
	5405B-0-14-24-DC	Sync Control Unit
	5508B-( )-14-24-DC	Single Gang Sync Strobe (flush)
	5521B-( )-14-24-DC	4” Square Sync Strobe (surface)
	5522B-( )-14-24-DC	4” Square Sync Strobe (flush)
	6126B-U-14-24 VDC	Horn/Strobe
	6223B-0-14-24-DC	Horn (flush)
	6224B-0-14-24-DC	Horn (surface)
	6225B-0-4-24-DC	Horn (ceiling)
	6226B-( )-14-24-DC	Horn/Strobe (flush)
	6227B-( )-14-24-DC	Horn/Strobe (surface)
	6228B-( )-4-24-DC	Horn/Strobe (ceiling)

Table A-3: Compatible Notification Appliances

Manufacturer	Model	Type
Faraday (Cont.)	6243B-0-14-24-DC	Electron-Mechanical Horn (flush)
	6244B-0-14-24-DC	Electron-Mechanical Horn (surface)
	6245B-0-4-24-DC	Electron-Mechanical Horn (ceiling)
	6246B-( )-14-24-DC	Electron-Mechanical Horn/Strobe (flush)
	6247B-( )-14-24-DC	Electron-Mechanical Horn/Strobe (surface)
	6248B-( )-4-24-DC	Electron-Mechanical Horn/Strobe (ceiling)
	6300B-0-14-24-DC	Mini-Horn (flush)
	6301B-0-14-24-DC	Mini-Horn (surface)
	6302B-( )-4-24-DC	Mini-Horn (ceiling)
	6310B-0-14-24-DC	Mini-Horn/Strobe/Strobe (flush)
	6311B-0-14-24-DC	Mini-Horn/Strobe/Strobe (surface)
	6312B-( )-14-24-DC	Mini-Horn/Strobe/Strobe (ceiling)
	6320B-0-14-24-DC	Sync Mini Horn/Strobe (1 gang)
	6321B-0-14-24-DC	Sync Mini Horn/Strobe (1,2 gang)
	6322B-( )-14-24-DC	Mini Horn/Sync Strobe (1,2 gang, 4SQ)
FCI	130-3117C	Mini Horn
	130-3147C	Mini Horn
	BLV-6	Vibrating Bell
	BLV-10	Vibrating Bell
	BLVCH	Vibrating Chime
	H12/24-FC	Horn
	H12/24W-FC	Horn
	H12/24K-FC	Horn
	HC12/24-FC	Horn
	HC12/24W-FC	Horn
	HC12/24K-FC	Horn
	P2415-FC	Horn/Strobe
	P2415W-FC	Horn/Strobe
	P2415K-FC	Horn/Strobe
	P241575-FC	Horn/Strobe
	P241575W-FC	Horn/Strobe
	P241575F-FC	Horn/Strobe
	P241575K-FC	Horn/Strobe
	P2430-FC	Horn/Strobe
	P2430W-FC	Horn/Strobe
	P2430K-FC	Horn/Strobe
	P2475-FC	Horn/Strobe
	P2475W-FC	Horn/Strobe

Table A-3: Compatible Notification Appliances

Manufacturer	Model	Type
FCI (Cont.)	P2475K-FC	Horn/Strobe
	P24110-FC	Horn/Strobe
	P24110W-FC	Horn/Strobe
	P24110K-FC	Horn/Strobe
	S2415-FC	Strobe
	S241575-FC	Strobe
	S241575W-FC	Strobe
	S241575K-FC	Strobe
	S2430-FC	Strobe
	S2430W-FC	Strobe
	S2430K-FC	Strobe
	S2475-FC	Strobe
	S2475W-FC	Strobe
	S2475K-FC	Strobe
	S24110-FC	Strobe
	S24110W-FC	Strobe
	S24110K-FC	Strobe
	MDL-FC	Sync. Module
	MDLW-FC	Sync. Module
Federal Signal	450	Horn
	VALS	Horn/Strobe
Gentex	GX90-4	Horn
	GXS-4-15-1	Strobe
	GXS-4-1575	Strobe
	GX90S-4-15	Horn
	GX90S-4-1575	Horn
	HG124	Horn
	SHG24-1575	Horn/Strobe
	SHG24-15	Horn/Strobe
	GMH-24-X	Horn
	GMS-24-X	Horn/Strobe
	GMS-24-X	Horn/Strobe
	G0T24	Horn
	G0S24-X	Horn
	WGMS-24-X	Horn/Strobe

