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Section 1
Introduction

The Model 5104 is a low-cost fire communicator that meets the requirements for NFPA 72, UL 864, ULC 527, MEA, CSFM, and FM.

1.1   Feature

- Four supervised fire zones, consisting of one Class A (Style D) and three Class B (Style B) zones.

- Current limited loop power output for the Class B zone inputs.

- Ground fault detection.

- Built-in piezo sounder for trouble and supervisory conditions.

- Reset/Silence switch that performs the following:

    1   Silences troubles and alarms.

    2   Resets smoke detector power.

    3   Resets accessory power.

- Supervision of Reset/Silence switch.

- 24 hour battery backup from a 12 VDC, 6.5 Ah rechargeable battery.

- Separate battery charging circuit that maximizes battery life.

- Multiple reporting formats (SIA, SK 3/1, Sescoa 3/1, Contact ID, SK 4/2, Radionics BFSK).

- Programmable relay output provides additional annunciation for either alarm or dialer-failed condition.

- Three LEDs indicating AC power (green) status, Trouble Silenced (yellow), and Dialer Failed (yellow).

- Four LEDs inside cabinet indicate short circuits and trouble conditions.

- Up- and Downloading with the 5541downloading software.

- Easy, English-language programming using the 5230 Remote Annunciator.

- Versatile two-number dialing feature for reporting to two different numbers.

- Programmable dialing format (rotary or TouchTone).

- Two phone line monitoring and seizure circuits.

- Transient Voltage protection on all inputs (AC, phone lines, accessory zones).

- Automatic daily test.

- EEPROM memory storage of all programmed information.

1.2   Accessory Devices

•   Model 5230 Remote Annunciator (optional). Used for system control, programming and troubleshooting.

•   Model 7860 modular cable with spade lugs for connection to Telco RJ31X plug (optional).

•   Model 7181 Universal Zone Converter (optional).

1.3   About This Manual

This manual is intended for those persons involved with the installation and maintenance of the 5104 Fire Communicator. It is a comprehensive guide providing detailed instructions, and should be kept for reference. As much as possible, we have tried to organize the manual chronologically by the tasks that need to be performed. Please let us know if the manual does not meet your needs in any way.

1.3.1   How to Use This Manual

In this manual, the following conventions are used:

•   Pages of the manual are numbered by section. For example, a page numbered as 5-1 is page 1 of Section 5.

•   Text in this type face indicates a 5230 display message: `System Normal.`

Section 2
Agency Requirements

This section list all the requirements for the 5104 by agency.

2.1   Telephone Requirements

If requested by telephone company the following information must be provided before connecting this device to the phone lines:

A.	Manufacturer:	Silent Knight
B.	Model Number:	5104B
C.	FCC Registration Number:	AC698R-17462-AL-E
D.	Type of jack (to be installed by the telephone company):	RJ31X
	Ringer equivalence:	0.1B

This device may not be directly connected to coin operated telephones or party line services.

This device cannot be adjusted or repaired in the field. In case of trouble with device, notify the installing company or Silent Knight for an RMA number and then return it to:

Silent Knight

7550 Meridian Circle

Maple Grove, MN 55369-4927

800-328-0103 or 612-493-6455

If the Model 5104 causes harm to the telephone network, the telephone company will notify the user in advance that temporary discontinuance of service may be required. If advanced notice is not practical the telephone company will notify the customer as soon as possible. You as the user have the right to file a complaint with the Federal Communications Commission if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice to allow you to make the necessary modifications to maintain uninterrupted service.

2.2 FCC Warning

Warning

This device has been verified to comply with FCC Rules Part 15. Operation is subject to the 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.

2.3 UL Requirements

The 5104 is UL listed as a Control Unit for use in Central Station Fire-Protective Signalling Systems (UL864, NFPA 72). All UL installations must comply with the following requirements:

1. The 120 VAC wiring to the 5104 cabinet must be enclosed in conduit.

2. Total standby current must not exceed 275 mA for central station use or 105 mA for remote station use.

3. Remote station installations must not attach any current drawing devices. This includes 5230 Remote Annunciator.

4. All electrical connections must comply with ratings shown in Section 3.

Section 3
Installation

This section contains information necessary to install the 5104 Fire Communicator and accessories.

3.1   Electrical Specifications

Primary AC	120 Vrms @ 60Hz, 450 mA rms
Total DC load	1.3 Amp
Accessory Power	12 VDC @ 750 mA
Phone Line Voltage	2.75 VDC min.
Smoke Power	12 VDC @ 750 mA
Battery Charging Voltage	13.8 VDC
Minimum Low Battery Detection	10.2 VDC
Minimum Low AC Detection	102 Vrms @ 60 Hz, full load
Auxiliary Notification Appliance Circuit	12 VDC @ 750 mA

3.2   Environmental Specifications

It is important to protect the 5104 panel from water. To prevent water damage, the following conditions should be AVOIDED when mounting the unit:

- 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, etc.).
- Operating temperature range is 32° to 120° F (0° to 49° C).
- Indoor use only.
- 10% to 85% non-condensing humidity at 30°C (86°F).
- Non-corrosive environment.

3.3 Wiring Specifications

Induced noise (transfer of electrical energy from one wire to another) can interfere with telephone communication or even cause false alarms. 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:

High Voltage	AC Power
Audio input/output	Phone Line Circuits, Terminals 13-20
Notification Circuits	Terminals 21-22
Data Communication Circuits	Terminals 25-26

- 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 earth ground at the panel only.

- 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.

- Route the wiring around the inside perimeter of the cabinet. It should not cross the circuit board where it could induce noise into the sensitive microelectronics of pick up unwanted RF noise from the high speed circuits. See Figure 3-1 for an example.
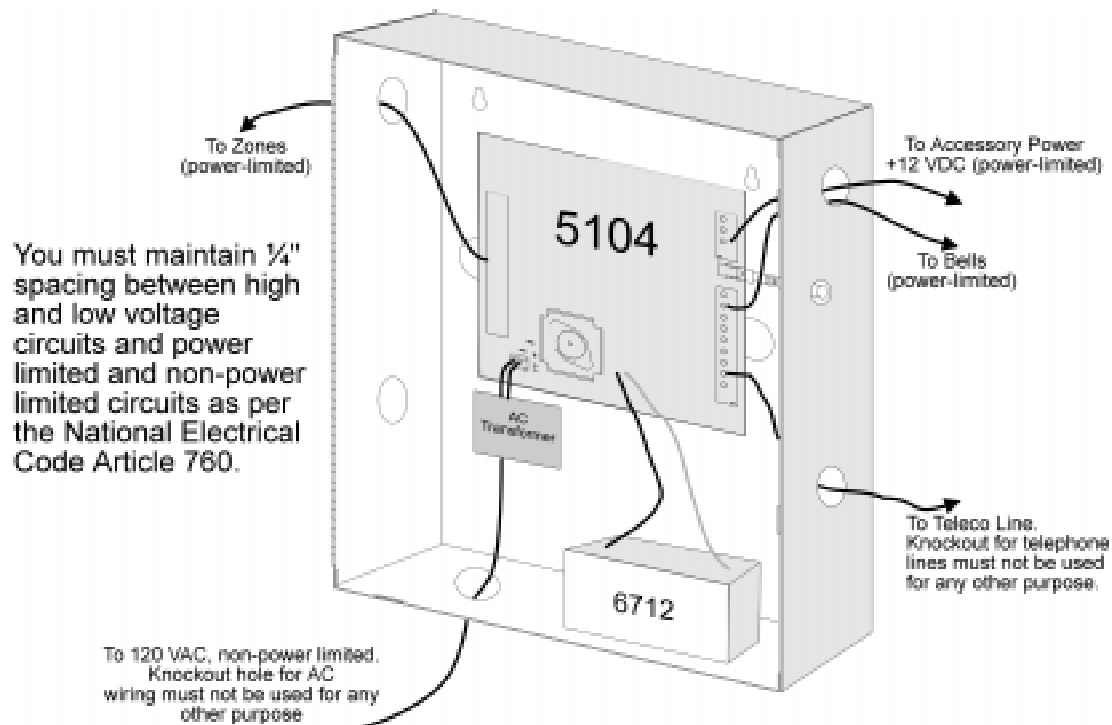

