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Operation and Installation Guide



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## 1.0 Introduction

This manual addresses the operation and installation of the D9412G/D7412G Control/Communicators **only**, and should not be used in conjunction with the D9412, D9112, D9112B1, D7412, D7212 or D7212B1 panels.

Throughout this manual, unless expressly stated, the words “panel” and “control/communicator” refer to both panels (D9412G and D7412G).

Table 3 provides an overview of the differences between the D9412G and D7412G panels.

## 1.1 Manual Organization

This manual is divided into fifteen sections and seven appendices, which are summarized in the table below.

Section	Description
1	<b>Introduction</b> – (this chapter) provides information on the structure of the manual, lists other literature related to these Control/Communicators, and describes the FCC rules with which they comply.
2	<b>Overview</b> – provides an overview of the D9412G/D7412G Control/Communicator panels, including operational specifications, standard and new features.
3	<b>Installation</b> – provides installation instructions for connecting the power terminals plus the status and battery LEDs.
4	<b>Power Module</b> – provides information on the primary and secondary modules and instructions on connecting and programming them.
5	<b>Power Outputs</b> – provides information on the power outputs and instructions on installing the transformer; explains the status and battery LEDs.
6	<b>Telephone Connections</b> – provides information on connecting the phone line and programming it for use.
7	<b>On-Board Points</b> – provides information on the on-board points and their parameters.
8	<b>Off-Board Points</b> – provides information on the off-board points and their parameters, including the installation, wiring and testing of OctoPOPITS.
9	<b>Off-Board Relays</b> – describes the installation and wiring of the D8129 OctoRelay and the D811 Arm Status Relay Module.
10	<b>Arming Devices</b> – describes the installation, wiring, programming and operation of independent zone control modules.
11	<b>SDI Devices</b> – provides a description and installation instructions for various SDI device modules.
12	<b>Programmer and Accessory Connections</b> – describes the Programmer Connector and the Accessory Connector.
13	<b>Faceplates</b> – provides an illustration of each of the panels (D9412G and D7412G).
14	<b>Quick Reference Terminal Description</b> – a chart providing a quick description of the various terminals on the panel.
15	<b>Troubleshooting</b> – provides troubleshooting solutions to a variety of commonly encountered problems.
Appendix	Description
A	<b>Approved Applications Compliance Guide</b> – lists all the agency requirements the D9412G/D7412G panels have met or exceeded.
B	<b>System Chart</b> – chart showing the minimum requirements for a system based on common applications.
C	<b>System Wiring Diagrams</b> – illustrations showing the terminal wiring connections for each of the panels.
D	<b>Current Rating Chart for Standby Battery Calculations</b> – a worksheet to calculate total power requirements for a system.
E	<b>Standby Battery Requirements</b> – provides battery life for common system applications.
F	<b>Standby Battery Calculations for NFPA 72 Fire Applications</b> – provides standby battery requirements for NFPA 72 Fire Alarm Applications.
G	<b>Point Address Charts</b> – provides ZONEX point addresses for POPITS.

**Table 1: D9412G/D7412G Operation and Installation Guide Organization**

## Introduction

### 1.2 Related Documentation

Shown below is a comprehensive list of all documentation (with part numbers) directly related to the D9412G/D7412G Control/Communicator panels. Throughout this manual, references are made to this documentation. If it is necessary to obtain one (or more) of these documents, please contact Radionics Technical Support and request the documentation by its corresponding part number.

Name of Documentation	Part Number
<i>D9412G/D7412G Operation and Installation Manual (this manual)</i>	43488
<i>D9412G/D7412G Program Entry Guide</i>	47775
<i>9000 Series Smoke Detector Compatibility List</i>	33284
<i>D9412G/D7412G Approved Applications Compliance Guide</i>	43494
<i>RAM IV Operations Manual</i>	38849
<i>D5200 Programmer Operations Manual</i>	74-06176-000
<i>D9412G Program Record Sheet</i>	47488
<i>D7412G Program Record Sheet</i>	47776
<i>New Features for the D9412G/D7412G Control/Communicators</i>	43746
<i>D9412G/D7412G Installation and Troubleshooting Quick Reference</i>	43700
<i>D9412G Release Notes</i>	43821
<i>D7412G Release Notes</i>	43856
<i>D9412G/D7412G Point Chart Label</i>	79-06660-000
<i>Security System Owner's Manual</i>	71-06633-000
<i>Security System Owner's Manual Supplement</i>	33267
<i>D720 Command Center Installation Manual</i>	74-06918-000
<i>D1255 Command Center Installation Manual</i>	74-06819-000
<i>D1256 Fire Command Center/D1257 Fire Alarm Annunciator Inguide</i>	74-06925-000
<i>D9210B Operation and Installation Manual</i>	32206
<i>D8125MUX Multiplex Bus interface Operation &amp; Installation Manual</i>	36796
<i>UL Certificated Bank Safe and Vault Applications Technogram</i>	73-07302-000

Table 2: Related Documentation

### 1.3 Documentation Conventions

#### 1.3.1 Type Styles Used in the Text

Special type styles are used to help identify the objects being described in this guide.

<b>Bold text</b>	usually indicates selections that you may use while programming your panel. It may also indicate an important fact that should be noted.
<b><i>Bold Italicized</i></b>	used to denote notes, cautions and/or warnings
<i>Italicized text</i>	Is used to reference the user to another part of this manual or another manual entirely. It is also used to symbolize names for records that the user will create.
Courier Text	Text that appears like this indicates what may appear on the D5200 Programmer display, command center/keypad or internal printer.
[CAPITALIZED TEXT]	Text like this is used to indicate to the user that a specific key should be pressed.

### 1.3.2 Tips, Notes, Cautions and Warnings

Throughout this document helpful tips and notes will be presented concerning the entire application and/or programming the unit. They will be set off as follows:



**Warning!** *There is the possibility of physical damage to the operator, equipment and/or proper execution of the program.*



**Caution!** *Cautions the operator that physical damage to the equipment or improper execution of the program may occur.*



**Important Notes** *should be heeded for successful operation and programming. Helpful tips and/or shortcuts may be included here.*

## 1.4 FCC Rules

### 1.4.1 Part 15

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

### 1.4.2 Part 68

This equipment complies with Part 68 of FCC rules. A label contains, among other information, the FCC registration number and ringer equivalence number (REN). If requested, this information must be provided to the telephone company.

The Radionics D9412G/D7412G Control/Communicators are registered for connection to the public telephone network using an RJ38X or RJ31X jack.

The ringer equivalence number (REN) is used to determine the number of devices that 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). To be certain of the number of devices that may be connected to the line, as determined by the RENs, contact the telephone company to determine the maximum REN for the calling area.

If trouble is experienced with the D9412G/D7412G Control/Communicators, please contact Radionics Customer Service for repair and/or warranty information. If the trouble is causing harm to the telephone network, the telephone company may request that the equipment be removed from the network until the problem is resolved. User repairs must not be made, and doing so will void the user's warranty.

If the D9412G/D7412G Control/Communicators cause harm to the telephone network, the telephone company will attempt to notify you in advance. If advance notice isn't practical, the telephone company will notify you as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

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

This equipment cannot be used on public coin service provided by the telephone company. Connection to Party Line service is subject to state tariffs. (Contact your state public utilities commission for information.)

FCC Registration Number:	AJ9MUL-46532-AL-E	Service Center in USA:	National Repair Center
Ringer Equivalence:	0.1B		130 Perinton Parkway
			Fairport, NY 14450
			(585) 223-4220

**Notes:**

## 2.0 Overview

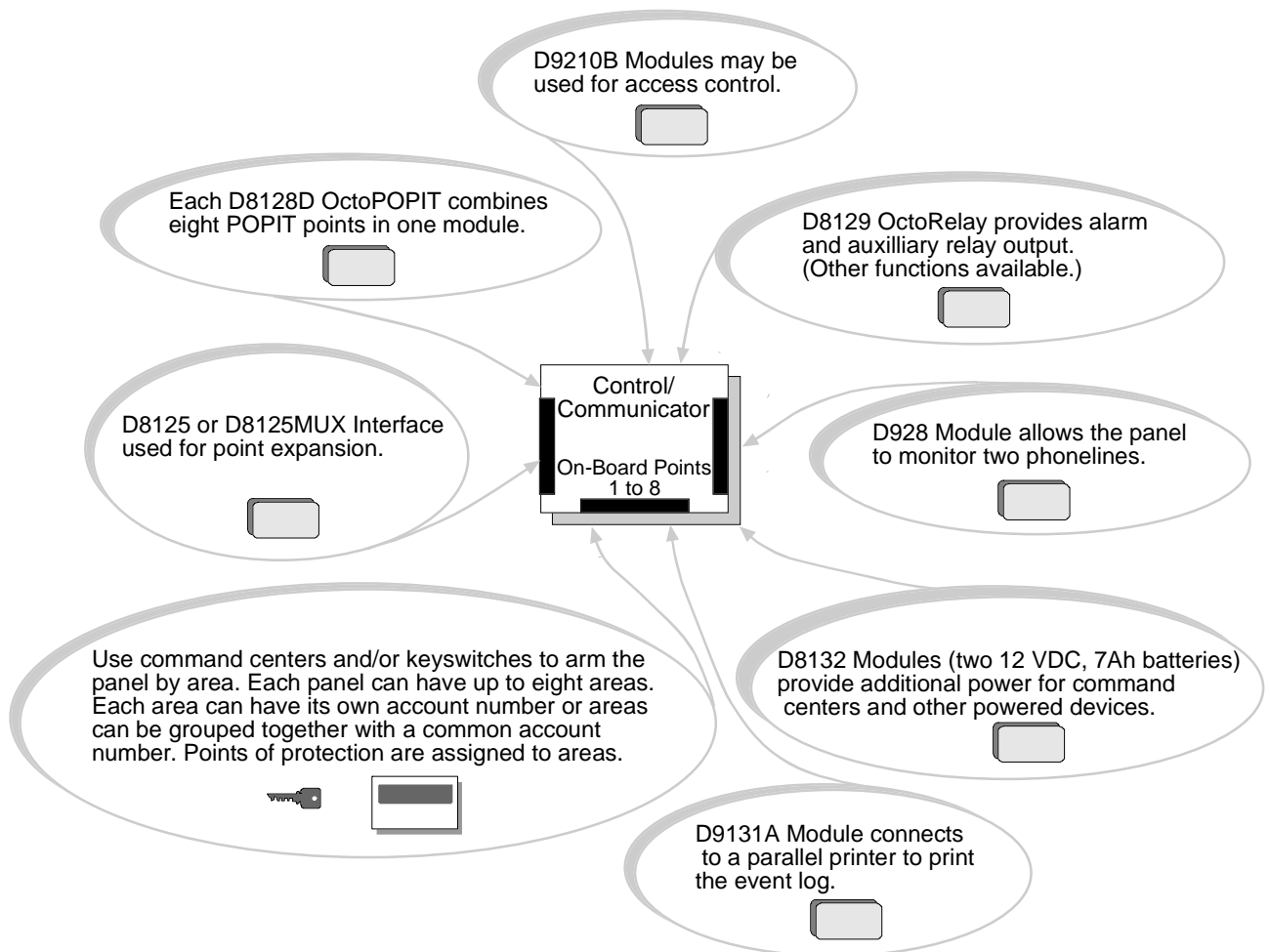


Figure 1: System Configuration

## 2.1 D9412G/D7412G Differences

The table below provides an overview of the differences between the D9412G and D7412G panels.

