



Fire Control Communicator
MS-5024/MS-5024E

Fire Alarm System Limitations

An automatic fire alarm system—typically made up of smoke detectors, heat detectors, manual pull stations, audible warning devices, and a fire alarm control with remote notification capability—can provide early warning of a developing fire. Such a system, however, does not assure protection against property damage or loss of life resulting from a fire.

The Manufacturer recommends that smoke and/or heat detectors be located throughout a protected premise following the recommendations of the current edition of the National Fire Protection Association Standard 72 (NFPA 72), manufacturer's recommendations, State and local codes, and the recommendations contained in the Guide for Proper Use of System Smoke Detectors, which is made available at no charge to all installing dealers. A study by the Federal Emergency Management Agency (an agency of the United States government) indicated that smoke detectors may not go off in as many as 35% of all fires. While fire alarm systems are designed to provide early warning against fire, they do not guarantee warning or protection against fire. A fire alarm system may not provide timely or adequate warning, or simply may not function, for a variety of reasons:

Smoke detectors may not sense fire where smoke cannot reach the detectors such as in chimneys, in or behind walls, on roofs, or on the other side of closed doors. Smoke detectors also may not sense a fire on another level or floor of a building. A second-floor detector, for example, may not sense a first-floor or basement fire.

Particles of combustion or "smoke" from a developing fire may not reach the sensing chambers of smoke detectors because:

- Barriers such as closed or partially closed doors, walls, or chimneys may inhibit particle or smoke flow.
- Smoke particles may become "cold," stratify, and not reach the ceiling or upper walls where detectors are located.
- Smoke particles may be blown away from detectors by air outlets.
- Smoke particles may be drawn into air returns before reaching the detector.

The amount of "smoke" present may be insufficient to alarm smoke detectors. Smoke detectors are designed to alarm at various levels of smoke density. If such density levels are not created by a developing fire at the location of detectors, the detectors will not go into alarm.

Smoke detectors, even when working properly, have sensing limitations. Detectors that have photoelectronic sensing chambers tend to detect smoldering fires better than flaming fires, which have little visible smoke. Detectors that have ionizing-type sensing chambers tend to detect fast-flaming fires better than smoldering fires. Because fires develop in different ways and are often unpredictable in their growth, neither type of detector is necessarily best and a given type of detector may not provide adequate warning of a fire.

Smoke detectors cannot be expected to provide adequate warning of fires caused by arson, children playing with matches (especially in bedrooms), smoking in bed, and violent explosions (caused by escaping gas, improper storage of flammable materials, etc.).

While a fire alarm system may lower insurance rates, it is not a substitute for fire insurance!

Heat detectors do not sense particles of combustion and alarm only when heat on their sensors increases at a predetermined rate or reaches a predetermined level. Rate-of-rise heat detectors may be subject to reduced sensitivity over time. For this reason, the rate-of-rise feature of each detector should be tested at least once per year by a qualified fire protection specialist. *Heat detectors are designed to protect property, not life.*

IMPORTANT! Smoke detectors must be installed in the same room as the control panel and in rooms used by the system for the connection of alarm transmission wiring, communications, signaling, and/or power. If detectors are not so located, a developing fire may damage the alarm system, crippling its ability to report a fire.

Audible warning devices such as bells may not alert people if these devices are located on the other side of closed or partly open doors or are located on another floor of a building. Any warning device may fail to alert people with a disability or those who have recently consumed drugs, alcohol or medication. Please note that:

- Strobes can, under certain circumstances, cause seizures in people with conditions such as epilepsy.
- Studies have shown that certain people, even when they hear a fire alarm signal, do not respond or comprehend the meaning of the signal. It is the property owner's responsibility to conduct fire drills and other training exercise to make people aware of fire alarm signals and instruct them on the proper reaction to alarm signals.
- In rare instances, the sounding of a warning device can cause temporary or permanent hearing loss.

A fire alarm system will not operate without any electrical power. If AC power fails, the system will operate from standby batteries only for a specified time and only if the batteries have been properly maintained and replaced regularly.

Equipment used in the system may not be technically compatible with the control. It is essential to use only equipment listed for service with your control panel.

Telephone lines needed to transmit alarm signals from a premise to a central monitoring station may be out of service or temporarily disabled. For added protection against telephone line failure, backup radio transmission systems are recommended.

The most common cause of fire alarm malfunction is inadequate maintenance. To keep the entire fire alarm system in excellent working order, ongoing maintenance is required per the manufacturer's recommendations, and UL and NFPA standards. At a minimum, the requirements of Chapter 7 of NFPA 72 shall be followed. Environments with large amounts of dust, dirt or high air velocity require more frequent maintenance. A maintenance agreement should be arranged through the local manufacturer's representative. Maintenance should be scheduled monthly or as required by National and/or local fire codes and should be performed by authorized professional fire alarm installers only. Adequate written records of all inspections should be kept.

Installation Precautions

WARNING - Several different sources of power can be connected to the fire alarm control panel. Disconnect all sources of power before servicing. Control unit and associated equipment may be damaged by removing and/or inserting cards, modules, or interconnecting cables while the unit is energized. Do not attempt to install, service, or operate this unit until this manual is read and understood.

CAUTION - *System Reacceptance Test after Software Changes.* To ensure proper system operation, this product must be tested in accordance with NFPA 72 Chapter 7 after any programming operation or change in site-specific software. Reacceptance testing is required after any change, addition or deletion of system components, or after any modification, repair or adjustment to system hardware or wiring.

All components, circuits, system operations, or software functions known to be affected by a change must be 100% tested. In addition, to ensure that other operations are not inadvertently affected, at least 10% of initiating devices that are not directly affected by the change, up to a maximum of 50 devices, must also be tested and proper system operation verified.

This system meets NFPA requirements for operation at 0-49° C/32-120° F and at a relative humidity of 85% RH (non-condensing) at 30° C/86° F. However, the useful life of the system's standby batteries and the electronic components may be adversely affected by extreme temperature ranges and humidity. Therefore, it is recommended that this system and all peripherals be installed in an environment with a nominal room temperature of 15-27° C/60-80° F.

Verify that wire sizes are adequate for all initiating and indicating device loops. Most devices cannot tolerate more than a 10% I.R. drop from the specified device voltage.

Adherence to the following will aid in problem-free installation with long-term reliability:

Like all solid state electronic devices, this system may operate erratically or can be damaged when subjected to lightning-induced transients. Although no system is completely immune from lightning transients and interferences, proper grounding will reduce susceptibility. *Overhead or outside aerial wiring is not recommended, due to an increased susceptibility to nearby lightning strikes.* Consult with the Technical Services Department if any problems are anticipated or encountered.

Disconnect AC power and batteries prior to removing or inserting circuit boards. Failure to do so can damage circuits.

Remove all electronic assemblies prior to any drilling, filing, reaming, or punching of the enclosure. When possible, make all cable entries from the sides or rear. Before making modifications, verify that they will not interfere with battery, transformer, and printed circuit board location.

Do not tighten screw terminals more than 9 in-lbs. Over-tightening may damage threads, resulting in reduced terminal contact pressure and difficulty with screw terminal removal.

Though designed to last many years, system components can fail at any time. This system contains static-sensitive components. Always ground yourself with a proper wrist strap before handling any circuits so that static charges are removed from the body. Use static-suppressive packaging to protect electronic assemblies removed from the unit.

Follow the instructions in the installation, operating, and programming manuals. These instructions must be followed to avoid damage to the control panel and associated equipment. FACP operation and reliability depend upon proper installation by authorized personnel.

FCC Warning

WARNING: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for class A computing device pursuant to Subpart B of Part 15 of FCC Rules, which is designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user will be required to correct the interference at his own expense.

Canadian Requirements

This digital apparatus does not exceed the Class A limits for radiation noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Notes

Table of Contents

CHAPTER 1: Product Description	11
1.1: Product Features	11
FIGURE 1-1: DP-5024	12
FIGURE 1-2: MS-5024 Control Panel.....	12
1.2: Controls and Indicators	13
1.2.1: Front Panel Switches	13
FIGURE 1-3: Controls and Indicators	13
1.2.2: Display and Indicators	13
1.2.3: Local Sounder	13
1.3: Circuits	13
1.3.1: Input Circuits.....	13
1.3.2: Output Circuits.....	13
1.3.3: Notification Appliance Circuits	14
1.3.4: Relays.....	14
1.4: Digital Communicator.....	14
1.5: Components.....	14
1.5.1: Main Circuit Board	14
1.5.2: Cabinet	14
1.5.3: Transformer Assembly.....	14
1.5.4: Batteries	15
1.6: Optional Devices	15
1.6.1: ADM-24	15
1.6.2: RZA-5F	15
1.6.3: CAC-5F.....	15
1.6.4: NACA-2F.....	15
1.6.5: DP-5024	15
1.6.6: BB-17F.....	16
1.7: Specifications	16
1.8: Telephone Requirements and Warnings	17
1.8.1: Telephone Circuitry.....	17
1.8.2: Digital Communicator.....	17
1.8.3: Telephone Company Rights and Warnings	17
1.8.4: For Canadian Applications.....	18
CHAPTER 2: Installation.....	19
2.1: Mounting Options	19
2.2: Backbox Mounting.....	19
FIGURE 2-1: Cabinet Dimensions and Knockout Locations.....	20
FIGURE 2-2: Backbox and Battery Box	21
2.3: Operating Power.....	22
FIGURE 2-3: Operating Power Connections.....	22
2.4: Input Circuits.....	23
FIGURE 2-4: Typical Initiating Device Circuit Connections	23
2.5: Output Circuits	24
2.5.1: DC Power Output Connections.....	24
FIGURE 2-5: Auxiliary Power Connections	24
2.5.2: Telephone Circuits	24
2.5.3: Notification Appliance Circuits (full-wave rectified).....	24
FIGURE 2-6: Typical NAC Connections	24
2.5.4: Programmable Relays	25
FIGURE 2-7: Programmable Relay Terminals.....	25
2.6: UL Power-limited Wiring Requirements	26

Table of Contents

FIGURE 2-8: Typical Wiring Diagram for UL Power-limited Requirements	26
2.7: Digital Communicator	27
FIGURE 2-9: Wiring Phone Jacks	27
2.8: Optional Boards	28
2.8.1: ADM-24 Annunciator Driver Module	28
FIGURE 2-10: ADM-24	28
2.8.2: RZA-5F Remote Annunciator	28
FIGURE 2-11: RZA-5F	28
FIGURE 2-12: Wiring the RZA-5F/ADM-24	29
FIGURE 2-13: Installing Annunciator in Single-Gang Box	29
2.8.3: NACA-2F and CAC-5F Class A Converter Modules	30
FIGURE 2-14: NACA-2F Style Z Converter Module	30
FIGURE 2-15: CAC-5F Style D Converter Module	30
CHAPTER 3: Programming Instructions	31
3.1: Entering Program Mode	31
3.2: Switch (Key) Functions	32
FIGURE 3-1: Control Panel Keypad	32
3.3: Programming Options	32
TABLE 3-1: 3+1, 4+1 Express, 4+1 Standard and Expanded, 4+2 Expanded - Primary	33
TABLE 3-2: 4+2 Standard and 4+2 Express Format - Primary	35
TABLE 3-3: 3+1, 4+1 Express, 4+1 Standard and Expanded, 4+2 Expanded - Secondary	37
TABLE 3-4: 4+2 Standard and 4+2 Express Format - Primary	39
FIGURE 3-2: Verification Timing Diagram	40
TABLE 3-5:	41
CHAPTER 4: Operating Instructions	46
4.1: Switches	46
4.1.1: Reset	46
4.1.2: Silence	46
4.1.3: Mode	47
4.1.4: 1st Event	47
4.1.5: Down Arrow	47
4.1.6: Up Arrow	47
4.1.7: [ENTER/STORE]	47
4.2: Display and LEDs	47
FIGURE 4-1: Phone Connectors and LEDs	48
4.3: Operation	49
4.3.1: Alarm Response	49
4.3.2: Alarm Restoral	49
4.3.3: System Supervisory Condition Response	50
4.3.4: System Supervisory Restoral Response	50
4.3.5: Trouble Condition Response	50
4.3.6: Trouble Conditions Restoral	51
4.3.7: Off Normal Reporting	51
4.3.8: Zone Disable/Enable	51
4.3.9: Fire Drill	52
4.3.10: No Battery/Low Battery	52
4.4: Central Station Communications	52
TABLE 4-1: Format Selection Addresses (16 & 42)	53
TABLE 4-2: Format Selection Address Explanation	54
4.4.1: Transmittal Priorities	55
TABLE 4-3: Compatible UL Listed Receivers	56

Notes

This control panel has been designed to comply with standards set forth by the following regulatory agencies:

- Underwriters Laboratories Standard UL 864
- NFPA 72 National Fire Alarm Code for Local, Remote Station and Central Station Fire Alarm Systems
- CAN/ULC - S527M Standard for Control Units for Fire Alarm Systems

Before proceeding, the installer should be familiar with the following documents.



NFPA Standards

NFPA 72 National Fire Alarm Code for Central Station Signaling Systems Protected Premises Unit (Automatic, Manual and Waterflow), Local Fire Alarm Systems and Remote Station Fire Alarm Systems.



Underwriters Laboratories Documents:

- UL 38 Manually Actuated Signaling Boxes
- UL 217 Smoke Detectors, Single and Multiple Station
- UL 228 Door Closers-Holders for Fire Protective Signaling Systems
- UL 268 Smoke Detectors for Fire Protective Signaling Systems
- UL 268A Smoke Detectors for Duct Applications
- UL 346 Waterflow Indicators for Fire Protective Signaling Systems
- UL 464 Audible Signaling Appliances
- UL 521 Heat Detectors for Fire Protective Signaling Systems
- UL 864 Standard for Control Units for Fire Protective Signaling Systems
- UL 1481 Power Supplies for Fire Protective Signaling Systems
- UL 1638 Visual Signaling Appliances
- UL 1971 Signaling Devices for Hearing Impaired
- CAN/ULC - S524M Standard for Installation of Fire Alarm Systems

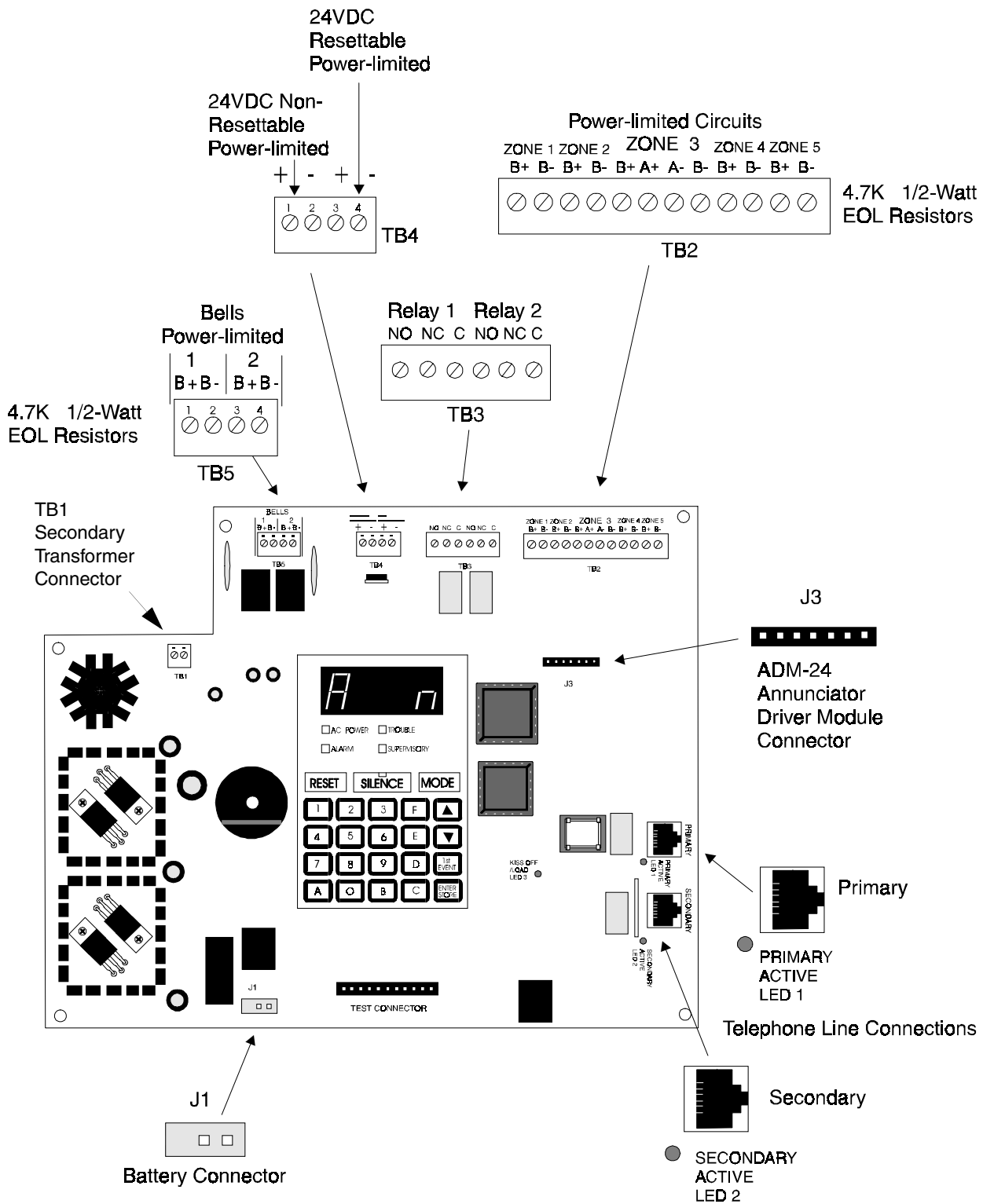


Other:

- NEC Article 250 Grounding
- NEC Article 300 Wiring Methods
- NEC Article 760 Fire Protective Signaling Systems
- Applicable Local and State Building Codes
- C22.1, Canadian Electrical Code, Part I
- C22.2 No. 0, General Requirements - Canadian Electrical Code, Part II
- C22.2 No. 0.4, Bonding and Grounding of Electrical Equipment (Protective Grounding) - Canadian
- C282, Emergency Electrical Power Supply for Buildings - Canadian
- Requirements of the Local Authority Having Jurisdiction (LAHJ)

Fire•Lite Documents

Fire•Lite Device Compatibility Document Document #15384



Note: When dressing wires, maintain a minimum of 0.25" distance between conductors to power-limited and nonpower-limited circuits.

CHAPTER 1 *Product Description*

The MS-5024 is a combination control panel and digital communicator all on one circuit board. It is a five-zone panel which uses conventional input devices. The panel accepts waterflow devices, two-wire smoke detectors, four-wire smoke detectors, pull stations and other normally open contact devices. Outputs include two NACs (Notification Appliance Circuits) and two programmable relays.

The integral communicator transmits system status (alarms, troubles, AC loss, etc.) to UL listed Central Stations via the public switched telephone network. The control panel has a built-in programmer and may also serve as a slave communicator to a host control panel. It also supervises all wiring, AC voltage, telephone line input voltage and battery level.

The MS-5024E offers the same features as the MS-5024 but allows connection to 220/240 VAC input. *Note that unless otherwise specified, the term MS-5024 shall be used in this manual to refer to both the MS-5024 and MS-5024E Fire Control Communicators.*

1.1 Product Features

- Selectable as Fire Panel, Fire Panel/Communicator or Slave Communicator
- Programmable Zone ID:
 - ✓ 2-wire smoke
 - ✓ Pull station
 - ✓ Normally open contact
 - ✓ Supervisory
 - ✓ Supervisory auto-resettable
 - ✓ Waterflow silenceable
 - ✓ Waterflow nonsilenceable
- One Style D (Class A) Initiating Zone
- Four Style B (Class B) Initiating Zones
- 3.6 amps usable power
- Two NFPA Style Y (Class B) Notification Appliance Circuits
- Built-in programmer
- Built-in voltmeter
- Telephone Line Active LED indicators
- Communication confirmation (Kissoff) LED
- Disable report by event
- Programmable Event Codes
- 24 volt operation
- Real-Time clock
- Trouble reminder
- Alarm verification
- Alarm presignal
- RZA-5F Remote Annunciator (requires ADM-24 Annunciator Driver Module)
- Small size - 14.5" (36.83 cm) X 12.5" (31.75 cm) X 2.875" (7.303 cm)
- History file with 32 event storage
- Silence inhibit per NAC

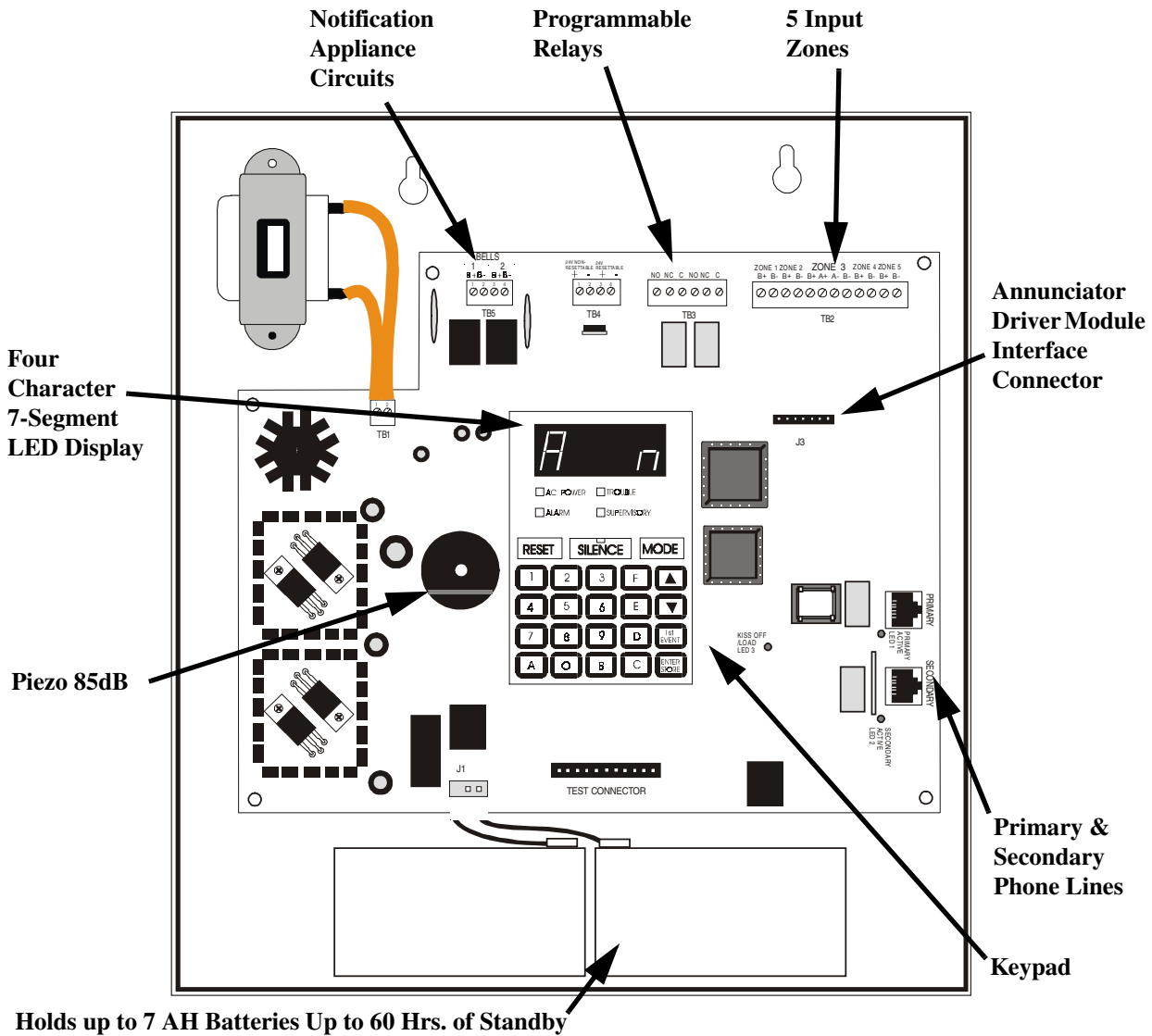
Product Features

- Auto-silence per NAC
- Touchtone/rotary dialing
- Programmable make/break ratio
- Fuseless design
- Number of dial attempts (5 minimum, 10 maximum)
- Programmable channel ID (slave)
- Programmable zone delay (waterflow only)
- Two Form-C programmable relays
- Low AC voltage sense
- One-man Walktest
- Optional Dead Front cover (DP-5024)
- CAC-5F Class A Converter module for Initiating Device Circuits
- NACA-2F Class A Converter module for Notification Appliance Circuits

FIGURE 1-1: DP-5024



FIGURE 1-2: MS-5024 Control Panel



1.2 Controls and Indicators

1.2.1 Front Panel Switches

RESET	Digits 0 - 9
SILENCE	A
MODE	B
Up Arrow	C
Down Arrow	D
1st EVENT	E
ENTER/STORE	F

1.2.2 Display and Indicators

- Four 7-Segment Displays - red
- Alarm - red LED
- Trouble - yellow LED
- Supervisory - yellow LED
- Silence - yellow LED
- AC Power - green LED
- Primary Phone Line Active - red LED
- Secondary Phone Line Active - red LED
- 'Kissoff' Signal from Central Station - green LED

1.2.3 Local Sounder

A piezo sounder provides separate and distinct sounds for alarm, trouble and supervisory conditions.