Table A-3: Compatible Notification Appliances

Manufacturer	Model	Type
System Sensor	MASS241	Horn/Strobe
	MASS24110ADA	Horn/Strobe
	MASS2415ADA	Horn/Strobe
	MASS2475ADA	Horn/Strobe
	SS4110ADA	Strobe
	SS2415ADA	Strobe
	SS2475ADA	Strobe
	PS2415ADA	Mini-Horn/Strobe
	PS241575ADA	Mini-Horn/Strobe
	PS24110ADA	Mini-Horn/Strobe
	PS2475ADA	Mini-Horn/Strobe
	P2415	Horn/Strobe
	P2415W	Horn/Strobe
	P2415K	Horn/Strobe
	P241575	Horn/Strobe
	P241575W	Horn/Strobe
	P241575F	Horn/Strobe
	P241575K	Horn/Strobe
	P2430	Horn/Strobe
	P2430W	Horn/Strobe
	P2430K	Horn/Strobe
	P2475	Horn/Strobe
	P2475W	Horn/Strobe
	P2475K	Horn/Strobe
	P24110	Horn/Strobe
	P24110W	Horn/Strobe
	P24110K	Horn/Strobe
	S2415	Strobe
	S241575	Strobe
	S241575W	Strobe
	S241575K	Strobe
	S2430	Strobe
	S2430W	Strobe
	S2430K	Strobe
	S2475	Strobe
	S2475W	Strobe
	S2475K	Strobe
System Sensor (Cont.)	S24110	Strobe
	S24110W	Strobe
	S24110K	Strobe

Table A-3: Compatible Notification Appliances

Manufacturer	Model	Type
Wheelock	46T-G4-24-R	Bell
	46T-G6-24-R	Bell
	46T-G10-24-R	Bell
	46T-G6-24-WS-24-HF-R	Strobe/Bell
	46T-G10-24-WS-24-HF-R	Strobe/Bell
	46T-G6-24-WH-24-HF-R	Strobe/Bell
	46T-G10-24-WH-24-HF-R	Strobe/Bell
	7001T-12\24-W-FR	Strobe Horn
	7002T-12\24-W-FR	Strobe Horn
	AES-DL1-R	Multitone Horn
	AES-EL1-R	Multitone Horn
	AES-DL1-WS-24-VF-R	Multitone Horn
	AES-EL1-WS-24-VF-R	Multitone Horn
	AES-DL1-WH-24-VF-R	Multitone Horn
	AES-EL1-WH-24-VF-R	Multitone Horn
	AES-DL1-WM-24-VF-R	Multitone Horn
	AES-EL1-WM-24-VF-R	Multitone Horn
	AH-24-R	Horn
	AH-24WP-R	Horn
	AMT-12\24-R	Strobe Horn
	AMT-24-LS-VFR	Strobe Horn
	AMT-24-LSM-VFR	Strobe Horn
	AMT-24-IS-VFR	Strobe Horn
	AS2415W-FR	Audible Strobe
	AS241575W-FR	Audible Strobe
	AS2430W-FR	Audible Strobe
	AS2475W-FR	Audible Strobe
	AS24110W-FR	Audible Strobe
	AS2415C-FW	Audible Strobe

