SENTROL ZX400/ZX410

Security System Control

Installation

Table of Contents

New Features

- **12 Zones with Sentrol's unique "2 in 1" Zoning™**
- **Plus one 2-wire fire zone**
- **Expandable to 28 zones, plus two 2-wire fire zones**
- **Integrated Sentrol Series 4000 Wireless**
- **Two truly independent partitions**
- **Up to 50 user codes with 15 levels of authority**
- **75 event log**
- **Four interchangeable Control Stations to choose from**
- **Customized scheduling with special supervisory report**
- **Ideal for residential, commercial, and industrial applications**
- **Control Station programming in less than 2 minutes with factory defaults**

The Sentrol ZX400/ZX410 Security Control features ease of installation and programming. The ZX400/ZX410 is easily programmed with any one of four Control Stations (LCD, LED, SSD, or VFD). The control may also be programmed remotely with the aid of a personal computer (PC) and a modem using Sentrol's remote programming software (RPM2PRO) and a panel support module (PRO400). The Control Stations are easy-to-operate and contain features such as cross-zoning, delay-before-dialing and an audibles "mute" function to help reduce false alarms.

The ZX400/ZX410 Security Control is pre-programmed from the factory with twelve burglar zones (one delay, two interior, and nine instant) and one 2-wire smoke detector zone to allow for out-of-box power-up and operation. The twelve burglar zones have been configured in a 'paralleled' condition using Sentrol's unique "2 in 1" Zoning™. A zone expander may be added to provide an additional 2-wire smoke detector zone and, with the use of "2 in 1" Zoning™, up to 16 additional zones.

Sentrol Series 4000 RF Gateway receivers and sensors allow you to overcome installation obstacles and increase profit potential. The wireless sensors have been engineered for long term stability and reliabil-ity. Using the Series 4000 Wireless System, you can expand the ZX400/ZX410 to include up to 16 wireless zones.

The Control's on-board RAM maintains its data even with the power disconnected. A "Watchdog" timer monitors the microprocessor to ensure the operational integrity of the system. The ZX400/ZX410 Control Board is equipped with one low current programmable output (PGO1) and one high current bell output (BELL) which may be used for Fire, Burglar, Auxiliary and/or Holdup alarms. In addition, two ZXODMs (Output Driver Modules) can be added to provide 20 more programmable low current outputs which may be used to trigger other devices.

The ZX400 Security Control may be purchased in the ZX410 pre-configured package assembly. This assembly incorporates the ZX400 Control Board mounted inside a larger 14" x 14" x 3.5" enclosure, EX1414. The ZX410 must be purchased for Commercial and Industrial UL Listed applications. For UL Listed Commercial Fire applications, the ZX440F is available. It consists of the ZX400 Control Board in a red EX1414 enclosure, with a ZXCFM (Commercial Fire Module), a CR860 dual battery harness and other cabling.

ZX400/ZX410 Wiring Diagrams

ON
OFF

Class II Power-Limited

J-3

Class II Power-Limited

TEL SUPV

I.C. Load Number 1

PG01

J-10

J-4

| 1 AC XFMR | 2 ~ | 3 SW NEG | 4 AUX12 | 5 BELL | 6 2WS | 7 NEG | 8 DAT A | 9 DAT B | 10 KP+12 | 11 NEG | 12 Z1/7 | 13 Z2/8 | 14 NEG | 15 Z3/9 | 16 Z4/10 | 17 NEG | 18 Z5/11 | 19 Z6/12 | 20 NEG |

GREEN
WHITE
RED
BLACK

CONNECT RJ31/33/45 CORD

GROUND SCREW

Enclosure Door Ground Wire

UNIFIED EARTH GROUND

Red and Black Leads RED = POS. (+) BLACK = NEG. (-)

TRANSFORMER
Basler BE 116235
16.5VAC/35VA
U.L. Class II 50/60Hz

WARNING
Internally Fused.
Do Not Short.
Do Not Connect
To A Switched
Receptacle.

UL LISTED SIGNALING DEVICE
Ademco AB12M

1500Ω EOL SUPERVISION

CONTROL STATIONS
ZONE EXPANDER
PRINTER INTERFACE
ODMs

N.O.

N.C.

N.C. ZONE 1

ZONE 9

1500Ω 1/2 WATT

1500Ω 1/2 WATT

825Ω 1/4 WATT

METHOD 1

N.C. ZONE 3

1500Ω 1/2 WATT

METHOD 2

N.C. ZONE 5

N.C. ZONE 11

1500Ω 1/2 WATT

825Ω 1/4 WATT

N.C.

CONNECTION OF UL COMMERCIAL BURGLAR AUDIBLE

| 7 NEG | 5 BELL | 13 Z2/8 |

POLARIZATION AND NOISE SUPPRESSION DIODE

ALL WIRING BETWEEN CONTROL & BELL MUST BE IN CONDUIT.

JUMPER

1500Ω (CR854) (EOL DEVICE)

ADEMCO AB12M GRADE A BELL COMMERCIAL

LISTED RATE OF RISE OR FIXED TEMPERATURE THERMOSTAT

TO ANY ZONE DEFINED AS 24-HOUR FIRE

POWER

MOTION DETECTOR

1500Ω (CR854) (EOL DEVICE)

SMOKE DETECTOR
SENTROL 2-WIRE MODELS
(See ZX400/ZX410 Interconnect Label
P/N 64600310-NOTE 2)

12V SEALED LEAD ACID BATTERY
Yuasa B-1270

FLOAT BATTERY VOLTAGE:
13.6 - 13.8V
Max. current: 500mA.

QUIESCENT CHARGE CURRENT: 20mA.
Replacement: Every 3 - 5 years.

RED
BLACK
BROWN
BROWN

POWER SUPERVISION UNIT
ESL MODEL 204-12/24V OR EQUIV.

1500Ω (CR854) (CONV ZONING)

UL LISTED RESISTORS
MODEL CR853 - 825Ω E.O.L.
MODEL CR854 - 1500Ω E.O.L.

POWER
+ + - -

ALARM CONTACTS

SMOKE DETECTOR
SENTROL 4-WIRE MODELS
(See ZX400/ZX410 Interconnect Label
P/N 64600310-NOTE 2)

See *Specification and Features* section for a complete list of compatible accessories.

FIGURE 1   Suggested UL Household Burglar Alarm and/or Fire ($f f$) Alarm Hookup

MPI-206

NO
NC
TG - COM
TG+
NEG
+12V

TEL
SUPV

TELEPHONE
SUPERVISION
CONNECTION

INSTALL
JUMPER →

TO TERMINAL 7

CUT
JUMPER

TO TERMINAL 4

J4

ORANGE

BLUE

SENTROL RJ38 CORD
(shown)

MPI-206

NO
NC
TG - COM
TG+
NEG
+12V

PROGRAMMABLE
OUTPUT 1
CONNECTION

PG01

TO TERMINAL 10

TO TERMINAL 20

OPTIONAL - When relay is required
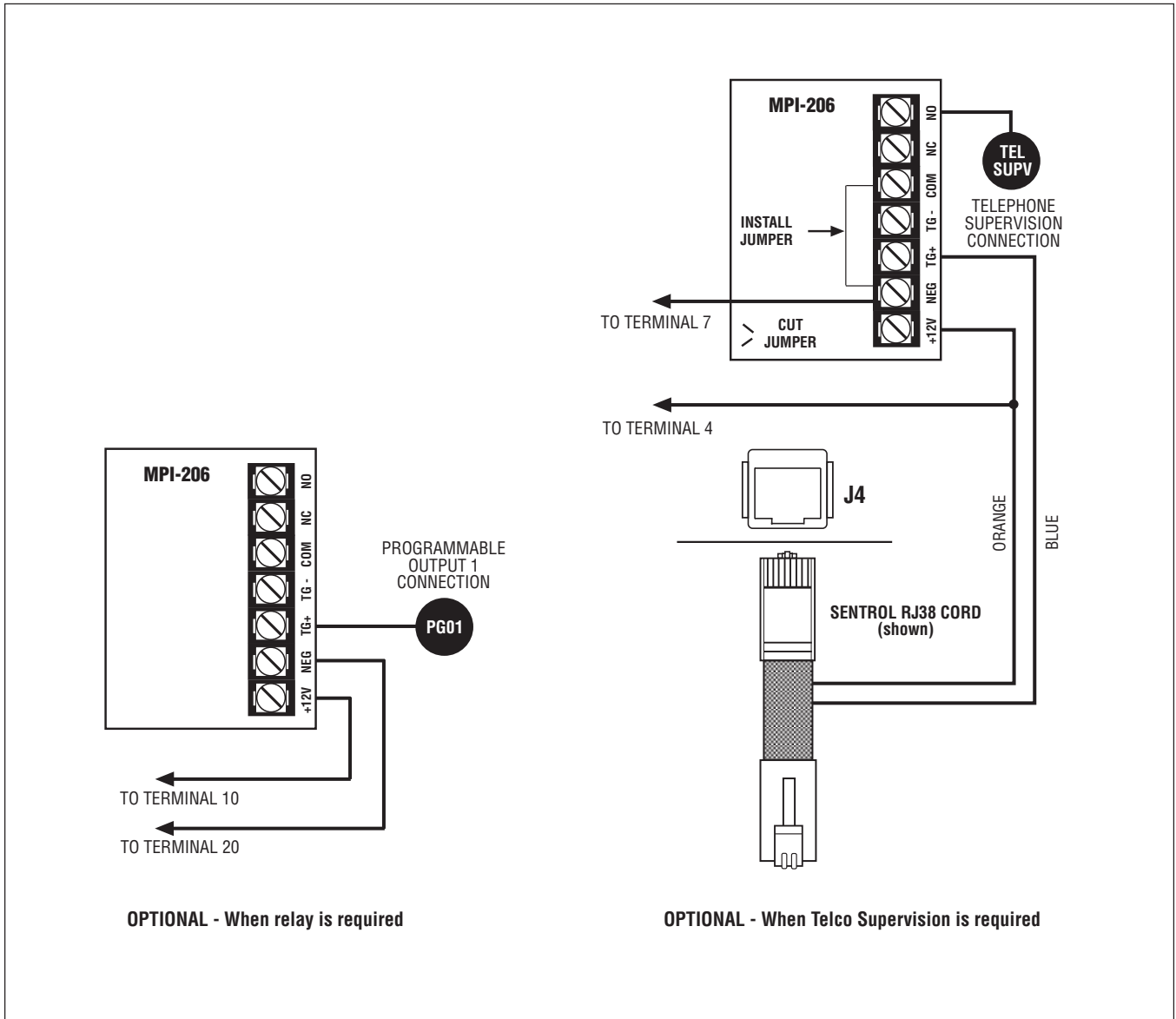
OPTIONAL - When Telco Supervision is required