New Features	D9412G	D7412G
<b>Access Control</b>	YES, 8 Doors	YES, 2 Doors
Expanded Users		
Arm/Disarm Passcodes	249	99
Cards/Tokens	996	396
<b>Passcode-Protected Custom Functions</b>	16	4
Number of Printers	3	1
Number of Points	246	75
Number of Relays	128	64

Table 3: Differences Between the D9412G and D7412G

# D9412G/D7412G

## Overview

### 2.2 Specifications

(The black and white circles with numbers indicate the specific panel terminal.)

<b>Voltage Input (Power Supply)</b>	<b>Primary:</b>	① ②	16.5 VAC 40 VA class 2 plug-in transformer (D1640)
	<b>Secondary:</b>	④ ⑤	Sealed lead-acid rechargeable (12 VDC, 7 Ah or 12 VDC, 17.2 or 18 Ah) battery. The panel supports a maximum of two 12 VDC, 7 Ah batteries using the D122 Dual Battery Harness or two D1218 (12 VDC, 17.2 or 18 Ah) batteries using a D122.
<b>Current Requirements</b>	Panel : 500 mA alarm, 200 mA idle See the <i>Standby Battery and Current Rating Chart</i> for the current draw requirements of other system components.		
<b>Power Outputs</b>	All external connections are inherently power-limited except battery terminals.		
	<b>Continuous Power Outputs</b>	③ ②④ ③②	1.4 A maximum at 10.2 VDC to 13.9 VDC (continuous supply) total for all devices and outputs supplied at Terminals 3, 24, and 32 and at the Accessory and Programming Connectors.
	<b>Alarm Power Output</b>	⑥ ⑦	2.0 A maximum at 10.2 VDC to 13.9 VDC output. Output may be steady or one of three pulsed patterns depending on programming. See the <i>Relays</i> section of the <i>D9412G/D7412G Program Entry Guide</i> .
	<b>Switched Aux Power</b>	⑧	1.4 A maximum at 10.2 VDC to 13.9 VDC output. Continuous output is interrupted by Sensor Reset or alarm verification depending on programming. See the <i>Relays</i> section of the <i>D9412G/D7412G Program Entry Guide</i> .
	<b>Fire and Fire/Burglary Systems</b>	To comply with UL 985 and 864 listing standards for fire alarm systems (effective March 1, 1989), the total combined continuous and alarm current draw for the system <b>during alarm conditions</b> must be limited to 1.4 A (1400 mA) provided by the primary power supply (rectified AC). If current draw for the system exceeds 1.4 A, remove connected devices until the current draw falls below 1.4 A, then connect the removed devices to a D8132 Battery Charger Module or to an external power supply (see <i>Figure 18</i> ).	
<b>Minimum Operating Voltage</b>	10.2 VDC		
<b>SDI Bus</b>	<b>SDI Bus A (+):</b>	9 VDC (15,000 ft. [4,572 m] max.)	
	<b>SDI Bus B (-):</b>	9 VDC (15,000 ft. [4,572 m] max.)	
<b>Telephone Connections</b>	<b>Connection</b>	RJ31X or RJ38X jack can be interfaced with the panels.	
	<b>Two TelCo Lines</b>	Radionics D928 Dual Phone Line Module required for two phone line service. Supervision supplied by the panel.	

Table continued on next page.



Overview

<b>Battery Discharge/Recharge Schedule</b>	<b>Discharge Cycle</b>	13.9 VDC	Charging float level												
		13.8 VDC	Charging Status LED on												
		12.1 VDC	Low Battery & AC Fail reports if programmed, Low Battery LED on												
		10.2 VDC	Battery load shed (processing functions continue if AC is present)												
	<b>Recharge Cycle</b>	AC ON	Load shed relay resets battery charging begins, Battery Trouble and AC Restoral reports sent.												
		13.7 VDC	Battery Restoral report sent, Low Battery LED off												
		13.9 VDC	Charging Status LED off, battery float charged												
<b>Environmental</b>	<b>Temperature:</b>	+32°F to +122°F (0°C to 50°C)													
	<b>Relative Humidity:</b>	5-85% at 86°F (30°C) non-condensing													
<b>Arming Stations</b>	D720 Command Center, D1255 Command Center, D1256 Fire Command Center; D1257 Fire Alarm Annunciator; Keyswitch														
<b>Point Thresholds</b>	<b>On board Points 1 to 8</b>	<table border="1"> <thead> <tr> <th></th> <th>Voltage</th> <th>Resistance</th> </tr> </thead> <tbody> <tr> <td><b>Normal</b></td> <td>2.3</td> <td>1 kΩ</td> </tr> <tr> <td><b>Short</b></td> <td>1.85</td> <td>0.657 kΩ</td> </tr> <tr> <td><b>Open</b></td> <td>2.93</td> <td>1.6 kΩ</td> </tr> </tbody> </table>			Voltage	Resistance	<b>Normal</b>	2.3	1 kΩ	<b>Short</b>	1.85	0.657 kΩ	<b>Open</b>	2.93	1.6 kΩ
	Voltage	Resistance													
<b>Normal</b>	2.3	1 kΩ													
<b>Short</b>	1.85	0.657 kΩ													
<b>Open</b>	2.93	1.6 kΩ													
<b>Compatible Enclosures</b>	D8103 Universal Enclosure, D8109 Fire Enclosure, D8108A Attack Resistant Enclosure														

Table 4: Specifications

Compatible Accessories

See the Radionics Product Catalog for complete list.

D122	Dual Battery Harness	D1255W	Command Center (white)
D125B	Powered Loop Interface Module	D1256	Fire Command Center
D126	12 V, 7 Ah Rechargeable Battery	D1257	Fire Annunciator
D127	Reversing Relay	D1640	16.5 VAC 40 VA Transformer
D129	Dual Class A Initiation Circuit Module	D5200	Programmer
D130	Relay Module	D5500	Remote Account Manager IV
D136	Plug-In Relay	D8004	Transformer Enclosure
D161	Phone Cord	D8121A, D8122	Derived Channel S.T.U.
D162	Phone Cord	D8125	POPEX Module
D185	Reverse Polarity Module	D8125MUX	Multiplex Bus Interface
D192C/D	Bell Circuit Supervision Module	D8128D	OctoPOPIT Module
D268/D269	Independent Zone Control (On-Board and OctoPOPIT points)	D8129	OctoRelay Module
D279	Independent Zone Control (On-Board and OctoPOPIT points)	D8130	Release Module
D442	Bells (10-inch)	D8132	Battery Charger Module
D448/D449	Mini-Horns	D9002-S	Accessory Control Module
D720	Command Center (Area LED)	D9127	POPIT Module
D720R	LED Command Center (red)	D9131A	Printer Interface
D720W	LED Command Center (white)	D9210B	Access Control Module
D928	Dual Phone Line Switcher	ZX776Z	PIR Motion Sensor (50 ft.) with POPIT
D1218	12 V, 17.2 Or 18 Ah Rechargeable Battery	ZX794Z	PIR Motion Sensor (80 ft.) with POPIT
D1255	Command Center (General Purpose)	ZX835	PIR/Microwave Motion Sensor (35°) with POPIT
D1255R	Command Center (red)	ZX938Z	PIR Motion Sensor (60 ft.) with POPIT
		ZX970	PIR/Microwave Motion Sensor (35°) with POPIT

## Overview

### 2.3 New Features in D9412G/D7412G

#### Introduction

The D9412G is intended to eventually replace the D9412 and D9112. The D7412G will eventually replace the D7412 and D7212. The suffix "G" indicates the control/communicator's ability to detect ground fault conditions. All other software feature sets that were available in the 9000 Series Control/Communicators have remained the same in the D9412G/D7412G.

#### Ground Fault Detect

In order for the D9412G/D7412G to be able to detect ground fault conditions, the Earth Ground Terminal on the control/communicators had to be electrically-isolated from all other terminals. A Ground Fault Detect Enable switch (S4) has been added to the panel and is located just under Terminal 10, Earth Ground. For more information on the operation of this function, see *Ground Fault Detect Enable* under *Connecting Earth Ground* in the *Installation* section of this manual.

#### Added Feature When Using Ground Fault Detect

When Ground Fault Detect is enabled (S4 closed), Points 1-8 can be used for non-powered fire-initiating devices; such as, Heat Detectors, 4-Wire Smoke Detectors, Pull Stations, etc. A D125B Powered Loop Interface or a D129 Dual Class A Interface Module is no longer required when connecting non-powered fire-initiating devices to Points 1-8.

### 2.4 Standard Features

#### 2.4.1 Points

The Radionics D9412G Control/Communicator panel provides up to 246 points of protection, and the D7412G Control/Communicator provides up to 75 points of protection. Point programming parameters determine the panel's response to open and shorted conditions on the point's sensor loop. Points are programmed individually with several options to custom-fit the protection to the installation.

Points 1 to 8 are located on the circuit board (on-board points). They are standard sensor loops. The remaining off-board points are POPIT points using D8128D OctoPOPITs, D8125 POPEX Modules and D9127/D8127 POPITs.

#### 2.4.2 Areas and Accounts

The system supports up to eight separate areas. All points can be assigned to a single area or spread out over up to eight areas.

The panel is armed and disarmed by area, and several areas can be armed and disarmed with one menu function. A passcode can also be assigned an authority level that allows a user to arm an area from a remote command center in another area. Assigning each area its own account number creates eight separate accounts in one panel. Assigning the same account number to different areas groups them together in a single account.

Area options include: exit tone and delay, separate fire and burglary outputs, and multiple opening and closing windows. Area type can be used to create area interdependencies.

#### 2.4.3 Communicator

The control/communicator uses a built-in digital communicator to send reports to the receiver. The panel transmits reports in either the Modem IIIa<sup>2</sup> or BFSK format. The D6600/D6500 receiver's MPU and line cards must have software revision 8.00 (or greater) installed to accept Modem IIIa<sup>2</sup> reports from the panel. Cycle the receiver's down to print the software revision numbers.

The panel connects to an RJ31X or RJ38X jack for phone line seizure. Connection to the RJ31X complies with FCC regulations for using the public telephone network. The panel can be programmed to direct reports to four separate phone numbers. Adding the D928 Dual Phone Line Switcher Module allows connection and supervision of a second phone line.

The system has routing capabilities that allow groups of event reports to be directed to four different destinations. Each of the report groups can be programmed to report to one or more of the destinations. Primary and backup reporting paths can be programmed for each of the destinations and each of the report groups. A custom option allows specification of individual event reports to be sent.

#### 2.4.4 Command Centers

A maximum of 32 unsupervised command centers can be connected to the system. The available power, number of supervised command centers, and number of areas that will be used, affect the total number of command centers that can be connected.

The system can supervise up to 8 command centers. The panel transmits a serial device trouble report `SDI FAILURE` in the Modem IIIa<sup>2</sup> format or `TROUBLE ZN D` in the BFSK format, if it loses communication with a supervised command center. More command centers can be added, but only eight can be supervised. Table 5 shows the command centers compatible with the D9412G/D7412G Control/Communicators. See *Command Center* in the *D9412G/D7412G Program Entry Guide* for complete details on programming command center options.

Model	Display	Application
D720	8 LED	Fire/Burglary
D1255	16-character alphanumeric	Fire/Burglary/Access
D1256	16-character alphanumeric	Fire
D1257	16-character alphanumeric	Fire

Table 5: Compatible Command Centers

#### 2.4.5 Keyswitch

Any of the eight available areas can be armed and disarmed with maintained or momentary closure devices such as keyswitches. Point programming determines loop responses and which area a keyswitch controls.