Table A-3: Compatible Notification Appliances

Manufacturer	Model	Type
Wheelock (Cont.)	AS2430C-FW	Audible Strobe
	AS2475C-FW	Audible Strobe
	AS24100C-FW	Audible Strobe
	AS-2415-VFR	Strobe Horn
	AS-241575-VFR	Strobe Horn
	AS-2430-VFR	Strobe Horn
	AS-2475-VFR	Strobe Horn
	AS-24110-HFR	Strobe Horn
	SM-12/24-R	Strobe Horn Controller
	DSM-12/24-R	Strobe Horn Controller
	CF-BF1	Chime
	CF-BF1-R	Chime
	CH70-24-R	Chime
	CH90-24-W	Chime
	CH70-2415W-FR	Chime Strobe
	CH70-241575W-FR	Chime Strobe
	CH70-2430W-FR	Chime Strobe
	CH70-2475W-FR	Chime Strobe
	CH70-24110W-FR	Chime Strobe
	CH-CF1	Chime
	CH-CF1-R	Chime
	CH-CF1-W	Chime
	CH-DF1	Chime
	CH-DF1-R	Chime
	CH-BF1-WS-24-HF-R	Strobe Chime
	CH-CF1-LS-24	Strobe Chime
	CH-CF1-MS-24	Strobe Chime
	CH-CF1-IS-24	Strobe Chime
	CH-CF1-LS-24-CFW	Strobe Chime
	CH-CF1-MS-24-CFW	Strobe Chime
	CH-CF1-IS-24-CFW	Strobe Chime
	CH-CF1-WS-24-CF-W	Strobe Chime
	CH-DF1-LS-24	Strobe Chime
	CH-DF1-MS-24	Strobe Chime
	CH-DF1-IS-24	Strobe Chime
	CH-DF1-LS-24-VFR	Strobe Chime
	CH-DF1-LSM-24-VFR	Strobe Chime
	CH-DF1-MS-24-VFR	Strobe Chime
	CH-DF1-IS-24-VFR	Strobe Chime
	CH-DF1-WM-24-VFR	Strobe Chime

Table A-3: Compatible Notification Appliances

Manufacturer	Model	Type
Wheelock (Cont.)	CH-DF1-WS-24-VF-R	Strobe Chime
	DSM-12/24	Sync Module
	EH-DL1-R	Electronic Horn
	EH-EL1-R Electronic Horn	Electronic Horn
	EHS-DL1-W-VF-R	Strobe Horn (single input)
	EHS-EL1-W-VF-R	Strobe Horn (single input)
	EH-DL1-WS-24-VF-R	Strobe Horn (dual input)
	EH-EL1-WS-24-VF-R	Strobe Horn (dual input)
	EH-DL1-WH-24-VF-R	Strobe Horn (dual input)
	EH-EL1-WH-24-VF-R	Strobe Horn (dual input)
	EH-DL1-WM-24-VF-R	Strobe Horn (dual input)
	EH-EL1-WM-24-VF-R	Strobe Horn (dual input)
	HSW-24-HFR	Remote Strobe
	HS2W-24-HFR	Remote Strobe
	HSPW-24-HFR	Remote Strobe
	IS-24-VFR	Remote Strobe
	IS1-24-VFR	Remote Strobe
	IS3-24-VFR	Remote Strobe
	ISP-24-HFR	Remote Strobe
	LS-24-VFR	Remote Strobe
	LS1-24-VFR	Remote Strobe
	LS3-24-VFR	Remote Strobe
	LSP-24-HFR	Remote Strobe
	LSM-24-VFR	Remote Strobe
	LS1M-24-VFR	Remote Strobe
	LS3M-24-VFR	Remote Strobe
	LSPM-24-VFR	Remote Strobe
	MS-24-VFR	Remote Strobe
	MS1-24-VFR	Remote Strobe
	MS3-24-VFR	Remote Strobe
	MSP-24-HFR	Remote Strobe
	MB-G6-24-R	Motor Bell
	MB-G10-24-R	Motor Bell
	MBS-G6-24-W-HF-R	Motor Bell with Strobe
	MBS-G10-24-W-HF-R	Motor Bell with Strobe
	MIZ-24-R	Mini-Horn
	MIZ-24-W	Mini-Horn
	MIZ-24-LS-VFR	Mini-Horn/Strobe
	MIZ-24-LSM-VFR	Mini-Horn/Strobe
	MIZ-24-MS-VFR	Mini-Horn/Strobe