FIGURE 2 Programmable Output And Telco Supervision Wiring Diagram

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ZX400/ZX410 Terminal Descriptions

TERMINAL	FUNCTION	DESCRIPTION
1, 2	AC Input	Connect the appropriate UL Class II transformer using 18 gauge minimum 2 conductor wire. Do not exceed 50 feet. Use a 16.5 VAC 35 VA transformer or an optional 16.5 VAC 20 VA transformer. **CAUTION: Do not short the terminals of the transformer together. This causes the internal fuse to blow. The transformer must be connected to a 120 VAC, 24-hour outlet not controlled by a switch other than an approved over-current protection device.**
3	Switched Negative	(-) Current limited 100 mA terminal. Negative connection for 4-wire smoke detectors, glass break detectors, and devices requiring resettable power.
4	Auxiliary Power	(+)12 VDC 500 mA continuous power. Overcurrent protected at 1.35 amps (PTC4). Used for powering motion detectors, 4-wire smoke detectors, glass break detectors, and other accessories. **CAUTION: Use terminals 4 and 10 when calculating total current drain.**
5	Supervised Bell Output (power-limited)	(+)12 VDC. Combined alarm current should not exceed 1.5 amps. Overcurrent protected at 1.85 amps (PTC2). A 1500 Ohm EOL resistor (CR854) **must be connected** between terminals 5 and 7; otherwise a bell output fault will occur.
6	Two Wire Smoke (Zone 30) (power-limited)	(+)12VDC of two-wire smoke detectors connected to this terminal. A 1500 Ohm EOL resistor (CR854) **must be connected** between terminals 6 and 7 regardless of whether a two-wire smoke detector is used or not. The maximum series resistance is 60 Ohms.
7, 11	Common Negative (power-limited)	**BLACK WIRE** - (-)12 VDC. Negative connection for Control Stations, zone expander, printer interface, RF Gateway, ODMs, 2-wire smoke detectors, motion detectors, and other devices.
8	Local Data Bus In (A)	**GREEN WIRE** - Connection for Control Stations, zone expander, printer interface, RF Gateway and ODMs. Use 22 guage wire up to 1000 ft. Use 18 guage wire up to 2000 ft.
9	Local Data Bus Out (B)	**WHITE WIRE** - Connection for Control Stations, zone expander, printer interface, RF Gateway and ODMs. Use 22 guage wire up to 1000 ft. Use 18 guage wire up to 2000 ft.
10	Control Station Power (power-limited)	**RED WIRE** - (+)12 VDC 500 mA continuous power connection for control stations, zone expander, printer interface, RF Gateway and ODMs. Overcurrent protected at 1.35 amps (PTC4). **CAUTION: Use terminals 4 and 10 when calculating total current drain.**
12 13 14 15 16 17 18 19 20	Zone 1/7 Loop (+) Zone 2/8 Loop (+) Common Negative Zone 3/9 Loop (+) Zone 4/10 Loop (+) Common Negative Zone 5/11 Loop (+) Zone 6/12 Loop (+) Common Negative	Each loop requires a 1500 Ohm end-of-line resistor (P/N CR854) for the primary zone, and an 825 Ohm end-of-line resistor (P/N CR853) for the secondary zone. A common negative is shared among all zones. The need for end-of-line resistors may be eliminated on all Burglar defined zones through programming. See Figure 1 for "2 in 1" Zoning™ wiring examples.
PGO1	Programmable Output 1	Use PGO1 as a +12V, 40 mA programmable output (see Figure 2).
TEL SUPV	Telephone Supervision	Use TEL SUPV as a telephone line trouble input (see Figure 2).
J4	Telco Jack	RJ-31X connection.

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"2 in 1" Zoning™

NOTE

If a Normally Open Device (i.e., 4-wire smoke detector) is used with "2 in 1" Zoning™, a short will occur across both zone loops when that device goes into alarm. It is recommended that these types of devices be used with Conventional Zone wiring only.

The Sentrol ZX400/ZX410 Security Control introduces an all new method of wiring zones that saves both time and wire costs. "2 in 1" Zoning™ allows the installer to wire two separate zones in parallel into one set of terminals.

Each zone is uniquely identified by its end-of-line resistor. The Primary Zone (zones 1-6) in each terminal is identified by a 1500 Ohm EOL resistor. The Secondary Zone (zones 7 - 12) is identified by an 825 Ohm EOL resistor. The Primary and Secondary zones operate as two independent zones to provide separate reporting, programming, and displays. Each zone is fully programmable as described in the *ZX400/ZX410 Programming Manual*. The zones are for Form A, Form B, or Form C sensors. **Maximum total loop wire and contact resistance (not including EOL) must not exceed 100 Ohms for the loop to function properly.**

There are two methods of wiring for "2 in 1" Zoning™. Method 1 wires one zone loop back to the control while a second zone loop is added in parallel off the first. This method may be employed in system retrofits, system expansions, or just simply to save wire cost and labor.
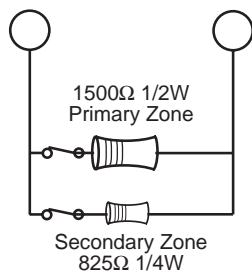

1500Ω 1/2W
Primary Zone

Secondary Zone
825Ω 1/4W

Figure 3 "2 in 1" Zoning™ Wiring - Method 1

Method 2 wires two separate zone loops back into one set of terminals. The panel recognizes each loop independently because two different EOL resistor values are used to differentiate between the Primary Zone (1500 Ohm 1/2 Watt) and the Secondary Zone (825 Ohm 1/4 Watt). This method provides two zones with one set of terminals and is ideal for pre-wire or already installed wiring.
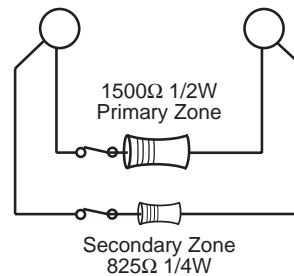

1500Ω 1/2W
Primary Zone

Secondary Zone
825Ω 1/4W

Figure 4 "2 in 1" Zoning™ Wiring - Method 2

NOTE

The resistors in Figure 3 & 4 are 1% values to maintain proper loop resistance values. If replacements are required, please refer to the manufacturer for correct replacements. The 1500 ohm resistor is color coded Brown•Green•Black•Brown•Brown. The 825 ohm resistor is color coded Gray•Red•Green•Black•Brown.

All zones sense five different voltage levels enabling one zone to act as two. Troubleshooting is simple using just a voltmeter at the control. The control monitors the voltage level across the zone and uses the voltage levels in Table 1 to determine whether the zone is normal, open, or shorted.

CONDITION	NOMINAL LOOP RESISTANCE	VOLTAGE READING
Primary Zone <u>and</u> Secondary Zone Open Contacts; Loop Cut or Open	Infinite Ohms	5.24 - 8.25 V
Secondary Zone Open Contact, Primary Zone Normal	1500 Ohms	4.24 - 5.23 V
Primary Zone Open Contact, Secondary Zone Normal	825 Ohms	3.24 - 4.23 V
Primary Zone and Secondary Zone Normal	825 Ohms in parallel with 1500 Ohms = 532 Ohms	2.00 - 3.23 V
Primary Zone and Secondary Zone Shorted	0 Ohms	0 - 1.99 V

TABLE 1   "2 in 1" Zoning™ Troubleshooting Chart

Conventional Methods of Wiring

Class 'B' End-Of-Line Resistor Supervised Zones

A Class 'B' zone must be supervised with a 1500 Ohm 1/2 Watt end-of-line resistor (P/N CR854). This resistor should be installed in series at the furthest point from the control. This configuration must be used whenever both Form A and Form B devices are connected and provides a high degree of protection against compromise or tampering. The control monitors the voltage level across the Primary zone and uses the Primary zone voltage levels in Table 1 to determine whether the zone is normal, open, or shorted. The operation of a zone is programmable as described in the *ZX400/ZX410 Programming Manual.* **Maximum total loop wire and contact resistance (not including EOLs) must not exceed 100 Ohms for the loop to function properly. The 1500 Ohm EOL resistor is optional for Form A connections but is required for Form B.**
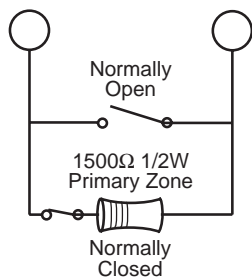
Non-Supervised Closed Circuit Loop (No EOL Resistor Supervision)

The EOL resistor is not required on Burglar zones. A conventional closed circuit loop may be connected directly to a primary zone and the zone will have either a short or an open condition. See the *ZX400/ZX410 Programming Manual* for programming an unsupervised zone. Fire zones may not be installed as unsupervised. **Only Burglar defined zones may be wired non-supervised. "2 in 1" Zoning™ is not allowed.**

Normally Open

1500Ω 1/2W Primary Zone

Normally Closed

Figure 5   Conventional Zone Wiring Method

NOTE

For UL Listed systems, EOL Supervision is required.

Control Station Addressing and Supervision

All Control Stations are shipped from the factory as Control Station #1 and supervised. They may be set to other addresses and to unsupervised as described below.

A supervised Control Station is reported as missing when the system fails to get any response from it. In order to maintain supervision, each supervised Control Station must have its own unique address.

An unsupervised Control Station can be removed from the system without the system detecting that it is missing. The advantage of an unsupervised Control Station is that a system can have as many Control Stations as the power supply can support. By adding additional power supplies, like the HCP-12SULC, Control Stations may be added up to a total of 13 bus devices on the system. For UL listed systems, unsupervised Control Stations are **not** allowed.

SSD, LCD, and VFD Control Stations

These Control Stations have a four position DIP switch on the circuit board to set the address and supervision. To change the Control Station to unsupervised, move DIP switch 4 to the ON position. To change the address, the DIP switch setting must be positioned according to Figure 6.
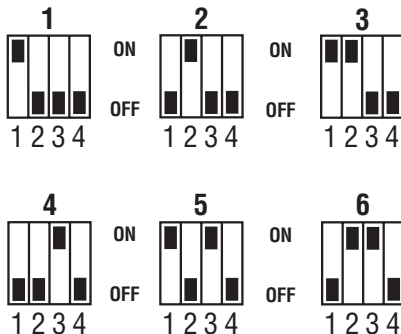

Figure 6   Control Station DIP Switch Settings

NOTE

When unsupervised Control Stations are used, ALL unsupervised LED Control Stations _must be_ addressed as 1 or 2, ALL unsupervised SSD Control Stations _must be_ addressed as 3 or 4, and ALL unsupervised LCD/VFD Control Stations _must be_ addressed as 5 or 6. You cannot mix a supervised Control Station and unsupervised Control Station with the same address setting.