1.3 Circuits

1.3.1 Input Circuits

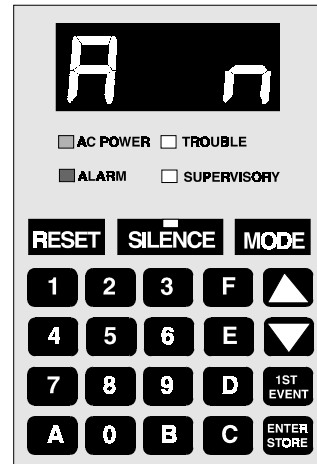
Five input circuits provide Style B configuration with one circuit also configurable for Style D. Input circuits may be used as standard fire control panel zones or slave communicator input channels.

- Initiating Device Circuit 1 (Style B) accepts Normally Open contact devices and 2-wire smoke detectors
- Initiating Device Circuit 2 (Style B) accepts Normally Open contact devices and 2-wire smoke detectors
- Initiating Device Circuit 3 (Style B/D) accepts Normally Open contact devices, 2-wire smoke detectors and waterflow devices
- Initiating Device Circuit 4 (Style B) accepts Normally Open contact devices and 2-wire smoke detectors
- Initiating Device Circuit 5 (Style B) accepts Normally Open contact devices and 2-wire smoke detectors

1.3.2 Output Circuits

- 24 Volt Resettable Power Output
- 24 Volt Nonresettable Power Output
- Primary Telephone Line
- Secondary Telephone Line
- 24 Volt Battery Charger

FIGURE 1-3: Controls and Indicators



Digital Communicator

1.3.3 Notification Appliance Circuits

Two NACs (Notification Appliance Circuits) configurable for Style Y (Class B) with various programmable features.

1.3.4 Relays

Two dry Form-C relay contacts programmable for Alarm, Trouble, Supervisory and/or Communications Failure. Contacts are rated 2 amps @ 30 VDC (resistive) and 0.5 amps @ 30 VAC (resistive).

1.4 Digital Communicator

Two modular phone jacks allow easy connection to telephone lines. Modular jacks are labeled PH1 and PH2 for the Primary and Secondary phone lines. Telephone line active red LEDs are provided as well as a green 'Kissoff' LED. The integral digital communicator provides the following functions:

- Line Seizure - takes control of the phone lines, disconnecting any premises phones
- Off/On Hook - perform on and off-hook status to the phone lines
- Listen for dial tone - 440 hertz tone typical in most networks
- Dialing the Central Station(s) number - default is Touch-Tone[®], programmable to rotary
- For tone burst or touchtone type formats: discern proper 'Ack' and 'Kissoff' tone(s) - the frequency and time duration of the tone(s) vary with the transmission format. The control panel will adjust accordingly
- Communicate in the following formats:
 - ✓ 12 Tone Burst Types: 20 pps
(3+1, 4+1 and 4+2 Standard, 3+1 Expanded, 4+1 Expanded, 4+2 Expanded)
 - ✓ 2 Touchtone Types:
4+1 Ademco Express and 4+2 Ademco Express
Refer to Table 4-3, "Compatible UL Listed Receivers," on page 56 for a list of compatible receivers.

1.5 Components

1.5.1 Main Circuit Board

The main circuit board contains the system's CPU, power supply, other primary components and wiring interface connectors. Optional modules plug in and are mounted to the main circuit board. The main circuit board is delivered premounted in the cabinet.

1.5.2 Cabinet

The cabinet is red with an attractive navy blue front overlay. The backbox measures 14.5" (36.83 cm) X 12.5" (31.75 cm) X 2.875" (7.303 cm) and provides space for two batteries (up to 7 Amp Hour). Also available is an optional dress panel (DP-5024), which mounts inside the cabinet.

1.5.3 Transformer Assembly

One 100 VA transformer is provided standard with the panel.

Optional Devices

1.5.4 Batteries

The cabinet provides space for 7 Amp Hour batteries (for 12 Amp Hour to 18 Amp Hour batteries use the UL listed BB-17F battery box). Batteries must be ordered separately.

1.6 Optional Devices

1.6.1 ADM-24

The ADM-24 Annunciator Driver Module supports the RZA-5F Remote Annunciator module. Annunciator wiring is supervised for open circuits by this module. The Annunciator Driver Module mounts to connector J3 in the upper right corner of the main board. Refer to Figure 1-2 on page 12 and Figure 2-10 on page 28.

1.6.2 RZA-5F

The RZA-5F Remote Annunciator mounts on a standard single-gang box and provides LED indications of the following:

- ✓ Alarm Zone 1 (red LED)
- ✓ Alarm Zone 2 (red LED)
- ✓ Alarm Zone 3 (red LED)
- ✓ Alarm Zone 4 (red LED)
- ✓ Alarm Zone 5 (red LED)
- ✓ System Trouble (yellow LED)

A Local Trouble Sounder and Tone Silence Switch are also provided. All LEDs and their wiring are supervised for open conditions. Any open condition will cause the System Trouble LED to illuminate. Slide in paper labels permit an easy change of zone information (refer to Figure 2-11 on page 28). *Note that the RZA-5F Remote Annunciator requires the use of the ADM-24 Annunciator Driver Module. Only one ADM-24/RZA-5F combination is allowed per system.*

1.6.3 CAC-5F

The CAC-5F Class A Converter module converts the Style B (Class B) Initiating Device Circuits to Style D (Class A). The CAC-5F mounts to terminal block TB2 located in the upper right corner of the main circuit board (refer to Figure 1-2 on page 12 and Figure 2-15 on page 30). The removable terminal block on the CAC-5F module provides for ease of wiring.

1.6.4 NACA-2F

The NACA-2F Notification Appliance Circuit Class A Converter module converts the two NAC circuits from Style Y (Class B) to Style Z (Class A). The converter module mounts to terminal block TB5 located in the upper left corner of the main circuit board (refer to Figure 1-2 on page 12 and Figure 2-14 on page 30). The removable terminal block on the NACA-2F module provides for ease of wiring.

1.6.5 DP-5024

The DP-5024 Dress Panel is red and is available as an option (required for Canadian installations). The dress panel restricts access to the system wiring while allowing access to the membrane switch panel (refer to Figure 1-1 on page 12).

Specifications

1.6.6 BB-17F

The BB-17F Battery Box may be used to house two 12 Amp Hour or 18 AMP Hour batteries. The battery box mounts directly below the control panel cabinet (refer to Figure 2-2 on page 21). The BB-17F is red and is provided with knockouts.

1.7 Specifications

AC Power - TB1

MS-5024: 120 VAC, 60 Hz, 1.2 amps

MS-5024E: 220/240 VAC, 50 Hz, 0.6 amps

Supervised for AC loss and brownout

Wire size: minimum 14 AWG (2.00 mm²) with 600V insulation

Battery (lead acid only) - J1

Maximum charging circuit: Normal Flat Charge - 27.6V @ 0.8 amp

Maximum charger capacity: 17 Amp Hour battery (MS-5024 cabinet holds maximum 7 Amp Hour battery. Larger batteries require Fire•Lite BB-17F or other UL listed battery cabinet).

Supervised for low and no battery

Initiating Device Circuits - TB2

Detector zones 1, 2, 3, 4 and 5

Power-limited circuitry

Operation: All zones (NFPA Style B), Zone 3 (NFPA Style B or D). Use CAC-5F for Style D operation

Normal operating voltage: 24 VDC (ripple = 100mV maximum)

Alarm current: 26 mA Short circuit current: 42 mA maximum

Maximum loop resistance: 100 ohms

End-of-Line Resistor: 4.7K, ½ watt (P/N 27072 UL listed)

Detector loop current sufficient to ensure operation of one alarmed detector/zone

Standby current: 7.26 mA (includes ELR and 2 mA maximum detector current)

Smoke Detector Identifier A

Refer to Fire•Lite Device Compatibility Document for listed compatible devices

Notification Appliance Circuits - TB5

Nonregulated special purpose power, Style Y supported. Use NACA-2F for Style Z operation

Power-limited circuitry

Operating voltage nominal 24 volts

Current limit: PTC Maximum signaling current/circuit: 1.5 amps (3.0 amps max. for all external devices)

End-of-Line Resistor: 4.7K, ½ watt (P/N 71252 UL listed) for Notification Appliance Circuits

Refer to Fire•Lite Device Compatibility Document for listed compatible devices

Programmable Relays - TB4

Contact rating: 2.0 amps @ 30 VDC (resistive), 0.5 amps @ 30 VAC (resistive)

Programmable: Form-C

Four-Wire Smoke Detector Power - TB4, Terminals 3(+) & 4(-)

Maximum ripple voltage: 10 mV_{RMS} Operating voltage: nominal 24 volts

Up to 300 mA is available for powering 4-wire smoke detectors

Power-limited circuitry Maximum standby current: 50 mA

Refer to Fire•Lite Device Compatibility Document for compatible listed devices

Telephone Requirements and Warnings

Nonresettable 24 VDC Power - TB4, Terminals 1(+) & 2(-)

Maximum ripple voltage: $10\text{ mV}_{\text{RMS}}$ Operating voltage: nominal 24 volts
Total DC current available from this output is up to 300 mA
Power-limited circuitry Maximum standby current is 150 mA
Refer to Fire•Lite Device Compatibility Document for compatible listed devices

Notes:

1. For power supply calculations, refer to “Battery Calculations” on page 63
2. Total current for nonresettable power, 4-wire smoke power and two NACs *must not exceed 3.6 amps*

1.8 Telephone Requirements and Warnings

1.8.1 Telephone Circuitry

Ringer Equivalence Number (REN) = 1.3B
AC Impedance 10.0 Mega Ohm
Complies with FCC Part 68
Mates with RJ31X Male Connector
Supervision Threshold: less than 4.0 volts for 2 minutes

The REN is used to determine the quantity of devices which may be connected to the telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of the RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to the line, as determined by the total RENs, contact the telephone company to determine the maximum REN for the calling area.

1.8.2 Digital Communicator

Before connecting the control panel to the public switched telephone network, the installation of two RJ31X jacks is necessary. The following information is provided if required by the local telephone company:

Manufacturer: Fire•Lite Alarms, Inc.
One Fire-Lite Place
Northford, CT 06472

Product Model Number: MS-5024
FCC Registration Number: 1W6USA-20004-AL-E
Ringer Equivalence: 1.3B

Note: The FCC ID label is located on the inside of the control panel door.

1.8.3 Telephone Company Rights and Warnings

The telephone company under certain circumstances may temporarily discontinue services and/or make changes in its facilities, services, equipment or procedures which may affect the operation of this control panel. However, the telephone company is required to give advance notice of such changes or interruptions.

If the control panel causes harm to the telephone network, the telephone company reserves the right to temporarily discontinue service. Advance notification will be provided except in cases when advance notice is not practical. In such cases, notification will be provided as soon as possible. The opportunity will be given to correct any problems and to file a complaint.

DO NOT CONNECT THIS PRODUCT TO COIN TELEPHONE, GROUND START OR PARTY LINE SERVICES.

Telephone Requirements and Warnings

When the control panel activates, premises phones will be disconnected.

Two separate phone lines are required. Do not connect both telephone interfaces to the same telephone line.

The control panel must be connected to the public switched telephone network upstream of any private telephone system at the protected premises.

An FCC compliant telephone cord must be used with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible RJ31X male modular plug which is Part 68 compliant.

1.8.4 For Canadian Applications

The following is excerpted from CP-01 Issue 5:

“NOTICE: The Industry Canada (IC) label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). 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 company. The equipment must also be installed using an acceptable method of connection. 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.

“The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination of an interface may consist of any combination of devices subject only to the requirement that the sum of the REN of all devices does not exceed 5.”

Representative: NOTIFIER, CANADA
24 Viceroy Road
Concord, Ontario L4K2L9

IC Certificate Number: 21325785A
Ringer Equivalence Number (REN): 1.3B
Load Number: 2

CHAPTER 2 *Installation*

2.1 Mounting Options

The cabinet may be either semi-flush or surface mounted. The door is removable during the installation period by opening and lifting off the hinges. The cabinet mounts using two key slots and two additional 0.250" diameter holes located in the backbox. The key slots are located at the top of the backbox and the two securing holes at the bottom.

Carefully unpack the system and check for shipping damage. Mount the cabinet in a clean, dry, vibration-free area where extreme temperatures are not encountered. The area should be readily accessible with sufficient room to easily install and maintain the panel. Locate the top of the cabinet approximately five feet above the floor with the hinge mounting on the left. Determine the number of conductors required for the devices to be installed. Sufficient knockouts are provided for wiring convenience. Select the appropriate knockout(s) and pull the required conductors into the box. Note that there are no knockouts located on the left (hinged) side of the cabinet. All wiring should be in accordance with the National and/or Local codes for fire alarm systems.



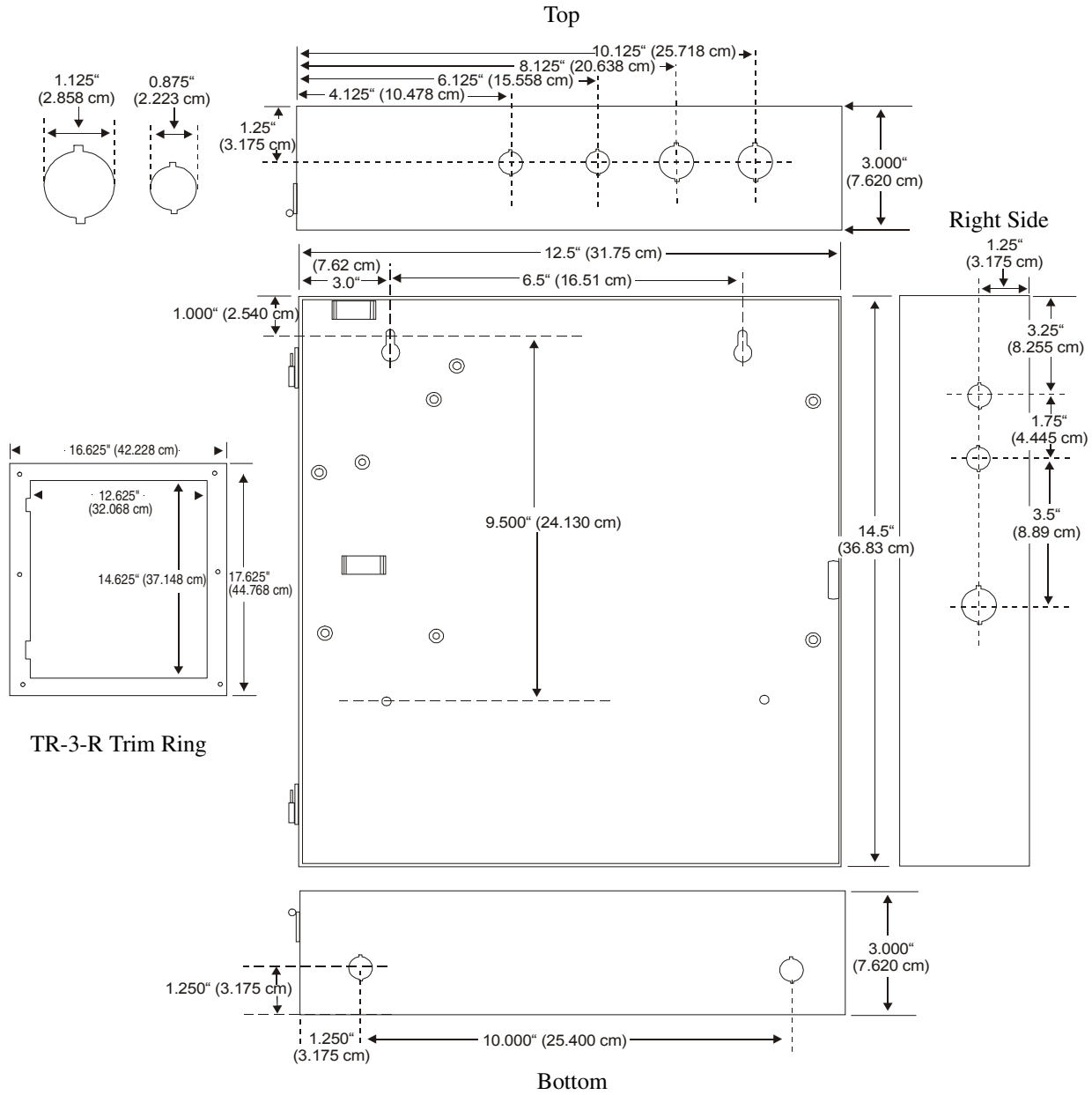
2.2 Backbox Mounting

- Refer to Figure 2-1 on page 20 and Figure 2-2 on page 21
- Make certain there is no power (AC or DC) applied to the control panel
- Open the door and lift the door off the pin hinges
- Remove AC wiring
- Remove the main PC board assembly by unscrewing the five screws in the corners of the board. Two stand-offs support the board in the center. Set the board aside in a safe, clean place. Avoid static discharge which may damage the board
- Mark and predrill holes for the top two keyhole mounting bolts using the dimensions shown
- Install two upper fasteners in the wall with the screw heads protruding
- Using the upper 'keyholes', mount the backbox over the two screws
- Mark and drill the lower two holes
- Mount backbox, install remaining fasteners and tighten
- When the location is dry and free of construction dust, reinstall the main PC board

Backbox Mounting

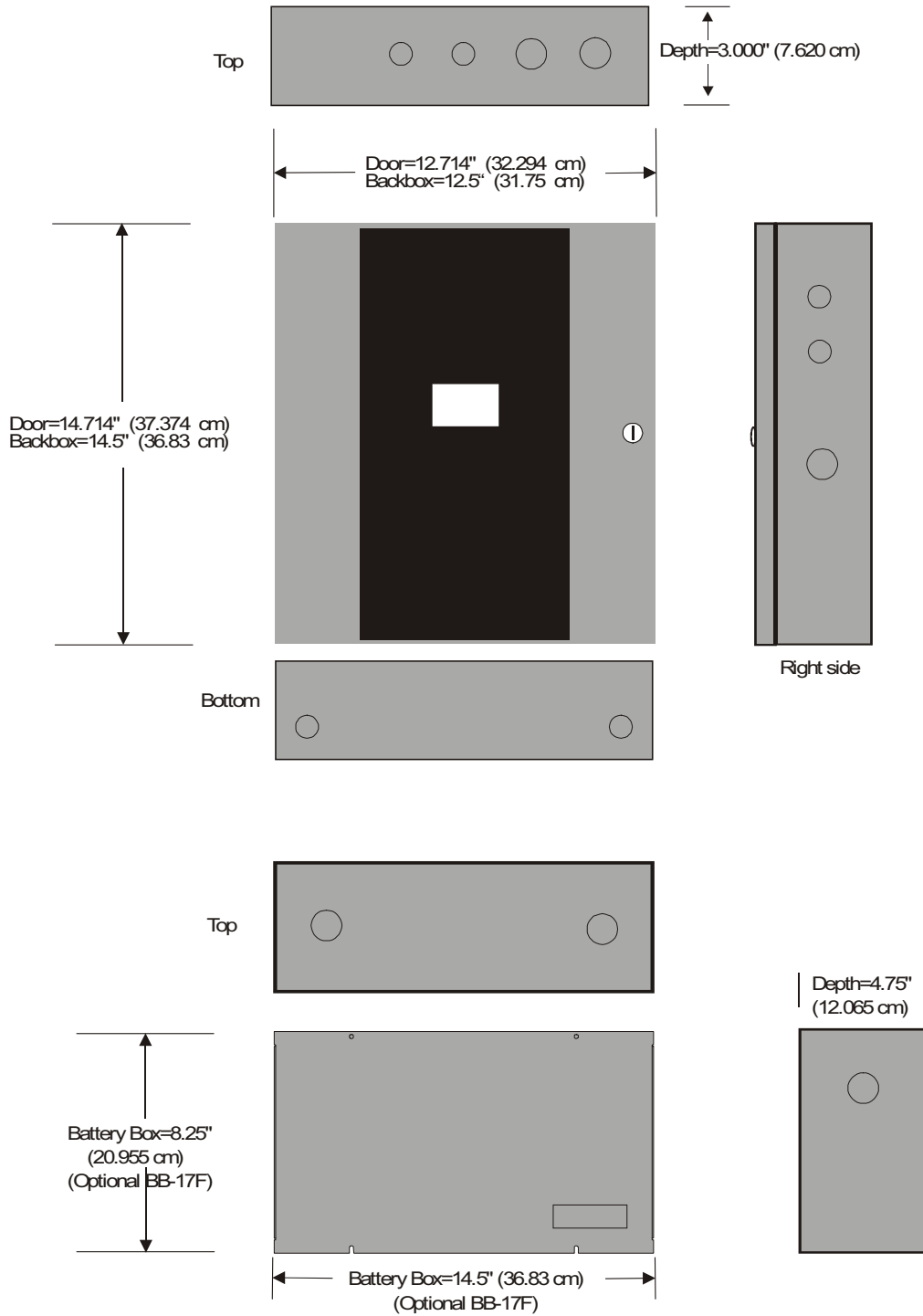
Draw wires through the respective knockout locations.

FIGURE 2-1: Cabinet Dimensions and Knockout Locations



Backbox Mounting

FIGURE 2-2: Backbox and Battery Box



Notes:

1. Mount the MS-5024 cabinet to the wall
2. Remove appropriate knockouts from the MS-5024 cabinet and BB-17F
3. Position the BB-17F near the MS-5024 cabinet and connect with conduit, making sure there is at least ½" of clearance between the two cabinets
4. Anchor the BB-17F to the wall

2.3 Operating Power

CAUTION! Several different sources of power can be connected to this panel. Disconnect all sources of power before servicing. The panel and associated equipment may be damaged by removing and/or inserting cards, modules or interconnecting cables while this unit is energized.