#### 2.4.6 Access Control

The D9412G can control eight access doors (each requiring the optional D9210B Access Control Module) with up to 996 uniquely identified cards/tokens. The D7412G can control two access doors with up to 396 uniquely identified cards/tokens. Access can be granted from a Weigand style access control device (card reader) connected to the D9210B Access Control Module. Access may also be granted from a "request to enter" or a "request to exit" input, or from a command center.

The access control features of the D9412G/D7412G can deny access during armed periods. It can also grant access only to certain authorized users depending on whether the area is master armed, perimeter armed, or disarmed. The alarm system can also be programmed to automatically disarm when designated authorized users are granted access.

#### 2.4.7 Event Memory

The system uses event memory to store events for each area. The events for an area can be viewed at a D1255 Command Center assigned to the area. The panel clears the events for an area from event memory and starts storing new events when the area is master armed.

#### 2.4.8 Event Log

The system stores from 500 to 1000 events and event modifiers from all areas in its event log. Event modifiers add information about an event to the log. Some events are always followed by a modifier. For example, the system adds at least two items to the log each time an area is armed or disarmed, the open (or close) event and an event modifier showing the previous arming state.

All events and their modifiers can be stored even if the panel does not send a report for them. The log can be viewed at a D1255 Command Center, printed locally using the D9131A Parallel Printer Interface and a parallel printer, or uploaded to the Remote Account Manager (RAM IV).

See the appendix in the *User's Guide* for a listing of log events and event modifiers.

#### 2.4.9 EMI & Lightning Transient Protection

The D9412G/D7412G Control/Communicators maintain the Radionics high level of quality and field dependability. Their design significantly reduces electromagnetic interference and malfunction generally caused by lightning.

#### 2.4.10 Programming

Use either the Radionics D5200 Programmer or the Remote Account Manager (RAM IV) to program the D9412G/D7412G Control/Communicators. Refer to the *D9412G/D7412G Program Entry Guide* for programming options.

## Overview

### 2.4.11 Other Features

The D9412G/D7412G Control/Communicators have many programmable features. A short list of some of the features follows. Complete details on all the features can be found in the *D9412G/D7412G Program Entry Guide*.

- Supervision of AC (primary power), battery (secondary power), ZONEX and SDI buses, the CPU (Central Processing Unit), up to three printers, and two telephone lines
- Automatic system test reports
- Remote access for programming, diagnostics, and log uploads using the Remote Account Manager (RAMIV)
- Fire Alarm Verification
- Programmable Alarm Output
- Programmable Relay Output using the D8129 OctoRelay Module
- Opening and Closing Windows
- Skeds (scheduled events)

### 2.4.12 Control/Communicator Assembly

The D9412G/D7412G Control/Communicator is shipped pre-assembled from the factory with the following parts:

- **Literature Pack**
  - *D9412G/D7412G Installation and Troubleshooting Quick Reference*
  - *D9412G Program Record Sheet or D7412G Program Record Sheet*
  - *UL Smoke Detector Compatibility Technogram*
  - *Point Chart Label*
- **Assembly**
  - PC board
  - Faceplate shield
  - Mounting Skirt
  - One #6x1/4" screw

### 2.4.13 Available by Separate Order

- **Separately Ordered Components** - Order the following to complete a basic 8 point installation.
  - D1255 or D720 Command Center (or keyswitch)
  - D1640 Transformer
  - D126 or D1218 Battery
  - D161 or D162 Phone Cord (order two cords if using the D928 Dual Phone Switcher)
  - D8103, D8108A, or D8109 Enclosure

Configured packages are also available. Please consult the Radionics Product Catalog.

- **Separately Ordered Literature** - The following literature is available in a separate literature package for dealers.
  - D9412G/D7412G Operation and Installation Guide
  - D9412G/D7412G Approved Applications Compliance Guide
  - D9412G/D7412G Program Entry Guide
  - D9412G Program Record Sheet and D7412G Program Record Sheet

**2.4.14 Listings and Approvals**

The D9412G/D7412G Literature Pack includes the *D9412G/D7412G Approved Applications Compliance Guide*. Refer to this guide for additional guidelines for installing the control/communicator in UL and Fire specific applications.

<b>Fire</b>	
<b>UL</b>	Underwriters Laboratories lists the D9412G/D7412G Control/Communicators as Signal System Control Unit for: Central Station, Local, Auxiliary, Remote Station, and Household Fire Warning.
<b>CSFM</b>	Approved by the California State Fire Marshal for highrise and non-highrise.
<b>Burglary</b>	
<b>UL</b>	Underwriters Laboratories lists the D9412G/D7412G Control/Communicators for: Central Station, Local, Police Connect, Bank Safe and Vault, Mercantile Safe and Vault, and Grade A Household systems, Access Control, and Proprietary.
<b>Department of Defense (DOD)</b>	The D9412G/D7412G Control/Communicators have been granted approval for Department of Defense (DOD) installations in Sensitive Compartmented Information Facilities (SCIF).

**Table 6: Listings**

**Notes:**

### 3.0 Installation

#### 3.1 Before Beginning

This *Installation* section contains a general installation procedure. It provides references to other sections of the manual for detailed instructions.

Radionics recommends a review of this manual and the *D9412G/D7412G Program Entry Guide* before beginning the installation to determine the hardware and wiring requirements for the features that will be used.

Have the following additional documents available when reading through this manual:

- *D9412G Program Record Sheet* or *D7412G Program Record Sheet*
- *Security System Owner's Manual* and *Security System Owner's Manual Supplement*
- *D1255 Command Center Installation Manual* or *D720 Command Center Installation Manual*

Before beginning the installation, become familiar with the operation of the D5200 Programmer or the Remote Account Manager (RAM IV).

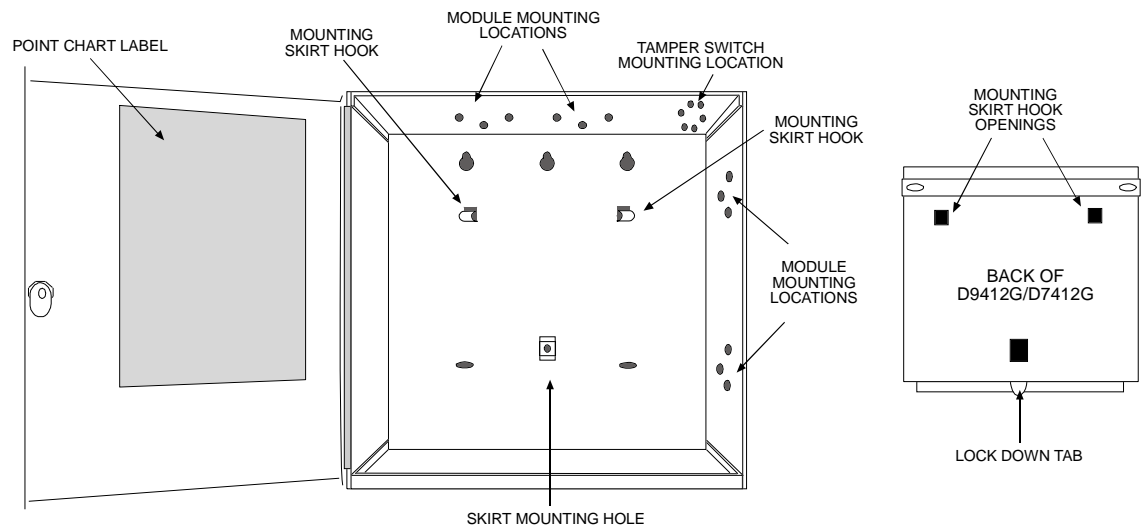
#### 3.2 Enclosure Options

Mount the control/communicator assembly in any of the Radionics enclosures listed below. Refer to *Appendix A: Approved Applications Compliance Guide* to determine if the application requires a specific enclosure.

- D8103 Universal Enclosure (tan)
- D8109 Fire Enclosure (red)
- D8108A Attack Resistant Enclosure (tan)

#### 3.3 Beginning the Installation

1. Mount the enclosure in the desired location. Use all five mounting holes. See *Figure 2*.



**Figure 2: Enclosure Mounting**

2. Run the necessary wiring throughout the premises and pull the wires into the enclosure.

**EMI (Electro Magnetic Interference) may cause problems:** Refer to *EMI on Long Wire Runs* in the *Troubleshooting* section of this manual.

## Installation

### 3.4 Installing the Assembly

1. Place the assembly over the inside back of the enclosure, aligning the large rectangular openings of the mounting skirt with the mounting hooks of the enclosure. Slide the assembly down so it hangs on the hooks. See *Figure 2*.
2. Remove the tape from the #6x1/4-inch screw in the mounting tab on the assembly. The screw passes through the mounting tab and into the skirt mounting hole in the enclosure. Tighten the screw to secure the assembly in the enclosure.
3. Connect earth ground to the panel before making any other connections. See *Connecting Earth Ground*.

### 3.5 Connecting Earth Ground

#### 3.5.1 Terminal 10

To help prevent damage from electrostatic charges or other transient electrical surges, connect the system to earth ground at Terminal 10 before making any other connections. A grounding rod or cold water pipe are recommended earth ground references.

**Do not use telephone or electrical ground for the earth ground connection.** Use 14-16 AWG wire when making the connection. Do not connect any other panel terminals to earth ground.

#### 3.5.2 Ground Fault Detect Enable



IMPORTANT

**Ground fault detect capability is available only on firmware versions 6.10 or higher.**

GROUND FAULT is defined as “a circuit impedance to Earth Ground of approximately 50 kilohms or less.” The panel will detect a ground fault on Terminals 1-9 and Terminals 11-32 if the Ground Fault Detect Enable jumper (S4) (see *Figure 3*) is locked (closed). When the jumper is in the unlocked (open) position, the panel will not detect ground fault conditions. If a ground fault condition occurs, the command centers will display `SERV GND FAULT` and the panel will transmit a `TROUBLE REPORT GROUND FAULT AREA 1 PT 000` (Modem IIIa<sup>2</sup> format only). In order for the panel to detect a ground fault condition, the panel must see the ground fault for at least 30 consecutive seconds. When the panel recognizes that ground fault condition is corrected, a `TROUBLE RESTORAL` report is sent. For the trouble restoral condition to be met, the ground fault must have been corrected for between 5 and 45 consecutive seconds.

#### 3.5.3 Locking the Reset Pin

Locking the Reset Pin disables the panel. See *Figure 4*. The system ignores the command centers and points while disabled. `CALL FOR SERVICE` appears in command center displays while the pin is locked down.

On-board relays (Terminals 6, 7, and 8) and off-board relays deactivate when the panel is reset. There is power at Terminal 8 when the relay is deactivated. Activation interrupts power at that terminal. The relays remain deactivated while the Reset Pin is locked in the disable position.