Figure 3-1 Wire Routing Example

3.4 Panel Description

This section describes the 5104 board components, including terminal strips, LEDs, Switches and cable connectors. See Figure 3-2.
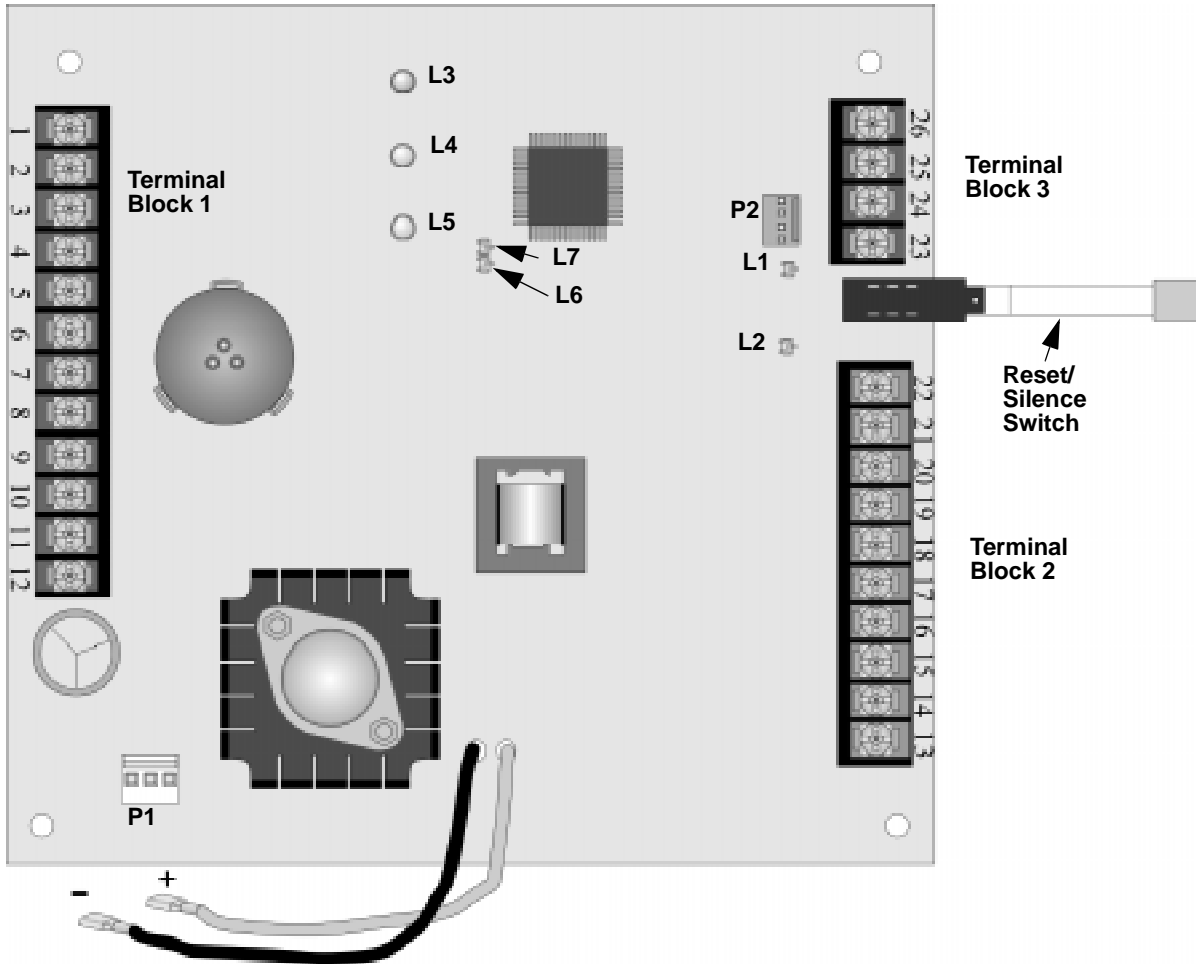

Figure 3-2 5104 Circuit Board

3.4.1   Terminal Description

Table 3-1 lists the terminals by number and describes the terminals use.

Table 3-1: Terminal Description by Terminal Block

Terminal Block #	Terminal #	Description		Electrical Specification
1	1	Loop A output (Class A Style D)	Zone 1	(Power Limited)
	2	Loop B output		
	3	Loop B input		
	4	Loop A input		
	5	Input (Class B Style A)	Zone 2	
	6	Power		(Power Limited)
	7	Circuit Ground		
	8	Input (Class B Style A)	Zone 3	
	9	Power		(Power Limited)
	10	Input (Class B Style A)	Zone 4	
	11	Power		(Power Limited)
	12	Circuit Ground		
2	13	Telco Ring	Phone Line 1	
	14	Telco Tip		
	15	House Ring		
	16	House Tip		
	17	Telco Ring	Phone Line 2	
	18	Telco Tip		
	19	House Ring		
	20	House Tip		
	21	Bell (+) positive	Notification Circuit	(Power Limited)
	22	Bell (-) negative		
3	23	Ground	5230 Annunciator (Optional)	
	24	Accessory Power		(Power Limited)
	25	Serial Data Out		(Power Limited)
	26	Serial Data In		

3.4.2 LED Descriptions

This section describes what each LED indicates. The 5104 has a total of seven LEDs, three are visible externally and four are visible only if the cabinet door is open. See Section 8 for additional information on LED operation.

3.4.2.1 Externally Visible LEDs (L3, L4, & L5)

This section describes the three LEDs (one green and two yellow) that are visible externally through the window on the 5104 cabinet door. Refer to Table 3-2 and Figure 3-2.

Table 3-2: Externally Visible LEDs

LED #	Name	Color	Description
L3	Power	Green	Normally ON unless the panel loses AC power or the panel is being reset.
L4	Silenced	Yellow	Normally OFF unless a trouble or supervisory condition has been silenced.
L5	Dialer	Yellow	Normally OFF unless there is a phone line or communication problem. See Section 3.4.2.2 for additional information.

3.4.2.2 Phone Line Fault Indicator LEDs (L6 &L7)

The 5104 has a built-in dual-phone line monitoring circuit. This circuit detects any fault in the phone line by monitoring the loop current and DC voltage. If the phone line drops to 1.8 VDC @ 5 mA or below for 40 to 90 seconds the on-board piezo and the corresponding LED will turn ON. The control panel will then report the fault condition to the central station on the other phone line. For example, if phone line one looses phone line voltage, the on-board piezo and the L6 will turn on, then the control panel will report the faulted line on phone line two. See Figure 3-2 for LED Locations

Note: To comply with NFPA 72 the model 5104 is equipped with phone line seizure. This means that any time the control panel dialer needs to communicate with the central station, it will not be possible to use the telephones that are on the same line as the fire system. During communication to the central station the phone lines will be seized for approximately one minute. However, under adverse telephone circuit conditions phone line seizure could last as long as 15 minutes.

Table 3-3: Phone Line Fault Indicator LEDs

LED #	Name	Color	Description
L6	Phone Line 1 Fault	Red	Visible only when the 5104 cabinet is open. If ON indicates that phone line 1 is faulted. A faulted condition is indicated if the phone line voltage drops below 1.8 VDC and the loop current is less than 5 mA. Flashing indicates a communication error has occurred.
L7	Phone Line 2 Fault	Red	Visible only when the 5104 cabinet is open. If ON indicates that phone line 2 is faulted. A faulted condition is indicated if the phone line voltage drops below 1.8 VDC and the loop current is less than 5 mA. Flashing indicates a communication error has occurred.

3.4.2.3 Overcurrent LED Indicators (L1 & L2)

The 5104 has two red LEDs which indicate if excessive current is being drawn by a device connected to either the Accessory Power or Smoke Power circuits. Table 3-4 lists the two overcurrent LEDs and gives a description of them. See Figure 3-2 for LED locations.

Table 3-4: Overcurrent LED Description

LED #	Name	Color	Description
L1	Accessory Power Fault	Red	If a device connected to the accessory power circuit draws more than 750 mA the overcurrent poly fuse will open and L1 will turn on.
L2	Smoke Power Fault	Red	If a device connected to the smoke power circuit draws more than 750 mA the overcurrent poly fuse will open and L2 will turn on.

If either L1 or L2 turn on disconnect power immediately. Refer to Section 8 for troubleshooting information.

3.4.3   Reset / Silence Switch

The Reset/Silence switch can be accessed from the outside of the cabinet. The Reset/Silence switch extends from a hole located on the right side of the control panel cabinet. The Reset/Silence switch has three functions.

The functions of the Reset/Silence switch are as follows:

* It silences audible alarm, trouble, or supervisory signals.

   A trouble or supervisory annunciation and alarm bell will be silenced immediately when you press the switch. An alarm annunciation on the 5230 cannot be silenced until the alarm condition has been restored.

* Reset smoke detector power.

   This function removes power from terminals 6, 9 and 11.

Note: To reset smoke detectors power depress the reset /trouble switch for a minimum of 1 second.

* Reset accessory powered devices.

   This function removes power from terminal 24.

Note: To reset accessory powered devices depress the reset/silence switch for a minimum of 1 second.

3.4.4   Cable Connectors (P1 & P2)

There are two connectors on the 5104 (see Figure 3-2 for P1 and P2 locations). The function
of these connectors is as follows:

Connector	Function
P1	Connects the wires from the secondary winding of the AC transformer to the control panel. (See Section 8 *Troubleshooting* for additional information.
P2	Used as a quick-connect for the 5230 Remote Annunciator to do programming or troubleshooting.

3.4.5   On-board Piezo Sounder

The on-board piezo sounder gives an audible output for trouble, and supervisory conditions.
Troubles and supervisories can be silenced with the Reset/Silence switch immediately.

3.5 Calculating Current Draw and Standby Battery

This section should be used to help you determine the current draw and standby battery needs for your installation.

3.5.1 Worksheet Requirements

The following steps must be taken when determining the 5104 current draw and standby battery requirements.

Fill in the Current Draw Worksheet (Table 3-5) in section 3.5.2.

For the 5104, the worst case current draw is listed in Table 3-5 for the panel and accessory devices.

Follow these steps to properly fill in the Current Draw Worksheet.

1. Fill in the number of devices used.

2. Compute the current draw requirements for alarm and standby and record this data into line A.

3. Add up the current draw for all the smoke detectors and record the totals in line B.

4. Total all the notification appliance device loads and enter that number into line C.

5. Make sure that the alarm current you calculated, including current for the panel itself, does not exceed 750 mA. This is the maximum current allowable.

6. Complete the remaining instructions in Table 3-5 to determine battery size requirements.

3.5.2   Current Draw Worksheet

Use this worksheet to determine current requirements during alarm/battery standby operation.