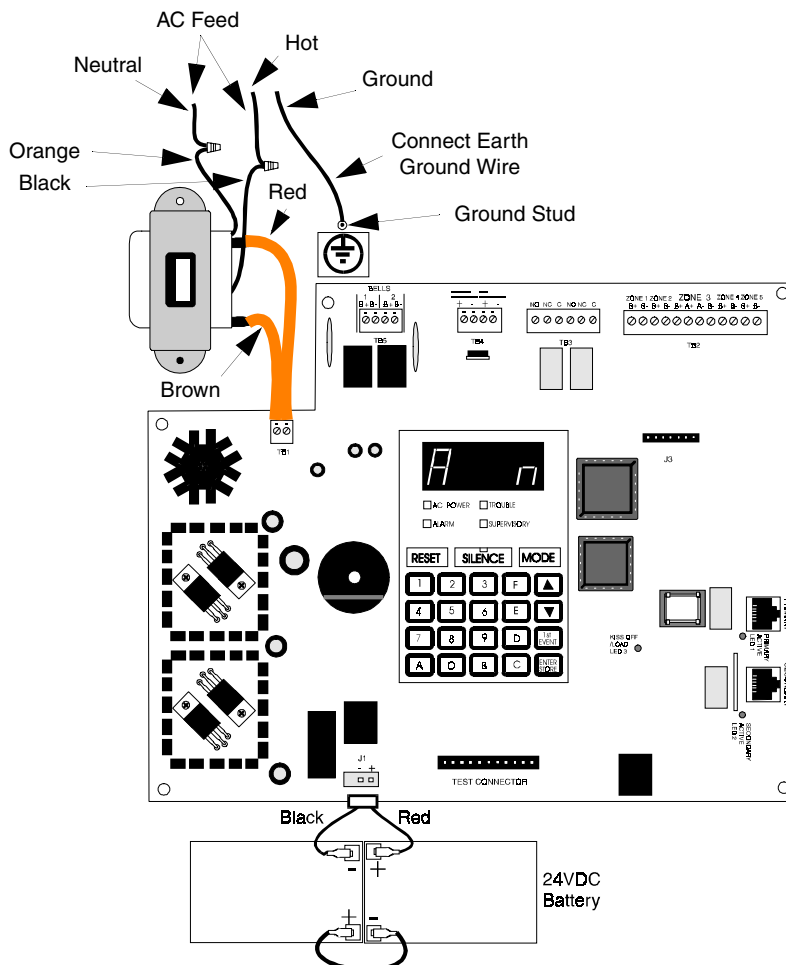
Primary Power Source (AC) and Earth Ground Connections

AC connections are made inside the control panel cabinet. Primary power source for the MS-5024 is 120VAC, 60 Hz, 1.2 amps and for the MS-5024E is 220/240VAC, 50 Hz, 0.6 amps. Run a pair of wires (with ground conductor) from the protected premises main breaker box to the orange and black primary leads of the MS-5024 transformer. As per the National Electric Code, use 14 AWG (2.00 mm²) or heavier gauge wire with 600 V insulation. No other equipment may be connected to this circuit. In addition, this circuit must be provided with overcurrent protection and may not contain any power disconnect devices. A separate Earth Ground connection must be made to ensure proper panel operation and lightning and transient protection. Connect the Earth Ground wire, minimum 14 AWG (2.00 mm²), to the grounding stud indicated by the ground symbol label. *Note that conduit must not be used for an Earth Ground connection since this does not provide reliable protection.*

Secondary Power Source (batteries)

Observe polarity when connecting the battery. Connect the battery cable to J1 on the main circuit board using the plug-in connector provided. The battery charger is current-limited and capable of recharging sealed lead acid type batteries. The charger shuts off when the system is in alarm or if the battery voltage drops too low (below 14.2VDC). See Appendix A for calculations of the correct battery rating. **WARNING!** Battery contains sulfuric acid which can cause severe burns to the skin and eyes and can destroy fabrics. If contact is made with sulfuric acid, immediately flush the skin or eyes with water for 15 minutes and seek immediate medical attention.

FIGURE 2-3: Operating Power Connections



2.4 Input Circuits

The control panel has five zone input circuits. The maximum loop resistance limit for each is 100 ohms. All field wiring of each zone is supervised for opens and ground faults. Both conditions are visually and audibly annunciated as well as communicated to a Central Station.

Each zone is a Style B (Class B) Initiating Device Circuit designed to accept any Normally Open contact device and conventional 2-wire, 24 volt smoke detectors. Each zone is power-limited to 7.26 mA in standby and 42 mA in alarm. Zone 3 may also be configured as a Style D (Class A) Initiating Device Circuit. Figure 2-5 illustrates typical circuit connections. *Note that all five initiating zones may be converted to Style D (Class A) by using a CAC-5F Class A Converter module (refer to Figure 2-15 on page 30).*

Zones 1-5 may be programmed as shown below. The factory default is 2-wire smoke detector for all zones.

- 2-wire Smoke Detector (factory default)
- Pull Station
- Normally Open Contact Device
- Supervisory
- Supervisory, autoresettable

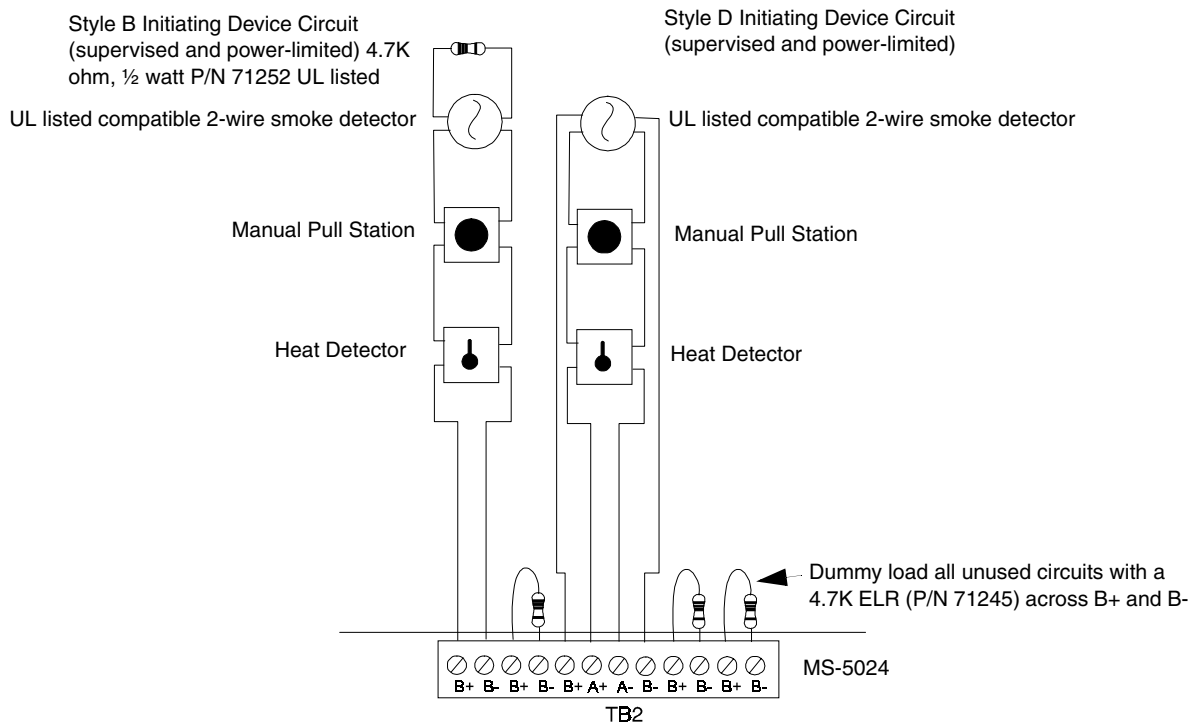
Zone 3 may also be programmed as:

- Waterflow silenceable
- Waterflow nonsilenceable

Note: A maximum of five waterflow devices may be used on Zone 3 per NFPA 72.

Four-wire smoke detectors may be connected to any zone. Resettable power is provided via TB4, Terminals 3 & 4. *It is allowable to mix an assortment of device types (i.e. smoke detectors, heat detectors, pull stations, etc.) on any zone. However, this is not recommended since specific and detailed reports will not be possible. For example, the report of general fire alarm versus pull station fire alarm or smoke detector fire alarm.*

FIGURE 2-4: Typical Initiating Device Circuit Connections



2.5 Output Circuits

2.5.1 DC Power Output Connections

All DC power outputs are power-limited.

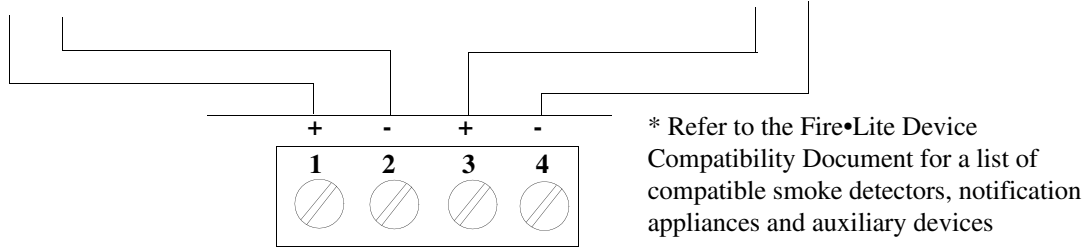
FIGURE 2-5: Auxiliary Power Connections

***Nonresettable Power (300 mA)**

24 VDC filtered, nonresettable power can be obtained from TB4 Terminals 1(+) & 2(-)

***4-Wire Smoke Detector Power (300 mA)**

24 VDC filtered, resettable power for 4-wire smoke detectors can be obtained from TB4 Terminals 3(+) & 4(-)



2.5.2 Telephone Circuits

Provision to connect to two independent telephone lines is available via two telephone jacks labeled PH1 (Primary) and PH2 (Secondary). Telephone line control/command is possible via double line seizure as well as usage of an RJ31X style interconnection (refer to Figure 2-9 on page 27).

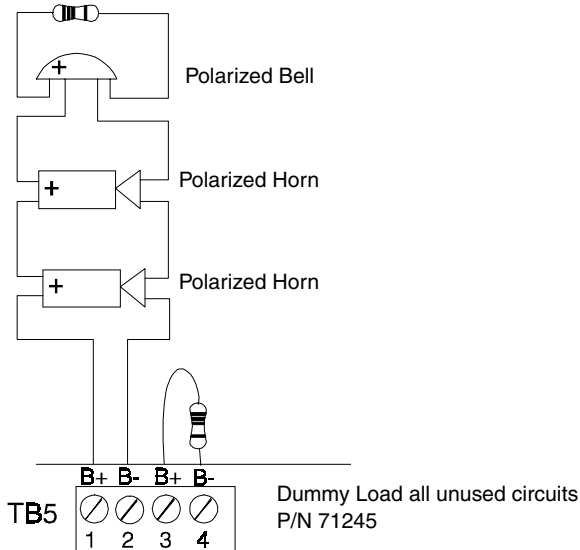
2.5.3 Notification Appliance Circuits (full-wave rectified)

The MS-5024 provides two Style Y NACs (Notification Appliance Circuits), each capable of 1.5 amps of current. Total current drawn from these as well as other DC power outputs cannot exceed 3.6 amps. Circuits are supervised and power-limited. Figure 2-6 illustrates a typical circuit connection. Refer to the Fire•Lite Device Compatibility Document for a listing of compatible notification appliances.

Note that both NACs may be converted to Style Z (Class A) by using an NACA-2F Class A Converter module (refer to Figure 2-14 on page 30).

FIGURE 2-6: Typical NAC Connections

Style Y Notification Appliance Circuit (supervised and power-limited). 4.7K ohm, 1/2 watt P/N 71252 UL listed



Output Circuits

Note that both NACs may be programmed as follows:

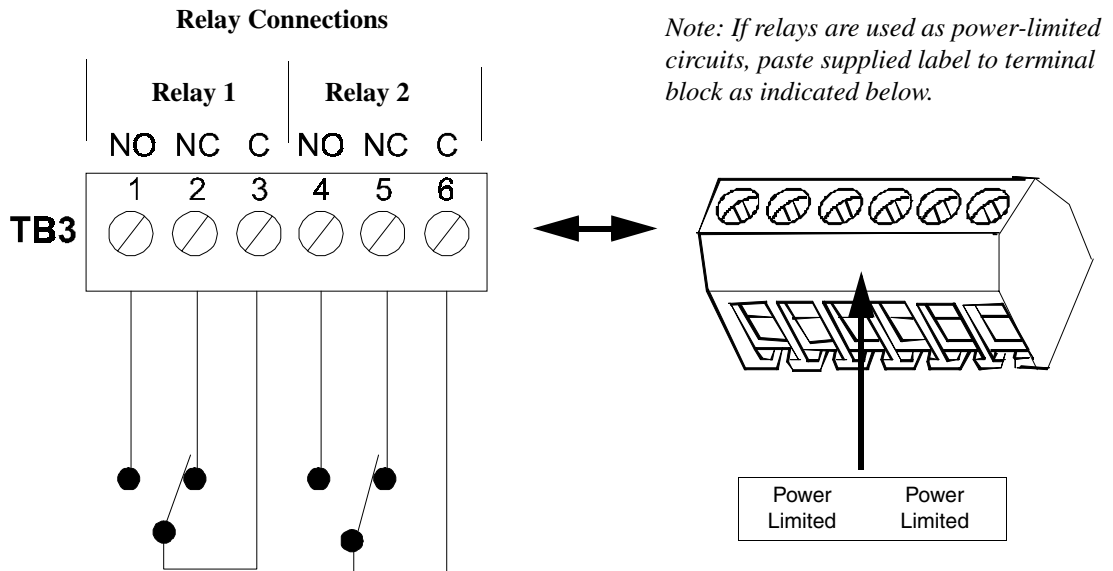
- Silenceable
- Nonsilenceable
- Enabled/Disabled
- Silence Inhibited
- Autosilence, 5 to 30 minutes
- Coded (March Time, Temporal, California)

2.5.4 Programmable Relays

The control panel provides two sets of Form-C programmable relay contacts rated for 2.0 amps @ 30 VDC (resistive). Each relay may be programmed for alarm, trouble, supervisory, communications failure or any combination of these. Refer to Figure 2-7 on page 25 for UL Power-limited wiring requirements.

Note that all relay connections must be power-limited or nonpower-limited. No mixing is permitted.

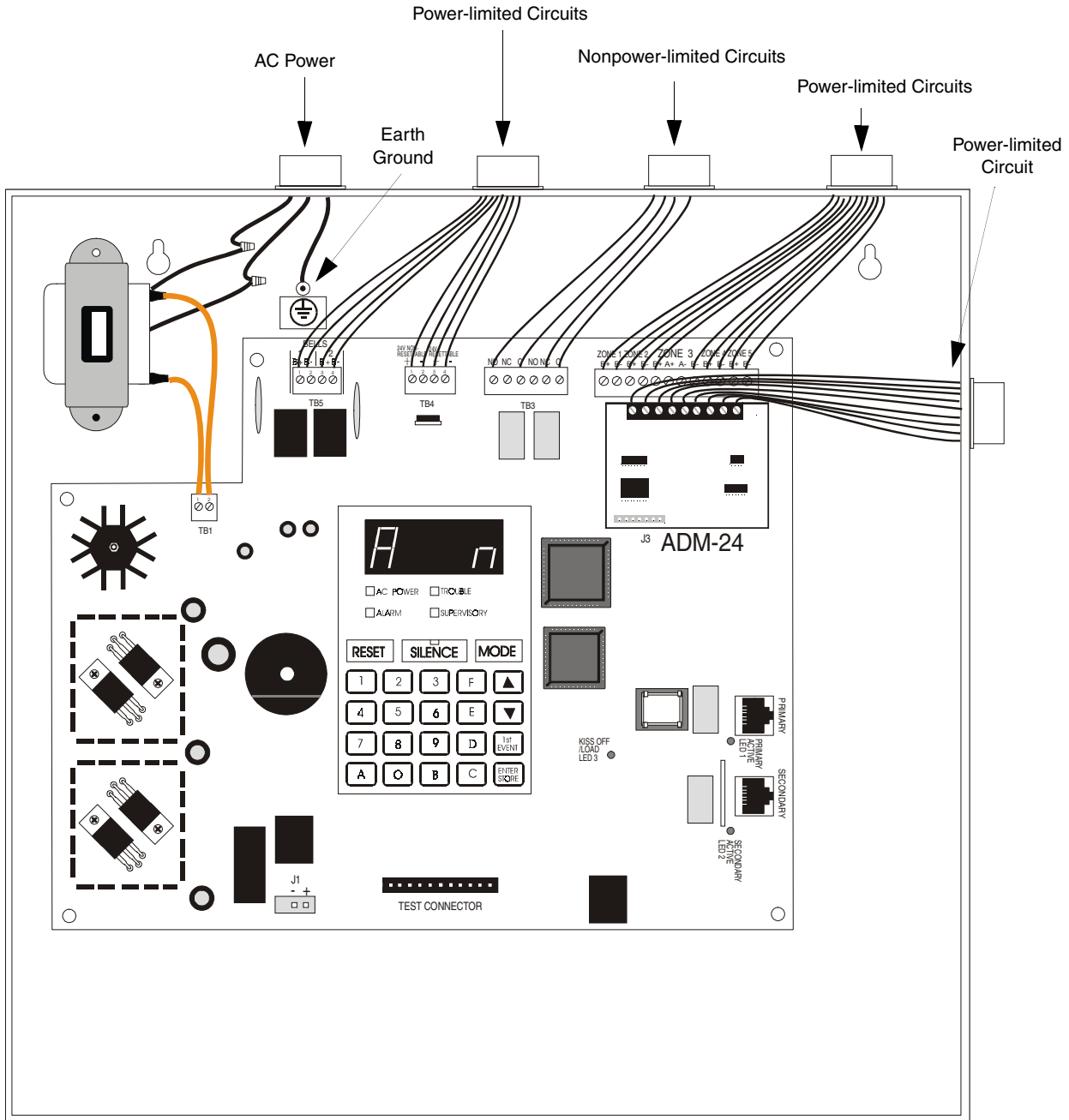
FIGURE 2-7: Programmable Relay Terminals



2.6 UL Power-limited Wiring Requirements

Power-limited and nonpower-limited circuit wiring must remain separated in the cabinet. All power-limited circuit wiring must remain at least 0.25" away from any nonpower-limited circuit wiring. Furthermore, all power-limited circuit wiring and nonpower-limited circuit wiring must enter and exit the cabinet through different knockouts and/or conduits. A typical wiring diagram for the MS-5024 is shown below.

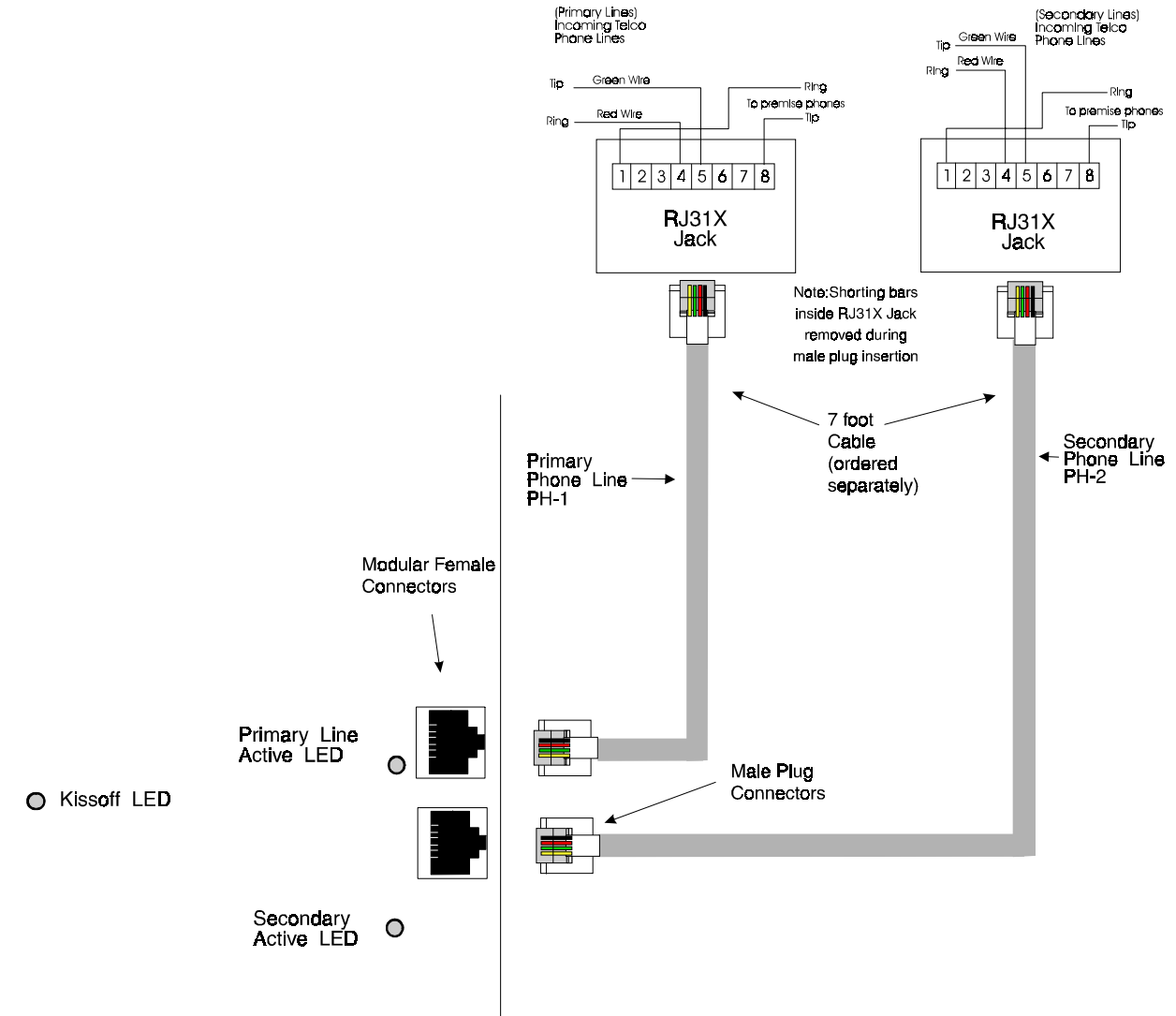
FIGURE 2-8: Typical Wiring Diagram for UL Power-limited Requirements



2.7 Digital Communicator

Two independent telephone lines can be connected to the control panel. Telephone line control/command is made possible via double line seizure as well as usage of an RJ31X style interconnection. The control panel's digital communicator is built into the main circuit board. Connection and wiring of two phone lines is required as shown below. *Note that it is critical that the digital communicator be located as the first device on the incoming telephone circuit to properly function.*

FIGURE 2-9: Wiring Phone Jacks

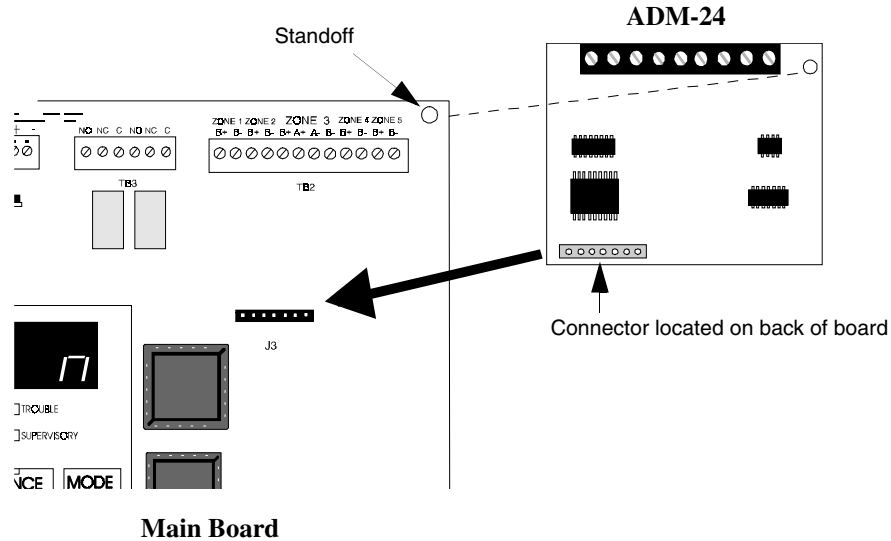


2.8 Optional Boards

2.8.1 ADM-24 Annunciator Driver Module

The ADM-24 supports the RZA-5F Remote Annunciator. The wiring is supervised for open conditions by this module. The Annunciator Driver Module mounts to J3 in the upper right corner of the main circuit board.