Table A-3: Compatible Notification Appliances

Manufacturer	Model	Type
Wheelock (C0nt.)	MIZ-24-HSW-HFR	Mini-Horn/Strobe
	MIZ-24-IS-VFR	Mini-Horn/Strobe
	MIZ-24-WS-VF-R	Mini-Horn/Strobe
	MIZ-24-WS-VF-W	Mini-Horn/Strobe
	MIZ-24-WH-VF-W	Mini-Horn/Strobe
	MIZ-24-WM-VF-W	Mini-Horn/Strobe
	MT-12/24-R	Strobe Horn
	MT4-12/24-R	Multitone Appliance
	MT4-115-R	Multitone Appliance
	MT-24-LS-VFR	Strobe Horn
	MT-24-LSM-VFR	Strobe Horn
	MT-24-MS-VFR	Strobe Horn
	MT-24-IS-VFR	Strobe Horn
	MT-24-SL-VFR	Strobe Horn
	MT-24-SLM-VFR	Synch. Multitone Strobe
	MT-24-WM	Strobe
	MT-24-WM-VF-R	Horn
	MT-24-WM-VFR	Strobe Horn
	NH-12/24-R	Horn
	NS-2415W-FR	Strobe Horn
	NS-241575W-FR	Strobe Horn
	NS-2430W-FR	Strobe Horn
	NS-2475W-FR	Strobe Horn
	NS-24110W-FR	Strobe Horn
	NS4-2415W-FR	Strobe Horn
	NS4-241575W-FR	Strobe Horn
	NS4-2430W-FR	Strobe Horn
	NS4-2475W-FR	Strobe Horn
	NS4-24110W-FR	Strobe Horn
	RS-2415W-FR	Strobe
	RS-2415W-FR	Strobe
	RS-241575W-FR	Strobe
	RS-2415-HFR	Strobe
	RSP-2415-VFR	Strobe
	RS-241575-VFR	Strobe
	RSP-241575-VFR	Strobe
	RS-2430-VFR	Strobe
	RS-2430-HFR	Strobe
	RS-2475-VFR	Strobe
	RSP-2475-HFR	Strobe

Table A-3: Compatible Notification Appliances

Manufacturer	Model	Type
Wheelock (Cont.)	RS-24110-HFR	Strobe
	RSP-24110-HFR	Strobe
	RSS-2415W-FR	Strobe
	RSS-241575W-FR	Strobe
	RSS-2430W-FR	Strobe
	RSS-2475W-FR	Strobe
	RSS-24110W-FR	Strobe
	RSS-2415C-FW	Strobe
	RSS-2430C-FW	Strobe
	RSS-2475C-FW	Strobe
	RSS-24100C-FW	Strobe
	RSSP-2415W-FR	Strobe
	RSSP-241575-FR	Strobe
	RSSP-2430W-FR	Strobe
	RSSP-2475W-FR	Strobe
	RSSP-24110W-FR	Strobe
	SL-24-VFR	Synchronized Remote Strobe
	SL1-24-VFR	Synchronized Remote Strobe
	SL3-24-VFR	Synchronized Remote Strobe
	SLP-24-VFR	Synchronized Remote Strobe
	SLM-24-VFR	Synchronized Remote Strobe
	SL1M-24-VFR	Synchronized Remote Strobe
	SL3M-24-VFR	Synchronized Remote Strobe
	SLPM-24-VFR	Synchronized Remote Strobe
	SHW-24-VFR	Synchronized Remote Strobe
	SH2W-24-VFR	Synchronized Remote Strobe
	SHPW-24-VFR	Synchronized Remote Strobe
	SCM-24-R	Controller for Synchronized Strobes
	SM-12/24-R	Sync Module
	SR-2415-VFR	Sync Strobe
	SRP-2415-HFR	Sync Strobe
	SR-241575-VFR	Sync Strobe
	SRP-241575-VFR	Sync Strobe
	SR-2475-VFR	Sync Strobe
	SR-2475-HFR	Sync Strobe
	SR-24110-HFR	Sync Strobe
	SRP-24110-HFR	Sync Strobe
	V7001T-12\24-W-FR	Strobe Horn
	WM3T-24-FR	Remote Strobe
	WM3T-24-VFR	Remote Strobe

Table A-3: Compatible Notification Appliances

Manufacturer	Model	Type
Wheelock (Cont.)	WS1T-24-FR	Strobe
	WS3T-24-FR	Strobe
	WST-24-FR	Strobe

SK-4224 Basic Operating Instructions P/N 151066

These instructions must be framed and displayed next to the SK-4224 panel in accordance with NFPA 72 fire code for Local Fire Alarm System.