Table 3-5: 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*	
	5104	1	Standby:	50 mA	50 mA	
			Alarm:	135 mA		135 mA
	5230	3 max	Standby:	60 mA	mA	
			Alarm:	120 mA		mA
	7181 (2max.) by configuration	4-wire to 2-wire	Standby:	38 mA	mA	
			Alarm:	61 mA		mA
		Class A Style D to Class B Style B	Standby:	38 mA	mA	
			Alarm:	176 mA		mA
		Class B Style B to Class A Style D	Standby:	52 mA	mA	
			Alarm:	90 mA		mA
A				**Current Subtotals:**	mA	mA
	Smoke Detectors		Refer to device manual for current rating. See Appendix for compatible devices.			
			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 Appliances		Refer to device manual for current rating. See Appendix for compatible devices.			
						mA
						mA
						mA
						mA
						mA
C				**Current Subtotals:**	mA	mA
D	Total current rating of all devices in system (add totals of A-C):				mA	mA
E	Number of standby hours. (24 or 60 for NFPA 72, chapter 1, 1-5.2.5):				H	
F	Multiply lines D and E.			**Total standby mAH**	mAH	
G	Alarm sounding period in hours. (For example, 5 minutes = .0833 hours)					H
H	Multiply lines D and G totals			**Total alarm AH**		AH
I	Add lines F and H. AH = Ampere Hours			**Total AH required**	AH	

3.5.2.1 Maximum Battery Standby Load

Table 3-6 shows the maximum battery standby load for the 5104 based on 24 and 60 hours of standby. the standby load calculations of line F in Table 3-5 must be less than the number shown in Table 3-6 for the battery size used and standby hours required.

Table 3-6: maximum Battery Standby Load

Rechargeable Battery Size	Maximum Load for 24 hrs. Standby, 5 min. Alarm	Maximum Load for 60 hrs. Standby, 5 min. Alarm
7 AH	275 mA	105 mA

3.6   Mounting the 5104 Cabinet

Read the environmental specifications in Section 3.2 before mounting the 5104 cabinet. This will ensure that you select a suitable location.

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.

Mount the 5104 so it is firmly secured to the wall surface. When mounting on concrete, especially when moisture is expected, attach a piece of 3/4 inch plywood to the concrete surface and then mount the 5104 to the plywood. Also mount any other modules to the plywood.

3.7   Battery Connection

The battery provides backup power to the system during AC power loss. Connect the 12 VDC battery (Model 6712) as shown in Figure 3-3.
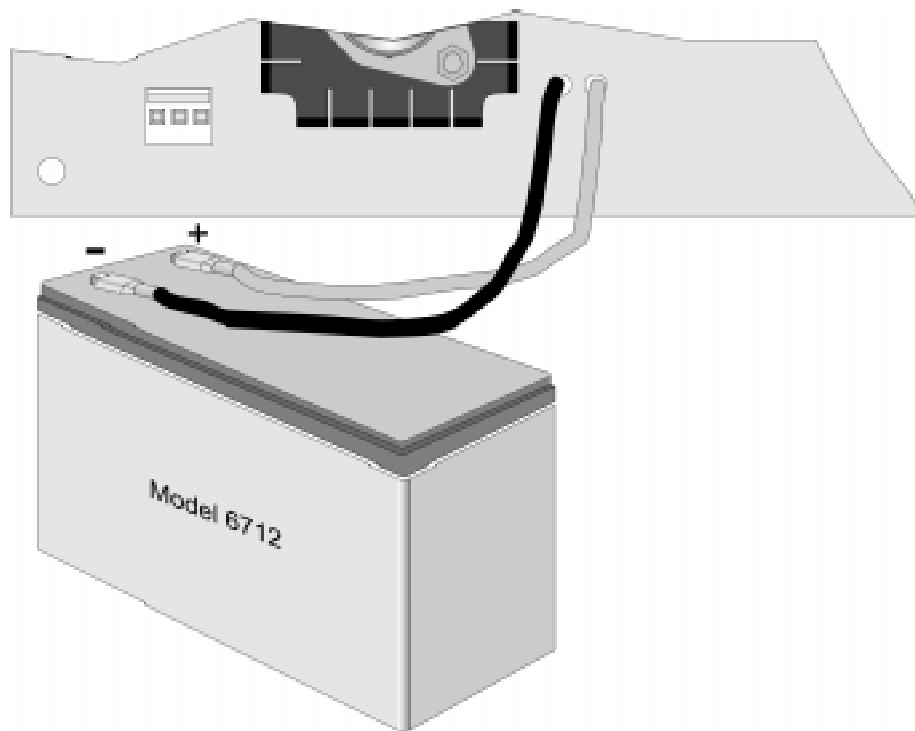
Figure 3-3 Backup Battery Connections

Note: Observe proper polarity when connecting the 12 VDC battery to 5104. If polarity is reversed, a resettable overcurrent protection device on the 5104 will automatically open removing power from the panel.

3.8   Detector Installation

3.8.1   Class A (Style D) Zones

Zones 1 is for a class A (style D) zone. It is intended for use with non-powered devices such as waterflow switches. Do NOT use smoke or duct detectors on Class A zones.

Each class A zone is a four-wire circuit that allows an alarm to be detected even after a single open or ground fault occurs. When a single open or ground fault occurs, the audible trouble signal will sound and the 5104 will report the trouble to the central station.

Figure 3-4 shows how to wire a class A (style D) loop. No end-of-line (EOL) resistor is needed for this zone. This zone must be wired using normally open contacts.
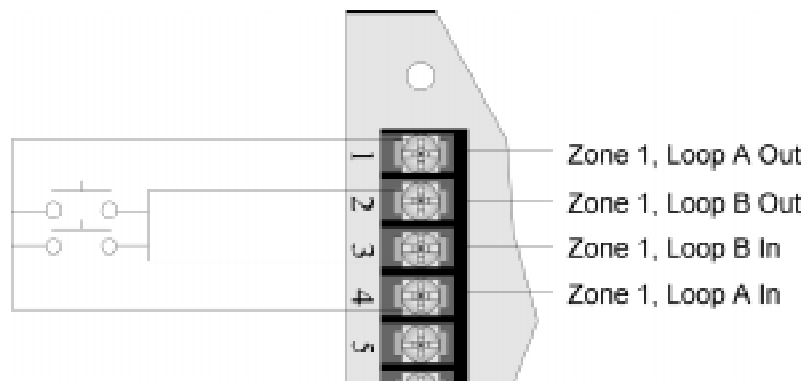
Figure 3-4 Class A (style D) Supervised Fire Loop
(Normally Open Sensors Only)

Note: Class A wiring is to be used for dry contacts only and does not support 2-wire detectors.

3.8.2   Class B (Style B) Zones

Zones 2 through 4 are class B (style B) fire zones. Each class B zone consists of a two-wire circuit that will detect the occurrence of an open in the loop, but may not be able to detect an alarm after such an occurrence. The detection of an open will cause the audible trouble signal to sound and the 5104 will report the trouble to the central station.

Figure 3-5 shows how to wire a class B (style B) loop. One side of each class B loop connects to a zone input terminal and the other side of each loop connects to loop power. For each loop, use a 4.7K-ohm EOL resistor wired in parallel with the normally open contact farthest from the panel.

Model 7628
4.7 KΩ EOL
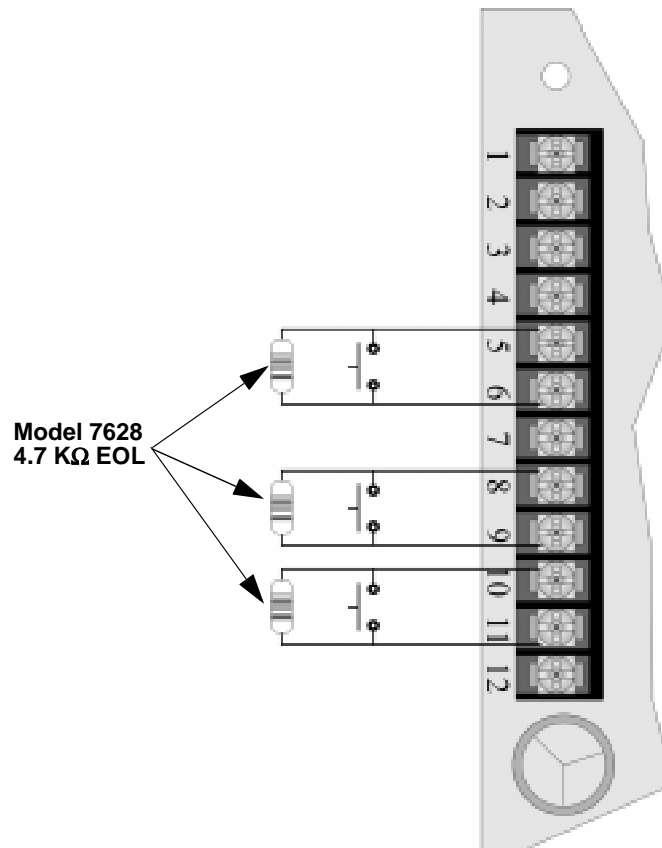
Figure 3-5 Model 5104B Class B (Style B) Loops

Note: Does not support 2-wire detectors.

Maximum Loop Resistance - 50 ohms
Maximum Total alarm current for all class B (Style B) zones - 750 mA
Maximum Standby Current per Zone:

Output (loop power)	750 mA
Input	0.5 mA

Note: UL requires all wiring to be at least 18 gauge.