FIGURE 2-10:ADM-24



2.8.2 RZA-5F Remote Annunciator

The RZA-5F mounts on a standard single-gang electrical box and provides LED indication of the following:

- Alarm Zone 1 (red LED)
- Alarm Zone 2 (red LED)
- Alarm Zone 3 (red LED)
- Alarm Zone 4 (red LED)
- Alarm Zone 5 (red LED)
- System Trouble (yellow LED)

The remote annunciator provides individual zone alarm LEDs, a system trouble LED, a piezo sounder and a remote sounder shut off switch. All LEDs and their wiring are supervised for open conditions. Any open condition will cause the System Trouble LED to illuminate.

Note that the RZA-5F requires the use of an ADM-24 Annunciator Drive Module. Only one RZA-5F/ADM-24 combination is allowed per system.

FIGURE 2-11:RZA-5F

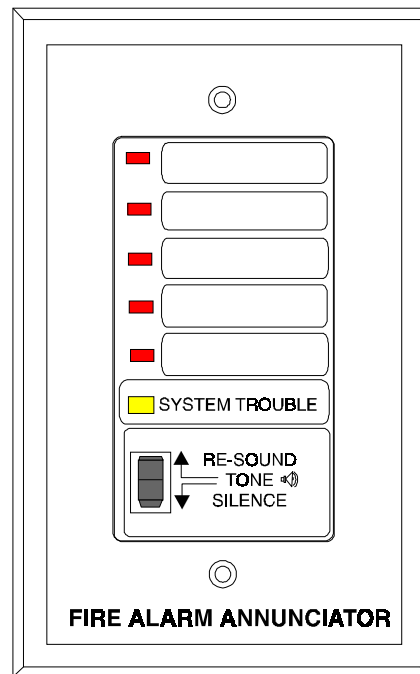


FIGURE 2-12:Wiring the RZA-5F/ADM-24

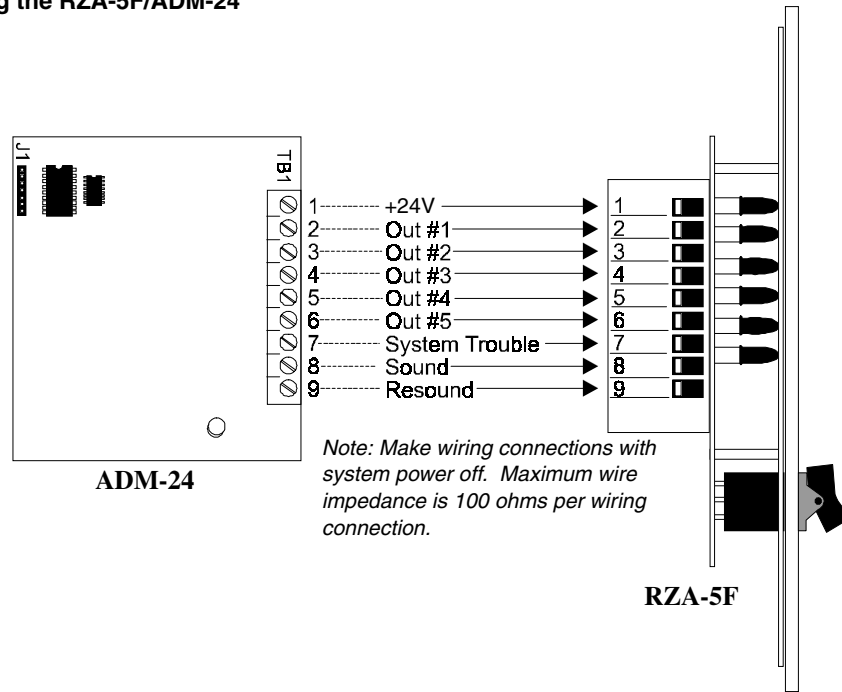
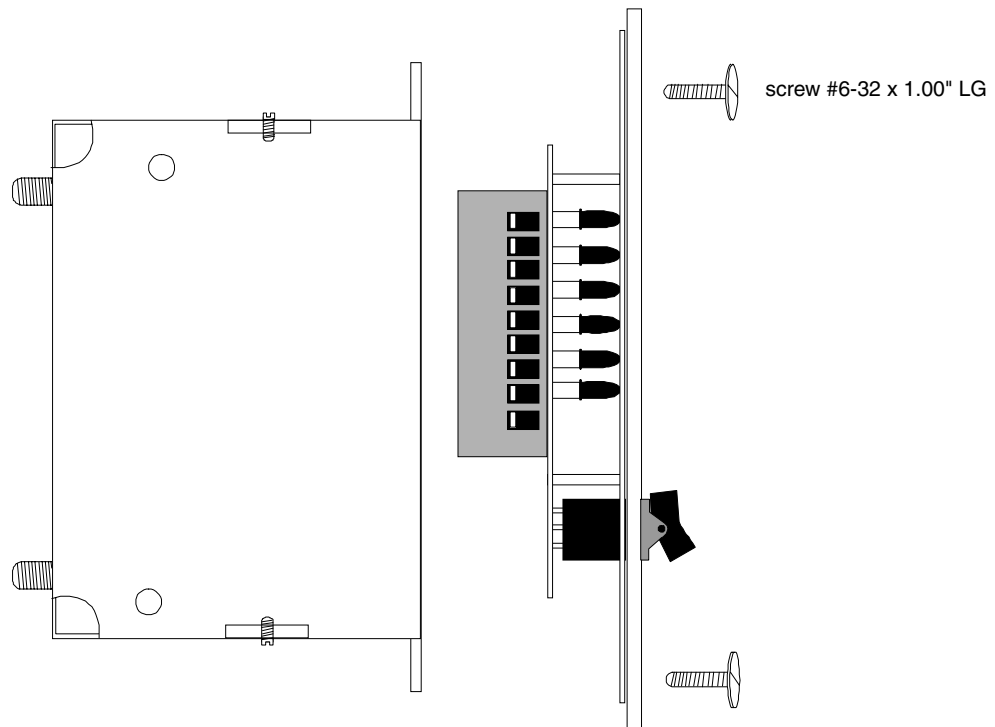


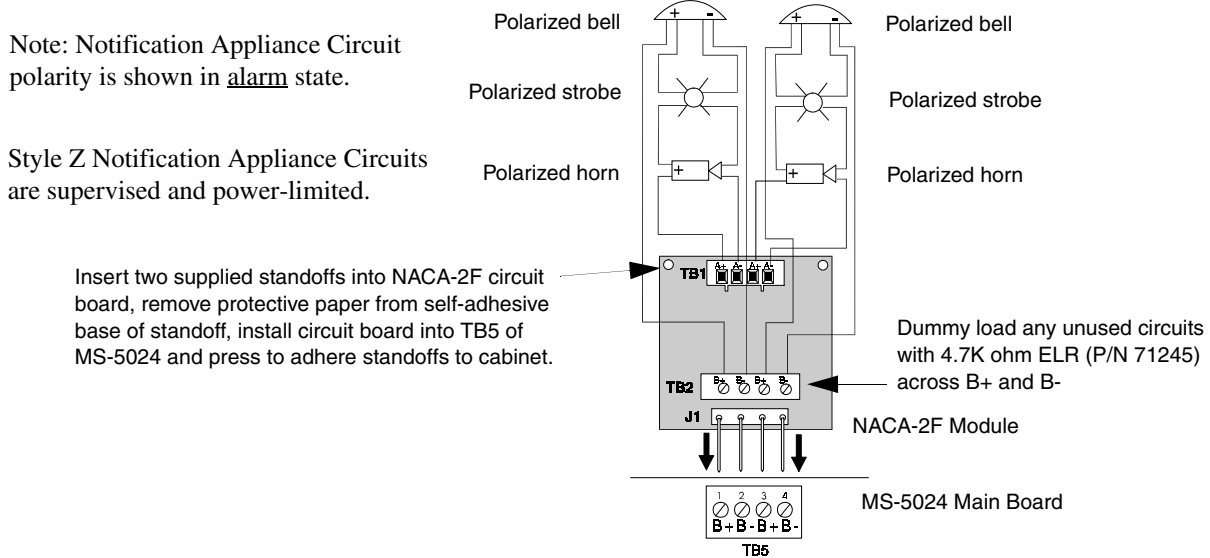
FIGURE 2-13:Installing Annunciator in Single-Gang Box



2.8.3 NACA-2F and CAC-5F Class A Converter Modules

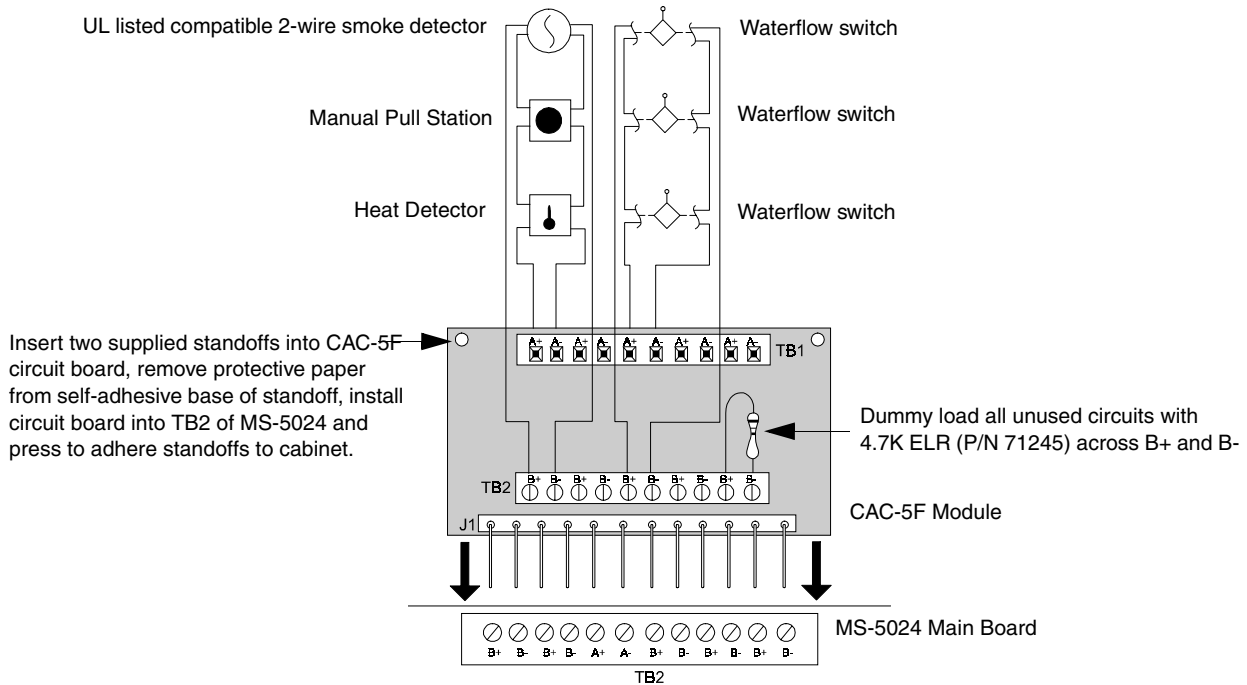
The NACA-2F module is used to convert the two Style Y (Class B) Notification Appliance Circuits to two Style Z (Class A) NACs. The module connector J1 is inserted into the terminals of terminal block TB5 on the MS-5024 and the terminal screws are tightened to secure the module. The NACs are wired as illustrated in Figure 2-14.

FIGURE 2-14:NACA-2F Style Z Converter Module



The CAC-5F module is used to convert the Initiating Device Circuits to five Style D IDCs. The module connector J1 is inserted into the terminals of terminal block TB2 on the MS-5024 and the terminal screws are tightened to secure the module. The IDCs are wired as illustrated in Figure 2-15.

FIGURE 2-15:CAC-5F Style D Converter Module



Note:

1. Circuits 1 through 5 can accommodate 2-wire smoke detectors plus any normally open contact device such as heat detectors or manual pull stations
2. Only circuit 3 accommodates the nonsilenceable waterflow function

CHAPTER 3 *Programming Instructions*

This chapter describes programming the panel from the onboard keypad. Programming of the control panel is possible at any time except when an alarm condition is present or during a fire drill.

The control panel has been designed for many different types of applications. After examining your specific application, review the programming options and choose the entries best suited for your system.

The control panel has a built-in intelligent programmer. All programming selections are stored in nonvolatile Electrically-Erasable Programmable Read-Only Memory (EEPROM). This ensures that the control panel will retain all entries made in programming mode even if both AC and battery power are removed. Invalid entries cause a 'beep' from the onboard piezo sounder.

The user *must* program the primary and secondary phone numbers, account numbers and 24 hour test report times for each Central Station account and the current time and date. The control panel comes with factory chosen options/features already programmed. Other options/features may be programmed if desired. If all factory default settings are acceptable, programming is complete.

Successful entry into Program Mode places the system into trouble. A 'system off-normal' message is transmitted to the Central Station.

3.1 Entering Program Mode

To enter Program Mode, press the **MODE** key once (the display will go blank). The user then has ten seconds to start entering the code **7764**.

☛ **7764** spells PROG on a Touch-Tone® phone

If an incorrect key is entered, reenter the proper 4-digit code *before* pressing the **[ENTER/STORE]** key. Note that as the information is entered into the control panel, the digits will scroll across the display from right to left.

```

  _7
 _77
_776
7764
    
```

The user is allowed a pause of up to 10 seconds between each number while entering the code. After pressing the **[ENTER/STORE]** key, the control panel will be in Program Mode and will display **00_F**. A maximum of 10 minutes of idle time is allowed at this point before starting the programming, otherwise the control panel will return to Normal Mode. A maximum of 10 minutes between key strokes is also allowed. All entries made prior to the 10 minute time-out are valid and are stored.

Once in Programming Mode, the control panel will:

- Blink the trouble LED
- Activate the relay(s) if programmed for trouble
- Disable the Notification Appliance Circuit(s)
- Disable the relay(s) if programmed for alarm
- Display **00_F**
- Ignore all other keys other than those mentioned in this section
- Continue to communicate any events not previously acknowledged at a Central Station prior to entering Program Mode

Switch (Key) Functions

Note that location 56 is factory defaulted to '0' for control panel only. This keeps the communicator off until location 56 is changed to '1' for slave communicator or '2' for panel/communicator. Once location 56 is set to '1' or '2' and a valid phone number is entered, entry into the Program Mode will cause transmission of the 'system off-normal' report.

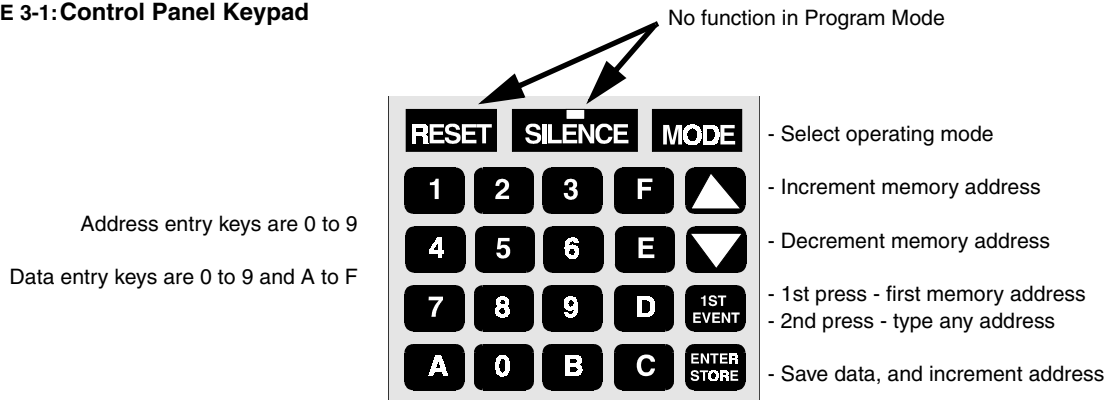
Throughout Program Mode, the first three locations on the left of the display represent the memory address which can range from 000 to 313 (alpha characters are not used). The last location (farthest right) represents the contents of the memory address. The first address displayed is shown below:

00_F
(address)(data)

3.2 Switch (Key) Functions

The function of each switch (key) in Program Mode is shown below.

FIGURE 3-1: Control Panel Keypad



3.3 Programming Options

Primary Central Station Phone Number (00-15)

The first sixteen addresses, 00-15, are factory set to 'F' (from **00_F** to **15_F**). Programming is typically done as follows: If the phone number to be entered is 484-7161, press the **4** key. The display will read **00_4**. Press the [ENTER/STORE] key to save the entry to memory and increment to the next address **01_F**.

Enter the remaining numbers in their respective addresses as shown below:

4	8	4	7	1	6	1	F	F	F	F	F	F	F	F	F
00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15

Valid entries for both the primary and secondary phone numbers are 0 - F with the numeric digits as dialed numbers and the alpha characters representing the following functions:

- A = * on a Touchtone phone keypad
- B = # on a Touchtone phone keypad
- C = look for secondary dial tone for up to 2 seconds (then dial anyway)
- D = three second pause
- E = five second pause
- F = end of phone number ('F' must be entered)

Primary Central Station Number Communication Format (16)

One location is needed to select the Communication Format for the primary phone number. Address 16 is used for this purpose. The default (factory setting) for this address is 'A' (16_A), which is 4+2 Standard, 1800 Hz 'Carrier', 2300 Hz 'ack'. You may enter 0 through D in place of the default, then press the [ENTER/STORE] key. Choose from the list of formats below:

- 0: 4+1 Ademco Express Standard, DTMF, 1400/2300 ACK
- 1: 4+2 Ademco Express Standard, DTMF, 1400/2300 ACK
- 2: 3+1 Standard 1800 Hz Carrier, 2300 Hz ACK
- 3: 3+1 Expanded 1800 Hz Carrier, 2300 Hz ACK
- 4: 3+1 Standard 1900 Hz Carrier, 1400 Hz ACK
- 5: 3+1 Expanded 1900 Hz Carrier, 1400 Hz ACK
- 6: 4+1 Standard 1800 Hz Carrier, 2300 Hz ACK
- 7: 4+1 Expanded 1800 Hz Carrier, 2300 Hz ACK
- 8: 4+1 Standard 1900 Hz Carrier, 1400 Hz ACK
- 9: 4+1 Expanded 1900 Hz Carrier, 1400 Hz ACK
- A: 4+2 Standard 1800 Hz Carrier, 2300 Hz ACK
- B: 4+2 Expanded 1800 Hz Carrier, 2300 Hz ACK
- C: 4+2 Standard 1900 Hz Carrier, 1400 Hz ACK
- D: 4+2 Expanded 1900 Hz Carrier, 1400 Hz ACK
- E: Not used
- F: Not used

Note: Consult your Central Station for proper selection or consult our factory representatives. For any format chosen, the control panel automatically programs all of the event codes. See Table 3-1 , Table 3-2 , Table 3-3 and Table 3-4 .

CAUTION! Default entries for event codes (as shown in Table 3-1 through Table 3-4) are programmed into memory each time address 16 is altered. Be certain to double check entries after programming the Zone Functions, addresses 57 - 61. Program the Format first then program the Zone(s) Function.

3+1, 4+1 Express, 4+1 Standard and Expanded, 4+2 Expanded Formats

If '0, 2, 3, 4, 5, 6, 7, 8, 9, B or D' is entered for address 16, the data in Table 3-1 is automatically programmed for the Primary Central Station phone number event codes. Enter '0' for the setting to disable the report.

TABLE 3-1: 3+1, 4+1 Express, 4+1 Standard and Expanded, 4+2 Expanded - Primary

Address	Description	Setting
82	Primary # Zone 1 Alarm Code	1
83	Primary # Zone 2 Alarm Code	1
84	Primary # Zone 3 Alarm Code	1
85	Primary # Zone 4 Alarm Code	1
86	Primary # Zone 5 Alarm Code	1
87	Primary # Zone 1 Disabled Code	F
88	Primary # Zone 2 Disabled Code	F
89	Primary # Zone 3 Disabled Code	F
90	Primary # Zone 4 Disabled Code	F
91	Primary # Zone 5 Disabled Code	F
92	Primary # Drill Code	9
93	Primary # AC Fault Code	F
94	Primary # Zone 1 Fault Code	F
95	Primary # Zone 2 Fault Code	F
96	Primary # Zone 3 Fault Code	F
97	Primary # Zone 4 Fault Code	F

TABLE 3-1: 3+1, 4+1 Express, 4+1 Standard and Expanded, 4+2 Expanded - Primary

Address	Description	Setting
98	Primary # Zone 5 Fault Code	F
99	Primary # Earth Fault Code	F
100	Primary # Low Battery Fault Code	F
101	Primary # No Battery Fault Code	F
102	Primary # Telco Primary Line Fault Code	F
103	Primary # Telco Secondary Line Fault Code	F
104	Primary # NAC #1 Fault Code	F
105	Primary # NAC #2 Fault Code	F
106	Primary # Communication Trouble Primary # Fault Code	F
107	Primary # Communication Trouble Secondary # Fault Code	F
108	Primary # Annunciator Fault Code	F
109	Primary # System Off Normal Code	F
110	Primary # Zone 1 Alarm Restore Code	E
111	Primary # Zone 2 Alarm Restore Code	E
112	Primary # Zone 3 Alarm Restore Code	E
113	Primary # Zone 4 Alarm Restore Code	E
114	Primary # Zone 5 Alarm Restore Code	E
115	Primary # Zone 1 Disabled Restore Code	E
116	Primary # Zone 2 Disabled Restore Code	E
117	Primary # Zone 3 Disabled Restore Code	E
118	Primary # Zone 4 Disabled Restore Code	E
119	Primary # Zone 5 Disabled Restore Code	E
120	Primary # Drill Restore Code	9
121	Primary # AC Fault Restore Code	E
122	Primary # Zone 1 Fault Restore Code	E
123	Primary # Zone 2 Fault Restore Code	E
124	Primary # Zone 3 Fault Restore Code	E
125	Primary # Zone 4 Fault Restore Code	E
126	Primary # Zone 5 Fault Restore Code	E
127	Primary # Earth Fault Restore Code	E
128	Primary # Low Battery Fault Restore Code	E
129	Primary # No Battery Fault Restore Code	E
130	Primary # Telco Primary Line Fault Restore Code	E
131	Primary # Telco Secondary Line Fault Restore Code	E
132	Primary # NAC #1 Fault Restore Code	E
133	Primary # NAC #2 Fault Restore Code	E
134	Primary # Communication Trouble Primary # Restore Code	E
135	Primary # Communication Trouble Secondary # Restore Code	E
136	Primary # Annunciator Fault Restore Code	E
137	Primary # System Off Normal Restore Code	E
138	Primary # System Test Report	9
139	Primary # System Abnormal Test Report	F

Programming Options

4+2 Standard and 4+2 Express Format

If '1, A or C' is entered for address 16, the data in Table 3-2 is automatically programmed for the Primary Central Station phone number event codes. Enter '00' for the setting to disable the report.