LED Control Stations

These Control Stations have two jumpers on the circuit board to set the address and supervision. To change the address of the Control Station #1 to Control Station #2, remove JP2 (see Figure 7). To change a Control Station to unsupervised, remove JP1 (see Figure 7).
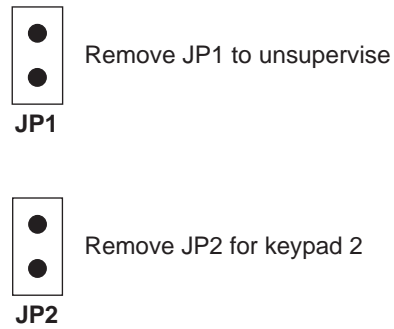

Remove JP1 to unsupervise

JP1

Remove JP2 for keypad 2

JP2

Figure 7   LED Control Station Jumpers

Control Station Troubleshooting

If a Control Station is incorrectly wired, it will not accept keystroke entries. The following symptoms may appear:

SYMPTOM	CONDITION
No Control Station LED's or display	Black or Red Wire removed or cut
No response from key presses	Green Wire removed or cut or two supervised Control Stations at the same address
LED's flash and may display "No Communication From Control" code	White Wire removed or cut Green/White Wires reversed Green & White Wires shorted together

The nominal voltage at the control with a single Control Station connected should measure as follows:

TERMINAL	VOLTAGE
from Common Negative (Terminal 7 or 11) to Data A (Terminal 8)	~ 11.5 VDC
from Common Negative (Terminal 7 or 11) to Data B (Terminal 9)	~ 7.7 VDC
from Common Negative (Terminal 7 or 11) to Control Station Power (Terminal 10)	~13.8 VDC

Clearing Trouble Messages

Once the system is up and running, trouble conditions may occur. Most trouble conditions are cleared automatically when the condition that initiated the trouble is restored or is eliminated. Three trouble conditions (Memory Error, Smoke Trouble and Missing Keypad) may be cleared manually by pressing and holding the Clear key for three seconds (until two beeps are heard). This action is also required to turn off the Duress output after it has been activated and to cause an "Installer Off Premises" event (see Operating the System - Installer On Premises).

A Bell Silenced trouble condition may only be cleared by performing a smoke reset operation.

12 VDC Outputs

The ZX400/ZX410 control provides one switched negative output, one Control Station power output, one auxiliary power output, one 2-wire smoke power terminal, one bell output, and one programmable low current output (PGO1). (See Figure 1).

Additional Outputs

Additional outputs can be added with the ZXODM Output Driver Modules. Each module receives its data from the local data bus and provides ten additional programmable outputs. The outputs provide +12 VDC on activation and must be limited to 40 mA of current draw. ODM1 has 10 unique outputs. ODM2 also has 10 unique outputs.

The ODMs may be addressed as ODM1 or ODM2. You may use multiple ODMs at a given address provided that power restrictions are followed. The ODMs come defaulted from the factory as ODM1. To change from ODM1 to ODM2, remove power, cut resistor R29, and re-apply power. Connect the ODMs to the control as shown in Figure 9. Use the twelve (12) wire cable provided with the ODMs for the outputs as shown.

Output conditions can be programmed as one of many conditions. Refer to the *ZX400/ZX410 Programming Manual* for programming information and restrictions.

A ZXODM may be mounted in the control enclosure using the double-sided tape provided on the back of the module. For UL Certificated installations requiring rigid mounting, a ZXODM may be mounted in a ZX410 control enclosure as shown in Figure 8 using the stand-offs provided in the ZEM/ODM Mounting Hardware Pack (P/N 13000515).

NOTE

The outputs on this module have limited transient immunity and should not leave the enclosure.
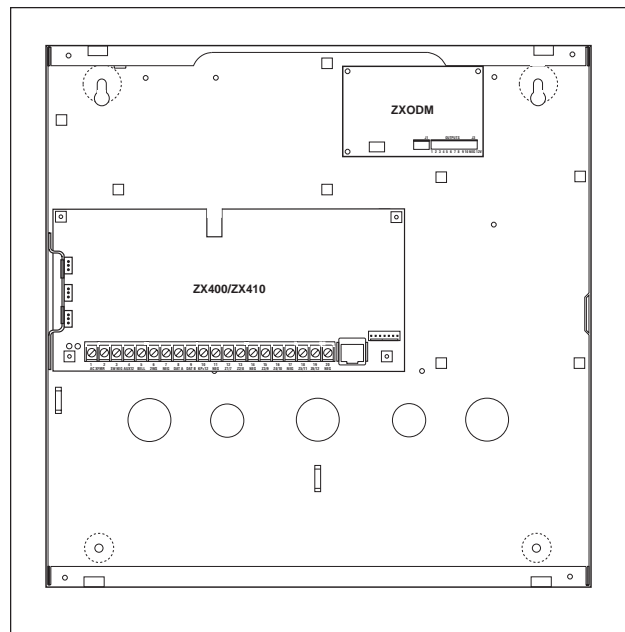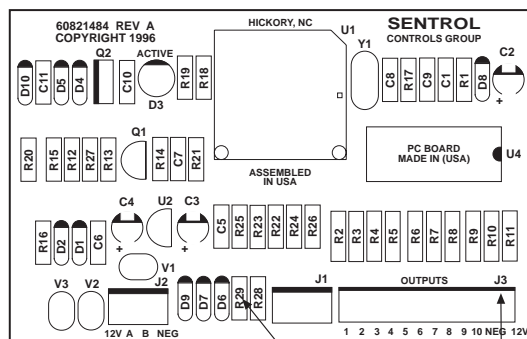

Figure 8   ZXODM Mounting

DATA BUS CONNECTION	
RED	Connect to Control terminal 10
GREEN	Connect to Control terminal 8
WHITE	Connect to Control terminal 9
BLACK	Connect to Control terminal 7

Data bus connection   Remove for ODM #2   J3 Connector

J3 CONNECTIONS			
OUTPUT	WIRE COLOR	DEFAULT	DESCRIPTION
1	Tan	13	Burglar
2	Pink	3	Fire
3	Gray	14	Holdup
4	Violet	15	Auxiliary/Medical
5	Yellow	19	Arm AWAY
6	Orange	31	Chime
7	Blue	18	Ready
8	Dk Brown	25	Pre-Alarm
9	Green	34	Lamp
10	White	39	Access
NEG	Black		
12V	Red		

Figure 9   ZXODM Wiring Diagram

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Outputs may be wired to indicator devices or relay module triggers (like the MPI-206) provided the 40 mA current draw condition is not exceeded. Figure 10 shows a wiring example for a relay to ODM 1 Output 2. Figure 11 shows a wiring example of ODM 1 Output 1 to trigger an LED.
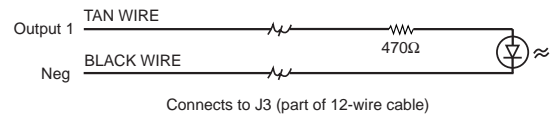

Output 2 — PINK WIRE

Neg — BLACK WIRE

Connects to J3 (part of 12-wire cable)

TRIG +

NEG

N.C.

COM

N.O.

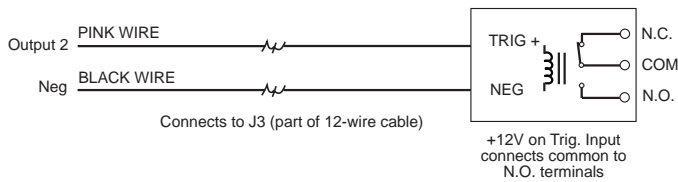+12V on Trig. Input connects common to N.O. terminals

FIGURE 10   Output Connected to a Relay

NOTE

Do not exceed 250 mA of total current through the Red (+12V) and Black wires (Negative) of the twelve wire cable. Add 18 gauge wire from the appropriate control panel terminals for total current drains in excess of 250 mA.

Output 1 — TAN WIRE

Neg — BLACK WIRE

470Ω

Connects to J3 (part of 12-wire cable)

FIGURE 11   Output Connected to an LED

NOTE

The LED & 470 Ohm current limiting resistor shown in Figure 11 are not supplied.

Expansion Zones

Zones 13-28 are expansion zones. They may reside on any zone expansion device (ZXEXP, ZEM, RF Gateway 1 or RF Gateway 2). Assignment of these zones to expansion devices is done through programming (see *ZX400/ZX410 Programming Manual*).

The options available for all zones are described in the table below.

ZONE	ON-BOARD	ZXEXP ZONE	RF ZONE	ZEM ZONE
1	On-Board Zone 1 Primary			
2	On-Board Zone 2 Primary			
3	On-Board Zone 3 Primary			
4	On-Board Zone 4 Primary			
5	On-Board Zone 5 Primary			
6	On-Board Zone 6 Primary			
7	On-board Zone 1 Secondary			
8	On-Board Zone 2 Secondary			
9	On-Board Zone 3 Secondary			
10	On-Board Zone 4 Secondary			
11	On-Board Zone 5 Secondary			
12	On-Board Zone 6 Secondary			
13		ZXEXP1 Zone 1 Primary	RF Device 13	ZEM1 Zone 1
14		ZXEXP1 Zone 2 Primary	RF Device 14	ZEM1 Zone 2
15		ZXEXP1 Zone 3 Primary	RF Device 15	ZEM1 Zone 3
16		ZXEXP1 Zone 4 Primary	RF Device 16	ZEM1 Zone 4
17		ZXEXP1 Zone 5 Primary	RF Device 17	ZEM2 Zone 1
18		ZXEXP1 Zone 6 Primary	RF Device 18	ZEM2 Zone 2
19		ZXEXP1 Zone 7 Primary	RF Device 19	ZEM2 Zone 3
20		ZXEXP1 Zone 8 Primary	RF Device 20	ZEM2 Zone 4
21		ZXEXP1 Zone 1 Secondary	RF Device 21	ZEM3 Zone 1
22		ZXEXP1 Zone 2 Secondary	RF Device 22	ZEM3 Zone 2
23		ZXEXP1 Zone 3 Secondary	RF Device 23	ZEM3 Zone 3
24		ZXEXP1 Zone 4 Secondary	RF Device 24	ZEM3 Zone 4
25		ZXEXP1 Zone 5 Secondary	RF Device 25	ZEM4 Zone 1
26		ZXEXP1 Zone 6 Secondary	RF Device 26	ZEM4 Zone 2
27		ZXEXP1 Zone 7 Secondary	RF Device 27	ZEM4 Zone 3
28		ZXEXP1 Zone 8 Secondary	RF Device 28	ZEM4 Zone 4
29		ZXEXP1 2-Wire Smoke Zone		
30	On-Board 2-Wire Smoke Zone			

TABLE 2   ZX400 Zone ID Assignments

ZXEXP Zone Expander Module

This module provides an additional 8 zones for the ZX400/ZX410 Control. If "2 in 1" Zoning™ is desired, this module provides 16 zones. All zones are fully programmable (see the *ZX400/ZX410 Programming Manual*). The Zone Expander terminals map into zones on the control as shown in Table 2. An additional Two-Wire Smoke loop is also provided on this module (Zone 29). This loop follows the same wiring restrictions as Terminal 6 on the ZX400/ZX410 control. A maximum of 10 detectors may be installed on the Zone Expander. Fast zones may not be used on the Zone Expander Module.