3.8.3 Four-Wire Smoke Detector Connection

4-wire smoke detectors must use a power supervision module. Connect four-wire smoke detectors as shown in Figure 3-6.
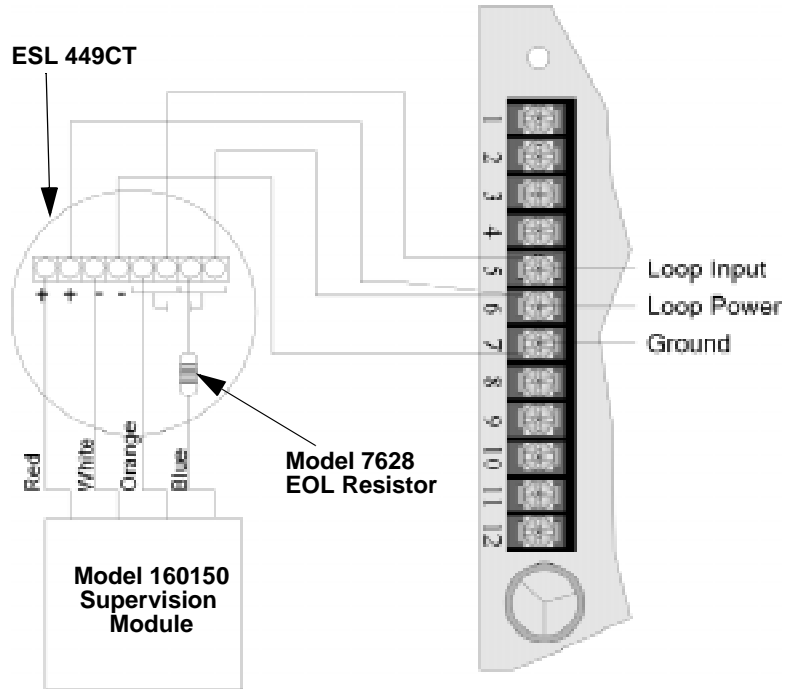

Figure 3-6 4-wire Smoke Detector Connections

3.8.4   Connecting the 7181 Zone Converter

The Model 7181 converts Class B Style B zones to Class A Style D zones and vise versa. Connect The 7181 to the 5104 as shown in Figure 3-7.
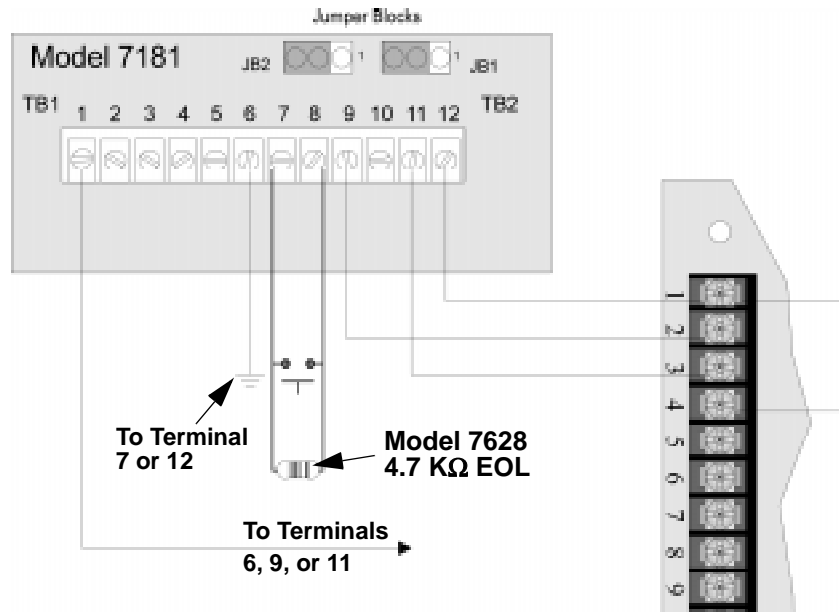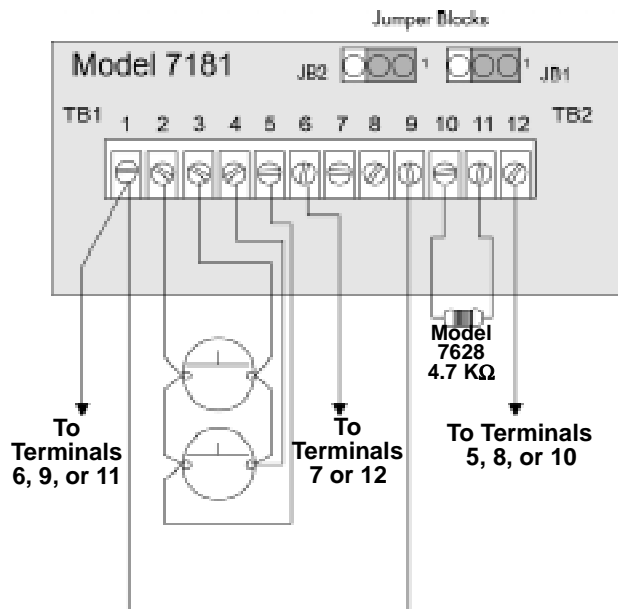

Figure 3-7 5104 Class A Panel Configuration to a 7181 Class B Sensor

Figure 3-8 5104 Class B Panel Configuration to a 7181 Class A Initiating Loop

Note: Class A initiation loops can not support 2-wire smoke detectors (see Figure 3-8).

3.9   Supplemental Notification Appliance Installation

The Supplemental notification circuit supplies a DC output that can be used to power a DC audible device during an alarm condition. Devices on the Supplemental notification output can be silenced by either pressing the Reset/Silence switch or by pressing the Silence button on a 5230 Annunciator (optional). Refer to Section 6.1.5 Step 12 to program the notification circuit's supervision properties.

3.9.1   Non-Supervised Notification Appliance Wiring

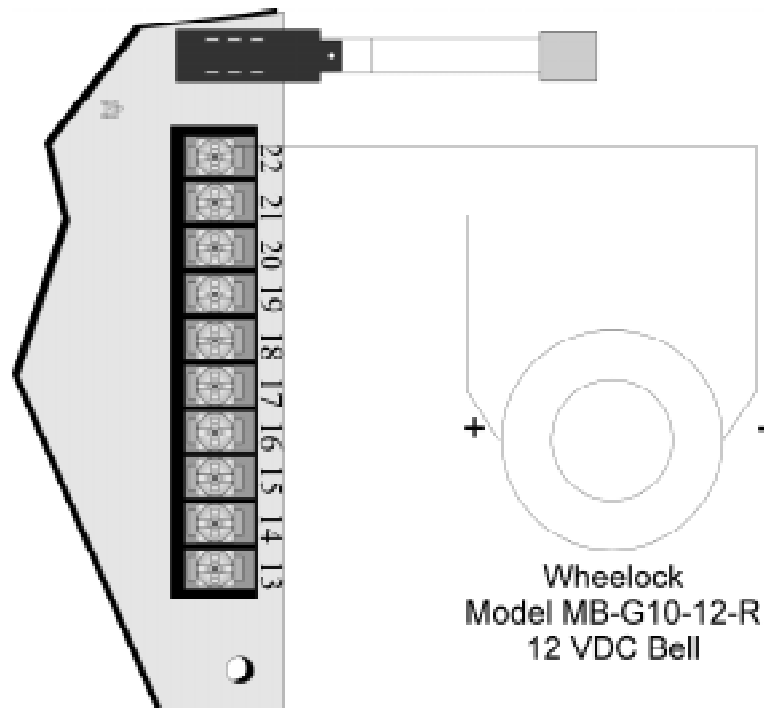Figure 3-9 illustrates how to wire a non-supervised notification device to the control panel.

Figure 3-9 Non-Supervised Alarm Bell Wiring

Note: Polarities shown in Figure 3-9 illustrate the polarity in an alarm condition. Under normal conditions the polarity of terminals 21 and 22 are reversed.

3.9.2 Supervised Notification Appliance Wiring

When using a supervised notification device any open or shorted wiring condition will be reported as a trouble. Figure 3-10 illustrates how to wire a supervised notification device to the control panel. Refer to Section 6.1.5 Step 12 to program the notification circuit's supervision properties.
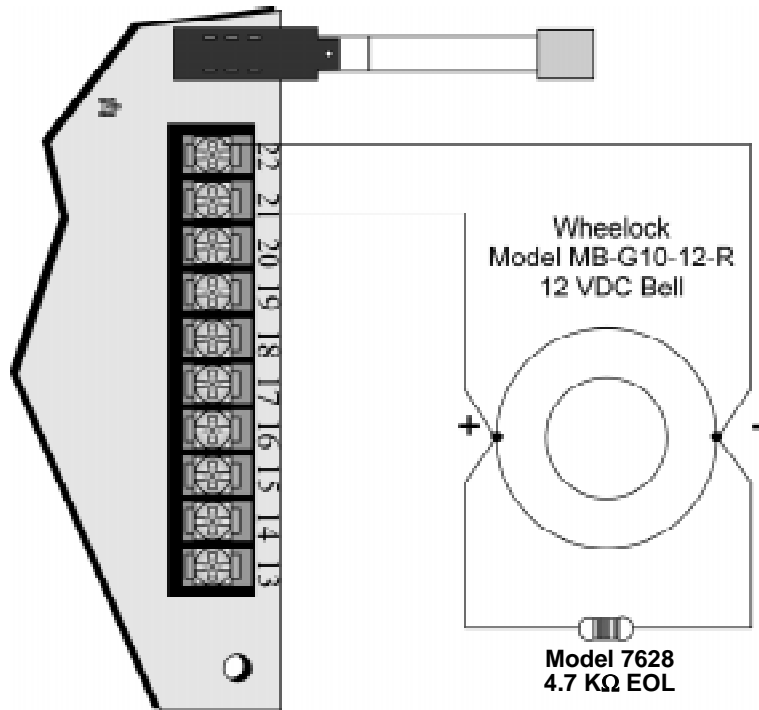

Figure 3-10 Supervised Alarm Bell Wiring

Note: Polarities shown in Figure 3-10 illustrate the polarity in an alarm condition. Under normal conditions the polarity of terminals 21 and 22 are reversed.