TABLE 3-2: 4+2 Standard and 4+2 Express Format - Primary

Address	Description	Setting
82 - 83	Primary # Zone 1 Alarm Code	11
84 - 85	Primary # Zone 2 Alarm Code	12
86 - 87	Primary # Zone 3 Alarm Code	13
88 - 89	Primary # Zone 4 Alarm Code	14
90 - 91	Primary # Zone 5 Alarm Code	15
92 - 93	Primary # Zone 1 Disabled Code	F1
94 - 95	Primary # Zone 2 Disabled Code	F2
96 - 97	Primary # Zone 3 Disabled Code	F3
98 - 99	Primary # Zone 4 Disabled Code	F4
100 - 101	Primary # Zone 5 Disabled Code	F5
102 - 103	Primary # Drill Code	97
104 - 105	Primary # AC Fault Code	F6
106 - 107	Primary # Zone 1 Fault Code	F1
108 - 109	Primary # Zone 2 Fault Code	F2
110 - 111	Primary # Zone 3 Fault Code	F3
112 - 113	Primary # Zone 4 Fault Code	F4
114 - 115	Primary # Zone 5 Fault Code	F5
116 - 117	Primary # Earth Fault Code	F7
118 - 119	Primary # Low Battery Fault Code	F8
120 - 121	Primary # No Battery Fault Code	F9
122 - 123	Primary # Telco Primary Line Fault Code	FA
124 - 125	Primary # Telco Secondary Line Fault Code	FB
126 - 127	Primary # NAC #1 Fault Code	FC
128 - 129	Primary # NAC #2 Fault Code	FC
130 - 131	Primary # Communication Trouble Primary # Fault Code	FD
132 - 133	Primary # Communication Trouble Secondary # Fault Code	FE
134 - 135	Primary # Annunciator Fault Code	FC
136 - 137	Primary # System Off Normal Code	FF
138 - 139	Primary # Zone 1 Alarm Restore Code	E1
140 - 141	Primary # Zone 2 Alarm Restore Code	E2
142 - 143	Primary # Zone 3 Alarm Restore Code	E3
144 - 145	Primary # Zone 4 Alarm Restore Code	E4
146 - 147	Primary # Zone 5 Alarm Restore Code	E5
148 - 149	Primary # Zone 1 Disabled Restore Code	E1
150 - 151	Primary # Zone 2 Disabled Restore Code	E2
152 - 153	Primary # Zone 3 Disabled Restore Code	E3
154 - 155	Primary # Zone 4 Disabled Restore Code	E4
156 - 157	Primary # Zone 5 Disabled Restore Code	E5
158 - 159	Primary # Drill Restore Code	98
160 - 161	Primary # AC Fault Restore Code	E6
162 - 163	Primary # Zone 1 Fault Restore Code	E1
164 - 165	Primary # Zone 2 Fault Restore Code	E2
166 - 167	Primary # Zone 3 Fault Restore Code	E3
168 - 169	Primary # Zone 4 Fault Restore Code	E4
170 - 171	Primary # Zone 5 Fault Restore Code	E5
172 - 173	Primary # Earth Fault Restore Code	E7
174 - 175	Primary # Low Battery Fault Restore Code	E8
176 - 177	Primary # No Battery Fault Restore Code	E9
178 - 179	Primary # Telco Primary Line Fault Restore Code	EA
180 - 181	Primary # Telco Secondary Line Fault Restore Code	EB
182 - 183	Primary # NAC #1 Fault Restore Code	EC
184 - 185	Primary # NAC #2 Fault Restore Code	EC
186 - 187	Primary # Communication Trouble Primary # Restore Code	ED
188 - 189	Primary # Communication Trouble Secondary # Restore Code	EE
190 - 191	Primary # Annunciator Fault Restore Code	EC
192 - 193	Primary # System Off Normal Restore Code	EF
194 - 195	Primary # System Test Report	99
196 - 197	Primary # System Abnormal Test Report	91

Programming Options

Primary Central Station Number Account Code (17-20)

Four locations at addresses 17-20 default to all '0s.' Valid entries are '0-9' and 'A-F.' The number of digits entered must match the format selection. If programming '2, 3, 4 or 5' into address 16, enter three digits (location 20 is not used). If programming '0, 1, 6, 7, 8, 9, A, B, C or D' into address 16, enter four digits.

Primary Central Station Number 24 Hour Test Time (21-24)

Use military time when entering the 24 hour 'test' time. The 24 hour test report to phone number 1 takes up four locations at addresses 21-24. The default is '0000' for 12:00 midnight. The limits for each location are as follows:

21 - enter 0, 1 or 2

22 - enter 0, 1, 2, 3, 4, 5, 6, 7, 8 or 9

23 - enter 0, 1, 2, 3, 4 or 5

24 - enter 0, 1, 2, 3, 4, 5, 6, 7, 8 or 9

Do not use 'A - F' as entries.

Primary Central Station Number 24/12/8/6 Hour Test Time Interval (25)

The test report sent to the Primary phone number may be sent every 6, 8, 12 or 24 hours. If the message is to be sent every 24 hours, leave the factory default entry of '0.' If other test report times are needed, enter '1' for 12 hours, '2' for 8 hours or '3' for 6 hours.

Secondary Central Station Phone Number (26-41)

The sixteen addresses, 26-41, are factory set to 'F' (from **26_F** to **41_F**). Programming is typically done as follows: If the phone number to be entered is 484-7161, press the **4** key. The display will read **26_4**. Press the [**ENTER/STORE**] key to save the entry to memory and increment to the next address **27_F**.

Enter the remaining numbers in their respective addresses as shown below:

4	8	4	7	1	6	1	F	F	F	F	F	F	F	F	F
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41

Valid entries for both the primary and secondary phone numbers are 0 - F with the numeric digits a dialed numbers and the alpha characters representing the following functions:

A = * on a Touchtone phone keypad

B = # on a Touchtone phone keypad

C = look for secondary dial tone for up to 2 seconds (then dial anyway)

D = three second pause

E = five second pause

F = end of phone number (F must be entered)

Secondary Central Station Number Communication Format (42)

One location is needed to select the Communication Format for the secondary phone number. Address 42 is used for this purpose. The default (factory setting) for this address is 'A' (42_A), which is 4+2 Standard, 1800 Hz 'Carrier', 2300 Hz 'ack'. You may enter 0 through D in place of the default, then press the [ENTER/STORE] key. Choose from the list of formats below:

- 0: 4+1 Ademco Express Standard, DTMF, 1400/2300 ACK
- 1: 4+2 Ademco Express Standard, DTMF, 1400/2300 ACK
- 2: 3+1 Standard 1800 Hz Carrier, 2300 Hz ACK
- 3: 3+1 Expanded 1800 Hz Carrier, 2300 Hz ACK
- 4: 3+1 Standard 1900 Hz Carrier, 1400 Hz ACK
- 5: 3+1 Expanded 1900 Hz Carrier, 1400 Hz ACK
- 6: 4+1 Standard 1800 Hz Carrier, 2300 Hz ACK
- 7: 4+1 Expanded 1800 Hz Carrier, 2300 Hz ACK
- 8: 4+1 Standard 1900 Hz Carrier, 1400 Hz ACK
- 9: 4+1 Expanded 1900 Hz Carrier, 1400 Hz ACK
- A: 4+2 Standard 1800 Hz Carrier, 2300 Hz ACK
- B: 4+2 Expanded 1800 Hz Carrier, 2300 Hz ACK
- C: 4+2 Standard 1900 Hz Carrier, 1400 Hz ACK
- D: 4+2 Expanded 1900 Hz Carrier, 1400 Hz ACK
- E: Not used
- F: Not used

Note: Consult your Central Station for proper selection or consult our factory representatives. For any format chosen, the control panel automatically programs all of the event codes. See Table 3-1 , Table 3-2 , Table 3-3 and Table 3-4 .

CAUTION! *Default entries for event codes (as shown in Table 3-1 through Table 3-4) are programmed into memory each time address 42 is altered. Be certain to double check entries after programming the Zone Functions, addresses 57 - 61. Program the Format first then program the Zone(s) Function.*

3+1, 4+1 Express, 4+1 Standard and Expanded, 4+2 Expanded Formats

If '0, 2, 3, 4, 5, 6, 7, 8, 9, B or D' is entered for address 42, the data in Table 3-3 is automatically programmed for the Secondary Central Station phone number event codes. Enter '0' for the setting to disable the report.

TABLE 3-3: 3+1, 4+1 Express, 4+1 Standard and Expanded, 4+2 Expanded - Secondary

Address	Description	Setting
198	Secondary # Zone 1 Alarm Code	1
199	Secondary # Zone 2 Alarm Code	1
200	Secondary # Zone 3 Alarm Code	1
201	Secondary # Zone 4 Alarm Code	1
202	Secondary # Zone 5 Alarm Code	1
203	Secondary # Zone 1 Disabled Code	F
204	Secondary # Zone 2 Disabled Code	F
205	Secondary # Zone 3 Disabled Code	F
206	Secondary # Zone 4 Disabled Code	F
207	Secondary # Zone 5 Disabled Code	F
208	Secondary # Drill Code	9
209	Secondary # AC Fault Code	F
210	Secondary # Zone 1 Fault Code	F
211	Secondary # Zone 2 Fault Code	F
212	Secondary # Zone 3 Fault Code	F
213	Secondary # Zone 4 Fault Code	F

TABLE 3-3: 3+1, 4+1 Express, 4+1 Standard and Expanded, 4+2 Expanded - Secondary

Address	Description	Setting
214	Secondary # Zone 5 Fault Code	F
215	Secondary # Earth Fault Code	F
216	Secondary # Low Battery Fault Code	F
217	Secondary # No Battery Fault Code	F
218	Secondary # Telco Primary Line Fault Code	F
219	Secondary # Telco Secondary Line Fault Code	F
220	Secondary # NAC #1 Fault Code	F
221	Secondary # NAC #2 Fault Code	F
222	Secondary # Communication Trouble Primary # Fault Code	F
223	Secondary # Communication Trouble Secondary # Fault Code	F
224	Secondary # Annunciator Fault Code	F
225	Secondary # System Off Normal Code	F
226	Secondary # Zone 1 Alarm Restore Code	E
227	Secondary # Zone 2 Alarm Restore Code	E
228	Secondary # Zone 3 Alarm Restore Code	E
229	Secondary # Zone 4 Alarm Restore Code	E
230	Secondary # Zone 5 Alarm Restore Code	E
231	Secondary # Zone 1 Disabled Restore Code	E
232	Secondary # Zone 2 Disabled Restore Code	E
233	Secondary # Zone 3 Disabled Restore Code	E
234	Secondary # Zone 4 Disabled Restore Code	E
235	Secondary # Zone 5 Disabled Restore Code	E
236	Secondary # Drill Restore Code	9
237	Secondary # AC Fault Restore Code	E
238	Secondary # Zone 1 Fault Restore Code	E
239	Secondary # Zone 2 Fault Restore Code	E
240	Secondary # Zone 3 Fault Restore Code	E
241	Secondary # Zone 4 Fault Restore Code	E
242	Secondary # Zone 5 Fault Restore Code	E
243	Secondary # Earth Fault Restore Code	E
244	Secondary # Low Battery Fault Restore Code	E
245	Secondary # No Battery Fault Restore Code	E
246	Secondary # Telco Primary Line Fault Restore Code	E
247	Secondary # Telco Secondary Line Fault Restore Code	E
248	Secondary # NAC #1 Fault Restore Code	E
249	Secondary # NAC #2 Fault Restore Code	E
250	Secondary # Communication Trouble Primary # Restore Code	E
251	Secondary # Communication Trouble Secondary # Restore Code	E
252	Secondary # Annunciator Fault Restore Code	E
253	Secondary # System Off Normal Restore Code	E
254	Secondary # System Test Report	9
255	Secondary # System Abnormal Test Report	F

Programming Options

4+2 Standard and 4+2 Express Format

If '1, A or C' is entered for address 42, the data in Table 3-4 is automatically programmed for the Secondary Central Station phone number event codes. Enter '00' for the setting to disable the report.

TABLE 3-4: 4+2 Standard and 4+2 Express Format - Primary

Address	Description	Setting
198 - 199	Secondary # Zone 1 Alarm Code	11
200 - 201	Secondary # Zone 2 Alarm Code	12
202 - 203	Secondary # Zone 3 Alarm Code	13
204 - 205	Secondary # Zone 4 Alarm Code	14
206 - 207	Secondary # Zone 5 Alarm Code	15
208 - 209	Secondary # Zone 1 Disabled Code	F1
210 - 211	Secondary # Zone 2 Disabled Code	F2
212 - 213	Secondary # Zone 3 Disabled Code	F3
214 - 215	Secondary # Zone 4 Disabled Code	F4
216 - 217	Secondary # Zone 5 Disabled Code	F5
218 - 219	Secondary # Drill Code	97
220 - 221	Secondary # AC Fault Code	F6
222 - 223	Secondary # Zone 1 Fault Code	F1
224 - 225	Secondary # Zone 2 Fault Code	F2
226 - 227	Secondary # Zone 3 Fault Code	F3
228 - 229	Secondary # Zone 4 Fault Code	F4
230 - 231	Secondary # Zone 5 Fault Code	F5
232 - 233	Secondary # Earth Fault Code	F7
234 - 235	Secondary # Low Battery Fault Code	F8
236 - 237	Secondary # No Battery Fault Code	F9
238 - 239	Secondary # Telco Primary Line Fault Code	FA
240 - 241	Secondary # Telco Secondary Line Fault Code	FB
242 - 243	Secondary # NAC #1 Fault Code	FC
244 - 245	Secondary # NAC #2 Fault Code	FC
246 - 247	Secondary # Communication Trouble Primary # Fault Code	FD
248 - 249	Secondary # Communication Trouble Secondary # Fault Code	FE
250 - 251	Secondary # Annunciator Fault Code	FC
252 - 253	Secondary # System Off Normal Code	FF
254 - 255	Secondary # Zone 1 Alarm Restore Code	E1
256 - 257	Secondary # Zone 2 Alarm Restore Code	E2
258 - 259	Secondary # Zone 3 Alarm Restore Code	E3
260 - 261	Secondary # Zone 4 Alarm Restore Code	E4
262 - 263	Secondary # Zone 5 Alarm Restore Code	E5
264 - 265	Secondary # Zone 1 Disabled Restore Code	E1
266 - 267	Secondary # Zone 2 Disabled Restore Code	E2
268 - 269	Secondary # Zone 3 Disabled Restore Code	E3
270 - 271	Secondary # Zone 4 Disabled Restore Code	E4
272 - 273	Secondary # Zone 5 Disabled Restore Code	E5
274 - 275	Secondary # Drill Restore Code	98
276 - 277	Secondary # AC Fault Restore Code	E6
278 - 279	Secondary # Zone 1 Fault Restore Code	E1
280 - 281	Secondary # Zone 2 Fault Restore Code	E2
282 - 283	Secondary # Zone 3 Fault Restore Code	E3
284 - 285	Secondary # Zone 4 Fault Restore Code	E4
286 - 287	Secondary # Zone 5 Fault Restore Code	E5
288 - 289	Secondary # Earth Fault Restore Code	E7
290 - 291	Secondary # Low Battery Fault Restore Code	E8
292 - 293	Secondary # No Battery Fault Restore Code	E9
294 - 295	Secondary # Telco Primary Line Fault Restore Code	EA
296 - 297	Secondary # Telco Secondary Line Fault Restore Code	EB
298 - 299	Secondary # NAC #1 Fault Restore Code	EC
300 - 301	Secondary # NAC #2 Fault Restore Code	EC
302 - 303	Secondary # Communication Trouble Primary # Restore Code	ED
304 - 305	Secondary # Communication Trouble Secondary # Restore Code	EE
306 - 307	Secondary # Annunciator Fault Restore Code	EC
308 - 309	Secondary # System Off Normal Restore Code	EF
310 - 311	Secondary # System Test Report	99
312 - 313	Secondary # System Abnormal Test Report	91

Secondary Central Station Number Account Code (43-46)

Four locations at addresses 43-46 default to all '0s.' Valid entries are '0-9' and 'A-F,' The number of digits entered must match the format selection. If programming '2, 3, 4 or 5' into address 42, enter three digits (location 46 is not used). If programming '0, 1, 6, 7, 8, 9, A, B, C or D' into address 42, enter four digits.

Secondary Central Station Number 24 Hour Test Time (47-50)

Use military time when entering the 24 hour 'test' time. The 24 hour test report to phone number 2 takes up four locations at addresses 47-50. The default is '0000' for 12:00 midnight. The limits for each location are as follows:

- 47 - enter 0, 1 or 2
 - 48 - enter 0, 1, 2, 3, 4, 5, 6, 7, 8 or 9
 - 49 - enter 0, 1, 2, 3, 4 or 5
 - 50 - enter 0, 1, 2, 3, 4, 5, 6, 7, 8 or 9
- Do not use 'A - F' as entries.*

Secondary Central Station Number 24/12/8/6 Hour Test Time Interval (51)

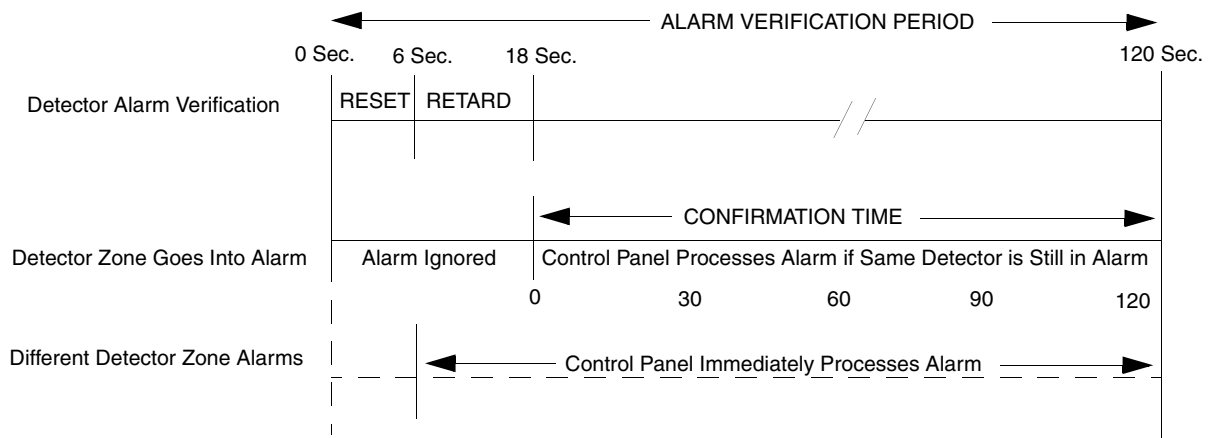
The test report sent to the Secondary phone number may be sent every 6, 8, 12 or 24 hours. If the message is to be sent every 24 hours, leave the factory default entry of '0.' If other test report times are needed, enter '1' for 12 hours, '2' for 8 hours or '3' for 6 hours.

Alarm Verification (52)

Alarm verification works only on zones programmed as 2-wire smoke detector zones. After detecting an alarm, the control panel removes power from all zones for 6 seconds, resetting all 2-wire smoke detectors. Power is reapplied and a 12 second retard period allows detectors to stabilize. During the retard/reset period of 18 seconds, subsequent alarms by the same initiating zone are ignored. An alarm detected on any other 2-wire detector zone during the retard period will cause immediate verified alarms. A subsequent alarm on the initiating zone occurring within the confirmation time will cause a verified alarm. *Note that mixing devices on zones designated as 2-wire smoke zones is not recommended.*

During the alarm verification period, access to other modes of operation is prevented.

FIGURE 3-2: Verification Timing Diagram



Factory default selection is '0' for no verification. Entering a '1' enables alarm verification. *Consult the local Authority Having Jurisdiction (AHJ) prior to altering this address.*

Programming Options

Programmable Relay #1 (53)

Programmable Relay #1 may be programmed to activate on alarm, trouble, supervisory, communication failure or any combination of the four conditions. The default (factory) setting for this address is '1' for activation on alarm only. Valid entries for address 53 are '0' through 'F' as listed below:

- 0 = Disable
- 1 = Alarm
- 2 = Supervisory
- 3 = Alarm or Supervisory
- 4 = Trouble
- 5 = Alarm or Trouble
- 6 = Supervisory or Trouble
- 7 = Alarm or Supervisory or Trouble
- 8 = Communication Failure
- 9 = Alarm or Communication Failure
- A = Supervisory or Communication Failure
- B = Alarm or Supervisory or Communication Failure
- C = Trouble or Communication Failure
- D = Alarm or Trouble or Communication Failure
- E = Supervisory or Trouble or Communication Failure
- F = Alarm or Supervisory or Trouble or Communication Failure

Programmable Relay #2 (54)

Programmable Relay #2 is programmed in address 54. The default (factory) setting for this address is '4' for activation on trouble only. Valid entries for address 54 are '0' through 'F' as listed above.

Future Use (55)

Slave Communicator/Fire Panel Selection (56)

Leaving address 56 at '0' causes the control panel to operate as a *fire panel only*. Selecting '1' will cause the panel to operate as a *slave communicator only*. Selecting '2' will cause the panel to operate as a *fire panel/communicator*.

Zones 1-5 Function Selection (57-61)

The five zones on the control panel may be programmed as shown below. Program entries alter zone function and transmittal priority.

TABLE 3-5:

<u>Program Entry</u>	<u>Function</u>
0	Operates 2-wire smoke detectors
1	Pull station
2	Normally open contact device
3	Supervisory
4	Supervisory autoresettable. Self-restore function, is not latched by the control panel
5	Waterflow silenceable. Silencing of silenceable Notification Appliance Circuits allowed. Affects zone 3 only.
6	Waterflow nonsilenceable. Silencing of silenceable Notification Appliance Circuits not allowed. Must clear waterflow alarm condition and press reset key. Affects zone 3 only

Programming Options

Zone 1 Function Selection (57)

Factory default for zone 1 is '0' for 2-wire smoke detector. Enter '1' for pull station, '2' for normally open contact device, '3' for supervisory or '4' for supervisory autoresettable.

Zone 2 Function Selection (58)

Factory default for zone 2 is '0' for 2-wire smoke detector. Enter '1' for pull station, '2' for normally open contact device, '3' for supervisory or '4' for supervisory autoresettable.

Zone 3 Function Selection (59)

Factory default for zone 3 is '0' for 2-wire smoke detector. Enter '1' for pull station, '2' for normally open contact device, '3' for supervisory, '4' for supervisory autoresettable, '5' for waterflow silenceable or '6' for waterflow nonsilenceable.

Zone 4 Function Selection (60)

Factory default for zone 4 is '0' for 2-wire smoke detector. Enter '1' for pull station, '2' for normally open contact device, '3' for supervisory or '4' for supervisory autoresettable.

Zone 5 Function Selection (61)

Factory default for zone 5 is '0' for 2-wire smoke detector. Enter '1' for pull station, '2' for normally open contact device, '3' for supervisory or '4' for supervisory autoresettable.

Note: Programming any zone to function as supervisory or supervisory autoresettable will cause the defaulted event codes (note in Table 3-1 through Table 3-4) to be automatically changed. The defaulted code of '1' is changed to '8' for Formats 3+1 and 4+1 Standard and Expanded, 4+2 Expanded and 4+1 Express. The defaulted codes of 11, 12, 13, 14 and 15 are changed to 81, 82, 83, 84 and 85 accordingly for Formats 4+2 Standard and 4+2 Express.

Waterflow Retard Timer (62-63)

A delay may be added prior to declaring a waterflow type of alarm. Delays up to 89 seconds are allowed. The default for addresses 62 and 63 are '00' for no additional delay. Valid entries for address 62 are '0' to '8' and for address 63 '0' to '9.' Program an entry into these addresses only if entering a '5' or '6' in address 59. *Be careful to include any built-in delays of the waterflow device.*

AC Loss Reporting Delay (64)

Enter a digit of '1' to '9' or 'A' to 'F' corresponding to the number of hours to be delayed in reporting the loss of AC power. The factory default setting is '0' for 6 hour delay. If 24 hour battery backup is being employed, select from choices '0' to '6'. If 60 hour battery backup is used, select from choices '7' to 'F'. Selections are:

- 0 = 6 hour delay
- 1 = 7 hour delay
- 2 = 8 hour delay
- 3 = 9 hour delay
- 4 = 10 hour delay
- 5 = 11 hour delay
- 6 = 12 hour delay
- 7 = 15 hour delay
- 8 = 16 hour delay
- 9 = 17 hour delay
- A = 18 hour delay
- B = 19 hour delay
- C = 20 hour delay
- D = 21 hour delay
- E = 22 hour delay
- F = 23 hour delay

Alarm Presignal (65)

Positive Alarm Sequence is used to delay Notification Appliance Circuit(s) activation while allowing for visual verification by a person. Once a zone triggers an alarm, the mainboard piezo and the annunciator piezo turn on steady, the display indicates the activated zone, the alarm LED blinks and the Notification Appliance Circuits are held off for 15 seconds. During this time, if the silence switch is pressed, the notification appliances may be held off for up to three minutes (see Alarm Presignal Delay Timer Address 66-68). After the programmed delay period, the notification appliances will activate. *Alarm Presignal does not function for zones defined as waterflow or supervisory.* The factory default is '0' for no Alarm Presignal. Enter '1' to select Alarm Presignal. During Alarm Presignal, access to other modes is prevented and the communicator will not transmit a signal to the Central Station signifying that the Alarm Presignal has been initiated.