LED (Color)		Function	Comments
AC (green)		ON = Good AC OFF = Low AC trouble condition and it was acknowledged FLASHING = Unacknowledged AC Low trouble condition	If flashing press the ACK button to acknowledge the condition.
GENERAL TROUBLE (yellow)		ON = System trouble OFF = System OK FLASHING = At least one serial device is in trouble DOUBLE FLASHING = Two types of serial devices are in trouble.	
WALK TEST (yellow)		ON = Walk test is in progress OFF = Walk test is off. FLASHING = Walk test is on and at least one zone is not ready	Allow approximately 47 seconds between detector tests. In walk test when a detector is tripped it will cause an alarm for two seconds, then the control panel will drop power to the circuit for seven seconds to reset the detector. Then an additional 38 seconds is needed to restore the detector. If verification is used the time between detector test will be about 2 minutes and 30 seconds.
GND FAULT (yellow)		ON = Ground fault condition exists and was acknowledged OFF = No fault FLASHING = A ground fault condition detected	If flashing press the ACK button to acknowledge the condition.
LOW BATTERY (yellow)		ON = Battery low condition that has been acknowledged OFF = Good battery condition FLASHING = Battery low condition	If flashing press the ACK button to acknowledge the condition.
ZONE 1 Through ZONE 4	ALARM (red)	ON = Zone in alarm which has been acknowledged OFF = No Alarm FLASHING = Zone in alarm has not yet been acknowledged	If flashing press the ACK button to acknowledge the condition.
	SUPERVISORY (yellow)	ON = Zone has a supervisory condition which has been acknowledged (self-restoring condition) OFF = No supervisory condition exists FLASHING = Supervisory trouble detected on that zone that has not yet been acknowledged	If flashing press the ACK button to acknowledge the condition.
	TROUBLE (yellow)	ON = Zone has a trouble condition which has been acknowledged OFF = No zone trouble FLASHING = Zone has a trouble condition not yet acknowledged DOUBLE FLASHING = Zone was disabled CLEAN ME FLASHING = Indicates that the smoke detector needs cleaning	If flashing press the ACK button to acknowledge the condition. A “Clean Me Flash” is a flash with a long LED on Time and a short LED off time indicating that the smoke detector needs cleaning. Applies only to smoke detectors with the CLEAN ME feature. The “Clean Me” flash starts after the trouble condition has been acknowledge.
NAC 1 and NAC 2	ACTIVE (yellow)	ON = NAC is active during an alarm OFF = NAC is not active during alarm	
	TROUBLE (yellow)	ON = NAC has a trouble condition and was acknowledged OFF = No trouble condition FLASHING = NAC is in trouble DOUBLE FLASHING = Circuit was disabled	If flashing press the ACK button to acknowledge the condition.
SYSTEM SILENCED (yellow)		ON = System audible output has been silenced OFF = Nothing silenced FLASHING = Partially silenced	When condition that caused audio activation clears, this condition will clear automatically. Note: Silencing an alarm will cause a general trouble condition.

Cut Along the Dotted Line

Operation	Keystrokes
Disable notification appliance circuit. To re-enable the circuit, press [NAC DISABLE] again.	Press the appropriate [NAC DISABLE] key. The NAC circuit will be disabled and the corresponding TROUBLE LED will Double Flash. This function is not available during an alarm condition.
Disable a zone To re-enable the circuit, press [ZONE DISABLE] again.	Press the appropriate [ZONE DISABLE] key. The zone will be disabled and the corresponding TROUBLE LED will Double Flash. This function is not available during an alarm or supervisory condition.
Begin Walk Test	Press [WALK TEST]. Walk Test LED turns on. Note: Walk test will not activate if the control panel has a trouble, alarm, or supervisory condition.
End Walk Test (The test ends automatically after 10 minutes of no system activity.)	Press [WALK TEST]. NOTE: The Walk Test feature is not operational during an alarm, supervisory or any system trouble condition.
Acknowledge condition (alarm, supervisory, trouble)	Press [ACK]. The corresponding LED will change from blinking to steady for the duration of the condition. Except for CLEAN ME trouble indications.
Silence Panel	Press [SILENCE]. This will silence the on-board PZT and all active NAC circuits that have been configured as "silenceable".
Perform system reset	Press [RESET]. Resets alarms, supervisories, troubles and all LEDs.
Manual Dialer Test.	Press the [ACK] and [SILENCE] buttons at the same time.
Dialer Reset.	Press the [RESET] and [WALK TEST] buttons at the same time.