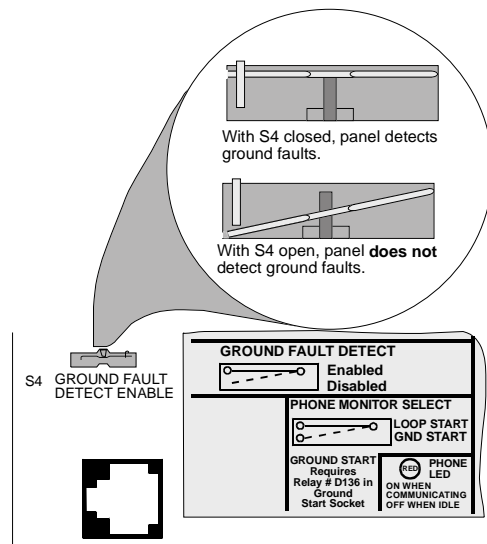


Figure 3: Ground Fault Detect

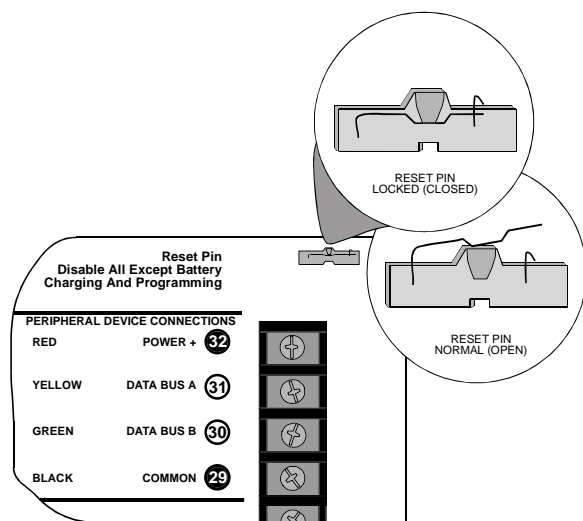


Figure 4: Reset Pin



Releasing the reset pin from the closed position resets the panel. The panel resets all its timers, counters, indexes, and buffers. Any points that restore after a reset is performed will not generate restoral reports.

If the reset pin is placed in the disable position when all areas are armed, there must be an entry in the **Answer Armed** program item. See *RAM Parameters* in the *D9412G/D7412G Program Entry Guide*.

Locking the pin in the disable position allows powering up the panel and charging the battery while the detection devices and command centers are being installed.

### 3.6 Finishing the Installation

**Earth ground and reset pin first:** Make the earth ground connection to Terminal 10 and lock the reset pin in the closed position if not already done.

#### 3.6.1 Charge the Battery While Finishing

Connect the battery and then the transformer so that the panel can charge the battery while the installation is being finished. See the *Power Supply* section for instructions.

**On-board Buzzer Sounds at Power Up and Reset:** The system performs a series of self diagnostic tests of its hardware, software, and program at power up and at reset. The buzzer on the panel sounds during the tests. They take about 1-3 seconds to complete.

If the panel fails any of the tests, the buzzer continues sounding and a system trouble message appears at the command centers. See *Self Diagnostics* in the *Trouble Shooting* section for a description of each system trouble message.

**Touch Terminal 10 first:** If the on-board buzzer sounds briefly when the panel is touched, any static charge that may be carried is being discharged to the panel. The panel may generate WATCHDOG RESET and/or PARAM FAIL events. See the *Trouble Shooting* section for a description of these events. Always touch Terminal 10, the panel's earth ground connection, before beginning work on the panel.

#### 3.6.2 Install and Wire Detection Devices

Install and wire detection devices and command centers at their locations throughout the premises. DO NOT make the connections at the panel end of the wiring yet.

The *On-board Points* section of this manual contains instructions for wiring the on-board points to detection devices. The *Arming Devices* section contains instructions for wiring the command centers.

Instructions for wiring the off-board point POPIT sensor loops are found in the instructions packaged with the POPIT Modules.

#### 3.6.3 Install Modules and Relays

1. **Power Down First:** Power down the unit by unplugging the transformer and disconnecting the battery. Radionics recommends powering down the unit when installing modules or relays, or when making wiring connections to the panel.

2. Install and wire any modules required for the installation as described in the module's installation instructions.

Instructions for the D8125 POPEX Module, the D8128D OctoPOPIT Module, the D8129 OctoRelay Module, the D811 Arm Status Relay Module, and the D928 Dual Phone Line Switcher appear in this manual.

See *Off-board Points* for D8125 and D8128D instructions. See *Relays* for D8129 and D811 instructions. See *Dual Line Transmitting* in the *Telephone Connections* section for instructions for the D928.

3. If using the power outputs at Terminals 7 or 8, install a D136 relay in the appropriate sockets. See *Programmable Power Outputs* in the *Power Outputs* section for instructions.
4. If using a ground start phone system, insert a D136 relay in the ground start check socket and set the ground start pin in the ground start position. See *Ground Start* in the *Telephone Connections* section.

## Installation

### 3.6.4 Make the Telephone Connections

See *Telephone Connections*. If connecting the panel to a ground start phone system, install a D136 relay, see *Install Modules and Relays* above.

### 3.6.5 Connect the On-board Points and command centers

Connect the on-board points and command center wiring to the system. See the *On-board Points* and *Arming Devices* sections for instructions.

### 3.6.6 Power Up

Reconnect the battery and then plug in the transformer. Remember the buzzer sounds for two seconds when the panel is first powered up.

Leave the reset pin locked down for now.

**Yellow Charging Status LED doesn't go out:** If the yellow charging status LED doesn't go out within five minutes of powering up the panel, the battery may be deeply discharged, or too many powered devices have been connected to the panel. Combined continuous current draw for Terminals 3, 8, 24, and 32, and the Accessory Connector cannot exceed 1.4 amp. See the *Power Outputs* section for help.

## 3.7 Programming the Panel

If a program hasn't been created for the panel, review the *D9412G/D7412G Program Entry Guide*. Check to be certain all the required accessory modules to be installed for desired features are available. The reset pin must be in the locked position to copy or send information to and from the panel.

Use the D5200 Programmer or the Remote Account Manager (RAM IV) to load a custom program into the panel.

Move the reset pin to the normal position. See *Figure 3*. The panel transmits reboot and battery reports to the receiver if programmed for reporting.

## 3.8 Install the Point Chart Label

Radionics recommends the *Point Chart Label* provided in the literature pack be filled out and installed on the inside of the enclosure door for all systems.

**Point chart label required for fire systems with verification points:** The point chart label must be installed for fire or combined fire/burglary systems using verification points.

Use the program record sheet to gather the information needed to fill out the point chart. Install the label on the enclosure door as shown in *Figure 2*. To avoid smearing the entries on the chart, use the label's peel off backing to press the label in place.

## 3.9 Testing the System

After finishing the installation and programming of the panel, make a complete functional test of the system. Test the panel and all devices for proper operation. Test after first programming the panel and after any subsequent programming session.

**Service Walk Test shows extra points:** Use the service walk test at a panel wide command center to perform a complete test of the panel. The service walk test function is similar to the ordinary walk test function, with the additional ability to display points that are not properly programmed.

During a Service Walk Test, a tested POPIT with its switches set for a point with a blank point index and/or no area assignment, appears as an extra point.

If a device is tested and the panel doesn't respond, there may be a problem with the device, the wiring, the POPIT ID setting, or the programming for the point. If the switches on a POPIT are set incorrectly, it may create both a missing and extra point. When a missing point is found, performing a service walk test for extra points may help diagnose the problem.

See the *Troubleshooting Section* of this manual for complete service walk test instructions.

**Clear after test:** To clear the event memory and report buffer, momentarily close the reset pin. Events stored in the panel's event log are not cleared.

## 4.0 Power Supply

### 4.1 Primary Power Terminals ①②

#### 4.1.1 Primary (AC) Power Circuit

A 16.5 VAC, 40 VA internally fused transformer (Radionics model D1640) is the primary power source. The AC power circuit provides 1.9 amps of rectified AC power. The panel reserves 500 mA of this power for internal operations leaving 1.4 amps for powered devices.

Transient suppressors and spark gaps protect the circuit from power surges. This protection relies on the ground connection at Terminal 10. Make sure to connect Terminal 10 to a proper ground. See *Connecting Earth Ground* in the *Installation* section.

#### AC Power Failure

The system indicates an AC power failure when the power at Terminals 1 and 2 is missing. The **AC Fail Time** program item sets the number of minutes or seconds that AC must be missing before the panel acknowledges the failure and the number of minutes or seconds after the power returns before the panel acknowledges the restoral of power. See the *D9412G/D7412G Program Entry Guide* for additional information regarding *AC Fail Time*.

#### 4.1.2 Installing the Transformer

**Do not short the terminals of the transformer:** Shorting the terminals opens the internal fuse causing permanent failure. Connect the transformer to Terminals 1 and 2 of the panel before plugging it into the power source.

Use 18 AWG (minimum) wire to connect the transformer to the panel. Wire length should be kept as short as possible. Maximum length is 50 feet.

AC wiring can induce both noise and low level voltage into adjacent wiring. Route phone and sensor loop wiring away from any AC conductors, including the transformer wire. Route data wiring away from AC and phone wiring.

**Connect the battery and then plug in the transformer:** Radionics recommends that the battery always be connected first and then the transformer be plugged in. See *Installing the Battery*.

Only plug the transformer into an unswitched, 120 VAC, 60 Hz power outlet. Secure the transformer to the outlet with the screw provided.

**D8004 Transformer Enclosure required for fire systems:** Use the D8004 Transformer Enclosure for the D1640 transformer in fire and combined fire/burglary applications. Check with the Authority Having Jurisdiction (AHJ) on mounting transformers on specific circuits.

### 4.2 Secondary Power Terminals ④⑤

#### 4.2.1 Secondary (DC) Power

A 12 V, 7 Ah (up to 14 Ah) sealed lead-acid rechargeable battery (D126) supplies secondary power for auxiliary and alarm outputs, and powers the system during interruptions in primary (AC) power.

**Lead Acid Batteries ONLY:** The charging circuit is calibrated for lead-acid batteries. Do not use gel-cell or nicad batteries.

**Extra Batteries Increase Back-up Time:** To increase battery back-up time, connect a second 12 V, 7 Ah battery in parallel to the first battery to form a 12 V, 14 Ah battery. Use a D122 Dual Battery Harness to ensure proper and safe connection.

#### D1218 Battery

The D1218 is a 12 V, 17.2 or 18 Ah battery and can be used in applications requiring extended battery standby time. Up to two D1218 batteries may be connected when used with a D122 Dual Battery Harness. Do not use any additional batteries when using a D1218 battery.

#### 4.2.2 Installing the Battery

Place the battery upright in the base of the enclosure. Locate the red and black leads supplied in the literature pack. Connect the black battery lead to Terminal 4, and then to the negative (-) side of the battery. Connect the red

# D9412G/D7412G

## Power Supply

battery lead to Terminal 5, and then to the positive (+) side of the battery.