Alarm Presignal Delay Timer (66-68)

The Alarm Presignal timer is factory set to 120 seconds (two minutes), with address 66 set to '1', address 67 set to '2' and address 68 set to '0'. The timer may be programmed from 0 to 179 seconds. Location 65 must be set to '1' to enable Alarm Presignal.

Notification Appliance Circuit #1 Enable (69)

Notification Appliance Circuit #1 may be programmed to '0' for silenceable, '1' for nonsilenceable or '2' for disabled. The factory default setting is '0' for silenceable. *Consult the local Authority Having Jurisdiction (AHJ) prior to altering this address.*

Silence Inhibit Notification Appliance Circuit #1 (70)

Setting address 70 to '1' prevents silencing of Notification Appliance Circuit #1 and the on-board piezo sounder for one minute after an alarm. The factory default setting is '0' for no silence inhibit of Notification Appliance Circuit #1.

Autosilence Notification Appliance Circuit #1 (71)

Notification Appliance Circuit #1 may be autosilenced after a programmed time interval between 5 and 30 minutes. Enter '1' for 5 minute autosilence, '2' for 10 minute autosilence, '3' for 15 minute autosilence, '4' for 20 minute autosilence, '5' for 25 minute autosilence or '6' for 30 minute autosilence. The factory default setting is '0' for no autosilence.

Coding Notification Appliance Circuit #1 (72)

Coding of Notification Appliance Circuit #1 can be programmed by selecting '1' for March Time (120 ppm), '2' for California (10 seconds On, 5 seconds Off) or '3' for Temporal (½ second On, ½ second Off, ½ second On, ½ second Off, ½ second On, 1½ second Off). The factory default setting is '0' for steady (no coding).

Notification Appliance Circuit #2 Enable (73)

Notification Appliance Circuit #2 may be programmed to '0' for silenceable, '1' for nonsilenceable or '2' for disabled. The factory default setting is '0' for silenceable. *Consult the local Authority Having Jurisdiction (AHJ) prior to altering this address.*

Silence Inhibit Notification Appliance Circuit #2 (74)

Setting address 74 to '1' prevents silencing of Notification Appliance Circuit #2 and the on-board piezo sounder for one minute after an alarm. The factory default setting is '0' for no silence inhibit of Notification Appliance Circuit #2.

Autosilence Notification Appliance Circuit #2 (75)

Notification Appliance Circuit #2 may be autosilenced after a programmed time interval between 5 and 30 minutes. Enter '1' for 5 minute autosilence, '2' for 10 minute autosilence, '3' for 15 minute autosilence, '4' for 20 minute autosilence, '5' for 25 minute autosilence or '6' for 30 minute autosilence. The factory default setting is '0' for no autosilence.

Programming Options

Coding Notification Appliance Circuit #2 (76)

Coding of Notification Appliance Circuit #2 can be programmed by selecting '1' for March Time (120 ppm), '2' for California (10 seconds On, 5 seconds Off) or '3' for Temporal (½ second On, ½ second Off, ½ second On, ½ second Off, ½ second On, 1½ second Off). The factory default setting is '0' for steady (no coding).

Trouble Reminder (77)

The factory default setting of '0' disables the trouble reminder feature. Selecting '1' will cause a reminding beep (after the Silence switch is pressed) every 15 seconds during an alarm and every two minutes during a trouble condition. The beeps from the on-board piezo sounder will occur until the alarm or fault is cleared.

Annunciator Supervision (78)

The factory default setting is '0' for no annunciator present. Set address 78 to '1' if an annunciator is present.

Backup Reporting (79)

Leaving address 79 at '0' means that reports will be transmitted to the secondary Central Station phone number only if attempts to communicate to the primary Central Station phone number are unsuccessful. Programming a '1' causes all reports to be transmitted to the secondary Central Station phone number.

Touchtone/Rotary Select (80)

A '0' programmed in this address by the factory triggers Touchtone dialing over both phone lines. Select '1' for rotary dialing.

Make/Break Ratio (81)

Use this address only if you have chosen '1' for address 80. The make/break ratio is factory set to '0' which is 67/33, but may be changed to '1' which is a 62/38 ratio.

Programming Event Codes (82-313)

The type of reports and 'event codes' that are sent to the Central Station are in the preceding Tables. The selections made for the Primary Central Station Number Communication Format (address 16) and the Secondary Central Station Number Communication Format (address 42) automatically program addresses 82-313 with factory default selections.

Any of the event codes may be changed. *Consult your Central Station prior to altering the event codes.* Entering an event code of '0' will cause the communicator to not transmit the report. For the 3+1, 4+1 and 4+2 Express formats or the 4+2 Expanded format, enter a single zero. For the 4+2 Standard or 4+2 Express formats enter two zeros. Transmission of reports to *either or both* Central Station phone numbers may be disabled.

Note the special 'system abnormal test report' event code. This report was added per new UL DACT requirements. This report is generated in place of the normal test report when an alarm and/or trouble condition exists at the time the test report is due to be sent.

Programming the Real-Time Clock

Entering an address greater than 313 will cause a display of the current time. On initial power-up, the clock will start running from the factory setting of 00:01 (military time). The far left digit will be flashing, indicating that this is the first digit to be programmed.

Hours/Minutes Setting

Select a digit then press the [ENTER/STORE] key. The digit 2nd from the left will start flashing. Select a digit then press the [ENTER/STORE] key. The hours setting is complete. With the digit 2nd from the right flashing, select a digit then press the [ENTER/STORE] key. The digit on the far right will start flashing. Select a digit then press the [ENTER/STORE] key. The minutes setting is complete. Once the last digit corresponding to the minutes is entered, the display will show the contents of address '00'. Note that if an invalid digit is selected (i.e. 3 or higher for the first digit) the FACP piezo will beep and the digit will continue to blink until a valid entry is made.

Programming Options

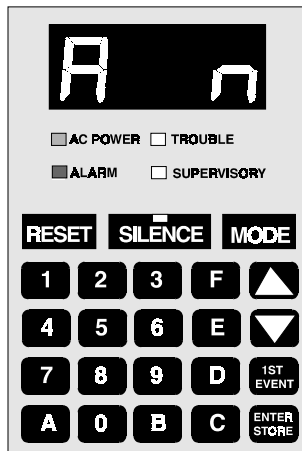
Note that the software for the MS-5024 operates the internal clock based upon 60 Hz. The software for the MS-5024E operates the internal clock based upon 50 Hz.

End Programming

Exit Programming Mode by pressing the **MODE** key, followed by the 4-digit code corresponding to an alternate mode of operation, then press the **[ENTER/STORE]** key.

During Program Mode, if no key is pressed within 10 minutes, the control panel will revert to Normal Mode.

CHAPTER 4 *Operating Instructions*



The MS-5024 has five modes of operation; Normal, Program, Walktest, Troubleshoot and History. Upon initial power-up, the system will be in Normal Mode. This chapter discusses operation of the control panel in the Normal Mode.

4.1 Switches

This section describes the function switches in Normal Mode.

4.1.1 Reset

The Reset Switch resets the system and any smoke detectors. If the Reset Switch is pressed, the control panel will:

- Clear the display and status LEDs
- Turn off the Notification Appliance Circuits
- Reset all zones by temporarily removing power
- Silence the on-board piezo sounder
- Store 'reset' message in the History file
- Restore the programmable relays to normal
- Temporarily remove power from the resettable power output TB4 Terminals 3 & 4

Upon release of the Reset Switch, the display will read **rES_** for six seconds. Any alarm, supervisory or trouble condition that exists after system reset will resound the system, reactivating normal system activity.

4.1.2 Silence

If the Silence Switch is pressed:

- The silenceable Notification Appliance Circuits will be turned Off
- The silence LED will be turned On
- The piezo sounder will be shut Off
- 'System Silenced' message will be stored in the History file

Display and LEDs

Upon the occurrence of a subsequent event (alarm or trouble), System Silence is overridden and the control panel will respond to the new event. *The System Silence switch will be ignored for nonsilenceable waterflow type alarms.*

4.1.3 Mode

Pressing the Mode Switch followed by a valid 4-digit numerical code and the [ENTER/STORE] key selects one of the five modes of operation. To enter Normal Mode from any other mode, press the **MODE** key then **6676** followed by the [ENTER/STORE] key.

☛ **6676** spells NORM on a Touch-Tone® phone.

4.1.4 1st Event

This switch, along with the Up Arrow and Down Arrow keys, is used to display any *presently* active alarm and/or fault conditions present in the system. Press the **1st Event** switch at any time to display the first event (alarm and/or trouble) that occurred.

4.1.5 Down Arrow

Use the Down Arrow key to view other events (older) that have occurred and are active (not yet cleared).

4.1.6 Up Arrow

Use the Up Arrow key to view other events (newer) that have occurred and are active (not yet cleared).

4.1.7 [ENTER/STORE]

See individual mode descriptions in other sections of this manual.

4.2 Display and LEDs

Four 7-segment red LED characters provide visual annunciation of status, events and messages. A list of messages that may appear on the display in Normal Mode is shown below:

d__1	Zone 1 Disabled	F__5	Trouble Zone 5
d__2	Zone 2 Disabled	rES__	System Reset
d__3	Zone 3 Disabled	F__A	Annunciator Fault
d__4	Zone 4 Disabled	F__E	Earth Fault
d__5	Zone 5 Disabled	Lo_b	Low Battery
E__1	Zone 1 Enabled	no_b	No Battery
E__2	Zone 2 Enabled	PH_1	Primary Central Station Number Comm. Fault
E__3	Zone 3 Enabled	PH_2	Secondary Central Station Number Comm.
E__4	Zone 4 Enabled	Fault	
E__5	Zone 5 Enabled	bEL1	Bell 1 Fault
A__1	Alarm Zone 1	bEL2	Bell 2 Fault
A__2	Alarm Zone 2	no_1	Primary Phone Line Fault
A__3	Alarm Zone 3	no_2	Secondary Phone Line Fault
A__4	Alarm Zone 4	SUP1	Supervisory Alarm Zone 1
A__5	Alarm Zone 5	SUP2	Supervisory Alarm Zone 2
F__1	Trouble Zone 1	SUP3	Supervisory Alarm Zone 3
F__2	Trouble Zone 2	SUP4	Supervisory Alarm Zone 4
F__3	Trouble Zone 3	SUP5	Supervisory Alarm Zone 5
F__4	Trouble Zone 4	_AC__	AC Power Loss

Display and LEDs

Individual LEDs are provided for:

System Alarm

A red LED that turns on steady when an alarm condition is detected and blinks during alarm Positive Alarm Sequence period.

System Trouble

A yellow LED that blinks to indicate a fault or abnormal condition exists and that the fire alarm system may be inoperative. It turns on steady when the silence switch is pressed.

AC Power On

A green LED that remains on while the AC power supply is within correct limits. *If this indicator fails to light under normal conditions, service the system immediately.*

Supervisory

A yellow LED that blinks to indicate the need for action in connection with the supervision or maintenance of sprinklers, extinguishing systems or other protective systems.

System Silence

A yellow LED that turns on to indicate that an alarm or trouble condition exists in the system, but both Notification Appliance Circuits (if programmed as silenceable) and local piezo have been silenced.

Primary Line Active

A red LED that indicates the primary phone line is active.

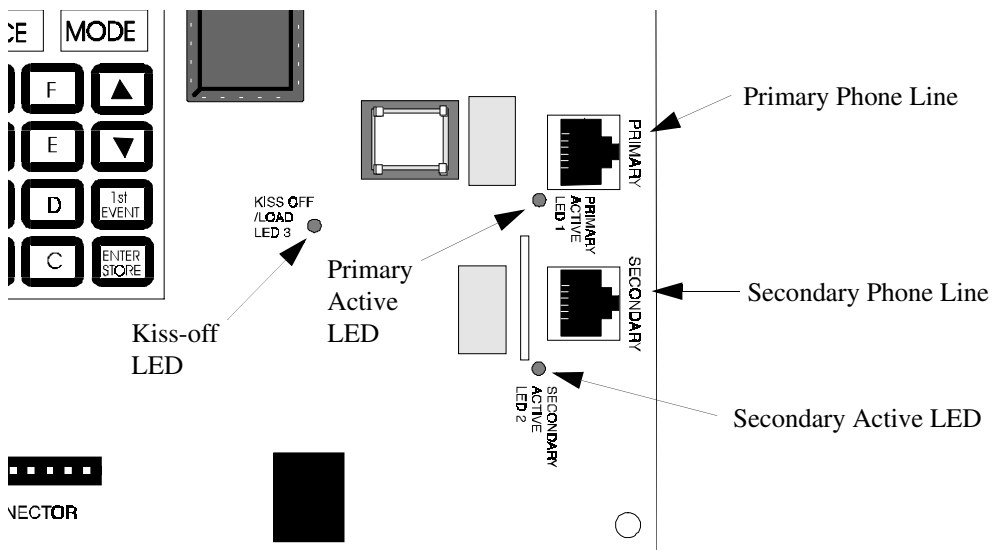
Secondary Line Active

A red LED that indicates the secondary phone line is active.

Kissoff

A green LED that blinks when a Central Station has acknowledged receipt of each transmitted message.

FIGURE 4-1: Phone Connectors and LEDs



4.3 Operation

Normal Mode is the standard mode of operation. In this mode, the panel continuously monitors system status. When no alarm or trouble conditions exist, the display will be blank and all LEDs will be off (except the AC Power LED). The Notification Appliance Circuits will be off, all relays are normal and the onboard piezo sounder will be off. The communicator is not active, primary and secondary active LEDs are off.

All alarm and system trouble conditions are annunciated on the control panel's display. The control panel will maintain an 'active event list' which will consist of all alarms, supervisory alarms and system troubles currently active and not cleared, requiring immediate service. When the system is cleared and restored to normal, the display will be blank. All alarms and troubles are stored in a history file and may be recalled at any time.

Higher priority events take precedence over lower priority events. Display and reporting of system status is done on a priority basis. Priorities are, from highest to lowest:

1. Alarms
2. Supervisory Alarms
3. System Troubles

If the events to be displayed consist of alarms and disabled zones only (no troubles), the control panel will scroll them on the display. Pressing the 1st Event key will stop the scrolling and cause the display of the *first* alarm that occurred after the panel was last reset, cleared of all active events and placed into Normal Mode. Operation of the Up and Down arrow keys will display all remaining events in order of their occurrences.

4.3.1 Alarm Response

The control panel will, upon detection of an alarm condition:

- Turn on the alarm LED
- Activate relay(s) programmed for alarm
- Display the alarm message, for example **A__1** for alarm on zone 1
- Communicate the alarm to the Central Station
- Store the alarm in the History file
- Turn on the Notification Appliance Circuits
- Turn on the piezo sounder
- Turn on the annunciator zone LED and annunciator piezo sounder

Note that when any zone is programmed as a supervisory zone, it will not be processed in the same manner as a conventional alarm zone. See "System Supervisory Condition Response" on page 50.

4.3.2 Alarm Restoral

The control panel returns to normal only after all alarms have been cleared and the Reset switch has been pressed (pull stations reset, smoke detectors reset and no smoke present, waterflow has stopped). The control panel will perform the following upon restoral of all active alarms:

- Turn off the alarm LED
- Deactivate the alarm relay(s) if programmed
- Clear the 4-character display
- Send all 'zone restoral' messages to the Central Station
- Turn off the Notification Appliance Circuits
- Turn off the piezo sounder
- Turn off the annunciator zone LED and annunciator piezo sounder

4.3.3 System Supervisory Condition Response

Program zones for supervisory in applications where a waterflow sensing device has been employed and the wiring to the waterflow valve and/or tamper switch is to be monitored. If the wiring has been cut or the tamper switch has been activated, a supervisory alarm condition will occur.

When a supervisory condition occurs, the control panel will:

- Blink the supervisory LED (½ second On, ½ second Off)
- Activate the supervisory relay(s) if programmed
- Display the following message: **SUPX** where X is the zone number
- Communicate the supervisory condition to the Central Station
- Store the 'supervisory' message in the History file
- Pulse the piezo sounder at ½ second on and ½ second off rate
- Turn on the annunciator zone LED and pulse the annunciator piezo

4.3.4 System Supervisory Restoral Response

When the supervisory condition has been cleared (condition is restored and the reset switch has been pressed), the control panel will perform the following:

- Turn off the supervisory LED
- Deactivate the supervisory relay(s) if programmed
- Clear the display of the **SUP** message
- Communicate a supervisory restoral message to the Central Station
- Turn off the piezo sounder
- Turn off the annunciator zone LED and annunciator piezo sounder

Note that for any zone programmed for supervisory autoresettable, the Reset key does not need to be pressed to clear the zone supervisory condition.

4.3.5 Trouble Condition Response

The control panel will perform the following upon detection of one or more trouble conditions:

- Blink the trouble LED (1 second on, 1 second off)
- Activate the trouble relay(s) if programmed
- Display the appropriate trouble message(s) in priority fashion from the highest priority to the lowest. *Note that the Up arrow, Down arrow or 1st Event key must be pressed to view the messages*
- Communicate the trouble conditions to the Central Station
- Store the trouble conditions in the History file
- Sound the piezo sounder (1 second on, 1 second off)
- Blink the annunciator trouble LED and pulse the piezo sounder

Note that when AC brownout occurs, the AC LED is turned off and the trouble LED blinks. Should the brownout condition remain, it will be transmitted to the Central Station after a delay (see program address 64).

Operation

Possible trouble messages that may appear on the display are as follows:

d__1	Zone 1 Disabled	F__A	Annunciator Fault
d__2	Zone 2 Disabled	F__E	Earth Fault
d__3	Zone 3 Disabled	Lo_b	Low Battery
d__4	Zone 4 Disabled	no_b	No Battery
d__5	Zone 5 Disabled	PH_1	Primary Central Station Number Comm. Fault
F__1	Trouble Zone 1	PH_2	Secondary Central Station Number Comm. Fault
F__2	Trouble Zone 2	bEL1	Bell 1 Fault
F__3	Trouble Zone 3	bEL2	Bell 2 Fault
F__4	Trouble Zone 4	no_1	Primary Phone Line Fault
F__5	Trouble Zone 5	no_2	Secondary Phone Line Fault

4.3.6 Trouble Conditions Restoral

The control panel performs the following upon restoral of all trouble conditions:

- Turn off the trouble LED
- Deactivate the trouble relay(s) if programmed
- Turn on the AC Power LED if the trouble was loss of AC power
- Clear the display of the trouble message(s)
- Communicate the restored trouble condition(s) to the Central Station

4.3.7 Off Normal Reporting

Removing the panel from Normal Mode and placing it into any other mode causes a transmission of an 'off normal' fault message. Returning the panel to Normal Mode causes a transmission of a 'return to normal' restoral message.

4.3.8 Zone Disable/Enable

The zone disable feature may be used to disable any zone in the system. Zones may be disabled if they are normal, in trouble or in alarm. *Zones may be disabled only during the Normal Mode of operation when the fire protection is active. If the panel is in alarm, the silence switch must be pressed first before zone disable will function.*

To disable a zone, press the **MODE** key once. The display will go blank. You then have 10 seconds to start entering the code **3472**. Next, press the **[ENTER/STORE]** key.

☛ **3472** spells DISA on a Touch-Tone® phone

A flashing lower case **d** will appear on the far left of the display. Press the zone number to be disabled. The number will appear on the far right display character. Pressing the **[ENTER/STORE]** key will disable the selected zone. Note that the relay (if programmed for trouble) is activated and the trouble LED will blink.

The zone disable message will remain on the display until the zone is enabled. To enable a zone, press the **MODE** key once. The display will go blank. You then have 10 seconds to start entering the code **3622**. Press the **[ENTER/STORE]** key.

☛ **3622** spells ENAB on a Touch-Tone® phone

A flashing upper case **E** will appear on the left of the display. Press the zone number to be enabled. The number will appear on the far right display character. Pressing the **[ENTER/STORE]** key will enable the selected zone. Note that the relay (if programmed for trouble) is restored to normal and the trouble LED will turn off if no other troubles exist on the system.

4.3.9 Fire Drill

The Drill (manual evacuate) feature turns on both Notification Appliance Circuits (if programmed as enabled) and turns off the silence LED. To perform a fire drill, press the **MODE** key followed by the code **3745** and then the **[ENTER/STORE]** key. The display will read **dril**. The relay (if programmed for alarm) is not activated. There is an option to transmit the fire drill report code to the Central Station.

☛ **3745** spells DRIL on a Touch-Tone® phone

During a fire drill, the Silence key will silence both Notification Appliance Circuits and the Reset key restores the panel to normal. *All zones remain active during a fire drill.*

4.3.10 No Battery/Low Battery

This control panel detects two levels of battery fault conditions, low battery and no battery. The low battery condition is 20.4 volts per NFPA and UL requirements. The no battery condition can occur if a battery is not installed or if the battery voltage drops below the 'no battery threshold' voltage limit. The no battery threshold voltage is the minimum voltage required to operate the system fully under loss of AC power. This voltage must be high enough to power initiating devices, power notification appliances and provide internal power to system components including the microprocessor. Both the no battery and low battery condition may be reported to the Central Station.

When AC power is lost and the system is running on battery, the panel will report 'loss of AC power' to the Central Station after a programmed delay period. The panel will report 'low battery' when the low battery threshold is reached. If AC power is not restored and the 'no battery' threshold is reached, the panel will power off. This prevents false alarms, nuisance reports and incorrect panel operation when the battery falls to dangerous levels. After the AC power is restored, the no battery (no_b) message will appear. The battery must be disconnected from the system and either replaced or allowed to restore itself before being reinstalled.

CAUTION! *Be certain to clear the no battery condition since the battery will not recharge from this condition and the panel will not clear itself. The low battery condition will self-clear when the battery recharges, provided the battery is good.*

4.4 Central Station Communications

The control panel transmits zone and system status reports to Central Station via the public switched telephone network. Two supervised telephone line connections are made to interface the control panel to the telephone lines. Two 7-foot telephone cables are required for this purpose and must be ordered separately.

The control panel supervises both telephone lines for proper voltage. A delay of two minutes will occur before a fault on either phone line connection is reported as a trouble. When a fault is detected, an audible trouble signal will sound, the yellow trouble LED will blink, the 4-character display will show either 'no_1' for Primary Line fault or 'no_2' for Secondary Line fault, and the trouble condition will be reported to the Central Station over the remaining good phone line.

The control panel comes with line seizure capability provided for both the primary and secondary telephone line interfaces. Any time that the control panel needs to make a call to a Central Station, line seizure will disconnect any local premises phones sharing the same telephone line.

All transmissions to the Central Stations will be sent over the Primary Central Station phone line. In the event of noisy phone lines, transmissions will be sent over the backup Secondary phone line.

Two phone numbers must be programmed, the Primary Central Station phone number and the Secondary Central Station phone number. All system reports will be transmitted to the Primary Central Station phone number. Reports will automatically be sent to the Secondary Central Station phone number if attempts to transmit to the Primary Central

Central Station Communications

Station phone number are unsuccessful. If 10 total attempts to communicate are unsuccessful, the relay(s) will activate if programmed for communications failure. Note that as an option, *all* reports may also be sent to the Secondary Central Station phone number.

The MS-5024 meets NFPA 72 National Fire Alarm Code reporting requirements for (1) type of signal, (2) condition and (3) location of the reporting premises. The general priority reporting structure is:

1. Zone Alarms and Restores
2. Zone Troubles and Restores
3. System Trouble and Restores
4. 24-hour test

The control panel is capable of reporting detailed messages depending upon the format in use. Table 4-1 shows the reporting structure for all formats.