Ten programmable outputs are available on the ZXEXP Zone Expander Module. These outputs are identical to the 10 outputs on ODM2. Connect the outputs to J2 on the ZXEXP in the same manner as J3 on the ZXODM. When using the outputs on this module, make sure all restrictions mentioned in the ZXODM section for power and negative are observed. The outputs have limited transient protection and should be properly protected (buffered by relays, etc.). They should be mounted in a suitable enclosure such as an EB1511 or EX1414 (part # 13000421).

Installation

1. Remove the plastic lid from the ZXEXP Zone Expander Module. Choose a suitable mounting place and mount the module with the two screws provided. It is recommended that the module be placed in a suitable enclosure like the EB1511 for additional environmental protection.

2. Connect the ZXEXP to the ZX400/ZX410 local data bus. **For a UL Household Fire System, the ZXEXP must be mounted within 500 ft. of the ZX400/ZX410 and the maximum Smoke Zone resistance is 20 Ohms.**

3. Wire initiating devices to the appropriate zone terminals on the ZXEXP module (see Table 2). Follow the same guidelines for "Hardware Zone Wiring" as completed for the control zones.

4. Use the 12 wire cable to connect outputs as described in the ZXODM section.

5. The "Active" LED will flash to indicate the ZXEXP is communicating with the control.

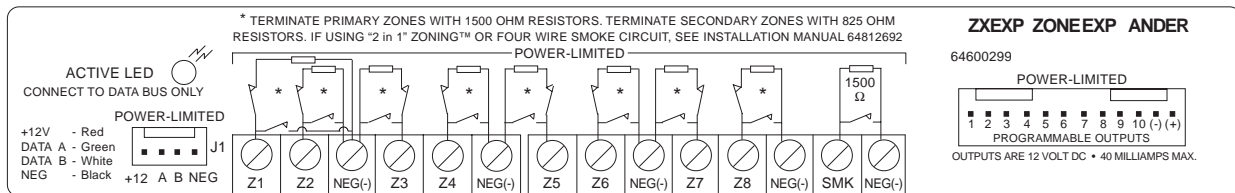| DATA BUS CONNECTION	
RED	Connect to Control terminal 10
GREEN	Connect to Control terminal 8
WHITE	Connect to Control terminal 9
BLACK	Connect to Control terminal 7

FIGURE 12 ZXEXP Zone Expander Module

Wireless Devices

The ZX400/ZX410 provides an option for including Wireless (or RF) Devices. The RF Devices may consist of RF Zone Devices (Universals, Door Contacts, Glassbreaks, PIRs and Smoke Detectors) and RF User Devices (Handhelds). These RF Devices require that one or two RF Gateways be attached to the system. The ZX400/ZX410 is compatible with both model 4710 and 4720 RF Gateways.

- **4710 RF Gateway** - provides up to 8 RF Zone Devices and up to 12 RF User Devices. It may only be used as RF Gateway 1. It can only provide for zones 13-20.

- **4720 RF Gateway** - provides up to 16 RF Zone Devices and up to 12 RF User Devices. It may be addressed as either RF Gateway 1 or RF Gateway 2 (refer to the RF Gateway instructions for address selection). It can provide zones 13-28 regardless of the address setting.

Either one or both gateway models may be used. If two RF Gateways are used, one must be addressed as RF Gateway 1 and the other as RF Gateway 2.

Mount the RF Gateway as described in the RF Gateway instructions. Wire the local data bus to the terminals: +12V - RED; DATA A - GREEN; DATA B - WHITE; NEG - BLACK. Reinstall the cover.

All RF Devices must be programmed into an RF Gateway for it to receive them. An RF Zone Device must also be mapped to a zone on the panel by the programming of that zone. An RF User Device must be mapped to a valid user passcode on the panel by programming a passcode that matches the device. All RF User Devices on RF Gateway 1 are independent of the RF User Devices on RF Gateway 2. Therefore, up to 24 RF User Devices may be used with two 4720 RF Gateways.

The RF Gateway and RF Zone Devices should be temporarily mounted in their desired locations until they have been tested with the Control Panel. These devices may need to be re-oriented or moved to achieve optimal reception.

To test the Received Signal Strength of each RF Zone Device, use Test 6 - RF Signal Strength Test. From the Control Station press the "8" key, followed by the Installer Code (9632) and then press the "6"

key. Next press the RF Zone Device Number (13 to 28). The Control Station will display and sound the Received Signal Strength of the last transmission sent by the RF Zone Device. See results below:

Strong Signal (HOT or 5 Control Station beeps): a strong or high level RF signal was measured by the receiver for that location of the transmitter. This is a good location for the transmitter and receiver.

Acceptable (ACC or 3 Control Station beeps): a normal or acceptable level of RF signal was measured by the receiver for that location of the transmitter. This is a good location for the transmitter and receiver.

Low Signal (LOW or 1 Control Station beep): a low or not acceptable level of RF signal was measured by the receiver for that location of the transmitter. Make multiple test transmissions, making sure that obstructions between the transmitter and receiver are normal but minimized (hands away from units, metal ladders away from receiver, etc.) during these tests. The transmitter and/or receiver will need to be relocated to obtain ACCEPTABLE level readings.

No Signal (NO or 1 long Control Station beep): no RF signal or an extremely low RF signal was measured by the receiver for that location of the transmitter. Bring the transmitter to the RF Gateway and activate the transmitter. The red LED on the RF Gateway should blink. If it does not, then the transmitter is not working. If the red LED does blink, but the signal strength is still NO SIGNAL, then a programming error exists. Check the programming of the zone in both the RF Gateway and the panel. If the signal strength is STRONG or ACCEPTABLE, then the transmitter and/or receiver will need to be relocated to obtain ACCEPTABLE level readings. Be sure to power down the control to clear out all signal strength levels before testing the transmitter at its new location.

After testing has been completed, the RF Gateway and RF Zone Devices should be permanently mounted.

NOTE

Series 4000 RF Gateways and transmitters which are not UL labeled are not allowed in UL Certified installations.

Fire Zone Modules

ZEM Zone Expansion Module

The ZX400/ZX410 provides an option for adding Class B Fire zones. These zones may be connected to ZEM Fire Zone Expansion Modules. There are two models of ZEMs available:

2502-ZEM	Two Class B Zones
2504-ZEM	Four Class B Zones

A ZEM may be mounted in a ZX410 control enclosure as shown in Figure 13. A ZEM may also be mounted in an EX1414 enclosure (P/N 13000421). Always use a ZEM/ODM Mounting Hardware Pack (P/N 13000515). Connect the ZEM to the ZX400/ZX410 local data bus using one of the ZEM's two data bus connectors. The second data bus connector may be used to connect another ZEM to the system.
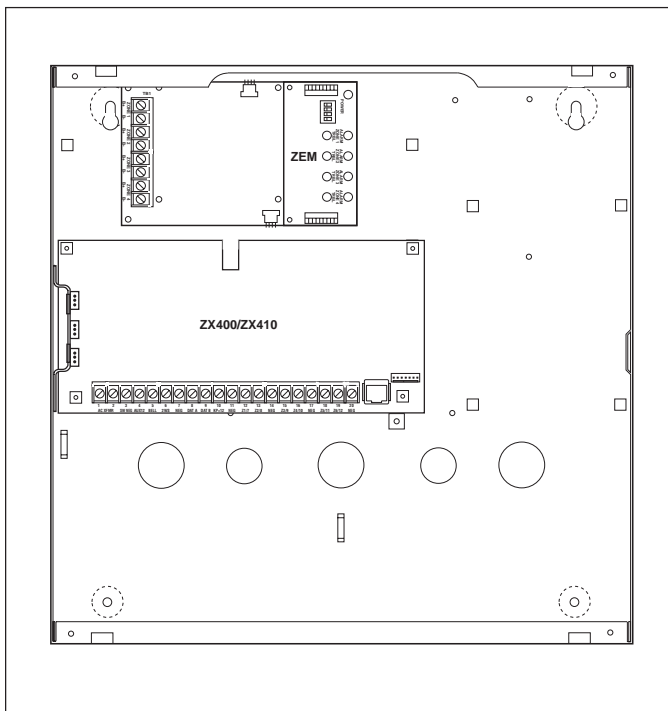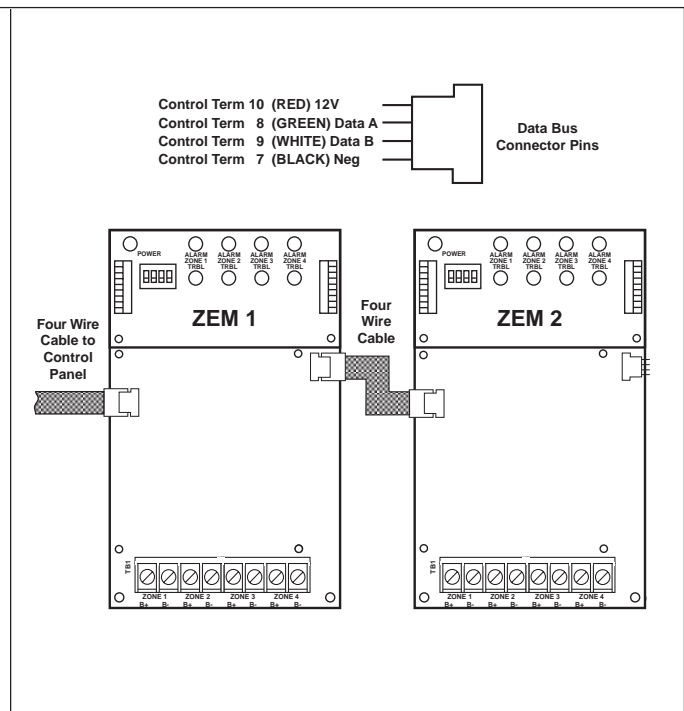

FIGURE 13　　ZEM Mounting

FIGURE 14　　ZEM Module Connection

Up to four ZEMs may be connected to the system. Set the address switches on a ZEM to provide the following zones:

Be sure that no two ZEMs have the same address settings.