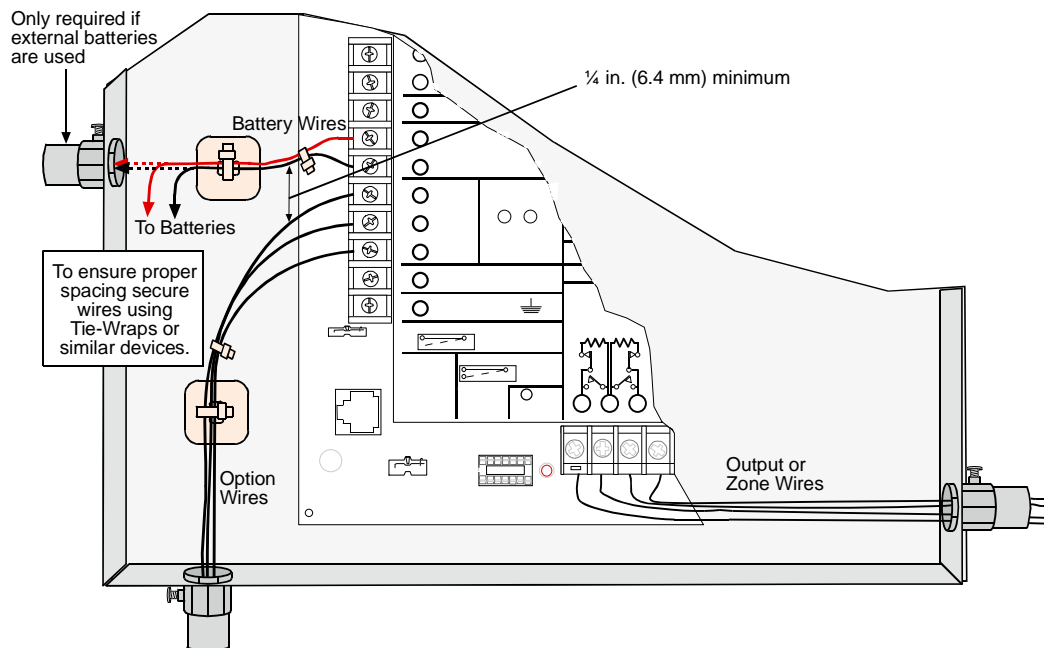


### High Current Arcs Possible

The positive (red) battery lead and Terminal 5 can create high current arcs if shorted to other terminals or the enclosure. Use caution when working with the positive lead and Terminal 5. Always disconnect the positive (red) lead from the battery before removing it from Terminal 5.



**The Battery Terminals and Wires are NOT Power Limited.** A ¼ in. (6.4 mm) spacing must be maintained between the battery terminals, battery wiring and all other wiring. Battery wiring may not share the same conduit, conduit fittings or conduit knock-outs with other wiring. See the following figure:



### 4.2.3 Replacing the Battery

Radionics recommends battery replacement every 3 to 5 years under normal use. Exceeding the maximum output ratings, or installing the transformer in an outlet that is routinely switched off, causes heavy discharges. Routine heavy discharges can lead to premature battery failure. Record the date of installation directly on the battery.

**D8132 boosts battery backup:** Adding a D8132 Battery Charger Module supports additional batteries of up to 36 Ah capacity if required.

The D8132 Battery Charger Module can be used to connect two additional batteries for a total of four. The panel plus any connected D8132 Modules and AUX power supplies must be on the same AC circuit so they will discharge evenly if AC power fails. The number of D8132 Modules is determined by the number of available outlets on the same circuit. See the *Standby Battery and Current Rating Chart* in this manual for battery standby time calculations.

**Note:** *In applications where the supervision of two batteries is required by the AHJ, a D113 Battery Supervision Module must be used.*

#### 4.2.4 Battery Supervision

When the battery voltage drops to 13.8 VDC, the yellow Charging Status LED lights. When the battery drops to 12.1 VDC the red Low Battery LED lights and the panel, if programmed for power supervision, transmits a BATTERY LOW report in the Radionics' Modem IIIa<sup>2</sup> Communication Format. It transmits a TROUBLE ZN 9 report in the BFSK format.

If the battery is missing or shorted, the red Low Battery LED flashes at the same rate as the green Operation Monitor LED. If the panel is programmed for power supervision, it transmits a BATTERY MISSING report in the Radionics' Modem IIIa<sup>2</sup> Communication Format, or TROUBLE ZN 9 report in the BFSK format.

When battery voltage returns to 13.7 VDC the Low Battery LED goes out. If the panel is programmed for power supervision, it transmits a BATTERY RESTORAL report in the Radionics' Modem IIIa<sup>2</sup> Communication Format or RESTORAL ZN 9 report in the BFSK format. At 13.9 VDC the Charging Status LED goes out.

**Investigate low battery reports immediately.** If primary (AC) power is off and the discharge continues, the panel becomes inoperative when the battery voltage drops below 10.2 VDC.

#### 4.2.5 Battery Charging Circuit

##### Float Charge

The float voltage for the battery charging circuit is 13.5 to 13.9 VDC at a maximum current of 1.4 amps. If float voltage drops lower than 13.5 VDC, the Charging Status LED will illuminate.

**Loss of AC Load Shed Relay protects battery:** During an AC power loss the battery supplies all power to the security system. If the battery voltage falls below 10.2 volts during an AC power loss, a "load shed" relay isolates the battery from the panel and disables the panel. Load shed protects the battery from being damaged by deep discharge. When AC power restores, the load shed relay resets and battery voltage is again available.

**Overcharge Load Shed With AC Present:** If more than 1.4 amps of current draw from the panel is detected, the panel shuts down. Remove all loads to the panel and disconnect AC power. Add a new battery and reconnect AC power.

Reset the panel by momentarily placing the reset pin in the disable position. See *Figure 4*. The red Low Battery LED continues to flash until the panel is reset.

A shorted battery condition is created either by a shorted cell inside the battery or by a short on Terminals 4 and 5. A shorted battery may generate WATCHDOG RESET reports.

## Power Supply

### 4.2.6 Battery Discharge/Recharge Schedule

#### Discharge Cycle

AC OFF	AC fail report when AC fails if panel is programmed to report AC failure at occurrence.
13.9 VDC	Charging float level
13.8 VDC	Charging Status LED on
12.1 VDC	Low Battery & AC fail reports if programmed; Low Battery LED on
10.2 VDC	Battery load shed (processing functions continue if AC is present)

#### Recharge Cycle

AC ON	Load shed relay resets, battery charging begins, battery trouble and AC restoral reports sent.
13.7 VDC	Battery restoral reports sent, Low Battery LED off
13.9 VDC	Charging Status LED off, battery float charged

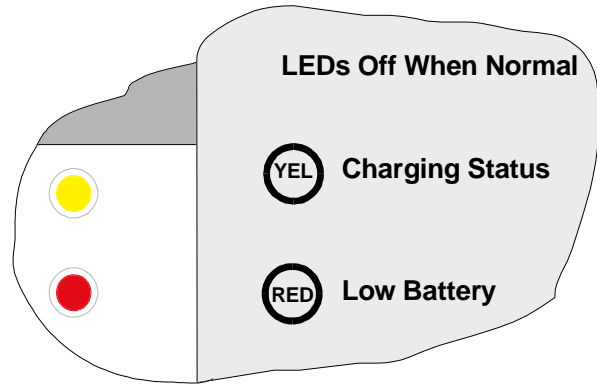


Figure 5: Charging and Battery LEDs

### 4.3 Charging Status and Low Battery LEDs

Type	LED Color	LED State	Action
Charging Status LED	Yellow		Shows the charging status of the battery. <i>Figure 5</i> shows its location.
	Yellow	Off	Battery is fully charged. <b>If the battery is missing, shorted, or reversed:</b> The Charging Status LED is off, but the red Low Battery LED is flashing.
	Yellow	On	Battery float charge is below 13.8 VDC. If AC is present the battery is charging. When the combined current draw from all outputs exceeds 1.4 amps. This is normal under alarm conditions for non-fire systems with sirens or bells draw more than 1.4 amps. If the LED comes on regularly for extended periods or doesn't go out, check the current draw for devices connected to the power outputs. See the <i>Power Outputs</i> section in this manual for instructions.
	Yellow	Flash once/min	System is checking the battery.
	Yellow and Red	Flash once/min	When the current draw for devices connected to the power outputs exceeds 1.4 amps and/or the battery is missing.
Low Battery LED	Red		Shows the condition of the battery. <i>Figure 5</i> shows its location.
	Red	Off	When the battery is fully charged.
	Red	On	Battery voltage as fallen below 12.1 VDC. LED goes out when voltage reaches 13.7 VDC.
	Red	Flash (same rate as Green LED)	Green LED is Operation Monitor LED. Battery is missing or shorted.
	Red and Yellow	Flash once/min	When current draw for devices connected to the power outputs exceeds 1.4 amps and/or the battery is missing.

Table 7: Charging Status and Low Battery LEDs

## 5.0 Power Outputs

### 5.1 Circuit Protection

Three Positive Temperature Coefficients (PTCs) protect the panel from short circuits on both the continuous and programmable power outputs. If the panel is programmed for power supervision and short is sustained on one of the power outputs, the panel transmits a BATTERY LOW or BATTERY MISSING for Radionics' Modem IIIa<sup>2</sup> Communication Format, or TROUBLE ZN 9 for BFSK.

One PTC protects Terminal 3: Auxiliary Power and Terminal 24: ZONEX Power. A short on one disrupts the power to the others.

One PTC protects Terminal 6: Alarm Power Output, Terminal 7: Alternate Alarm Power Output, and Terminal 8: Switched Auxiliary Power. A short on one of these terminals disrupts the power to the other two.

One PTC protects Terminal 32: Power +.

### 5.2 Total Available Power

The system produces up to 1.4 amp of combined power at 10.2 VDC to 13.9 VDC for all powered devices. The outputs listed below share the available power. These outputs are shown as red circles on the face plate.

**Terminal 3 - Auxiliary Power.** Use this terminal to power devices requiring continuous power.

**Terminal 6 (Relay A) - Alarm Power Output.** Normally open, power on alarm.

**Terminal 7 (Relay B) - Alternate Alarm Power Output.** Normally open, power on alarm.

**Terminal 8 (Relay C) - Switched Auxiliary Power.** Normally open, power off on reset.

**Terminal 24 - ZONEX Power.** Use this terminal to power ZONEX Modules such as the D8125, D8128D, and D8129 Modules.

**Terminal 32 - Power +**

Use this terminal to power SDI (Serial Device Interface) devices such as command centers, the D9131A Parallel Printer Interface, and the D9210B Access Control Interface.

**Accessory Connector**

The D928 Dual Phone Line Switcher connects to the accessory connector.

### 5.3 Continuous Power Outputs Terminals **3** **24** **32**

#### 5.3.1 Continuous Current Draw

The **continuous** current draw for powered devices connected to Terminals 3, 8, 24, and 32 and the Accessory Connector must not exceed 1.4 A . Devices powered from these outputs must operate over a range of 10.2 VDC to 13.9 VDC.

**Power restricted for fire and combined fire/burglary systems:** Use the *Fire System Power Formula* to calculate the current available for fire and combined fire/burglary systems. See *Programmable Power Outputs*.

### 5.4 Programmable Power Outputs Terminals **6** **7** **8**

#### 5.4.1 Programming

The power outputs at Terminals 6, 7, and 8 are programmed as Relays A, B, and C. All relays are programmed in the *Relays* section of the program. Relays are assigned a relay type, Fire Bell for example, when they are assigned to an area. Relays can be assigned to one or more areas.

The Radionics defaults set Relay A (Terminal 6) as a Steady Alarm Bell output and Relay B (Terminal 7) as a Pulsed Fire Bell output, and Relay C (Terminal 8) as a Verification/Reset output for smoke detectors. The *D9412G/D7412G Program Entry Guide* contains complete instructions for programming relays. Descriptions of the functional characteristics of each terminal appear on the next page.

See the *Bell Parameters* section of the program to set the Fire Bell, Alarm Bell output responses for relays. Four annunciation patterns: Steady, Pulsed, California Standard, and Temporal Code 3 are available.

## Power Outputs

**Voltage Output at Terminals 6, 7 and 8:** If Terminals 6, 7, and 8 don't provide the expected output:

- Check the programming for Relays A, B, and C in the *Relays* section of the program.
- Check the *Bell Parameters* section of the program to verify the Alarm and Fire Bell responses are programmed for the expected duration and pattern.
- Check the *Point Assignments* to verify each point is programmed for the expected local response.