TABLE 4-1: Format Selection Addresses (16 & 42)

	Format # 0, 2, 4, 6, 8	Format # 3, 5, 7, 9	Format # 1, A, C	Format # B, D
Report	3+1/4+1/Standard 4+1 Express	3+1/4+1/Expanded	4+2/Standard 4+2 Express	4+2/Expanded
Alarm	SSS(S) A	SSS(S) A AAA(A) Z	SSSS AA2	SSSS AZ
Alarm Restore	SSS(S) RA	SSS(S) RA RARARA(RA) Z	SSSS RARA2	SSSS RAZ
Zone Trouble (Zone Open)	SSS(S) TZ	SSS(S) TZ TZTZTZ(TZ) Z	SSSS TZTZ2	SSSS TZZ
Zone Trouble Restore	SSS(S) RTZ	SSS(S) RTZ RTZRTZRTZ(RTZ) Z	SSSS RTZRTZ2	SSSS RTZZ
System Trouble	SSS(S) TS	SSS(S) TS TSTSTS(TS) Y	SSSS TSTS2	SSSS TSY
System Trouble Restore	SSS(S) RTS	SSS(S) RTS RTSRTSRTS(RTS) Y	SSSS RTSRTS2	SSSS RTSY
Zone Disable	SSS(S) DZ	SSS(S) DZ DZDZDZ(DZ) Z	SSSS DZDZ2	SSSS DZZ
Zone Disable Restore	SSS(S) RDZ	SSS(S) RDZ RDZRDZRDZ(RDZ) Z	SSSS RDZRDZ2	SSSS RDZZ
Low Battery	SSS(S) L	SSS(S) L	SSSS LL2	SSSS LL2
Low Battery Restore	SSS(S) RL	SSS(S) RL	SSSS RLRL2	SSSS RLRL2
AC Loss	SSS(S) P	SSS(S) P	SSSS PP2	SSSS PP2
AC Loss Restore	SSS(S) RP	SSS(S) RP	SSSS RPRP2	SSSS RPRP2
Fire Drill	SSS(S) Fd	SSS(S) Fd	SSSS FdFd2	SSSS FdFd2
Fire Drill Restore	SSS(S) RFd	SSS(S) RFd	SSSS RFdRFd2	SSSS RFdRFd2
Supervisory Condition	SSS(S) V	SSS(S) V VVV(V) Z	SSSS VV2	SSSS VZ
Supervisory Condition Restore	SSS(S) RV	SSS(S) RV RVRVRV(RV) Z	SSSS RVRV2	SSSS RVZ
Test Report	SSS(S) X	SSS(S) X	SSSS XX2	SSSS XX2

Refer to Table 4-2 on page 54 for an explanation of each letter code in Table 4-1 .

Refer to Table 4-3 on page 56 for a list of compatible receivers.

4.4.1 Transmittal Priorities

The integral communicator transmits highest priority events first. Events in terms of priority are listed below in descending order:

1: Alarms (highest Priority Level)

- Pull Stations
- Waterflow
- Smoke Detector
- Other Alarm Types

2: Supervisory Zone

3: System Troubles

- Zone Disabled
- Fire Drill
- AC Fail (after delay)
- Zonal Faults
- Earth Fault
- Low Battery/No Battery
- Telephone Line Fault
- Notification Appliance Circuits Fault
- Communication Trouble
- Annunciator Trouble
- System Off Normal

4: Restoral Reports

- Zone Alarm
- Supervisory
- Zone(s) Enabled
- Fire Drill
- AC
- Zone Fault
- Earth
- Battery
- Telephone Line
- Notification Appliance Circuits
- Communication
- Annunciator Trouble
- System Off Normal

5: 24 Hour Test (Lowest Priority)

Red LEDs are provided on the control panel circuit board to identify which telephone line is activated. Also, a green LED (labeled 'Kissoff') will turn on whenever the control panel has successfully transmitted reports to the Central Station. The 'Kissoff' LED may turn on several times during communications with a Central Station.

CHAPTER 5 *Servicing*

5.1 Walktest Mode

The MS-5024 provides the capability to perform a one-man walktest of the system without triggering the communicator or the alarm relay (if programmed). Walktest allows for testing of the five zones (initiating circuits). The first initiating device activated on a zone will cause the Notification Appliance Circuits to turn on for four seconds. Subsequent device activations on the same zone will cause the Notification Appliance Circuits to turn on for one second. Any smoke detectors that are activated will be reset. Zonal faults (open circuits) will cause the appliance circuit to remain on steadily. Prior to entering Walktest Mode, check to be certain that all system faults have been cleared. *Note that the trouble relay will be activated (if programmed) while the control panel is in this mode. Placing the control panel into Walktest Mode will be possible only if the system has no active alarms.*

Pressing the **MODE** key followed by the 4-digit code **9255** and then the **[ENTER/STORE]** key will place the control panel into Walktest Mode.

☛ **9255** spells WALK on a Touch-Tone® phone.

Once in Walktest Mode, the control panel will immediately:

- Blink the trouble LED
- Activate the trouble relay(s) if programmed
- Turn on the Notification Appliance Circuits for four seconds for the first alarm on a zone. Subsequent alarms will sound for one second. Troubles cause the Notification Appliance Circuits to remain on
- Disable the alarm relay(s) if programmed
- Display all alarm conditions as they occur
- Display all zone troubles as they occur
- Display ground faults as they occur
- Transmit 'off normal' message to Central Station(s)
- Continue to communicate any events not acknowledged at a Central Station prior to entering Walktest Mode

During Walktest Mode, zonal activity is displayed in real time as it occurs. At the end of walktesting the system, the display will show the last event that occurred. To view all events stored during the walktest, use the Up arrow, Down arrow and 1st Event keys. The Down arrow key moves the walktest list to show older (previous) events. The Up arrow key moves the walktest list to show newer (most recent) events. Pressing the 1st Event key at any time will cause the display of the first event stored upon initial entry into Walktest Mode. While in Walktest Mode, the control panel will store up to 128 events in the walktest file for future recall and display.

To return the control panel to Normal Mode, press the **MODE** key followed by the code **6676** and then the **[ENTER/STORE]** key. Any delay between key entries greater than 10 seconds causes the control panel to remain in Walktest Mode.

The control panel will automatically revert back to Normal Mode if no system activity has occurred for 60 minutes. This would include pressing any keys or activity on any zone.

5.2 History Mode

All Normal Mode events are stored in a History file for future recall. Recall is possible via the 4-character display. See the following page for a list and description of each event displayed.

The History file list is a first-in, first-out (FIFO). In this manner, only the most recent events may be called up from memory. Old events will be overwritten (i.e. pushed out of the FIFO). The number of stored events is 32. This History file is kept in E² memory. Complete power loss will not erase the list.

Pressing the **MODE** key followed by **4478** and then the **[ENTER/STORE]** key places the control panel into History Mode. *This will not occur if there are any active alarm conditions present.* The event displayed is the most recent event.

☛ **4478** spells HIST on a Touch-Tone® phone.

Once in History Mode, the control panel will:

- Blink the trouble LED
- Activate the trouble relay(s) if programmed
- Disable the Notification Appliance Circuit(s)
- Disable the alarm relay(s) if programmed
- Display all events as they occurred since the last time the History file list was cleared. The most recent event will be displayed first
- Ignore all other keys other than those mentioned in this section
- Transmit the 'off normal' message to the Central Station(s)
- Continue to communicate any events not previously acknowledged at the Central Station prior to entering History Mode

The Down arrow key moves the History file to show older (previous) events. The Up arrow key moves the History file to show newer (most recent) events.

Shown below is the list of messages as they will appear on the display:

d_1	Zone 1 Disabled	F_5	Trouble Zone 5
d_2	Zone 2 Disabled	rES_	System Reset
d_3	Zone 3 Disabled	F_A	Annunciator Fault
d_4	Zone 4 Disabled	F_E	Earth Fault
d_5	Zone 5 Disabled	Lo_b	Low Battery
E_1	Zone 1 Enabled	no_b	No Battery
E_2	Zone 2 Enabled	PH_1	Primary Central Station Number Comm. Fault
E_3	Zone 3 Enabled	PH_2	Secondary Central Station Number Comm.
E_4	Zone 4 Enabled	Fault	
E_5	Zone 5 Enabled	bEL1	Bell 1 Fault
A_1	Alarm Zone 1	bEL2	Bell 2 Fault
A_2	Alarm Zone 2	no_1	Primary Phone Line Fault
A_3	Alarm Zone 3	no_2	Secondary Phone Line Fault
A_4	Alarm Zone 4	SUP1	Supervisory Alarm Zone 1
A_5	Alarm Zone 5	SUP2	Supervisory Alarm Zone 2
F_1	Trouble Zone 1	SUP3	Supervisory Alarm Zone 3
F_2	Trouble Zone 2	SUP4	Supervisory Alarm Zone 4
F_3	Trouble Zone 3	SUP5	Supervisory Alarm Zone 5
F_4	Trouble Zone 4	_AC_	AC Power Loss

To erase the list from E² memory, press the Silence key twice before exiting the History Mode. A lack of keyboard activity for a period of 10 minutes will cause the control panel to return to Normal Mode.

5.3 Troubleshoot Mode

In this mode, system voltages may be displayed on the 4-character display. An internal voltmeter measures the voltage present at:

- zone inputs
- AC power input
- battery terminal leads
- NAC #1
- NAC #2
- resettable 24 volt power

A lack of keyboard activity for a period of 20 minutes will cause the control panel to return to Normal Mode. To enter Troubleshoot Mode, press the **MODE** key followed by the code **8768** and then the **[ENTER/STORE]** key.

☛ **8768** spells TROU on a Touch-Tone® phone.

Once in this mode, the control panel will:

- Blink the trouble LED
- Activate the trouble relay(s) if programmed
- Disable the Notification Appliance Circuits
- Disable the alarm relay(s) if programmed
- Transmit the 'off normal' message to the Central Station(s)
- Continue to communicate any events not yet acknowledged at the Central Station prior to entering Troubleshoot Mode

The Up arrow key, Down arrow key and 1st Event key do not function in this mode.

5.3.1 Zones

Pressing **01** through **05** followed by the **[ENTER/STORE]** key displays the zone voltage of the selected zone. Listed below are the nominal threshold voltages for each zone:

Zone #	Normal w/EOL	Shorted	Open Circuit
1 through 5	23.5V	00.0V	25.4V

5.3.2 AC Line

Pressing **A** followed by the **[ENTER/STORE]** key displays the AC input voltage as shown below. The following lists the AC line voltage range. The AC On indicator will turn off and the trouble LED will turn on when the AC line voltage drops below the Low Line threshold.

AC Line Voltage	Low Line	Normal	High Line
MS-5024	102VAC	115VAC	132VAC
MS-5024E	204VAC	220VAC	264VAC

5.3.3 Battery

Pressing **B** followed by the **[ENTER/STORE]** key displays the Battery voltage. Shown below are the critical battery threshold conditions:

Battery Voltage	Normal	Low Battery	No Battery
	27.6 VDC	20.4 VDC	<14.2 VDC

IMPORTANT The battery charger will turn off when the battery voltage drops to 14.2 VDC or less (No Battery condition). A battery with a higher voltage must be installed to turn the charger back on.

Note: Make measurements after allowing 48 hours to charge depleted batteries. If batteries do not show normal readings, replace them.

Lamp Test

5.3.4 NAC 1 & 2

Pressing **B1** followed by the **[ENTER/STORE]** key displays the voltage on NAC #1.

Pressing **B2** followed by the **[ENTER/STORE]** key displays the voltage on NAC #2.

NAC voltage readings are nominally -2.32 volts when an EOL resistor of correct value is in place. A reading of 0.00 volts appears for shorts, -4.50 volts for opens. Intermediate readings are also possible.

5.3.5 Resettable Power

Pressing the **Reset** key followed by the **[ENTER/STORE]** key displays the resettable 24 volt power. The resettable power must read 24 volts (+/- 10%).

5.3.6 Telephone Lines

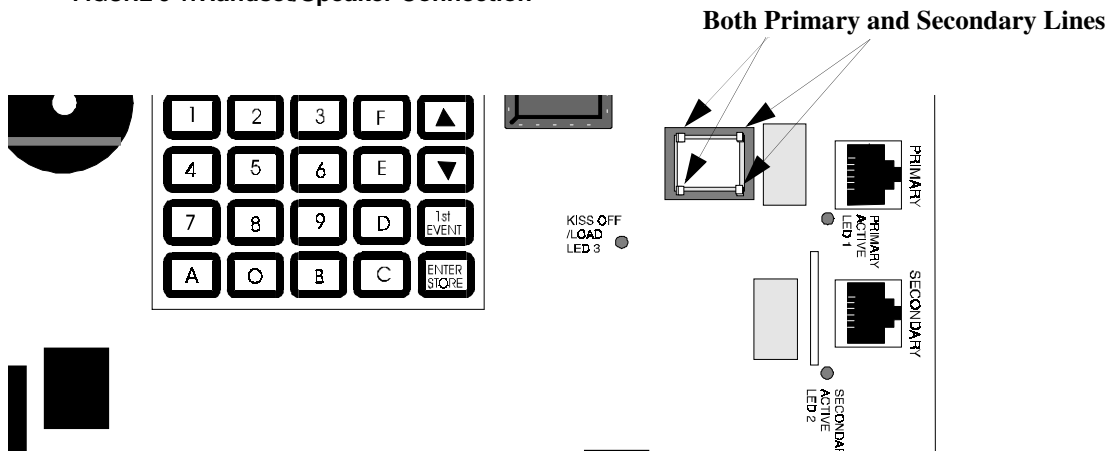
Pressing **C** for touchtone dialing or **D** for rotary dialing, followed by the **[ENTER/STORE]** key causes seizure of the Primary phone line which in turn lights the red LED signifying Primary phone line active. After a delay of three seconds, the control panel goes off-hook to acquire a dial tone.

The control panel keypad may be used as a telephone touchpad for number dialing. Once the first digit is pressed, the display will move the **C** or **D** character one position to the left, while placing the digit to be dialed on the farthest right display position. Continue to press the phone numbers to be dialed. Successive depressions of the **[ENTER/STORE]** key hangs-up and picks-up the phone (places the phone on or off the hook).

The secondary phone line may be tested by pressing the **E** key for touchtone dialing or the **F** key for rotary dialing and then following the same procedure used for the primary phone line.

A handset may be temporarily connected across transformer T1 as indicated in Figure 5-1. The handset, when connected across T1, may be used only as an amplifier/speaker and telephone with the control panel used for number dialing.

FIGURE 5-1: Handset/Speaker Connection



5.4 Lamp Test

To perform a Lamp Test, press the **MODE** key, then the code **5267** followed by the **[ENTER/STORE]** key. This will test all system LEDs except the Primary Active LED, Secondary Active LED and Modem LED. The LEDs will stay on for five seconds, then the control panel will return to Normal Mode.

☛ **5267** spells LAMP on a Touch-Tone® phone

CHAPTER 6 *Slave Communicator Configuration*

The MS-5024 may be used as a slave communicator to a host or master FACP (fire alarm control panel). All wiring between the master and the slave communicator is supervised. 4.7K ohm End-of-Line resistors should be connected.

In slave configuration, the five zones become five channels that may be triggered by the relay outputs of any host FACP. The inputs have the following functions in the slave configuration:

- Zone 1/Channel 1 is used for general alarm
- Zone 2/Channel 2 is used for general trouble
- Zone 3/Channel 3 may be programmed to match the FACP relay function used as an input
- Zone 4/Channel 4 is used for supervisory
- Zone 5/Channel 5 may be programmed to match the FACP relay function used as an input

The factory settings for Zone 2/Channel 2 alarm and restoral are altered as follows:

- If 0, 2, 3, 4, 5, 6, 7, 8, 9, B or D is entered for address 16 or 42, the report code for Zone 2 Alarm Code (address 83, 199) is 'F', Zone 2 Restoral Code (address 111, 227) is 'E'
- If 1, A or C is entered for address 16 or 42, the report code for Zone 2 Alarm Code (addresses 84-85, 200-201) is 'FF', Zone 2 Restoral Code (addresses 140-141, 256-257) is 'EF.'

The factory settings for Zone 4/Channel 4 alarm and restoral are altered as follows:

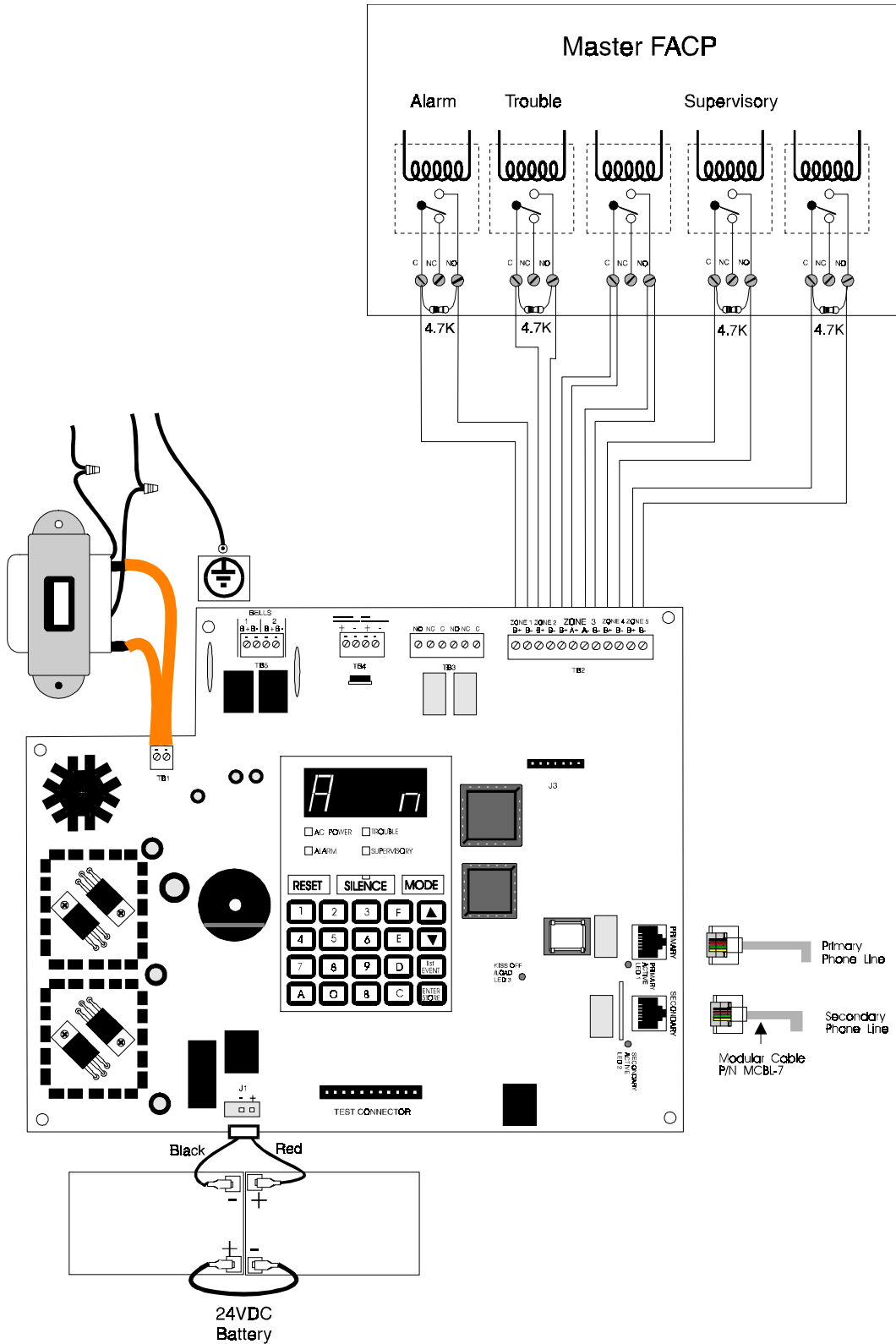
- If 0, 2, 3, 4, 5, 6, 7, 8, 9, B or D is entered for address 16 or 42, report code for Zone 4/Channel 4 Alarm Code (address 85, 201) is '8', Zone 4 Restoral Code (address 113, 229) is 'E.'
- If 1, A or C is entered for addresses 16 or 42, the report code for Zone 4 Alarm Code (addresses 88-89, 204-205) is 84, Zone 4 Restoral Code (addresses 144-145, 260-261) is 'E4.'

Location 56 must be programmed to a '1' to enable the control panel as a slave communicator.

Be certain to connect the slave communicator's primary AC power to the same branch circuit as the host FACP.

Note that Alarm Presignal and Alarm Verification do not function in Slave Communicator Mode.

FIGURE 6-1: Slave Communicator Connections



Relays in the master FACP activate various input circuits on the slave communicator. Messages (event codes) programmed for a particular input circuit (channel) will be transmitted to the Central Station upon relay activation.

Appendix A *Battery Calculations*

Use the Total Standby and Alarm Load currents calculated in Table A-2 on page 64 and Table A-3 on page 65 for the following battery calculation.

TABLE A-1: Battery Calculations

Standby Load Current (amps) []	X	Required Standby Time in Hours (24 or 60 Hours) []	=	_____
Alarm Load Current (amps) []	X	Required Alarm Time in Hours (i.e. 5 minutes = 0.084) []	=	_____
Add Standby and Alarm Load for Required Ampere Hour Battery			=	_____
Multiply by the Derating Factor of 1.2			X 1.2	_____
Total Ampere Hours (AH) Required			=	_____

Notes:

1. 7 Ampere Hour battery can be located in the backbox
2. 12 Ampere Hour and 17 Ampere Hour batteries require the BB-17F battery box

Battery Calculations

Main Power Supply

The MS-5024 provides filtered power for operating the fire alarm control panel, operating external devices and operating the standby battery. The power for operating external devices is limited. Use Table A-2 (standby or nonalarm) and Table A-3 on page 65 (alarm) to determine if external loading is within the capabilities of the power supply.

Concerning 4-wire smoke detectors: be sure to power detectors from TB4, Terminals 3 & 4.

Note that all external devices are connected to TB4 only.

TABLE A-2: Regulated Load in Standby

Device Type	# of Devices		Current (amps)	=	Total Current (amps)
Main Circuit Board	1	X	0.123	=	0.123
ADM-24	(1 maximum)	X	0.006	=	
RZA-5F	(1 maximum)	X	0	=	0
CAC-5F	(1 maximum)	X	0	=	0
NACA-2F	(1 maximum)	X	0	=	0
2-wire Detector Heads	[]	X	[] ¹	=	
4-wire Detector Heads	[]	X	[] ¹	=	
Power Supervision Relays ²	[]	X	0.025	=	
Additional Current Draw from TB4 (nonalarm)		X		=	
Sum Column for Standby Load				=	amps

Notes:

1. Refer to the Device Compatibility Document for 2-wire smoke detector standby current
2. Must use compatible listed Power Supervision Relay

TABLE A-3: Regulated Load in Alarm

Device Type	# of Devices		Current (amps)		Total Current (amps)
Main Circuit Board	1	X	0.255	=	0.255 ⁵
ADM-24	(1 maximum)	X	0.006	=	
RZA-5F	(1 maximum)	X	0.046 ⁴	=	
CAC-5F	(1 maximum)	X	0	=	0
NACA-2F	(1 maximum)	X	0	=	0
4-Wire Smoke Detector	[]	X	[]	=	
Power Supervision Relay ³	[]	X	0.025	=	
Programmable Relay(s) ⁶	[]	X	0.01	=	
Notification Appliances	[]	X	[]	=	
Additional Current Draw from TB2 and TB4 (alarm current)		X		=	
Sum Column for Alarm Load				=	amps

Notes:

1. Current limitations of terminals:
 - ✓ TB4, Terminals 1 & 2 = 0.300 amp, filtered, 24 VDC (+/- 5%), 120 Hz ripple @ 10 mV_{RMS} Nonresettable Power (100 Hz ripple for MS-5024E)
 - ✓ TB4, Terminals 3 & 4 = 0.300 amp, filtered, 24 VDC (+/- 5%), 120 Hz ripple @ 10 mV_{RMS} Resettable Power (100 Hz ripple for MS-5024E)
 - ✓ TB5, Terminals 1 & 2 = 1.5 amps
 - ✓ TB5, Terminals 3 & 4 = 1.5 amps
2. Total current draw listed above cannot exceed 3.6 amps
3. Must use compatible listed Power Supervision Relay
4. The current shown for the RZA-5F is for all five zones in alarm. For one zone in alarm, the RZA-5F current draw is 16 mA
5. The current shown represents one zone on the Main Circuit Board in alarm. For all five zones in alarm, the current draw increases to 0.39 amps
6. Relays may be programmed for alarm, trouble, supervisory, communications failure or any combination of these

Appendix B *Programming Reference Sheet*

...To enter Programming Mode, press the **MODE** key, the code **7764** and then the **[ENTER/STORE]** key...