3.10 Telephone Line Connections

The 5104 control panel connects to the phone lines with a 7860 cable, which plugs into an RJ31X phone jack. The telephone company will install an RJ31X phone jack if you request them. Both telephone lines must be installed to comply with NFPA 72. Wire the phone lines as shown in Figure 3-11.
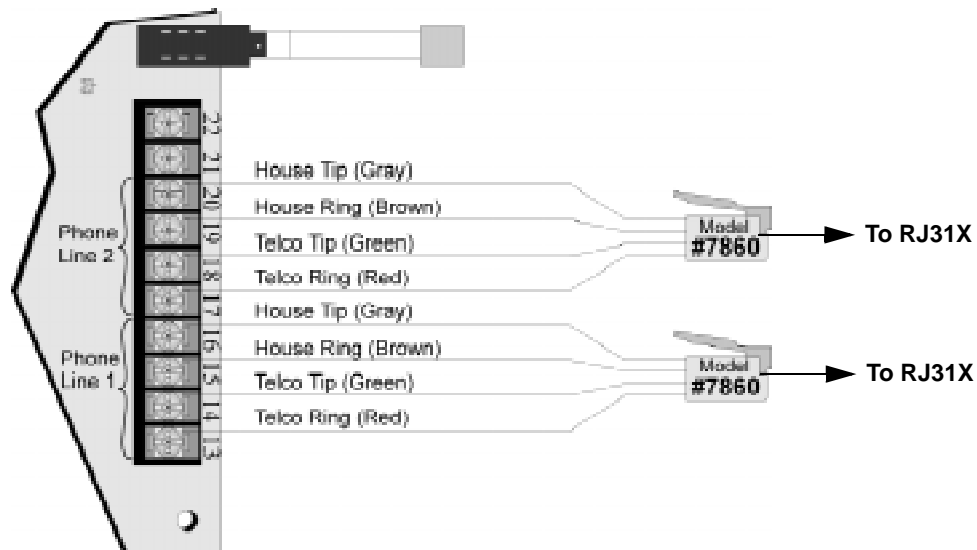

Figure 3-11 Telephone Line Connections

3.11 Model 5230 Installation

The optional 5230 remote annunciator provides both trouble and alarm annunciation, and a convenient means of English-language programming the system.
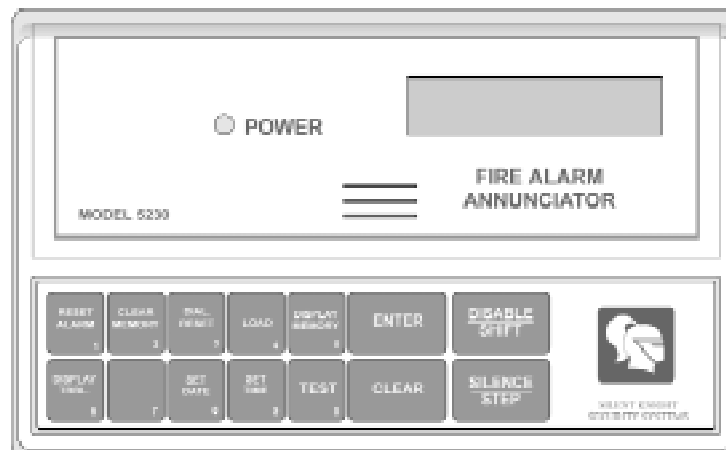

Figure 3-12 Model 5230 Remote Annunciator.

3.11.1 Mounting the 5230

When installing the 5230 as a permanent component of the system it must be mounted to a dual gang electrical box. All wire runs must use 12 to 18 AWG wire with a maximum length of 1000 feet. The annunciator must be supervised.

Follow these instruction to properly install the 5230 remote annunciator:

1. Remove the rear mounting plate:

    By inserting a #4 flat blade screwdriver into the slot located on the bottom edge of the annunciator and gently turn the screwdriver until the mounting plate pulls away from the frame.

2. Secure the rear mounting plate to the dual gang electrical box.

    Be sure to orientate the rear mounting plate so that the word "TOP" is toward the top of the plate and facing toward you. See Figure 3-13.
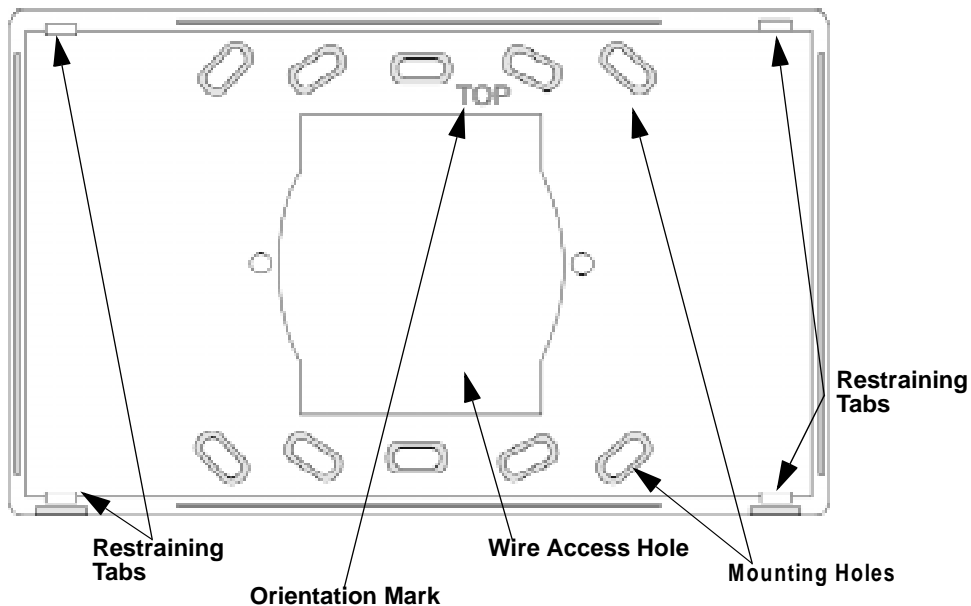

Figure 3-13 Rear Mounting Plate

3. Set the desired ID for the 5230 by setting the dip switches (on = up) as follows:

Table 3-7

ID Number	Dip Switch 1	Dip Switch 2	Dip Switch 3	Dip Switch 4
0*	On	On	On	On
1	Off	On	On	On
2	On	Off	On	On
3	Off	Off	On	On

*   *Not supervised*

4. Pull wire through the wire access hole and connect the wires as follows:

130294 Quick Connect Cable	5230 Terminals		5104 Terminals	
	Number	**Description**	**Number**	**Description**
Brown	1	Annunciator Ground	23	Ground
Red	2	Annunciator Power	24	Accessory Power
Orange	3	Annunciator Input	25	Serial Data Out
Yellow	4	Annunciator Output	26	Serial Data In

5. Snap the 5230 into place by lining up the 5230 onto the restraining tabs and snapping the 5230 into place.

Note: Refer to Section 5 for 5230 Operation.

Section 4
Slave Fire Communicator Application

The 5104 can be used to communicate the status of a larger or pre-existing (referred to as Host panel in this manual) fire control system that does not have a digital communicator. To configure the 5104 as a slave communicator wire it as shown in Figure 4-1 or Figure 4-2.
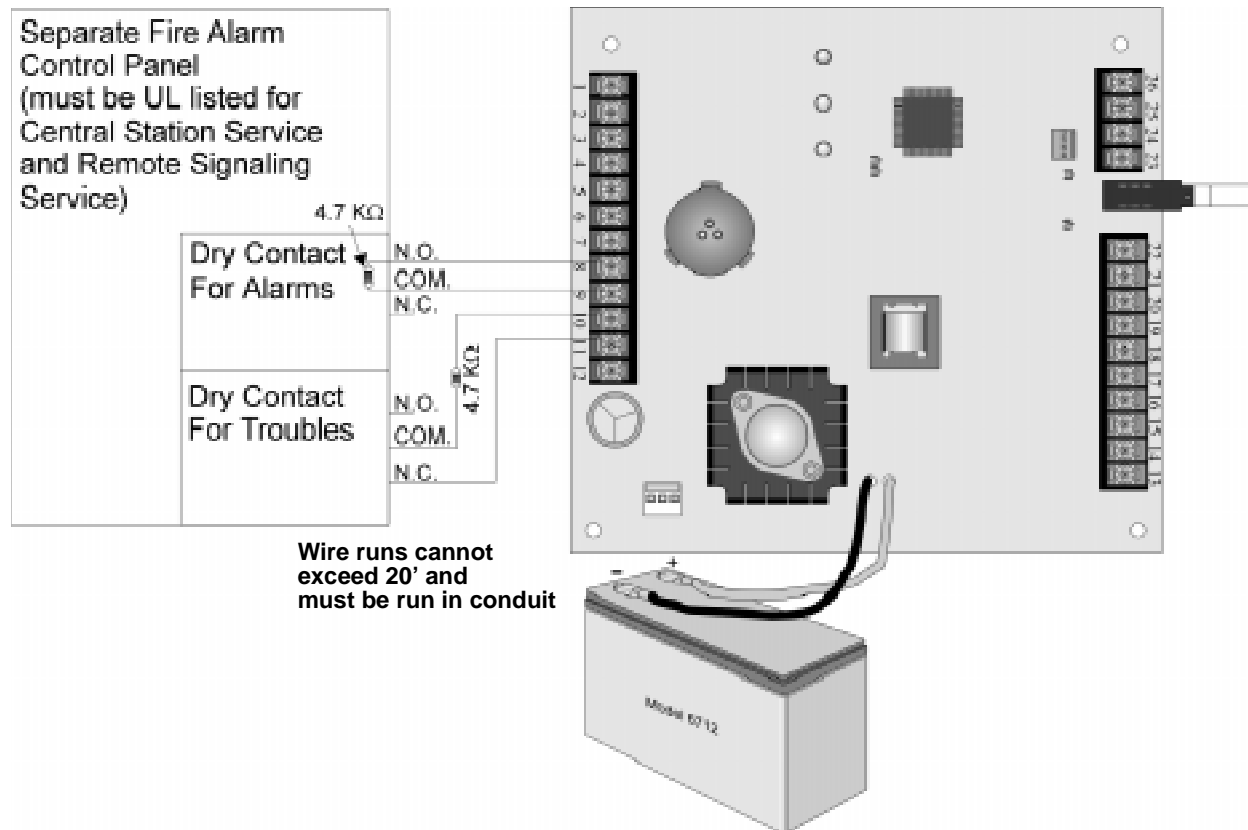

Figure 4-1 5104 Slave Communicator Configuration Using 5104 Transformer for Power

Note: If power is supplied by the 5104 transformer, the host control panel must not send the 5104 a loss of AC signal.