### 5.4.2 Optional Relays Required

Install an optional D136 plug-in relay into the ALT ALARM socket to enable the output at Terminal 7. Install a D136 in the SW AUX socket to enable the output at Terminal 8. The relay sockets are under the faceplate as shown in *Figure 6*.

#### Relay Installation

Power down the system before inserting the D136 relays. The plug-in relays are shorter than the sockets they plug into. See *Figure 6*. They can be installed in either the left or right end of the socket.

#### Don't rely on relay labelling:

Don't rely on the labelling to install D136 relays. Check for the side with three pins. The three pins go on the top side of the socket.

Incorrect insertion does not damage the relay or the system, however the related circuits do not function properly.

### 5.4.3 Terminals 6 and 7

Terminals 6 (Relay A) and 7 (Relay B), provide positive (+) 10.2 VDC to 13.9 VDC power output when activated. Use the power at Terminals 6 and 7 to power bells, siren drivers, piezo fire sounders, electronic horns, or other devices. Programming determines the format of the output and the conditions that activate it. One PTC protects Terminals 6, 7, and 8 against shorts.

#### Available Power

The system combines the 1.4 amp of primary power produced by the power supply with the secondary power source (the battery) to produce a total of 2.0 amp of **alarm** power at 10.2 to 13.9 VDC. Terminals 6 and 7 share the available alarm power.

**Power restricted for fire and combined fire/burglary systems:** Fire systems are prohibited from using the battery for determining alarm power. Use the *Fire System Power Formula* below to calculate the current available for fire and combined fire/burglary systems.

### 5.4.4 Fire System Power Formula

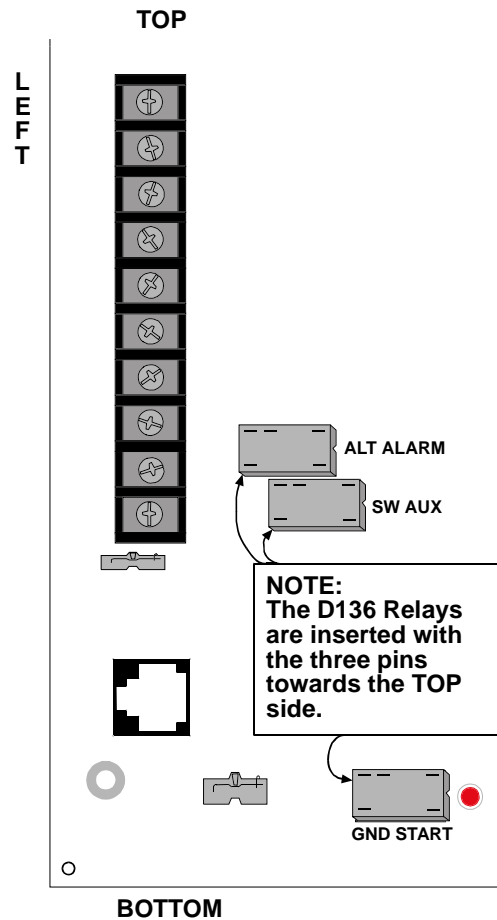
To calculate the current available at Terminals 6 and 7 for fire and combined fire/burglary systems:

1. Add together the current draws for all devices connected to Terminals 3, 8, 24, and 32, and the Accessory Connector. This total is the total current required for the **Normal Standby Condition (NSC)**.
2. The current available for NSC is 1.4 A. Subtract the NSC current required calculated in step 1 from the NSC current available, 1.4 A. The difference is the Alarm Current available for Terminals 6 and 7.

In formula format:

**1.4 A – NSC current required (step 1) = Alarm Current available**

Refer to the Battery Standby Chart in the *Appendix A: Approved Applications Compliance Guide* for module/ accessory current requirements.



**Figure 6: Relays for Terminals 7 and 8 and Ground Start**



### 5.4.5 Terminal 8

Terminal 8 provides continuous positive (+) 10.2 VDC to 13.9 VDC power. Relay C interrupts the power at Terminal 8 when activated. Use Terminal 8 to power smoke detectors or other devices that are reset by interrupting power. One self-resetting circuit breaker protects Terminals 6, 7, and 8 against shorts.

#### **Verification/Reset Relay**

The default program sets Relay C (Terminal 8) as a verification/reset relay. See the *Relay Parameters* and *Point Assignments* sections in the *D9412G/D7412G Program Entry Guide* for instructions on programming verification/reset relays and points.

Performing a Sensor Reset at a command center produces a five second relay activation of verification/reset relays. The panel ignores verification/reset points during the five seconds of relay activation.

## Power Outputs

**Notes:**

## 6.0 Telephone Connections

### 6.1 Registration

The Radionics D9412G/D7412G Control/Communicator panels are registered with the Federal Communication Commission under part 68, for connection to the public telephone system using an RJ31X or RJ38X jack installed by the local phone company.

**Note:** An RJ31X jack can be modified by placing a jumper wire between Terminals 2 and 7 to become an RJ38X jack.

### 6.2 Notification

Do not connect registered equipment to party lines or coin-operated telephones. The local telephone company must be notified and supplied with the following information before connecting the panel to the telephone network:

- The particular line to which the panel will be connected
- Make (Radionics), model (D9412G or D7412G), and serial number of the panel
- FCC registration number and ringer equivalence for the panel:

FCC Registration Number: AJ9MUL-46532-AL-E

Ringer Equivalence: 0.1B

### 6.3 Location

To prevent jamming of signals, wire the RJ31X or RJ38X jack before the in-house phone system to support line seizure. See *Figure 7*. Install the jack on the street side of the phone switch, wired ahead of any PBX equipment. Line seizure provides for a temporary interruption of normal phone usage while the communicator transmits data. After installation, confirm that the panel seizes the line, acquires dial tone, reports correctly to the receiver, and releases the phone line to the in-house phone system.

### 6.4 Phone Cord Connection

Connect one end of a D161 (7 ft.) or D162 (2 ft.) Telephone Cord to the TELCO Cord connector located on the bottom left corner of the panel. See *Figure 8*. Connect the other end to the RJ31X or RJ38X jack.

**Note:** To supervise the phone cord, use an RJ38X jack.

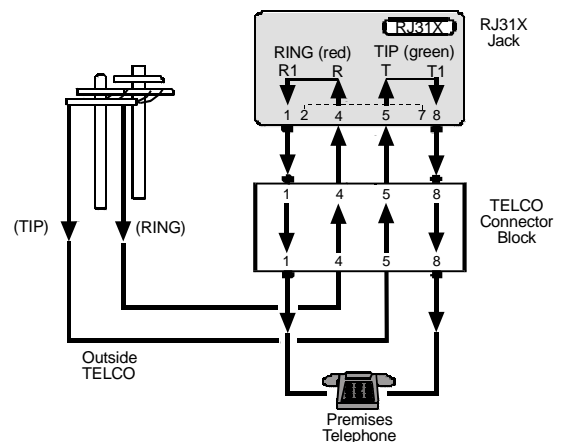


Figure 7: RJ31X Wiring

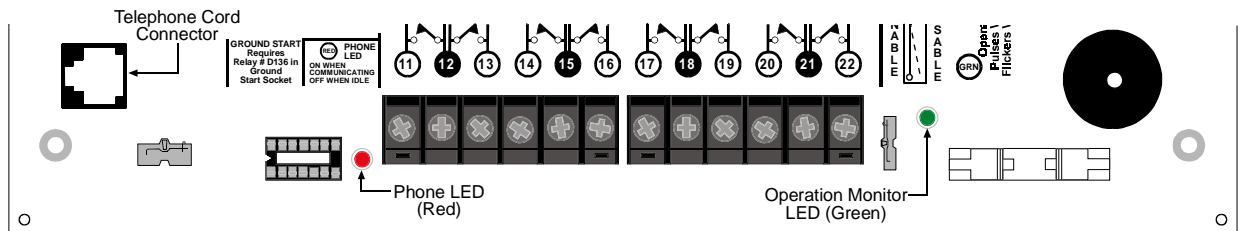


Figure 8: Phone Connector and LED and Operation Monitor LED Locations

### 6.5 Phone LED (Red)

The red Phone LED lights when the panel seizes the phone line and remains lit until the panel returns the phone line. See *Figure 8* for the location of the red LED.

## Telephone Connections

### 6.6 Operation Monitor LED (Green)

The green Operation Monitor LED indicates the operation of the CPU (Central Processing Unit). When the CPU is operating normally, the LED flashes 0.5 second on, 0.5 second off.

The green LED also serves as a ring indicator. The LED is located on the lower right side (see Figure 8). When there is ring voltage on the phone line (the phone is ringing), the green LED flickers at a faster rate for the duration of each ring. Ring voltage must reach a minimum of 45 VAC before the system detects it.

### 6.7 Dialing Format

The system can be programmed to use DTMF or pulse dialing. See *Phone Parameters* in the *D9412G/D7412G Program Entry Guide*.

### 6.8 Phone Line Monitor

The panel has a built-in phone line monitor that tests the phone line for voltage. If the D928 Dual Phone Line Switcher is used to connect two phone lines to the panel, the panel monitors both lines. The normal voltage on a telephone line is approximately 48 VDC (24 VDC for some phone systems). The phone line monitor senses trouble when the voltage on the line falls below 4.5 to 7.5 VDC.

If the monitor senses trouble, it starts a programmable phone line trouble timer. The timer continues to run as long as the monitor senses trouble. It resets to zero when the panel senses a normal line. If the timer reaches the delay time in the *Phone Supervision* program item, it begins a phone line trouble response. Programming determines what the response is. See *Phone Parameters* in the *D9412G/D7412G Program Entry Guide*.

The panel stops monitoring the phone line during its phone line trouble response. If the response includes sending a report, the panel does not resume monitoring until the report is acknowledged or it goes into communication failure.

**Bad line may test OK:** The telephone line monitor uses voltage levels to test the status of the phone line. In some instances a given telephone line may be out of service without affecting the voltage on the line. The phone line monitor can not recognize this trouble condition.

### 6.9 Called Party Disconnect

Telephone companies provide "called party disconnect" to allow the called party to terminate a call. The called party must go on hook (hang up) for a fixed interval before a dial tone is available for a new call. This interval varies with telephone company equipment. D9412G/D7412G firmware allows for "called party disconnect" by adding a 35 second "on hook" interval to the dial tone detect function. If the panel does not detect a dial tone in seven seconds, it puts the phone line on hook for 35 seconds to activate "called party disconnect," goes off hook and begins a seven-second dial tone detect. If no dial tone is detected, the panel dials the number anyway. Each time the number is dialed, the panel records this as an attempt.

### 6.10 Communication Failure

After two attempts to reach the receiver, a `COMM FAIL PH #` event is generated. This event will tag along with the original event.

After ten attempts to reach the receiver, the panel goes into communication failure. The panel clears any reports in its phone buffer and `COMM FAIL RT #` event is generated, which appears in the display at command centers. A trouble sounder can be programmed to annunciate at the command centers. An hour after the `COMM FAIL RT #` is generated, the panel attempts to send this event, if programmed. If the `COMM FAIL RT #` event is the only event in the queue and is unable to reach the central station, the command centers will not turn on the trouble sounder again.

If the D928 Dual Phone Line Switcher is used, the D9412G/D7412G makes a total of ten attempts before going into communication failure.

#### 6.10.1 Enhanced Communication

The D9412G/D7412G Control/Communicator panels have the ability to transmit events over the SDI Bus to a D9133TTL-E Module. For more information on Enhanced Communications capabilities, please refer to the *RADX AUX1* section of the *D9412G/D7412G Program Entry Guide*.