₀₀ ₀₁ ₀₂ ₀₃ ₀₄ ₀₅ ₀₆ ₀₇ ₀₈ ₀₉ ₁₀ ₁₁ ₁₂ ₁₃ ₁₄ ₁₅

Addresses 00 to 15 store the Primary Central Station Phone Number. Enter 'F' to represent the end of the number.

₁₆ Primary Central Station Communication Format: Enter '0 - D'.

₁₇ ₁₈ ₁₉ ₂₀ Primary Central Station Account Code: Valid entries are '0 - F'.

₂₁ ₂₂ ₂₃ ₂₄ Primary Central Station 24-Hour Test Time. Enter military time (i.e. 1400 for 2 PM).

₂₅ Primary Number Test Time Interval. Enter '0' for 24 hour; '1' for 12 hour; '2' for 8 hour; '3' for 6 hour.

₂₆ ₂₇ ₂₈ ₂₉ ₃₀ ₃₁ ₃₂ ₃₃ ₃₄ ₃₅ ₃₆ ₃₇ ₃₈ ₃₉ ₄₀ ₄₁

Addresses 26 to 41 store the Secondary Central Station Phone Number. Enter 'F' to represent the end of the number.

₄₂ Secondary Central Station Communication Format: Enter '0 - D'.

₄₃ ₄₄ ₄₅ ₄₆ Secondary Central Station Account Code: Valid entries are '0 - F'.

₄₇ ₄₈ ₄₉ ₅₀ Secondary Central Station 24-Hour Test Time. Enter military time (i.e. 1400 for 2 PM).

₅₁ Secondary Number Test Time Interval. Enter '0' for 24 hour; '1' for 12 hour; '2' for 8 hour; '3' for 6 hour.

₅₂ Alarm Verification. Enter '0' for no verification; '1' for verification of all 2-wire smoke zones.

₅₃ Programmable Relay 1: Enter '0' to Disable; '1' for Alarm; '2' for Supervisory; '3' for Alarm or Supervisory; '4' for Trouble; '5' for Alarm or Trouble; '6' for Supervisory or Trouble; '7' for Alarm or Supervisory or Trouble; '8' for Communication Failure; '9' for Alarm or Communication Failure; 'A' for Supervisory or Communication Failure; 'B' for Alarm or Supervisory or Communication Failure; 'C' for Trouble or Communication Failure; 'D' for Alarm or Trouble or Communication Failure; 'E' for Supervisory or Trouble or Communication Failure; 'F' for Alarm or Supervisory or Trouble or Communication Failure.

₅₄ Programmable Relay 1: Enter '0' to Disable; '1' for Alarm; '2' for Supervisory; '3' for Alarm or Supervisory; '4' for Trouble; '5' for Alarm or Trouble; '6' for Supervisory or Trouble; '7' for Alarm or Supervisory or Trouble; '8' for Communication Failure; '9' for Alarm or Communication Failure; 'A' for Supervisory or Communication Failure; 'B' for Alarm or Supervisory or Communication Failure; 'C' for Trouble or Communication Failure; 'D' for Alarm or Trouble or Communication Failure; 'E' for Supervisory or Trouble or Communication Failure; 'F' for Alarm or Supervisory or Trouble or Communication Failure.

₅₅ Future use.

₅₆ Slave Communicator/Fire Panel Selection. Enter '0' for fire panel only; '1' for slave communicator only; '2' for fire panel/communicator operation.

₅₇ Zone 1 Function Select. Enter '0' for 2-wire smoke detectors; '1' for pull station; '2' for normally open contact devices; '3' for supervisory devices; '4' for supervisory devices (autoresettable).

₅₈ Zone 2 Function Select. Enter '0' for 2-wire smoke detectors; '1' for pull station; '2' for normally open contact devices; '3' for supervisory devices; '4' for supervisory devices (autoresettable).

₅₉ Zone 3 Function Select. Enter '0' for 2-wire smoke detectors; '1' for pull station; '2' for normally open contact devices; '3' for supervisory devices; '4' for supervisory devices (autoresettable); '5' for waterflow (silenceable); '6' for waterflow (nonsilenceable).

- ₆₀ Zone 4 Function Select. Enter '0' for 2-wire smoke detectors; '1' for pull station; '2' for normally open contact devices; '3' for supervisory devices; '4' for supervisory devices (autoresettable).
- ₆₁ Zone 5 Function Select. Enter '0' for 2-wire smoke detectors; '1' for pull station; '2' for normally open contact devices; '3' for supervisory devices; '4' for supervisory devices (autoresettable).
- ₆₂ ₆₃ Waterflow Retard Timer. Enter 0 - 89 additional seconds.
- ₆₄ AC Loss Reporting Delay. Enter '0' for 6 hour delay; '1' for 7 hours; '2' for 8 hours; '3' for 9 hours; '4' for 10 hours; '5' for 11 hours; '6' for 12 hours; '7' for 15 hours; '8' for 16 hours; '9' for 17 hours; 'A' for 18 hours; 'B' for 19 hours; 'C' for 20 hours; 'D' for 21 hours; 'E' for 22 hours; 'F' for 23 hours.
- ₆₅ Alarm Presignal. Enter '0' to disable alarm presignal; '1' to enable.
- ₆₆ ₆₇ ₆₈ Alarm Presignal Delay Time. Enter 0 - 179 additional seconds (default - 120 seconds).
- ₆₉ Notification Appliance Circuit #1 Selection. Enter '0' for enabled (silenceable); '1' for enabled (nonsilenceable); '2' for disabled.
- ₇₀ Silence Inhibit NAC #1. Enter '0' for no silence inhibit; '1' to inhibit silencing of NAC #1 for one minute.
- ₇₁ Autosilence NAC #1. Enter '0' for no autosilence; '1' for 5 minutes; '2' for 10 minutes; '3' for 15 minutes; '4' for 20 minutes; '5' for 25 minutes; '6' for 30 minutes.
- ₇₂ Coding NAC #1. Enter '0' for steady; '1' for March Time (120 ppm); '2' for California (10 seconds On, 5 seconds Off); '3' for Temporal (½ second On, ½ second Off, ½ second On, ½ second Off, ½ second On, 1½ second Off).
- ₇₃ Notification Appliance Circuit #2 Selection. Enter '0' for enabled (silenceable); '1' for enabled (nonsilenceable); '2' for disabled.
- ₇₄ Silence Inhibit NAC #2. Enter '0' for no silence inhibit; '1' to inhibit silencing of NAC #2 for one minute.
- ₇₅ Autosilence NAC #2. Enter '0' for no autosilence; '1' for 5 minutes; '2' for 10 minutes; '3' for 15 minutes; '4' for 20 minutes; '5' for 25 minutes; '6' for 30 minutes.
- ₇₆ Coding NAC #2. Enter '0' for steady; '1' for March Time (120 ppm); '2' for California (10 seconds On, 5 seconds Off); '3' for Temporal (½ second On, ½ second Off, ½ second On, ½ second Off, ½ second On, 1½ second Off)
- ₇₇ Trouble Reminder. Enter '0' to disable trouble reminder; '1' to enable.
- ₇₈ Annunciator Supervision. Enter '0' for annunciator not present; '1' for annunciator present.
- ₇₉ Backup Reporting. Enter '0' to report to secondary phone number as backup only; '1' to report to secondary phone number for all reports/messages.
- ₈₀ Touchtone/Rotary Select. Enter '0' for touchtone dialing; '1' for rotary dialing.
- ₈₁ Make/Break Ratio. Enter '0' for 67/33 ratio; '1' for 62/38 ratio.

Programming Reference Sheets

82	83	84	85	86	87	88	89	90	91	92	93	94
95	96	97	98	99	100	101	102	103	104	105	106	107
108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133
134	135	136	137	138	139	140	141	142	143	144	145	146
147	148	149	150	151	152	153	154	155	156	157	158	159
160	161	162	163	164	165	166	167	168	169	170	171	172
173	174	175	176	177	178	179	180	181	182	183	184	185
186	187	188	189	190	191	192	193	194	195	196	197	198
199	200	201	202	203	204	205	206	207	208	209	210	211
212	213	214	215	216	217	218	219	220	221	222	223	224
225	226	227	228	229	230	231	232	233	234	235	236	237
238	239	240	241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260	261	262	263
264	265	266	267	268	269	270	271	272	273	274	275	276
277	278	279	280	281	282	283	284	285	286	287	288	289
290	291	292	293	294	295	296	297	298	299	300	301	302
303	304	305	306	307	308	309	310	311	312	313		

Programming Reference Sheets - Factory Default Settings

...To enter Programming Mode, press the **MODE** key, the code **7764** and then the **[ENTER/STORE]** key...

F₀₀ **F**₀₁ **F**₀₂ **F**₀₃ **F**₀₄ **F**₀₅ **F**₀₆ **F**₀₇ **F**₀₈ **F**₀₉ **F**₁₀ **F**₁₁ **F**₁₂ **F**₁₃ **F**₁₄ **F**₁₅

Addresses 00 to 15 store the Primary Central Station Phone Number. *Enter 'F' to represent the end of the number.*

A₁₆ Primary Central Station Communication Format: 'A' for 4+2 Standard, 1800/2300.

0₁₇ **0**₁₈ **0**₁₉ **0**₂₀ Primary Central Station Account Code.

0₂₁ **0**₂₂ **0**₂₃ **0**₂₄ Primary Central Station 24-Hour Test Time. 0000 = 12:00 midnight.

0₂₅ Primary Number Test Time Interval. '0' for 24 hours.

F₂₆ **F**₂₇ **F**₂₈ **F**₂₉ **F**₃₀ **F**₃₁ **F**₃₂ **F**₃₃ **F**₃₄ **F**₃₅ **F**₃₆ **F**₃₇ **F**₃₈ **F**₃₉ **F**₄₀ **F**₄₁

Addresses 26 to 41 store the Secondary Central Station Phone Number. *Enter 'F' to represent the end of the number.*

A₄₂ Secondary Central Station Communication Format: 'A' for 4+2 Standard, 1800/2300.

0₄₃ **0**₄₄ **0**₄₅ **0**₄₆ Secondary Central Station Account Code.

0₄₇ **0**₄₈ **0**₄₉ **0**₅₀ Secondary Central Station 24-Hour Test Time. 0000 = 12:00 midnight.

0₅₁ Secondary Number Test Time Interval. '0' for 24 hours.

0₅₂ Alarm Verification. '0' for no verification.

1₅₃ Programmable Relay #1. '1' for alarm only.

4₅₄ Programmable Relay #2. '4' for trouble only.

0₅₅ Future use.

0₅₆ Slave Communicator/Fire Panel Selection. '0' for fire panel only operation.

0₅₇ Zone 1 Function Select. '0' for 2-wire smoke detectors.

0₅₈ Zone 2 Function Select. '0' for 2-wire smoke detectors.

0₅₉ Zone 3 Function Select. '0' for 2-wire smoke detectors.

0₆₀ Zone 4 Function Select. '0' for 2-wire smoke detectors.

0₆₁ Zone 5 Function Select. '0' for 2-wire smoke detectors.

0₆₂ **0**₆₃ Waterflow Retard Timer. '00' for no delay.

0₆₄ AC Loss Reporting Delay. '0' for 6 hour delay.

0₆₅ Alarm Presignal. '0' for no Positive Alarm Sequence.

1₆₆ **2**₆₇ **0**₆₈ Alarm Presignal Delay Time. 120 second Positive Alarm Sequence delay.

0₆₉ Notification Appliance Circuit #1 Selection. '0' for enabled (silenceable).

0₇₀ Silence Inhibit NAC #1. '0' for no silence inhibit.

0₇₁ Autosilence NAC #1. '0' for no autosilence.

Programming Reference Sheet

- ₇₂ Coding NAC #1. '0' for steady no coding.
- ₇₃ Notification Appliance Circuit #2 Selection. '0' for enabled (silenceable).
- ₇₄ Silence Inhibit NAC #2. '0' for no silence inhibit.
- ₇₅ Autosilence NAC #2. '0' for no autosilence.
- ₇₆ Coding NAC #2. '0' for steady no coding.
- ₇₇ Trouble Reminder. '0' for no trouble reminder.
- ₇₈ Annunciator/Printer Supervision. '0' for annunciator not present.
- ₇₉ Backup Reporting. '0' to report to secondary phone number as backup only.
- ₈₀ Touchtone/Rotary Select. '0' for touchtone dialing.
- ₈₁ Make/Break Ratio. '0' for 67/33 ratio.

Programming Reference Sheets Factory Default

1 ₈₂	1 ₈₃	1 ₈₄	2 ₈₅	1 ₈₆	3 ₈₇	1 ₈₈	4 ₈₉	1 ₉₀	5 ₉₁	F ₉₂	1 ₉₃	F ₉₄
2 ₉₅	F ₉₆	3 ₉₇	F ₉₈	4 ₉₉	F ₁₀₀	5 ₁₀₁	9 ₁₀₂	7 ₁₀₃	F ₁₀₄	6 ₁₀₅	F ₁₀₆	1 ₁₀₇
F ₁₀₈	2 ₁₀₉	F ₁₁₀	3 ₁₁₁	F ₁₁₂	4 ₁₁₃	F ₁₁₄	5 ₁₁₅	F ₁₁₆	7 ₁₁₇	F ₁₁₈	8 ₁₁₉	F ₁₂₀
9 ₁₂₁	F ₁₂₂	A ₁₂₃	F ₁₂₄	B ₁₂₅	F ₁₂₆	C ₁₂₇	F ₁₂₈	C ₁₂₉	F ₁₃₀	D ₁₃₁	F ₁₃₂	E ₁₃₃
F ₁₃₄	C ₁₃₅	F ₁₃₆	F ₁₃₇	E ₁₃₈	1 ₁₃₉	E ₁₄₀	2 ₁₄₁	E ₁₄₂	3 ₁₄₃	E ₁₄₄	4 ₁₄₅	E ₁₄₆
5 ₁₄₇	E ₁₄₈	1 ₁₄₉	E ₁₅₀	2 ₁₅₁	E ₁₅₂	3 ₁₅₃	E ₁₅₄	4 ₁₅₅	E ₁₅₆	5 ₁₅₇	9 ₁₅₈	8 ₁₅₉
E ₁₆₀	6 ₁₆₁	E ₁₆₂	1 ₁₆₃	E ₁₆₄	2 ₁₆₅	E ₁₆₆	3 ₁₆₇	E ₁₆₈	4 ₁₆₉	E ₁₇₀	5 ₁₇₁	E ₁₇₂
7 ₁₇₃	E ₁₇₄	8 ₁₇₅	E ₁₇₆	9 ₁₇₇	E ₁₇₈	A ₁₇₉	E ₁₈₀	B ₁₈₁	E ₁₈₂	C ₁₈₃	E ₁₈₄	C ₁₈₅
E ₁₈₆	D ₁₈₇	E ₁₈₈	E ₁₈₉	E ₁₉₀	C ₁₉₁	E ₁₉₂	F ₁₉₃	9 ₁₉₄	9 ₁₉₅	9 ₁₉₆	1 ₁₉₇	1 ₁₉₈
1 ₁₉₉	1 ₂₀₀	2 ₂₀₁	1 ₂₀₂	3 ₂₀₃	1 ₂₀₄	4 ₂₀₅	1 ₂₀₆	5 ₂₀₇	F ₂₀₈	1 ₂₀₉	F ₂₁₀	2 ₂₁₁
F ₂₁₂	3 ₂₁₃	F ₂₁₄	4 ₂₁₅	F ₂₁₆	5 ₂₁₇	9 ₂₁₈	7 ₂₁₉	F ₂₂₀	6 ₂₂₁	F ₂₂₂	1 ₂₂₃	F ₂₂₄
2 ₂₂₅	F ₂₂₆	3 ₂₂₇	F ₂₂₈	4 ₂₂₉	F ₂₃₀	5 ₂₃₁	F ₂₃₂	7 ₂₃₃	F ₂₃₄	8 ₂₃₅	F ₂₃₆	9 ₂₃₇
F ₂₃₈	A ₂₃₉	F ₂₄₀	B ₂₄₁	F ₂₄₂	C ₂₄₃	F ₂₄₄	C ₂₄₅	F ₂₄₆	D ₂₄₇	F ₂₄₈	E ₂₄₉	F ₂₅₀
C ₂₅₁	F ₂₅₂	F ₂₅₃	E ₂₅₄	1 ₂₅₅	E ₂₅₆	2 ₂₅₇	E ₂₅₈	3 ₂₅₉	E ₂₆₀	4 ₂₆₁	E ₂₆₂	5 ₂₆₃
E ₂₆₄	1 ₂₆₅	E ₂₆₆	2 ₂₆₇	E ₂₆₈	3 ₂₆₉	E ₂₇₀	4 ₂₇₁	E ₂₇₂	5 ₂₇₃	9 ₂₇₄	8 ₂₇₅	E ₂₇₆
6 ₂₇₇	E ₂₇₈	1 ₂₇₉	E ₂₈₀	2 ₂₈₁	E ₂₈₂	3 ₂₈₃	E ₂₈₄	4 ₂₈₅	E ₂₈₆	5 ₂₈₇	E ₂₈₈	7 ₂₈₉
E ₂₉₀	8 ₂₉₁	E ₂₉₂	9 ₂₉₃	E ₂₉₄	A ₂₉₅	E ₂₉₆	B ₂₉₇	E ₂₉₈	C ₂₉₉	E ₃₀₀	C ₃₀₁	E ₃₀₂
D ₃₀₃	E ₃₀₄	E ₃₀₅	E ₃₀₆	C ₃₀₇	E ₃₀₈	F ₃₀₉	9 ₃₁₀	9 ₃₁₁	9 ₃₁₂	1 ₃₁₃		

Appendix C *Wire Requirements*

Connecting external system accessories to the MS-5024 main circuits must be carefully considered to ensure proper operation. It is important to use the correct type of wire, wire gauge and wire run length per each MS-5024 circuit. Reference the chart below to specify wire requirements and limitations for each MS-5024.

TABLE C-1: Wire Requirements

Circuit Connections		Wire Requirements		
Circuit Type	Circuit Function	Wire Type and Limitations	Recommended Maximum Distance (feet/m)	Wire Gauge
Initiating Device Circuit (power-limited)	Connects to Initiating Devices	Untwisted, unshielded wire (Do not exceed 100 ohms)	10,000 (3,000 m) 8,000 (2,400 m) 4,875 (1,480 m) 3,225 (980 m)	12AWG Belden 9582 14AWG Belden 9580 16AWG Belden 9572 18AWG Belden 9571 (0.75 mm ² - 3.25 mm ²)
24 VDC Filtered, Resettable, Nonresettable (power-limited)	Connects to annunciators and other accessories	No more than 1.2 volt drop allowed from supply source to end of any branch	Distance limitation set by 1.2 volt maximum line drop	12 - 18 AWG (0.75 mm ² - 3.25 mm ²)

Appendix D *Operation and Function Modes*

TABLE D-1: Operation Modes

Code	Activity	Notes
6676 (NORM)	Return to normal operation	Fire protection on.
7764 (PROG)	Enters Program Mode	Four levels of programming may be entered. Fire protection is off.
9255 (WALK)	Enters Walktest Mode	Audible walktest function. Fire protection is off.
4478 (HIST)	View History File	Use display to view History File. Fire protection is off.
8768 (TROU)	Activates internal system voltmeter for troubleshooting and diagnosing problems	Fire protection is off while voltmeter function is enabled.
5267 (LAMP)	Turns on all LEDs on the main PCB for 5 seconds	Fire protection is on.

TABLE D-2: Function Modes

Code	Activity	Notes
3472 (DISA)	Allows disabling of any input zone	May only disable one zone at a time. Places system into trouble.
3622 (ENAB)	Allows enabling (return to normal) of any zone	May only enable one zone at a time.
3745 (DRIL)	Performs drill function by turning on both NAC outputs	Transmission of drill function to Central Station is defaulted to On.

Notes

Index

Numerics

1st Event 47
220/240 VAC 11

A

AC loss
 reporting delay 42
AC Power 16
AC power 22
AC Power On 48
account code 36, 40
ADM-24 15, 28, 29
 see also annunciator driver module 11
Alarm 48
alarm presignal 43
 delay timer 43
Alarm Response 49
Alarm Restoral 49
alarm verification 40
annunciator drive module 28
annunciator driver module 11, 15
annunciator supervision 44
auto-silence 12
autosilence
 programming 43

B

backbox mounting 19
backup reporting 44
batteries 15
battery 22
battery box 16
battery calculations 63
battery charger 13, 16
BB-17F 16

C

cabinet 14
cabinet dimensions 20
CAC-5F 15, 30
 see also Class A IDC converter module 12
Central Station Communications 52
central station phone 32, 36
circuit board 14
Class A converter modules 30
Class A IDC module 15
Class A NAC module 15
clock
 real-time 44
coding
 NAC 43
communication format 33, 37
communication formats 14
communicator 11
controls 13
current 11

D

description 11
dial tone 14
dialing 14
digital communicator 14, 17, 27
display 47
Down Arrow 47

E

ENTER/STORE 47
event codes

 programming 44
exit
 programming 45
export version 11

F

Fire Drill 52
fire panel 41
fire panel/communicator 11
format
 communication 33, 37
formats
 communication 14
function modes 73

H

history 58
history file 11

I

IDC 16, 23
 see also Initiating Device Circuit 13
indicators 13
Initiating Device Circuit 16, 23
initiating device circuit 13
initiating zone 11
input
 zones 23
input circuits 13, 23
installation 19

K

key functions 32
keys 46
Kissoff 48

L

lamp test 60
LEDs 47
line seizure 14
local sounder 13

M

make/break ratio 44
Mode 47
mounting 19

N

NAC 16, 24
 programming 43
 see also Notification Appliance Circuit 11
 see also notification appliance circuit 14
NACA-2F 15, 30
 see also Class A NAC module 12
No Battery/Low Battery 52
nonresettable power 13, 17, 24
Notification Appliance Circuit 11, 16, 24

O

Off Normal Reporting 51
off/on hook 14
operating instructions 46
operation 49
operations modes 73
output circuits 13, 24

P

piezo

- see also local sounder 13
- power
 - operating 22
- power-limited wiring 26
- presignal
 - alarm 43
- Primary Line Active 48
- program mode 31
- programmer 11
- programming 31
 - options 32
 - sheets 66

R

- Receivers 56
- relay 12
- relays 14, 16
 - alarm 14
 - programming 25, 41
 - supervisory 14
 - trouble 14
- remote annunciator 11, 15, 28
- Reset 46
- resettable power 13, 16, 24
- Ringer Equivalence Number (REN) 17
- RZA-5F 15, 28, 29
 - see also remote annunciator 11

S

- Secondary Line Active 48
- servicing 57
- Silence 46, 48
- silence inhibit 11
 - programming 43
- size 11
- slave communicator 11, 41, 61
- specifications 16
- Supervisory 48
- Supervisory Condition Response 50
- Supervisory Restoral Response 50
- switches 46
- System Alarm 48
- System Silence 48
- System Trouble 48

T

- telephone circuit 13, 17, 24
- telephone circuits
 - wiring 27
- test time 36, 40
 - interval 36, 40
- tone burst 14
- touchtone 14
 - programming 44
- transformer 14
- Transmittal Priorities 55
- Trouble 48
- Trouble Condition Response 50
- Trouble Conditions Restoral 51
- trouble reminder 44
- troubleshoot 59

U

- Up Arrow 47

V

- verification
 - alarm 40

- voltmeter 11

W

- walktest 12, 57
- waterflow
 - retard timer 42
- waterflow circuit 23
- wire
 - requirements 72

Z

- zone
 - functions 41, 42
 - programming 23
- Zone Disable/Enable 51
- zone ID 11

Notes

Notes

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