ZEM #	S1	S2	S3	S4	ZONES		
1	ON	OFF	OFF	OFF	13 & 14	OR	13 - 16
2	OFF	ON	OFF	OFF	17 & 18	OR	17 - 20
3	ON	ON	OFF	OFF	21 & 22	OR	21 - 24
4	OFF	OFF	ON	OFF	25 & 26	OR	25 - 28

TABLE 3　　ZEM Address Switch Settings

Connect initiating devices to the ZEM (see figures below).
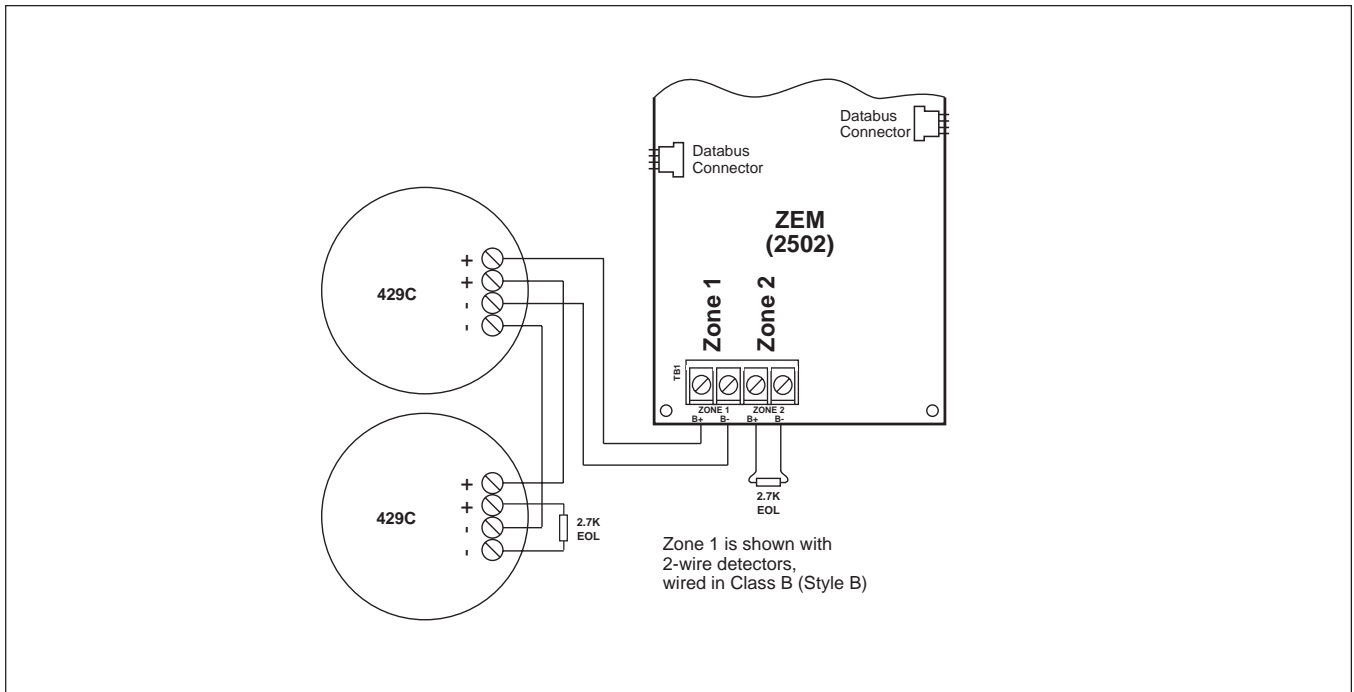
FIGURE 15   Class B Connection
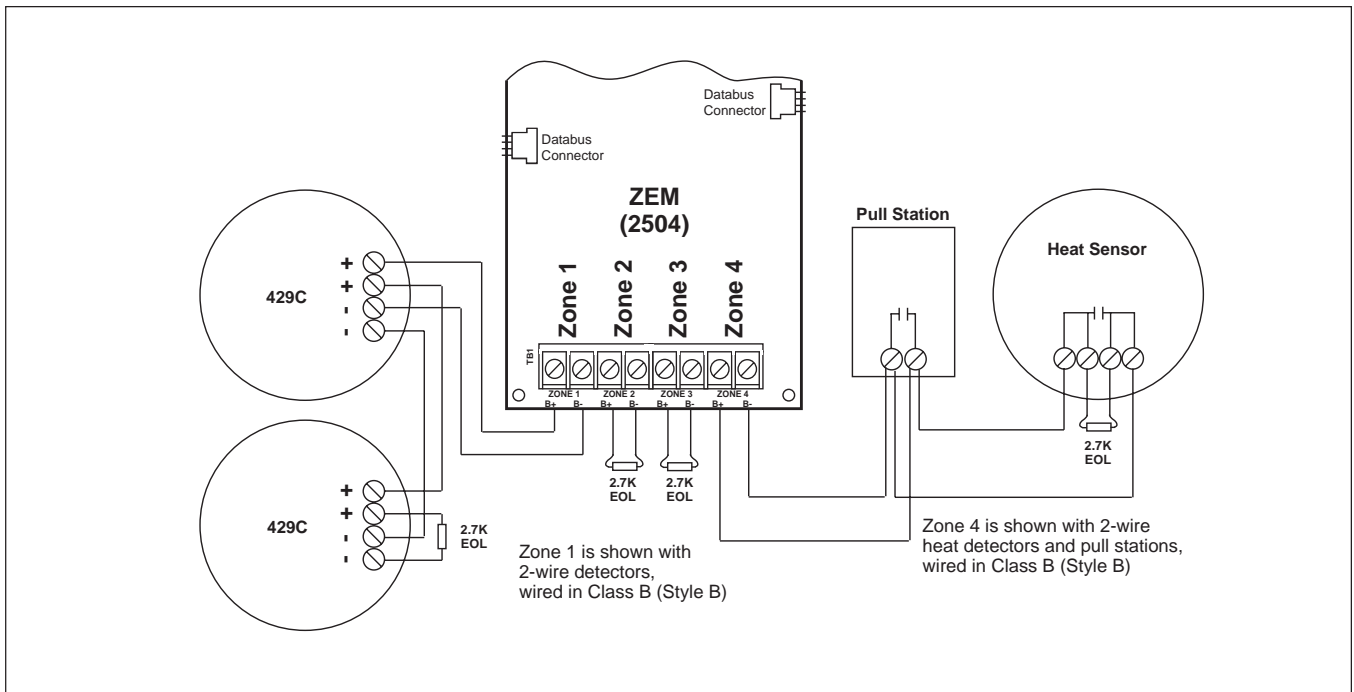
FIGURE 16   Class B Connection

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ZRM Zone Relay Module

The ZRM Zone Relay Module is a zone follower with a relay following its corresponding zone on a ZEM. A ZRM plugs directly into a ZEM and only requires wiring the terminals labeled NO, COM, and NC. Each relay has dry, Form "C" contacts rated 2A @ 30 VDC resistive.

NOTE

Circuits connected to a ZRM must be power-limited.

FIGURE 17   Mounting ZRM to ZEM Module
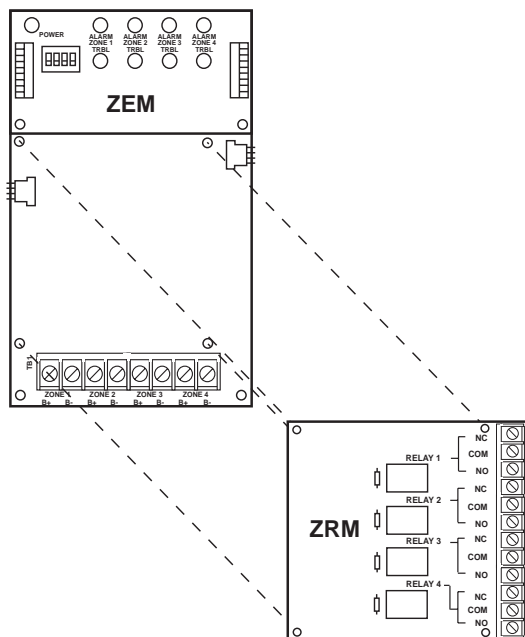
ZXCFK Fire Module Kit

The ZXCFK Fire Module Kit is designed to provide the hardware necessary to upgrade a ZX410 to meet the requirements for a UL Listed commercial fire system per UL 864/NFPA 72 Local Protective Signaling Systems and Central Station Systems.

To upgrade a ZX410 with a ZXCFK, refer to the *ZX440F Installation/Programming Manual* P/N 64812853 that comes with the ZXCFK.

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Power Issues

Optional Battery Configurations

In order to meet UL985 & CSFM standby current requirements of 24 hours at 400 mA, a minimum of two 12 VDC, 7 Ah sealed lead acid batteries must be installed utilizing the Dual Battery Harness provided as shown in Figure 18.