## 6.11 Ground Start

Some telephone systems require a momentary ground input to initiate dial tone. To interface with a ground start system, insert a plug-in relay (D136) into the GND START socket and set the Phone Monitor Select jumper to the GND START position.



**Ground start not for use in NFPA applications.** You can not use ground start telephone systems for NFPA Central Station Protective Signaling or Remote Station applications.

**Note:** Terminal 10 must be connected to an earth ground in order for ground start phone systems to operate properly on the D9412G/D7412G.

### 6.11.1 Relay Installation

Power down the system before inserting the D136 relay into the GND START socket. The relay socket is in the lower left corner as shown in *Figure 6*. The plug-in relay is shorter than the socket it plugs into. It can be installed in either the left or right end of the socket.

**Don't rely on relay labeling:** Don't rely on the labelling to install D136 relays. Check for the side with three pins. The three pins go on the top side on the socket.

Incorrect insertion does not damage the relay or the panel, however the related circuits do not function properly. A ground start relay must not be inserted if the ground start jumper is in the loop start position (see below).

### 6.11.2 Phone Monitor Select Jumper

The Phone Monitor Select jumper is above the TELCO connector point at the lower left corner of the panel. Set it in the ground start position. See *Figure 9*.

## 6.12 D928 Dual Phone Line Switcher

### 6.12.1 Description

The optional D928 Dual Phone Line Switcher allows the panel to transmit reports. The panel monitors both lines. If a signal is generated and the panel senses that a line is bad, then it will attempt to use the other phone line to send the message. If trouble is detected, the panel keeps the faulty phone line in memory.

**Set the ring count above 2 on answering machines:** The panel's RAM Line Monitor feature may not operate correctly if an answering machine with a ring count of less than two rings is connected to a phone line used by the D928 Module.

### 6.12.2 Operation

See the *Phone* section of the *Panel Wide Parameters* section of the *D9412G/D7412G Program Entry Guide* for phone supervision and reporting options. Set the *Two Phone Lines* prompt to YES to use the D928.

When the D928 is installed, the panel will alternate between Phone Line 1 and Phone Line 2 to send its first report. For example, on day one the panel will attempt to first communicate on Phone Line 1. On day two, the panel will switch and attempt to communicate on Phone Line 2.

**Note 1:** Any time the panel is reset or powered down/up, the next reported event will always attempt to call out on Phone Line 1 first.

**Note 2:** If Phone Line 2 is not in service on "Day 2," the panel will switch to the Primary Phone Line to send the report.

With the D928 Dual Phone Line Switcher installed, the panel uses two phone lines, primary and secondary, to dial up to four phone numbers.

When using a Primary and Backup Device within a Route Group #, the panel makes two attempts on the primary phone line using the Primary Device # as programmed. If these two attempts fail, the panel switches to the secondary phone line using the Backup Device # as programmed. This pattern continues for a total of ten attempts. After ten unsuccessful attempts, the panel generates a Comm Fail event for the given Route Group #.

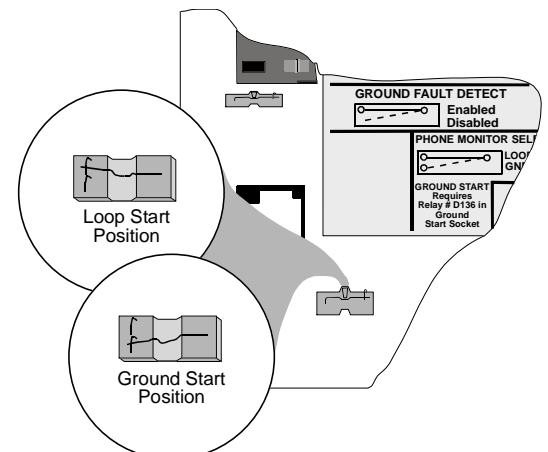


Figure 9: Phone Monitor Select

# D9412G/D7412G

## Telephone Connections

### 6.12.3 Watchdog Feature

The D928 Watchdog circuit monitors the panel's CPU (Central Processing Unit) for proper operation. If the CPU fails, the buzzer on the D928 sounds as does the sounder on the panel. This sounder cannot be reset while the CPU is failed. The D928 stops sounding only when the panel's CPU returns to normal operation.

### 6.12.4 Installing the D928

#### Mounting

The D928 must mount on the lower right side of the enclosure using the screws provided with the switcher.

#### Wiring

The D928 has two flying leads. The green lead monitors AC power. The black lead provides surge protection for the two incoming phone lines. The black lead also is the ground reference for the AC LED.

1. Connect the green lead from the D928 to Terminal 1.
2. Connect the black lead from the D928 to Terminal 9.

#### Phone Connections

1. Plug one end of the ribbon cable provided with the D928 into J4 on the D928. Plug the other end into the ACCESSORY CONNECTOR on the panel.
2. Plug one end of the D162 (2 ft.) phone cord provided with the D928 into J3 on the D928. Plug the other end into TELCO on the panel.
3. Plug one end of a D161 (7 ft.) or D162 (2 ft.) phone cord into J1 on the D928. Plug the other end into the RJ31X or RJ38X for the primary phone line.
4. Plug one end of a D161 or D162 phone cord into J2 on the D928. Plug the other end into the RJ31X or RJ38X for the secondary phone line.

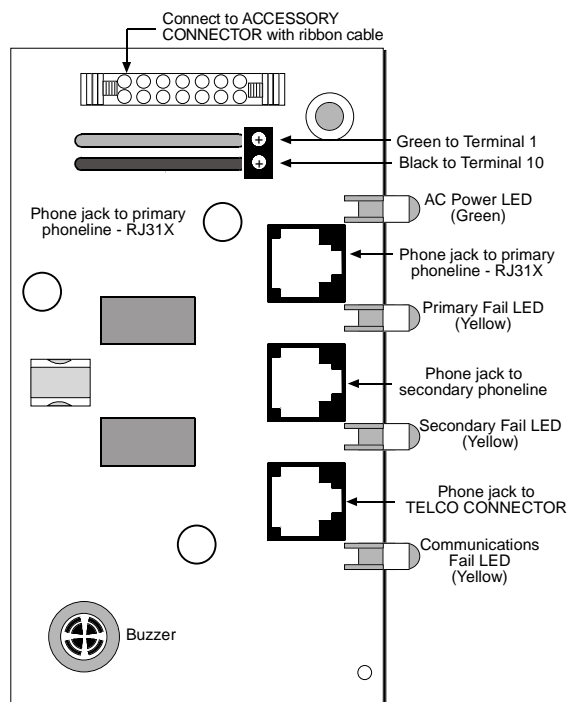


Figure 10: D928 Dual Phone Line Switcher

### 6.12.5 D928 Status LEDs

Four LEDs mounted on the front edge of the D928 Module show the status of AC power for the panel, the status of the two phones lines, and communication failure. See Figure 10. When programmed and operating normally, only the green AC power status LED should be lit.

#### AC Power LED

The green AC Power Status LED lights when there is AC power at Terminals 1 and 2 on the panel.



**An issue has been discovered on D928 modules purchased before November 19, 2001. If you have installed a D928 on a Radionics D9412G or D7412G you may test for the condition by disconnecting AC power from the panel (the battery must remain connected) and observing the green LED. If the green LED glows dimly, the module may be replaced at no charge.**

#### Phone Line Fail LEDs

Two yellow Phone Line Status LEDs (one for the primary phone line, one for the secondary phone line) light up when phone line voltage drops below 4.5 to 7.5 VDC. The panel monitors the faulty phone line for the programmed interval before indicating a trouble condition. See *Phone Line Monitor* in this section for a description of phone line monitor operation.

#### Communication Failure LED

The yellow Communication Failure LED lights when the system is in communication failure. The LED is cleared when communication restores. See *Communication Failure* in this section.

## 7.0 On-board Points

### 7.1 Description Terminals ⑪ to ⑳

The panel provides eight on-board points. Each point functions independently and does not interfere with the operation of the others. The panel monitors the sensor loops for normal, shorted, or open conditions between an input terminal (11, 13, 14, 16, 17, 19, 20, or 22) and any of the point common terminals (12, 15, 18, and 21). Programming for the point determines how the panel responds to those conditions. See the *D9412G/D7412G Program Entry Guide* for point programming options. The panel also monitors the sensor loops for ground fault conditions if S4 is latched (ground fault detect enabled).

### 7.2 Point Sensor Loops

When wiring the on-board points (see *Figure 11*), install a 1 kΩ resistor at the far end of the sensor loop to provide a reference for supervision. Dry-contact sensing devices can be connected in series (normally-closed) and/or in parallel (normally-open) to any of these loops.

The number of normally-open and/or normally-closed detection devices each sensor loop can supervise is limited only by the resistance on the loop. The total resistance for wire length and contacts, minus the end-of-line resistor, must not exceed 100 ohms.

### 7.3 Point Parameters

The condition of on-board points 1 to 8 can be determined by measuring the voltage across the point input terminal and one of the common terminals. The sensor loops must be connected and the 1 kΩ end of line resistor in place.

**Open Loop** = Greater than 3.7 VDC, but less than 5.0 VDC.

**Normal Loop** = Greater than 2.0 VDC, but less than 3.0 VDC.

**Shorted Loop** = Greater than 0.0 VDC, but less than 1.3 VDC.

### 7.4 Point Response Time

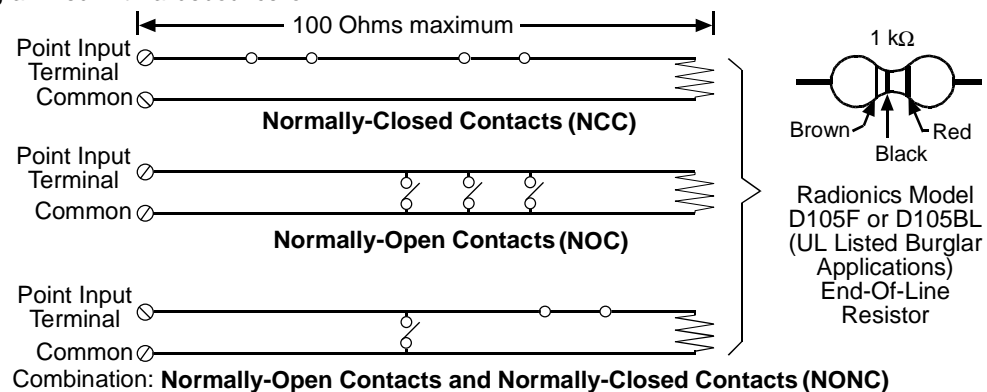
The panel scans both on-board and off-board point sensor loops every 300 milliseconds. The *Debounce Count* program item in the *Point Assignment* section determines point response time by setting the number of scans that a point must be faulted before the panel initiates an alarm.

The debounce count can range from 2 to 15. Therefore point response time ranges from 600 milliseconds to 4.5 seconds. The Radionics default for Debounce Count is 2.



**Increasing debounce count may cause missed alarms:** If you increase the Debounce Count, detection devices may go into alarm and reset without exceeding the point response time.

Radionics recommends a debounce count of 2 for all points except for Interior Follower points, which should be programmed as a 3. In addition to this, door points that are connected to a D9210B Access Interface Module should be programmed with a debounce of 4.