For Service Contact:	

Cut Along the Dotted Line

Silent Knight Fire Product Warranty and Return Policy

General Terms and Conditions

- All new fire products manufactured by Silent Knight have a limited warranty period of 18 months from the date of manufacture against defects in materials and workmanship. See limited warranty statement for details.
- This limited warranty does not apply to those products that are damaged due to misuse, abuse, negligence, exposer to adverse environmental conditions, or have been modified in any manner whatsoever.

Repair and RA Procedure

- All products that are returned to Silent Knight for credit or repair require a RA (Return Authorization) number. Call Silent Knight Customer Service at 800-446-6444 or 763-493-6435 between 8:00 A.M. and 4:45 P.M. CST, Monday through Friday to obtain a return authorization number. Silent Knight Technical Support is available at 800-328-0103 between 8:00 A.M. and 6:00 P.M. CST, Monday through Friday.
- RA number must be prominently displayed on the outside of the shipping box. See return address example under Advanced Replacement Policy.
- Include a packing slip that has the RA number, a content list, and a detailed description of the problem should be included with each return.
- All products returned to Silent Knight must be sent freight pre-paid. After product is processed, Silent Knight will pay for shipping product back to customer via UPS ground.
- Return the Silent Knight product circuit board only. Products that are returned in cabinets will be charged an additional $50 to cover the extra shipping and handling costs over board only returns. **Do not return batteries**. Silent Knight has the authority to determine if a product is repairable. Products that are deemed un-repairable will be returned to the customer.
- Product that is returned that has a board date code more than 18 months from date of manufacture will be repaired and the customer will be assessed the standard Silent Knight repair charge for that model.

Advanced Replacement Policy

- Silent Knight offers an option of advance replacement for fire product printed circuit boards that fail during the first 6 months of the warranty period.
- For advance replacement of a defective board contact your local Silent Knight Distributor or call Silent Knight at 800-446-6444 or 763-493-6435 to obtain a RA (Return Authorization) number and request advanced replacement.
- Customers without a Silent Knight account must use a MasterCard, Visa, or American Express credit card to get an advance replacement.

- A new or refurbished board will be shipped to the customer. The customer will initially be billed for the replacement board but a credit will be issued after the repairable board is received at Silent Knight. All returned products must comply with the guidelines described under “General Terms and Conditions”.
- The defective board must be returned within 30 days of shipment of replacement board for customer to receive credit. No credit will be issued if the returned board was damaged due to misuse or abuse.
- Repairs and returns should be sent to:

  Silent Knight

  Attn: Repair Department

  7550 Meridian Circle Suite 100

  Maple Grove, MN 55369-4927

  RA Number:_____

Limited Warranty

Silent Knight warrants that the products of its manufacture shall be free from defects in materials or workmanship for 18 months from the manufacturing date code on the printed circuit board, if such goods have been properly installed, are subject to normal proper use, and have not been modified in any manner whatsoever. Upon return of the defective product, Silent Knight will at its sole discretion, either repair or replace, at no cost, such goods as may be of defective material or workmanship. Customers outside the United States are to return products to their distributor for repair.

Silent Knight SHALL NOT UNDER ANY CIRCUMSTANCES BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING FROM LOSS OF PROPERTY OR OTHER DAMAGE OR LOSSES OWING TO THE FAILURE OF Silent Knight PRODUCTS BEYOND THE COST OF REPAIR OR REPLACEMENT OF ANY DEFECTIVE PRODUCTS.

Silent Knight MAKES NO WARRANTY OF FITNESS OR MERCHANTABILITY AND NO OTHER WARRANTY, ORAL OR WRITTEN, EXPRESS OR IMPLIED, BEYOND THE 18 MONTH WARRANTY EXPRESSLY SPECIFIED HEREIN.



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