If power is supplied by the 5104 transformer, do not select the Slave Dialer option in programming.

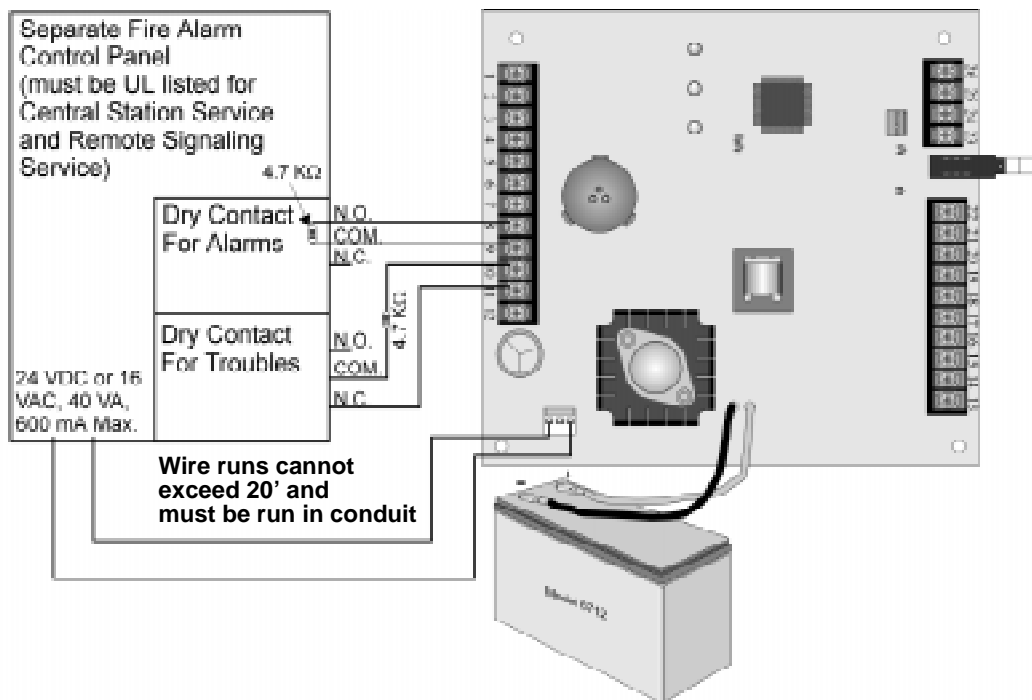Configure the zone inputs, phone lines and annunciator as shown in Section 3 of this manual.

Figure 4-2 5104 Slave Communicator Configuration Using Host panel Power

Note: If power is supplied by the host control panel, the host control panel must delay the loss of AC signal to the 5104 for 6 to 12 hours.

If power is supplied by the host control panel, you must set Slave Dialer to Yes in the 5104's programming (see Section 6.1.5, Step 43).

Configure the zone inputs, phone lines and annunciator as shown in Section 3 of this manual.

Section 5
5230 Operation

This section contains information about the operation of the 5104 through a 5230 remote annunciator.

5.1   5230 Display Messages

If the 5104 is not reporting, being programmed, and if no functions are being entered, the LCD cycles through all system messages applicable at the time. The display will show a different message every 2 seconds if there is more than one message.

Table 5-1 lists of the 5230 messages:
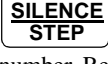
Table 5-1: 5230 LCD Messages and Meanings

Message	Meaning
Trouble Zone # (1-4)	Trouble condition exist on the zone or zones indicated by #
Alarm Zone # (1-4)	Alarm condition exist on the zone or zones indicated by #
Low AC	AC power has been lost.
Trouble Line 1	Trouble condition on phone line 1.
Trouble Line 2	Trouble condition on phone line 2.
Dialer Trouble	Indicates a dialer failed condition.
Earth Ground Fault	Indicates that an earth ground fault condition exists.
Earth Pwr Fault	Indicates that an earth ground to power, fault condition exists.
Silenced	A trouble condition exists and the annunciaton has been turned off.
System Normal	Displayed if no trouble, alarm or 5230 system error exists.
Data Lost	Displayed if event memory overflows.
Reporting	A report is being transmitted to central station.
Up/Download	Data is being uploaded or downloaded from the central station computer.
Bus Trouble	The 5230 cannot communicate with 5104.
Try Again	If there is a 10 seconds time lapse between key presses while entering a function, the 5230 will display this message. An invalid entry was made.
Trouble Remote # (1-3)	One or more 5230 annunciators are in trouble. The 5230 ID number is indicated in the # place.
EEPROM Sum Error	Error during program mode.
Low Battery	Battery voltage is less than 10.2 VDC.
Trouble Smk Pwr	Smoke loop power is less than 10 V or an overcurrent condition exists.
Bell Trouble	Trouble condition on the notification circuit.
Trouble Com 1	Auto test or manual test unable to report on line 1.
Trouble Com 2	Auto test or manual test unable to report on line 2.
Supervisory # (1-4)	Alarm condition on the zone programmed as the sprinkler zone.

5.2   5230 Touchpad Functions

There are several key functions used on the 5230 to input to the 5104, which are described in Table 5-2. However, as the 5230 is used with other control panels, not all the key function apply to the 5104.

Table 5-2: Touchpad Keystrokes and Their Task or Function

Task or Function	Keystroke
Enter function or data. Used initiate any command or to enter a step parameter into programming memory.	**ENTER** . See examples below.
Enter Program Mode.	**7** **ENTER** Installer Code.
Set Time.	**SET TIME 9** **ENTER** Installer Or Operator Code.
Manual Test. Sends a phone test to central station.	**TEST 0** **ENTER** Installer or Operator Code followed by the time in military (24 hr clock).
Clear. Used to delete the most recent key sequence from annunciator memory. Used to correct an incorrect entry.	**CLEAR**
Shift. Used with other keys to enter alpha-numeric values. This key is labeled Disable/Shift, but is only used as a shift task.	**DISABLE SHIFT**
Silence. Used to silence audible trouble or alarm annunciations. ***Note:*** Trouble or supervisory annunciations will be silenced immediately when you press the silence key followed by the installer or operator code. Silences notification output, while 5230 remains audible.	**SILENCE STEP** Installer or Operator Code.
Step. Used to advance to a different programming step while in programming mode. In reference to any programming tasks this key will be referred to as the "Step" key.	**SILENCE STEP** followed by the desired step number. Refer to Section 6 for programming information.
Perform upload or download to a remote computer.	**LOAD 4** **ENTER** Installer Code.
Display Troubles. Used to display any system troubles.	**DISPLAY TRBL. 6** **ENTER** Installer or Operator Code.
Dialer Reset. Resets dialer and discontinues communication attempts.	**DIAL. RESET 3** **ENTER** Installer Code.

Section 6
Programming

This section contains information pertaining to the programming of the 5104 with the 5230 Remote Annunciator. All programming is stored in an EEPROM (Electrically Erasable Read-Only Memory) chip, which is non-volatile memory storage. The various areas of programming are referred to as programming steps. These steps are covered in greater detail in Section 6.1.5.

6.1   5230 Programming

6.1.1   Default User Codes

The 5230 uses two programmable user codes (Installer and Operator codes). This section will refer to these user codes as either the Installer Code or the Operator Code. Table 6-1 lists the factory default Installer and Operator codes:

Table 6-1: Factory Default User Codes

User Codes	Factory Default
Installer Code	5104
Operator Code	1111

6.1.2   How to Enter and Exit Program Mode

This section describes how to enter and exit programming mode.

6.1.3   How to Enter Program Mode

Follow these steps to enter program mode:

1. Press ⎡ 7 ⎤.

2. Press ⎡ ENTER ⎤.

3. Enter the Installer Code.

6.1.4   How to Exit Program Mode

To exit program mode press ⎡ SILENCE STEP ⎤ ⎡ SILENCE STEP ⎤ ⎡ CLEAR ⎤ ⎡ CLEAR ⎤

6.1.5 Step Programming

All programming, for the 5104, done through the 5230 is done in steps. Each step programs a set parameter of the 5104, such as phone numbers, reporting formats, and zone functions.

6.1.6 Maneuvering in Program Mode

This section describes how to maneuver through programming more efficiently.

6.1.6.1 Entering Selected Values

When in program mode the two-line display shows the step name on the first line and the shows the present value programmed for that step (see Figure 6-1).

**Line 1
Step Name**

**Line 2
Programmed Value**

Line 2 DTMF
Yes

Figure 6-1 Example of 5230 Display

To enter a new value into line 2, simple enter that value and press the enter key.

Yes or No Selections

When the selection choices are Yes or No, you can press any numbered key to toggle the selection between Yes or No then press the enter key to program your choice into memory.

Selecting Alpha-numeric characters
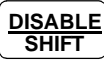
To enter a number 0-9, simply press the key corresponding to the digit(s) you desire. For example, to enter a phone number of 123-4567 press the keys, in order, 1234567 then enter.

To enter Alpha character (A-E) press the [DISABLE SHIFT] followed by digits 1 (for A), 2 (for B), 3 (for C), 4 (for D), 5 (for E). For example, to enter a 3/1 Alarm Code of D (see Table 6-3 for step information), press [DISABLE SHIFT] [LOAD 4] [ENTER] to enter the D character.

Special Character and Functions

Some phone number require special characters or functions to dial the central station correctly. Table 6-2 lists the special character used for dialing a phone number and CIC (Carrier ID Code) codes.

Table 6-2: Special Characters for Dialing Sequence

Character	Touchpad Inputs	Displayed Character
Pause	DISABLE SHIFT / RESET ALARM 1	A
*	DISABLE SHIFT / CLEAR MEMORY 2	B
#	DISABLE SHIFT / DIAL. RESET 3	C
Look for second dial tone.	DISABLE SHIFT / LOAD 4	D

6.1.6.2 Bypass a Step

To bypass a step to get to the next step, simply press the enter key without entering any data.