To Bat. +
On The Control

BATTERY B   BATTERY A

To Bat. -
On The Control

FIGURE 18 Connection of the Dual Battery Harness

ZX400/ZX410 Power Worksheet

ITEM	DESCRIPTION	STANDBY CURRENT PER UNIT (AMPS)		QTY		TOTAL STANDBY CURRENT PER ITEM (AMPS)	TOTAL ALARM CURRENT PER UNIT (AMPS)		QTY		TOTAL SYSTEM ALARM CURRENT (AMPS)
			X		=			X		=	
			X		=			X		=	
			X		=			X		=	
			X		=			X		=	
			X		=			X		=	
			X		=			X		=	
			X		=			X		=	
			X		=			X		=	
			X		=			X		=	
			X		=			X		=	
		TOTAL SYSTEM STANDBY CURRENT (AMPS)					**TOTAL SYSTEM ALARM CURRENT (AMPS)**				

REQUIRED OPERATING TIME OF SECONDARY POWER SOURCE FROM NFPA 72 1-5.2.5:

STANDBY:_____ HOURS   ALARM:_____ MINUTES X 1/60 = _____ HOURS

REQUIRED STANDBY TIME (HOURS)		TOTAL SYSTEM STANDBY CURRENT (AMPS)		REQUIRED STANDBY CAPACITY (AMP-HOURS)	REQUIRED ALARM TIME (HOURS)		TOTAL SYSTEM ALARM CURRENT (AMPS)		REQUIRED ALARM CAPACITY (AMP-HOURS)
	X		=			X		=	

REQUIRED STANDBY CAPACITY (AMP-HOURS)		REQUIRED ALARM CAPACITY (AMP-HOURS)		TOTAL REQUIRED CAPACITY (AMP-HOURS)	OPTIONAL FACTOR OF SAFETY		REQUIRED BATTERY CAPACITY (AMP-HOURS)
	+		=			X	

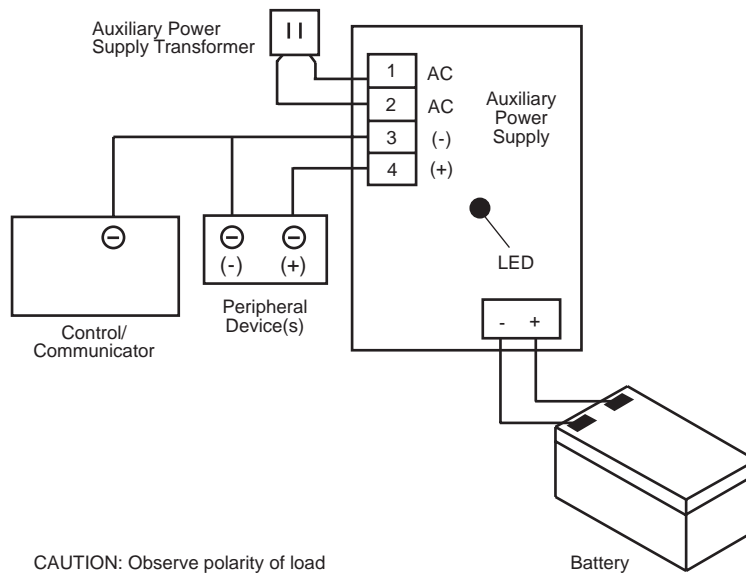# Auxiliary Power Supply Installation

To increase the available current supplied by the control, a HCP-12SULC Power Supply may be added. Each HCP-12SULC supplies an additional 450 mA of current, utilizing at least one 12 Ah battery. See Figure 19.

The HCP-12SULC Power Supply can provide a 12 VDC power output, with a current rating of 2.0 A continuous, while the AC primary power source is present. If the primary source is lost, the HCP-12SULC electronically switches to the standby battery.

When using this power supply on a listed system, a duplex utility cover for the primary power outlet must be installed. Install conduit or another listed raceway between all connecting junction boxes and protective enclosures as shown.

Use only the battery and transformer as recommended in the Specifications and Instructions for the power supply. See "Optional Battery Configurations" for information about the connection of additional batteries.

The HCP-12SULC must not be connected to a load which exceeds 2.0A continuous demand.

FIGURE 19 HCP-12SULC Power Supply Installation

ZXPTR Printer Interface Module

The optional ZXPTR Printer Interface Module connects to the local data bus and can be used for printing events in real-time or on command. This module interfaces with any Centronics-style parallel printer. Only one printer may be used per system. Note that the printer connection is not supervised.

1. To install the ZXPTR, choose a suitable location, but not more than 25 feet from the Centronics-style parallel printer, following the wiring description in Figure 1.

2. Remove the cover and circuit board and mount the base to an appropriate wall or desktop.

3. Attach the printer cable to the ZXPTR printer port and affix with screws if desired.

4. Wire the local data bus to the terminals: +12V is red; Data A is green; Data B is white; NEG is Black.

5. Reinstall the circuit board and cover.

6. The "Active" LED will flash to indicate the ZXPTR is communicating with the control.

Specifications And Features

Control Board

- Six (6) two-wire zones, each supervised with a 1500 Ohm end-of-line resistor. "2 in 1" Zoning™ provides twelve (12) fully programmable zones with 1500 and 825 Ohm resistors. System expansion to 28 fully programmable zones via Zone Expander Module, ZXEXP.
- On/Off power switch.
- One assignable high current alarm output. (Supervised Bell Output).
- One programmable low current output (40 mA).
- Fast zone loop response time: 80 msec (zones 1 - 6), 20 msec (zones 7 - 12).
- Dedicated two-wire smoke detector zones on control (zone 30) and zone expander (zone 29).
- Three (3) Control Station activated panic zones.
- Nominal current drain for control board only 126 - 154 mA.
- Watchdog microprocessor monitoring.
- Superior six (6) stage lightning/transient protection.
- One switched negative output (100 mA).
- Expandable to twenty-one (21) programmable low current outputs via two output driver modules, and/or a zone expander.
- Continuous battery monitoring.
- Low voltage detection monitoring @ 11.3 volts threshold.
- Automatic system shutdown if voltage falls below 9.8V.
- Operating temperature range inside the enclosure: 32°F to 122°F (0°C to +50°C).
- Two and four-wire smoke zones available.
- Control Station Programmable.
- Upload/Download via RPM/2 Pro.
- Loop response time: 320 msec (general purpose hardwired zones), 1600 msec (two-wire smoke zones).

Power Supply

- Fully regulated 13.8 volt 900 mA supply available with a 16.5 VAC 35 VA transformer.
- Optional 16.5 VAC 20 VA transformer provides 450 mA power (not UL Listed).
- Reverse polarity protection on battery inputs.
- Float charging circuit: 13.8 volts DC.

Recommended Battery

- Rechargeable 12 VDC 7 Ah sealed lead acid. Use two (2) batteries to meet CSFM and Household Fire requirement of 24-hour standby at 450 mA.
- Rechargeable 12 VDC 17.2 Ah sealed lead acid. Use one (1) battery to meet CSFM requirement of 24 hours of standby at 450 mA.

Recommended Transformer

- UL Listed Class II plug-in; 16.5 VAC 35 VA secondary; 120 V 60 Hz primary connected to 24-hour unswitched outlet.
- Optional UL Listed Class II plug-in 16.5 VAC 20 VA secondary, 120 V 60 Hz primary connected to 24-hour unswitched outlet.

Enclosure

- Twenty (20) gauge metal cabinet with knock-out for optional cam lock. Dimensions: 9"W x 10"H x 2.875"D (228.6 mm x 254 mm x 73.02 mm).
- Optional EX1414 20 gauge locking metal cabinet with two keys. Dimensions 14"W x 14"H x 3.5"D (356 mm x 356 mm x 89 mm).
- TC1100 Tamper Resistant Enclosure: extra high security cover (uses EX1414 option).

Digital Communicator

- DTMF Touchtone™ or Rotary (pulse) dialing. Rotary speed: 10pps, (selectable U.S. style 60% break, 40% make or International style 66% break, 33% make).
- Ringer equivalence: 0.0B.
- Transmission formats include: Contact ID, 20 and 40 baud Pulse Formats (3/1, 4/1, 4/2, Hexadecimal Reporting), Non-Telco Contact ID, Pager.
- Reports to most major Central Station receivers.
- Primary phone number can have up to 20 digits.
- Secondary phone number can have up to 20 digits.

- Two pager phone numbers, each can have up to 20 digits
- Remote programming phone number can have up to 20 digits.
- Reporting capabilities: two 4-digit account codes per area, two 4-digit system account codes, report by zone, opening and closing reports, force arm/bypass reports, restoral reports, trouble reports, cancel reporting, low battery, AC failure/restoral.
- Dual and split reporting capability.
- Pager capability with 16-digit programmable message and 2-digit coded messages.
- Sentrol communication defaults for quick programming.
- Disable call waiting.

Control Stations

- Color-coded four-wire data bus connection.
- 19-Button Control Station with audible feedback.
- Three (3) Control Station panic button zones.
- Surface mountable; mounts to any standard single or double gang electrical box.
- Built-in piezo sounder.
- Easy-to-read arming level: AWAY, STAY, and NIGHT backlit LEDs.
- Backlit keys with door.
- Unsupervised Control Stations allows up to 12 Control Stations.

ZXLCD Control Station

- Backlit display.
- Two lines x 16 characters LCD display.
- Area assignable/Multi-area.
- Addressable with DIP switches, supervised/unsupervised.
- Plain English display.
- Nominal current drain: 20mA - 110mA.
- Up to six (6) supervised Control Stations per system.
- Size: 5.33"H x 6.08"W x 1.024"D (135.4 mm x 154.4 mm x 26.0 mm).
- Optional red plastic for Commercial Fire applications

ZXVFD Control Station

- Two lines x 16 characters VFD display.
- Area assignable/Multi-area.
- Addressable with DIP switches, supervised/unsupervised.
- Plain English display.
- Nominal current drain: 20 - 170 mA.
- Up to six (6) supervised Control Stations per system.
- Size: 5.33"H x 6.08"W x 1.024"D (135.4 mm x 154.4 mm x 26.0 mm).

ZXLED12 Control Station

- Thirteen (13) LEDs annunciate general purpose zones 1 through 12 and control board Two-Wire Fire zone.
- Ready & trouble LEDs.
- Addressable as Control Station #1 or #2. Jumper change makes Control Station unsupervised.
- Area assignable/Single area.
- Nominal Current Drain: 23 - 31 mA.
- Size: 5.0"H x 4.5"W x 1.0"D (127 mm x 114.3 mm x 25.4 mm).

ZXSSD Control Station

- Three 0.56" (14.2 mm) seven segment display digits.
- Ready & trouble LEDs.
- Up to six (6) supervised Control Stations per system.
- Area assignable/Multi-area.
- Addressable with DIP switches, supervised/unsupervised.
- Nominal Current Drain: 23 - 116 mA.
- Size: 5.0"H x 4.5"W x 1.0"D (127 mm x 114.3 mm x 25.4 mm).

Optional Accessories

- ZXEXP Zone Expander Module: Expands the control to 8/16 additional zones. Provides an additional two-wire smoke zone (max. 10 detectors). Provides 10 additional programmable outputs. Nominal current drain: 60 - 72 mA with no outputs connected.