6.1.6.3 Go to a Step

You may desire to program only a few features and do not wish to step through the entire programming menu. To do this follow the steps below.

1. Press SILENCE STEP .

2. Enter the step number you wish to go to.

3. Press ENTER .

6.1.7   Programming Steps

Table 6-3 lists all the steps names, their task, the choices available in those steps, and the factory default setting of those steps.

Table 6-3: List of Programming Steps

Step #	Task	Choices	Default	
Step 0	3/1 Alarm Code	0 - 9, A, B, C, D, E	1	Sets the 3/1 reporting format code sent for an "Fire Alarm". Use the Shift key plus digits 1 - 5 for letters A - E.
Step 1	3/1 Sprnk Code	0 - 9, A, B, C, D, E	2	Sets the 3/1 reporting format code sent for a "Sprinkler Supervisory". Use the Shift key plus digits 1 - 5 for letters A - E.
Step 2	3/1 Trouble Code	0 - 9, A, B, C, D, E	8	Sets the 3/1 reporting format code sent for a "Trouble". Use the Shift key plus digits 1 - 5 for letters A - E.
Step 3	3/1 Restore Code	0 - 9, A, B, C, D, E	7	Sets the 3/1 reporting format code sent for a "Restore". Use the Shift key plus digits 1 - 5 for letters A - E.
Step 4	3/1 Test Code	0 - 9, A, B, C, D, E	9	Sets the 3/1 reporting format code sent for a "Test Code". Use the Shift key plus digits 1 - 5 for letters A - E.
Step 5	Low AC Hours	6 - 15 hrs	6	Set the number of hours the control panel will wait to report a loss of AC power to the central station.
Step 6	# Rings	0 - 15	0	Used to set the number of rings before the 5104 will answer the phone line to perform a download from a computer. 0 = disabled, which means the 5104 will not answer an in coming call.
Step 7	Line 1 DTMF	Yes or No	No	Yes = DTMF (Touch Tone) dialing enabled. No = Rotary dialing enabled. Press any number key to toggle the setting between "Yes" or "No".
Step 8	Line 2 DTMF	Yes or No	No	Yes = DTMF (Touch Tone) dialing enabled. No = Rotary dialing enabled. Press any number key to toggle the setting between "Yes" or "No".
Step 9	Must Report #1	Yes or No	No	Set phone number dialing priority. When the 5104 sends a report, it attempts to send the report to the priority phone number (see steps 14 - 17). If the priority phone number is not available, the system tries the other phone number. It continues to alternate between the two phone numbers until the report is sent to one of the phone numbers. If phone #2 is the phone number available, the report will go to #2. How ever, if the Must Report #1 option has been selected, the system will continue to try and send the report to phone #1. Press any numeric-digit to toggle the selection from Yes to No.

Table 6-3: List of Programming Steps

Step #	Task	Choices	Default	
Step 10	Must Report #2	Yes or No	No	See also step 9. If phone #1 is the first phone number available, the report will go to phone #1. However, if the Must Report #2 option is selected, the system will continue trying to report to phone #2 until it succeeds or exhausts the programmed number of attempts.
Step 11	Relay Alarm	Yes or No	No	Press any numeric-digit to toggle the selection from Yes to No. Yes = Bell circuit activates during alarm condition by the auxiliary relay. No = Bell circuit activates during a dialer failed condition.
Step 12	Relay Supervise	Yes or No	No	Press any numeric-digit to toggle the selection from Yes to No. Yes = Bell circuit is supervised (see Figure 3-10). No = Bell circuit in unsupervised (see Figure 3-9).
Step 13	# of 5230	0 - 3	0	Sets the number of annunciators that will be supervised. 0 = no supervision on any of the system annunciators.
Step 14	Send Alarm #1	Yes or No	Yes	Set priority for alarm reports. Press any numeric-digit to toggle the selection from Yes to No. Yes = Priority phone number is #1. No = Priority phone number is #2.
Step 15	Send Trouble #1	Yes or No	Yes	Set priority for trouble reports. Yes = Priority phone number is #1. No = Priority phone number is #2.
Step 16	Send Test #1	Yes or No	Yes	Set priority for manual and auto test reports. Yes = Priority phone number is #1. No = Priority phone number is #2.
Step 17	Report Sprnk #1	Yes or No	Yes	Set how zone 1 will report. Press any numeric-digit to toggle the selection from Yes to No. Yes = If you want to report troubles and alarms as a sprinkler. No = If you want troubles and alarms to report as fires. *Note:* Bells will only sound if "No" is selected.
Step 18	Report Sprnk #2	Yes or No	No	Set how zone 2 will report. Press any numeric-digit to toggle the selection from Yes to No. Yes = If you want to report troubles and alarms as a sprinkler, when using SIA format. No = If you want troubles and alarms to report as fires. *Note:* Bells will only sound if "No" is selected.

Table 6-3: List of Programming Steps

Step #	Task	Choices	Default	
Step 19	Report Sprnk #3	Yes or No	No	Set how zone 3 will report. Press any numeric-digit to toggle the selection from Yes to No. Yes = If you want to report troubles and alarms as a sprinkler. No = If you want troubles and alarms to report as fires. *Note:* Bells will only sound if "No" is selected.
Step 20	Report Sprnk #4	Yes or No	No	Set how zone 4 will report. Press any numeric-digit to toggle the selection from Yes to No. Yes = If you want to report troubles and alarms as a sprinkler. No = If you want troubles and alarms to report as fires. *Note:* Bells will only sound if "No" is selected.
Step 21	Latch Sprnk	Yes or No	No	Set how the sprinkler zone will operate. Press any numeric-digit to toggle the selection from Yes to No. Yes = When the sprinkler zone shorts for a duration longer than the Zone Response (set in steps 35 through 38), the annunciator remains active until reported or manually silenced. No = When the sprinkler zone shorts for a duration longer than the Zone Response (set in steps 35 through 38), the zone will follow system status and indicate a supervisory on that zone for the duration of the faulted condition.
Step 22	Account #1	6-digits	105104	Enter six-digits for an account number. For accounts shorter than 6-digits use leading zeros before you enter account number, so that all six places are filled. For example, if the format requires a shorter account number, such as 3/1 enter 000123.
Step 23	Attempts #1	3 - 5	3	Select the number of attempts the dialer will make to report to this account before a dialer failed condition occurs. the dialer will then call the other account. A total of 15 attempts will be made.
Step 24	Format #1	0 = SIA8 1 = Reserved 2 = SK4/2 3 = BFSK14 4 = BFSK23 5 = SIA20 6 = 3/1 14 7 = 3/1 23 8 = Contact ID	SK4/2	Selects the reporting format to be used on phone number 1. Enter the number of the choice (see choice column) to select the desired reporting format. See Section 7 for detailed information on the 5104 reporting formats.

Table 6-3: List of Programming Steps

Step #	Task	Choices	Default	
Step 25	`CIC #1`	1 to 8 digits	None	Carrier Identification Code is the prefix that needs to be dialed before a phone number to access a particular long distance carrier. Use special characters to add pauses, #, *, and "look for second dial tone" characters into the phone number. See Table 6-2 for special characters.
Step 26	`Phone #1`	1 to 16 digits	None	Enter 16 digits for phone number 1. Use special characters to add pauses, #, *, and "look for second dial tone" characters into the phone number. See Table 6-2 for special characters.
Step 27	`Account #2`	6-digits	205104	Enter up to six-digits for an account number. For accounts shorter than 6-digits use leading zeros before you enter account number, so that all six places are filled. For example, if the format requires a shorter account number, such as 3/1 enter 000123.
Step 28	`Attempts #2`	3 - 5	3	Select the number of attempts the dialer will make to report to this account before a dialer failed condition occurs. the dialer will then call the other account. A total of 15 attempts will be made.
Step 29	`Format #2`		SK4/2	See Step 24.
Step 30	`CIC #2`		None	See Step 25.
Step 31	`Phone #2`		None	See Step 26.
Step 32	`Computer Account`	6-digits	305104	Account number used when reporting to the downloading computer. If account number is shorter than 6-digits use leading zeros.
Step 33	`Computer CIC`	1 to 8-digits	None	Carrier Identification Code is the prefix that needs to be dialed before a phone number to access a particular long distance carrier. Use special characters to add pauses, #, *, and "look for second dial tone" characters into the phone number. See Table 6-2 for special characters.
Step 34	`Computer Phone`	1 to 16-digits	None	Enter up to 16 digits for phone number 1. Use special characters to add pauses, #, *, and "look for second dial tone" characters into the phone number. See Table 6-2 for special characters.
Step 35	`Zone Response #1`	0 = 0.3 to 0.4 sec. 1 = 3 to 4 sec. 2 = 16 to 20 sec. 3 = 32 to 40 sec.	1	Select the speed that this zone will respond to alarm, trouble, or restore conditions. Selection 0 is not recommended, as it may cause unnecessary alarm. Selection 2 & 3 are considered delayed response. Delayed responses may be used only on waterflow switches, unless the waterflow switch has a built-in delay. Any selection other than 0 - 3 will scroll through the available selections.
Step 36	`Zone Response #2`		1	
Step 37	`Zone Response #3`		1	See Step 35
Step 38	`Zone Response #4`		1	
Step 39	`Installers Code`	4-digits	5104	Enter a 4-digit code to be used by the installer or service technician. The installer code allows the user to initiate downloads, set time, and entering program mode.

Table 6-3: List of Programming Steps

Step #	Task	Choices	Default	
Step 40	`Operators Code`	4-digits	1111	Enter a 4-digit code to be used by the operator. The operator code allows the user to silence annunciations and to conduct manual tests.
Step 41	`Test Time`	24-hrs military time	01:30	Enter the time that a automatic test will be sent to central station. Use a 24-hour military time format. For example, to enter the time 5:15 pm enter 17:15. Use leading zeros for single-digit hours, such as 01:30 etc. **Note:** Any events that have not been restored will be sent along with the test report.
Step 42	`Test Interval`	1 to 30	1	Enter how often (in days 1 to 30) the control panel will do an automatic phone test.
Step 43	`Slave Dialer`	Yes or No	No	Press any numeric-digit to toggle the selection from Yes to No. Yes = If the 5104 is used as a slave communicator for a host panel. This tells the 5104 not to test the battery or earth ground, which could cause interference with the host panel. No = The 5104 will test battery and earth ground.

6.2   Model 5541 Programming

The 5104 can also be programmed remotely by downloading program parameters for a computer using 5541 Downloading software. When using the 5541 software select the Model 5104B from the Panel Interface Version menu and follow the procedures in the *Model 5541 Downloading Software Operation Manual P/N 150497*.

Section 7
Reporting

The 5104 can transmit information in 5 different formats. This section describes the five basic reporting formats of the 5104 and the codes that they send to a central station receiver. Of these 5 formats some of the formats offer a more specific selection for that format. For example, you can select a 3/1 format that requires a 1400 or 2300 Hz handshake, or SIA format that can handle 8 of 20 events per call. Selecting the correct format depends on the type of receiver that will receive calls from the 5104.

7.1   Reporting Formats

This section gives a description of each of the 5104 reporting formats. Refer to Table 7-1.

Table 7-1: Reporting Formats Descriptions

Format Name		Description
Category Name	**Programming Name**	
3/1	3/1 14	Old format, transmits a 3-digit account number and a 1-digit alarm code. Transmissions are acknowledged at 1400 Hz.
	3/1 23	Old format, transmits a 3-digit account number and a 1-digit alarm code. Transmissions are acknowledged at 2300 Hz.
4/2	SK 4/2	Tone burst format, transmits a 4-digit account code and 2-digit alarm code. Transmissions are acknowledged at 1400 Hz.
BFSK	BFSK14	Radionics format which transmits a high-speed, single-round, 3-digit account number, followed by report information. Transmissions are acknowledged at 1400 Hz.
	BFSK23	Radionics format which transmits a high-speed, single-round, 3-digit account number, followed by report information. Transmissions are acknowledged at 2300 Hz.
SIA	SIA8	Security Industry Association standard communication format which send a maximum of 8 events per call.
	SIA20	Security Industry Association standard communication format which send a maximum of 20 events per call. Up to a 6-digit account number.
Contact ID	Contact ID	Ademco Contact ID format. DTMF (Dual Tone Multiple Frequency) format. Send a 4-digit account number. Transmission are acknowledged at both 1400 and 2300 Hz.

7.2   Reporting Codes

Table 7-2 list the events sent by the 5104 and the code that is sent for that event by the type of reporting format used.

Table 7-2: Event and Reporting Code by Format

Event	SIA8 & 20	SK4/2	3/1 1400 &2300	BFSK14 & 23	Contact ID
Fire Alarm 1-4	FA1 - FA4	01 - 04	Alarm Code	01 - 04	1 110 001 - 1 110 004
Fire Alarm Restore 1-4	FH1 - FH4	21 - 24	Restore Code	E1 - E4	3 110 001 - 3 110 004
Fire Trouble 1-4	FT1 - FT4	61 - 64	Trouble Code	F1 - F4	1 373 001 - 1 373 004
Fire Trouble Restore 1-4	FJ1 - FJ4	71 - 74	Restore Code	E1 - E4	3 373 001 - 3 373 004
Sprinkler Supervisory 1-4	SS1 - SS4	01 -04	Sprinkler Code	01 - 04	1 203 001 - 1 203 004
Sprinkler Supervisory Restore 1-4	SR1 - SR4	21 - 24	Restore Code	E1 - E4	3 203 001 - 3 203 004
Sprinkler Trouble 1-4	ST1 - ST4	61 - 64	Trouble Code	F1 - F4	1 203 001 - 1 203 004
Sprinkler Trouble Restore 1-4	SJ1 - SJ4	71 - 74	Restore Code	E1 - E4	3 203 001 - 3 203 004
Annunciator Trouble 1-3	ET1 - ET3	33	Trouble Code	FD	1 330 001 - 1 330 003
Annunciator Restore 1-3	ER1 - ER3	37	Restore Code	ED	3 330 001 - 3 330 003
Bell Trouble	ET32	33	Trouble Code	FD	1 320 001
Bell Restore	ER32	37	Restore Code	ED	3 320 001
Earth Ground Trouble	ET38	33	Trouble Code	FD	1 310 000
Earth Ground Restore	ER38	37	Restore Code	ED	3 310 000
Earth Power Trouble	ET39	33	Trouble Code	FD	1 310 000
Earth Power Restore	ER39	37	Restore Code	ED	3 310 000
Smoke (Loop) Power Trouble	ET40	33	Trouble Code	FD	1 300 000
Smoke (Loop) Power Restore	ER40	37	Restore Code	ED	3 300 000
Aux Power Trouble	ET43	33	Trouble Code	FD	1 300 003
Aux Power Restore	ER43	37	Restore Code	ED	3 300 003
AC Trouble	AT0	60	Trouble Code	FA	1 301 000
AC Restore	AR0	70	Restore Code	EA	3 301 000
Battery Trouble	YT0	69	Trouble Code	F9	1 302 000
Battery Restore	YR0	79	Restore Code	E9	3 302 000
Trouble Phone Line #1	LT1	31	Trouble Code	FB	1 351 000
Restore Phone Line #1	LR1	35	Restore Code	EB	3 351 000
Trouble Phone Line #2	LT2	32	Trouble Code	FC	1 352 000
Restore Phone Line #2	LR2	36	Restore Code	EC	3 352 000
Communications Failure Line #1	YC1	31	Trouble Code	FB	1 351 000
Communications Restore Line #1	YK1	35	Restore Code	EB	3 351 000
Communications Failure Line #2	YC2	32	Trouble Code	FC	1 352 000

Table 7-2: Event and Reporting Code by Format

Event	SIA8 & 20	SK4/2	3/1 1400 &2300	BFSK14 & 23	Contact ID
Communications Restore Line #2	YK2	36	Restore Code	EC	3 352 000
Manual Test	RX0	30	Test Code	EE	1 601 000
Automatic Test	RP0	30	Test Code	EE	1 602 000
Downloading Passed	RS0	30	Test Code	EF	1 412 000
Downloading Failed	RU0	30	Test Code	FF	1 413 000
Data Lost	RT0	39	Trouble Code	FE	1 354 000

Section 8
Troubleshooting

This section contains trouble shooting information for servicing the 5104. The following is a list of LED indications, 5230 LCD messages, and their meaning. Along with this information are possible causes of these problems and some solution.

LED Indications	5230 LCD Messages	Meaning	Cause and Correction
	`Trouble Zone #` (1-4)	Trouble condition exist on the zone or zones indicated by #	The device connected to this zone is in trouble. EOL problem on this loop. This indication will clear once the problem has been corrected
	`Alarm Zone #` (1-4)	Alarm condition exist on the zone or zones indicated by #	The device connected to this zone is in the alarm condition.
L3 Off	`Low AC`	AC power has been lost.	Check for power on the primary of the transformer.
L6 On	`Trouble Line 1`	Trouble condition on line 1.	Phone line or phone connections are bad or unable to report to central station. Verify the programmed central station phone number.
L7 On	`Trouble Line 2`	Trouble condition on line 2.	
L5 On	`Dialer Trouble`	Indicates a dialer failed condition.	
	`Earth Ground Fault`	Indicates that an earth ground fault condition exists.	
	`Earth Pwr Fault`	Indicates that an earth power fault condition exists.	
L4 On.	`Silenced`	A trouble condition exists and the annunciator has been turned off.	EOL problem on this loop. This indication will clear once the problem has been corrected
	`Data Lost`	Displayed if event memory overflows.	
	`Bus Trouble`	The 5230 cannot communicate with 5104.	
	`Try Again`	If there is a 10 seconds time lapse between key presses while entering a function, the 5230 will display this message.	You waited to long between touchpad entries and the system timed out or an incorrect entry was made.
	`Trouble Remote #`	One or more 5230 annunciator is in trouble. The 5230 ID number is indicated in the # place.	Check for shorts or opens in wire runs. Check to make sure that none of the 5230 have the same ID code.
	`EEPROM Sum Error`	Error during program mode.	Exit program mode (see Section 6.1.4) then re-enter program mode and try again.
L2 On	`Trouble Smk Pwr`	Smoke loop power is less than 10 V or an overcurrent condition exists. Overcurrent draw on terminal 6, 9, or 11.	
	`Bell Trouble`	Trouble condition on the notification circuit.	Overcurrent draw on the notification circuit. Missing or incorrect EOL on a supervised notification circuit.

LED Indications	5230 LCD Messages	Meaning	Cause and Correction
L6 Flashes	`Trouble Com 1`	Event reports, auto test or manual test unable to report on line 1.	Phone line voltage is O.K. but the panel was unable to communicate on line 1. Try dialling the phone number that you programmed, from a premise phone, to verify it is reaching the central station. If that checks out O.K. verify that you are using a compatible reporting format with that receiver.
L7 Flashes	`Trouble Com 2`	Event reports, auto test or manual test unable to report on line 2.	Phone line voltage is O.K. but the panel was unable to communicate on line 2. Try dialling the phone number that you programmed, from a premise phone, to verify it is reaching the central station. If that checks out O.K. verify that you are using a compatible reporting format with that receiver.
	`Supervisory # (1-4)`	Alarm condition on the zone programmed as the sprinkler zone.	Short on the programmed sprinkler zone.
	`Low Battery`	Backup battery voltage is below 10.2 VDC.	Check backup battery connection. Check backup battery voltage level with volt meter. Replace the backup battery.
L1 On	Blank	+12 Accessory power fault	Check for overcurrent on terminal 24.