- ZXODM: Output Driver Module: Provides ten (10) fully programmable 40 mA + 12 VDC outputs. Nominal current drain: 10 - 13 mA with no outputs connected.
- ZXPTR Printer Interface Module: Allows connection of a standard parallel printer via interface. Nominal current drain: 45 - 55 mA without printer connected.
- ZX410 - ZX400 Control board mounted in EX1414 enclosure. (The ZX410 assembly is required for Burglary applications).
- ZX440F - ZX400 Control board mounted in EX1414F enclosure with ZXCFM Fire Module. (The ZX440F assembly is required for Commercial Fire applications).
- F2600 Transformer Enclosure: Ensures that the AC plug-in transformer remains securely fixed to the AC wall outlet. (Required for Commercial Fire applications).
- T-1635 Transformer: UL Listed Class II plug-in 16.5 VAC 35 VA secondary.
- T-1620 Optional Transformer: UL Listed Class II plug-in 16.5 VAC 20 VA secondary.
- T1850 Transformer: UL Listed Class II plug-in 18 VAC 50 VA secondary.
- HCP-12SULC Power Supply: Provides a 12 or 24 VDC power-limited output with a current rating of 2.0 A continuous while the AC primary power source is present.
- CR860 Dual Battery Harness: Allows for an additional 12 VDC 7 Ah sealed lead acid battery connection to the control to meet additional standby requirements.
- CR862 Battery Harness: Allows for 12 VDC 17.2 Ah sealed lead acid battery connection to the control to meet additional standby requirements.
- EB1511 Auxiliary Enclosure: 15" x 11" x 4" enclosure with cam lock allows wall mounting of accessories and batteries.
- EX1414 Optional Larger Enclosure: 14" x 14" x 3.5".
- EX1414F Larger Red Enclosure for Fire: 14" x 14" x 3.5".
- AE912 Raucous Sounder: Current consumption: 28 mA @ 12 VDC.
- MPI-266 Battery Cut-Off Module: Disconnects battery from deep discharges.
- MPI-267 Power Disconnect Module: Disconnects battery from deep discharges.
- MPI-268 Earth Ground Fault Detector: Current consumption: less than 20 mA.
- MPI-206 General Purpose Relay Module.

- 4710 RF Gateway (8 RF Zone Devices, 6 RF User Devices). Nominal Current Drain: 80mA.
- 4720 RF Gateway (16 RF Zone Devices, 12 RF User Devices). Nominal Current Drain: 80mA.
- 4110 Universal Transmitter and battery.
- 4545 Shatter Pro Glassbreak Detector with Transmitter and batteries.
- 4655 Sharpshooter PIR with Transmitter and battery.
- 4004 Four Button Wireless Key Transmitter and Battery.
- 4310S, ST, SLT Wireless Smoke Detectors (UL 217) with Transmitter and Battery.
- 4330S, ST, SLT, SLTM Wireless Smoke Detectors (UL 268) with Transmitter and Battery.
- 4113 Three Point Universal Transmitter and Battery.
- 4010 Single Button Panic Transmitter and Battery.
- 4011 Dual Button Panic/Medical Transmitter and Battery.
- ZEM Fire Zone Expansion Modules:
      2502-ZEM Two Class B Zones
      2504-ZEM Four Class B Zones
  Current Drain: 40 - 60 mA.
  Max. Line Resistance: 100 Ohms (Class B)
- ZRM Zone Relay Modules:
      ZRM-2 (2 Zones)
      ZRM-4 (4 Zones)
  Contact Rating: 5 A @ 12 VDC, 120 VAC resistive.
- ZXIRR01 Security System Remote Control with Keyfob Transmitter.
- ZXLCDD1 LCD Keypad Demonstrator. *(Demo Unit Only)*.
- ZXVFDD1 VFD Keypad Demonstrator. *(Demo Unit Only)*.
- TC1100 Tamper Enclosure
- ZXCVR-Red Tamper Enclosure with two 3025T Tamper Switches

Output Provisions

- Low Current Trigger Outputs: Current output of 40 mA each. One output on main board, expandable to 21 with ZXODM Output Driver Modules and/or ZXEXP Zone Expander Module.
- Maximum combined continuous current drain at Terminals 4, 5, 6, 10, and PG01 is 0.9 amps with 16.5 VAC 35 VA transformer.
- Current Limits: The combined current at Bell Output Terminal 5 is limited to 1.85 amps (PTC2). The 12V Auxiliary current is limited by PTC4 to 1.35 amps. Reverse battery protection is limited to 1.85 amps (PTC3).

List Of Compatible Accessories

ESL Two-Wire Smoke Detectors

429 AT, C, CT, CRT, CST: Standby Current: 70 µA max. (Max. 20 detectors per zone)
521 B, BXT, CRXT: Standby Current: 70 µA max. (Max. 20 detectors per zone)
711U, 712U, 713-5U, 713-6U: Standby Current: 70 µA max. (Max. 20 detectors per zone)
721U, 721UT, 721UD, 722U, 722UD: Standby Current: 70µA max. (Max. 20 detectors per zone)
731U, 732U: Standby Current: 70 µA max. (Max. 20 detectors per zone)

ESL Four-Wire Smoke Detectors

445 AT: Standby Current: 500 µA @ 6 V; 1.5 mA @ 15 V
445 C, CR, CRT, CS, CSH, CST, CSR, CSRT: Standby Current: 40 µA @12 V; 100 µA @ 24 V
449 CTE: Standby Current: 10 µA max
449 C, CT, CRT, CST, CSRT, CSRH, CSST: Standby Current: 70 µA max

System Sensors Two-Wire Smoke Detectors

1100 Ionization	2100T Photoelectric
1400 Ionization	2400 Photoelectric
1400TH Ionization	2400AT Photoelectric
2100 Photoelectric	2400TH Photoelectric

(Max. 6 detectors per zone)

System Sensors Four-Wire Smoke Detectors

1112, 1112 Ionization	2412B Photoelectric
1412B Ionization	2412THB Photoelectric
1451 Ionization	2412AT Photoelectric
2112, 212 Photoelectric	2451 Photoelectric
2112, 2124T Photoelectric	2451TH Photoelectric
2112, 2124TSR Photo-electric	

Wheelock

34T-12R Horn: Input voltage: 9-15.6 VDC; Rated Current: 0.125 A
EH-DL1-R Electronic Horn: Input voltage 12/24 VDC; Input Current; (@ 12 VDC) 0.015 A/(@24 VDC) 0.017 A
EH-DL2-R Electronic Horn: Input voltage: 12 VDC; Input Current: 0.047 A.
EH-EL1-R Electronic Horn: Input voltage: 12/24 VDC; Input Current: (@12 VDC) 0.015 A/(@ 24 VDC) 0.017 A
EH-EL2-R Electronic Horn: Input voltage: 12 VDC; Input Current: 0.047 A
AES-DL2-R Multi-tone Electronic Signal: voltage: 12 VDC; Current (High): 0.050 A; Current (Low): 0.025 A
AES-EL2-R Multi-tone Electronic Signal: voltage: 12 VDC; Current (High): 0.0100 A; Current (Low): 0.050 A
MIZ-12-R Mini horn: voltage: 12 VDC; Current: 0.010 A
MIZ-12-W Mini-horn: voltage: 12 VDC; Current 0.010 A
CH-BF2-R Fire Chime: Input voltage: 12 VDC; Input Current: 0.020 A
CH-CF2-W Fire Chime: Input voltage: 12 VDC; Input Current: 0.020 A
CH-DF2-R Fire Chime: Input voltage: 12 VDC; Input Current: 0.020 A
46T-G4-12-R DC Vibrating Bells: Shell Size: 4 Inches; Input voltage: 12 VDC; Input Current: 0.125 A
46T-G6-12-R DC Vibrating Bells: Shell Size: 6 Inches; Input voltage: 12 VDC; Input Current: 0.125 A
46T-G10-12-R DC Vibrating Bells: Shell Size: 10 Inches; Input voltage: 12 VDC; Input Current: 0.080 A

Compatible Central Station Receivers

UL permits communication with the following UL Listed Central Station receivers (see the *ZX400/ZX410 Programming Guide*, P/N 64812702, for format):

Manufacturer	Model Number
Ademco	685
Fire Burglary Instruments	CP-220
Osborne-Hoffman	Quick Alert II
Radionics	6000
Radionics	6500
Silent Knight	9000
Sur-Gard	MLR2-DG

Agency Requirements

UL has established certain requirements which pertain to the installation, use, and programming of this equipment. The local Authority Having Jurisdiction (AHJ) and/or UL may have other requirements which apply to the installation of this system that are not detailed in this manual. It is the responsibility of the installing dealer to check with the AHJ and/or UL before installing this system. The following table details guidelines that must be followed in order to comply with the UL listings as stated in Table 5.

For Home Health Care systems, two (2) Control Stations are required.

Application	Listing	Maximum Continuous Current Drain (milliamps) w/ 7 AH Battery	Minimum Battery Standby Time In Hours	LCD or LED Control Stations	SSD or VFD Control Stations	Smoke Detector ESL 429 & 700 series, System Sensors 1400 & 2400 series	Auxiliary Equipment Required
Home Health Care Household Burglary	UL 1637 UL 1023	400	4	6	4	N/A	UL listed signaling device
Household Fire	CSFM UL 985	400	24	6	4	Required	UL listed signaling device
Household Burglary/ Fire Combination	UL 1023 UL 985	400	4 24	6	4	Required	UL listed signaling device
Central Station Burglary (Grade C)	UL 1610 UL 1635	400	4	6	4	N/A	TC1100 Tamper Resistant cover with a ZX410
Central Station (Grade B)	UL 1610 UL 1635	400	4	6	4	N/A	TC1100 Tamper Burglary Resistant cover with a ZX410 and a UL listed audible device (AB12M recommended)
Local Burglary (Grade A)	UL 609	400	4	6	4	N/A	TC1100 Tamper Resistant cover with a ZX410 and a UL listed audible device (AB12M recommended)
Police Station Connection (Grade A)	UL 365	400	4	6	4	N/A	TC1100 Tamper Burglary Resistant cover with a ZX410 and a UL listed audible device (AB12M recommended)
Maximum combined continuous current drain (standby) refers to terminals 4, 5, 6, 10, and PGO1. Under alarm conditions, the combined output current drain should not exceed 950 mA with a 16.5 VAC 35 VA transformer. For 24 hr standby, UL Household Fire & CSFM, two 7 Ah batteries are required.							

TABLE 4   Agency Power and Configuration Requirement

UL and ULC Listings

APPLICATION	LISTING
Household Burglary	UL 1023
Household Fire	UL 985
Household Burglary/Household Fire Combination	UL 1023/UL 985
Local Burglar Alarm Grades A, B and C Central Station	UL 609
Police Station Connect Burglar Alarm Unit	UL 365
Digital Alarm Communicator System	UL 1635
Home Health Care Signal System	UL 1637
Central Station Burglar Alarm Unit	UL 1610
California State Fire Marshal	7167-1459:109
Residential Burglar System	ULC 5310
Local Burglar Alarm	ULC 5303
Central Station	ULC 5301
Commercial Burglary	ULC 5302
Burglar Alarm Units Central & Monitoring	ULC 5304

TABLE 5   UL and ULC Listings

National Fire Protection Association (NFPA) Rules

The National Fire and Burglar Alarm Association (NFPA) has established rules to follow pertaining to fire prevention and the installation of fire detection equipment.

Smoke Detector Locations

For residential applications, install smoke detectors in each bedroom and outside each separate sleeping area in the immediate vicinity of the bedrooms and on each additional story of the family living unit including basement and excluding crawl spaces and unfinished attics. In new construction, a smoke detector should also be installed in each sleeping area. For family living units with one or more split levels (i.e.: adjacent levels with less than one full story separation between levels), a smoke detector required by the above is sufficient for an adjacent lower level, including basements. EXCEPTION: Where there is an intervening door between one level and the adjacent lower level, install a smoke detection on the lower level. For commercial applications, install smoke detectors in each separate work area, including hallways and storage areas.

Install ceiling-mounted smoke detectors in the center of the room or hall, not less than 4 inches from any wall. When mounting the detector on a wall, place the top of the detector 4 to 12 inches from the ceiling.

Do not install smoke detectors where normal ambient temperatures are above 100˚F. (37.8˚C.)

Do not position smoke detectors in front of air conditioners, heating registers, ceiling fans, or other locations where normal air circulation will keep smoke from entering the detector.

Heat from a fire rises to the ceiling, spreads out across the ceiling surface and begins to bank down from the ceiling. Corners where the ceiling and walls meet create air spaces in to which heat has difficulty penetrating. Usually, these dead air spaces measure about four (4) inches (0.1m) along the ceiling from the corner and four (4) inches (0.1m) down the wall. Do not place heat or smoke detectors in these dead air spaces.

Testing

This system should be tested weekly. All switches, contacts, and accessories must be UL Listed devices. This equipment should be installed in accordance with the National Fire Protection Association Standard No. 72 (National Fire Protection Association, Batterymarch Park, Quincy MA 02269). Control panel specifications are subject to change without notice.

Consult smoke detector specifications and local and national codes for coverage descriptions.
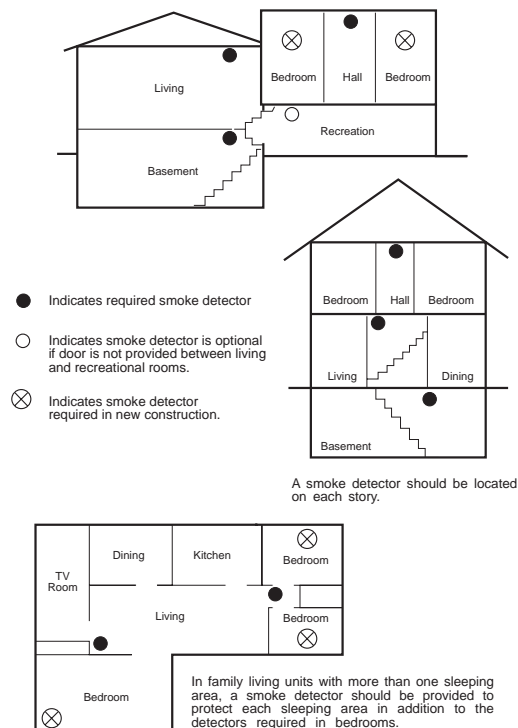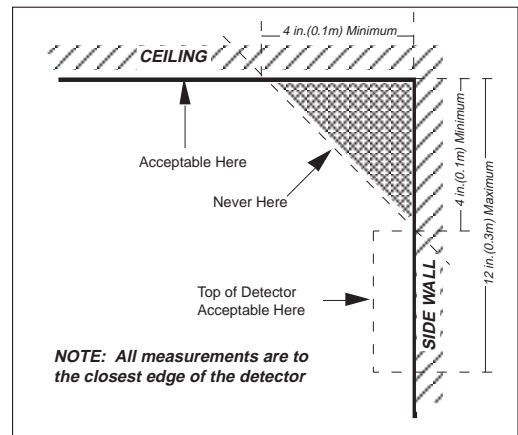

FIGURE 20   Smoke Detector Placement

System Troubleshooting

When the system detects a trouble condition, it is periodically displayed on the Control Station(s) and a trouble tone is sounded. The trouble tone will sound until it is either silenced (with an OFF + passcode) or until the trouble condition restores. The display of a trouble condition will continue to appear until the condition either restores or is cleared.

TROUBLE	DESCRIPTION
AC FAILURE	Indicates the loss of AC power or that the AC voltage is not high enough to power the system.
ALARM SILENCED	Indicates that an Auxiliary or Holdup Alarm condition is present and the alarm has been manually silenced.
BELL 1 FAULT	Indicates that there is an open in the wiring or that the EOL is missing on the Bell.
BELL SILENCED	Indicates that a Fire Alarm condition is present and the Fire Bell has been manually silenced. A manual Smoke Reset is required to clear the alarm condition.
CALL RPM FAIL	Indicates that an installer initiated call to the Remote Programming computer was unsuccessful.
COMM FAILURE	Indicates that an event was not successfully communicated to the Central Station. This condition can be cleared by disabling both phone lines.
FIRE TROUBLE	Indicates that there is wiring problem on a Fire zone or that a Fire Alarm condition is present and the Fire Bell(s) has been manually silenced. A manual Smoke Reset is required to clear the alarm condition.
KEYPAD MISSING	Indicates that a supervised keypad is no longer responding to polls from the control panel. Possible causes include: The keypad has been removed or had its address changed, faulty data bus wiring, or multiple supervised keypads at the same address. This condition can be cleared by pressing the CLEAR key for 3 seconds.
LOW/NO BATTERY	Indicates that the battery voltage is low or that no battery is present.
MEMORY ERROR	Indicates that the system has detected corruption of Function Map data. This condition can only be cleared by pressing the CLEAR key for 3 seconds.
NO COMMUNICATION FROM CONTROL	Indicates that the keypad is not receiving commands from the control panel. Possible causes include: Faulty data bus wiring, bad address setting on the keypad, control panel failure, or control panel shutdown due to low operating voltage (hibernation mode).
NON-TELCO FAIL	Indicates that Non-Telco event reporting has been selected, but the Non-Telco interface is not functioning.
PHONE LINE 1 FAIL	Indicates that Phone Line Monitoring has been enabled for Phone Line 1 and an external Phone Line Monitor has detected a fault or no external Phone Line Monitor is connected. This condition can be cleared by disabling Monitoring of Phone Line 1.
RF JAMMING	Indicates that the RF Gateway has detected noise that could affect RF transmissions. If RF Jamming is detected for at least 90 seconds, then all RF Burglar Zones will be faulted.
RF LOW BATTERY	Indicates that the RF Point or RF User Device needs the battery replaced.
RF NOT REPORTING	Indicates that the RF Point is no longer transmitting to the RF Gateway.
RF SENSOR TAMPER	Indicates that the cover was removed from the RF Point.
SMOKE TROUBLE	Indicates that a Smoke Detector needs to be cleaned. This condition will clear automatically some time after the detector(s) has been cleaned or it may be cleared by performing a Smoke Reset or by pressing the CLEAR key for 3 seconds.
SUPERVISORY TROUBLE	Indicates that there is a wiring problem on a Fire Supervisory zone or that a Supervisory Alarm condition is present and has been manually silenced.
ZONE MISSING	Indicates that the zone's expansion device is not responding to polls from the control panel.
ZONE TROUBLE	Indicates that a wiring problem exists on the zone or that a Burglar Tamper condition exists and the condition has been silenced.

Notes

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FCC Compliance

Part 68 Notification

This equipment complies with Part 68 of the Federal Communications Commissions (FCC) rules. All connections to the telephone network must be made through standard telephone company plugs and jacks, RJ-31X or equivalent, in such a manner as to allow for easy and immediate disconnection of the equipment. If the connecting cord is unplugged from the jack there shall be no interference to the telephone equipment still connected to the telephone network.

The FCC registration number and Ringer Equivalence Number (REN) can be found printed on the wiring connection label located inside the Control Box Enclosure. If requested, provide this information to your telephone company. The REN is useful to determine the quantity of devices that may be connected to your telephone line and still have all of those devices ring when your number is called. In most, but not all areas, the sum of the RENs of all devices should not exceed five (5.0).

In the unlikely event that the equipment should ever fail to operate properly, it should be disconnected from the telephone jack to determine if the problem is with the telephone network or with the equipment. If a problem is found with the equipment, leave disconnected until it is repaired or replaced.

In the unlikely event that the equipment should ever cause harm to the telephone network, the telephone company may temporarily discontinue your service. If possible, they will notify you in advance. However, if advance notice isn't practical, the telephone company may temporarily discontinue service without prior notification. In the case of temporary discontinuance, the telephone company shall promptly notify the telephone subscriber who will be given the opportunity to correct the situation. The customer also has the right to bring a complaint to the FCC if he feels the disconnection is not warranted.

Your telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of your equipment. If they do, you will be given advance notice so as to give you an opportunity to maintain uninterrupted service.

You should notify the telephone company if this equipment is removed from the premises and the telephone jack is no longer needed.

Part 15 Notification

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or locate the receiving antenna.
• Increase the separation between the equipment and receiver.
• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
• Consult the dealer or an experience radio/TV technician for help.

CAUTION: Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Canadian Notice

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction. Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications com-

pany. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment. Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The LOAD NUMBER (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100. The LOAD NUMBER for the system is 2.

This equipment is a Class B Digital apparatus which complies with the radio interference regulations, CRC c. 1374.

Limitations

The ZX400/ZX410 is part of a system designed to warn against unauthorized entry or of other situations. However, it is not a guarantee of protection against the occurrence of those events. Any alarm system is subject to compromise or failure to warn for various reasons. Unauthorized access can be gained through unprotected points or by disarming or bypassing protected points. Sensing devices are power driven and will not operate without power. Telephone lines over which alarm signals are transmitted may be out of service or rendered inoperable by an intruder. Smoke detectors have limitations and cannot detect all types of fires, or sense smoke which is out of the effective range of the detector.

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ƒƒ **SPECIAL NOTE referencing use of the word "Fire" in this manual.**

Use of this control for fire detection and/or annunciation may not be permitted by certain states, counties, municipalities, or local jurisdiction. It is the responsibility of the installing alarm company to check with their local AHJ (Authority Having Jurisdiction) or State Fire Marshal's office prior to using this control for fire detection.

**This Product is Listed by
UNDERWRITERS LABORATORIES INC.
and Bears the Mark:**
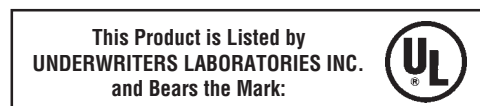
See Page 30 for listing information

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