**Figure 11: On-board Point Sensor Loop Wiring**

## On-board Points

### 7.5 Wiring Information for Installations using the Ademco AB-12 Bell/Housing

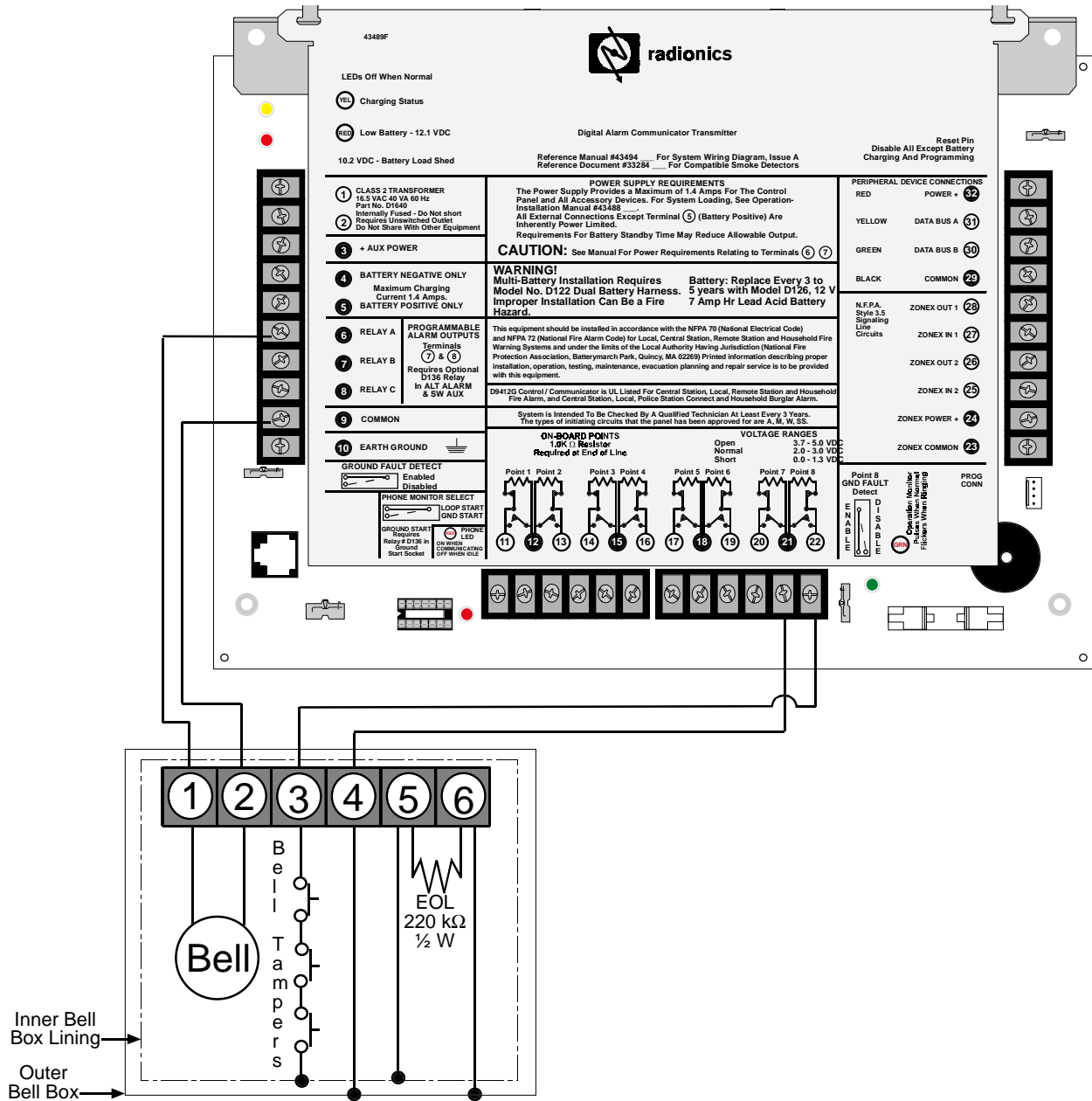


Figure 12: Wiring for Installations using the Ademco AB-12 Bell/Housing

1. Disconnect the wire jumper from Terminal 4 to the inner housing of the Bell Box (prevents a ground fault condition).
2. Connect wiring between the control and Bell Box as shown above. To use the AB-12 Bell/Housing, place the S3 switch in the disabled (open) position. The EOL used in the AB-12 Bell/Housing must be a 220 kΩ, 0.5 W resistor.
3. Program Point 8 as 24-hour, ALARM on open and short. (PT TYPE 0, PT RESPONSE 0).



## 8.0 Off-board Points

### 8.1 Point (ZONEX) Bus D9412G Terminals 23 to 28 D7412G Terminals 27 to 28

The D9412G can use POPIT (Point of Protection Input Transponder) Modules to provide up to 238 off-board points, bringing the total number of points the D9412G can monitor to 246. The D7412G can provide up to 67 off-board points bringing the total number of points the D7412G can monitor to 75. Each off-board point requires a POPIT Module.

POPITs connect to supervised two-wire data expansion loops run from POPIT to POPIT throughout the premises. Data expansion loops connect to a D8125 POPEX (Point of Protection Expander) Module. POPEX Modules connect to the point bus on the panel, Terminals 23 and 24 for power (3 and 9 on the D7412G), and Terminals 25 and 26 (D9412G only), or 27 and 28 for data.

If a POPIT is disconnected from the expansion loop, a trouble message (Extra Point) appears immediately. See the *D9412G/D7412G Program Entry Guide* for programming options.

If a POPIT is connected to the expansion loop that is programmed for a point number that does not appear in the program for the panel, it appears as a trouble condition when the data expansion loop restores from a faulted condition. A faulted condition on the data expansion loop includes:

- 1) Positive leg of the data expansion loop shorted to ground.
- 2) Negative leg of the data expansion loop shorted to ground.
- 3) Data expansion loop (positive or negative leg) becomes disconnected.
- 4) Data expansion loop becomes shorted.

Placing a short on the data expansion loop generates a `PT BUS TROUBLE` report. The panel sees all points on the shorted expansion loop as shorted, and responds according to point programming, except for fire points. The fire points will respond locally as a trouble condition and transmit missing fire reports if programmed during this condition.

POPIT Modules monitor their sensor loops for three conditions: loop normal, loop open, and loop shorted. They report these three conditions to the control panel.

The D9412G/D7412G uses point programming to interpret the sensor loop information reported by the POPITs and make the appropriate system response.

### 8.2 D8125, D8127 and D9127 POPIT Modules

D8127 and D9127 POPITs use the D8125 POPEX Module to report to the panel. Each D8125 supports up to 119 POPIT points. Connect two D8125 Modules to the D9412G to bring the combined total number of POPIT and on-board points to 246. Points 9 to 127 connect to the first POPEX Module. Points 129 to 247 connect to the second POPEX Module. The D9412G reserves Points 128 and 248 for internal use. The panel only annunciates activity for each POPIT, not each detection device connected to the sensor loop.

There are two versions of the D8127 and D9127 Modules. Both module enclosures are made of UL listed fire resistant material. D8127T and D9127T Modules contain tamper switches. D8127U and D9127U Modules come with untampered covers. Unless the module is mounted in a tampered enclosure, UL requires D8127T and D9127T Modules for certificated accounts.

#### 8.2.1 Listings

The D8125 POPEX and the D8127 and D9127 POPIT Modules are UL listed for Local or Police Connected Burglar Alarm, Central Station Burglar Alarm, Household Burglar Alarm, Central Station Fire, Local Fire, Remote Station Fire, Household Fire and Electrically Actuated Transmitter Applications. See *Appendix A: Approved Applications Compliance Guide* in this manual to determine the required equipment and enclosures for the application.

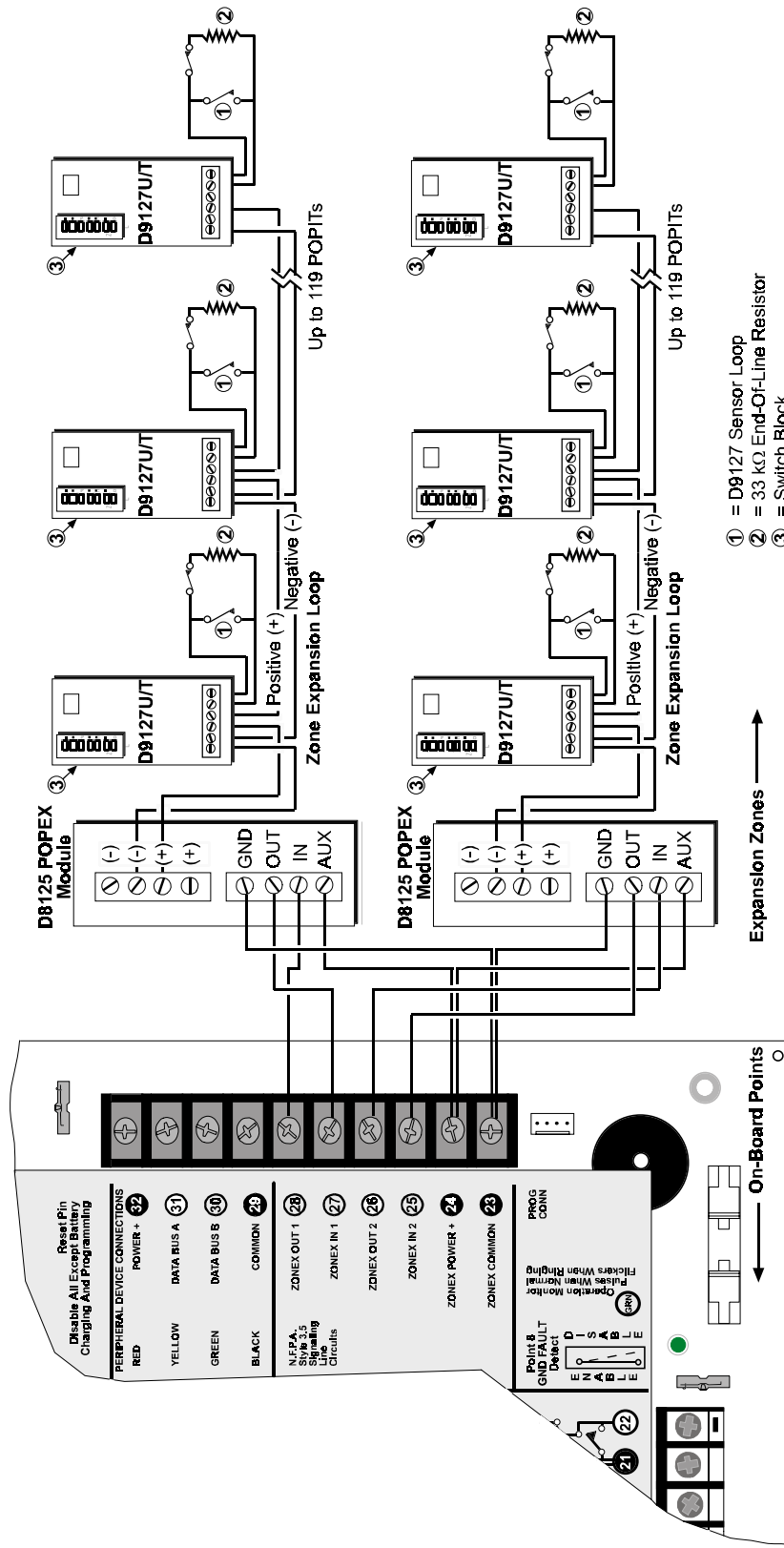


Figure 13a: Connecting the D8125 POPEX to the D9412G Panel

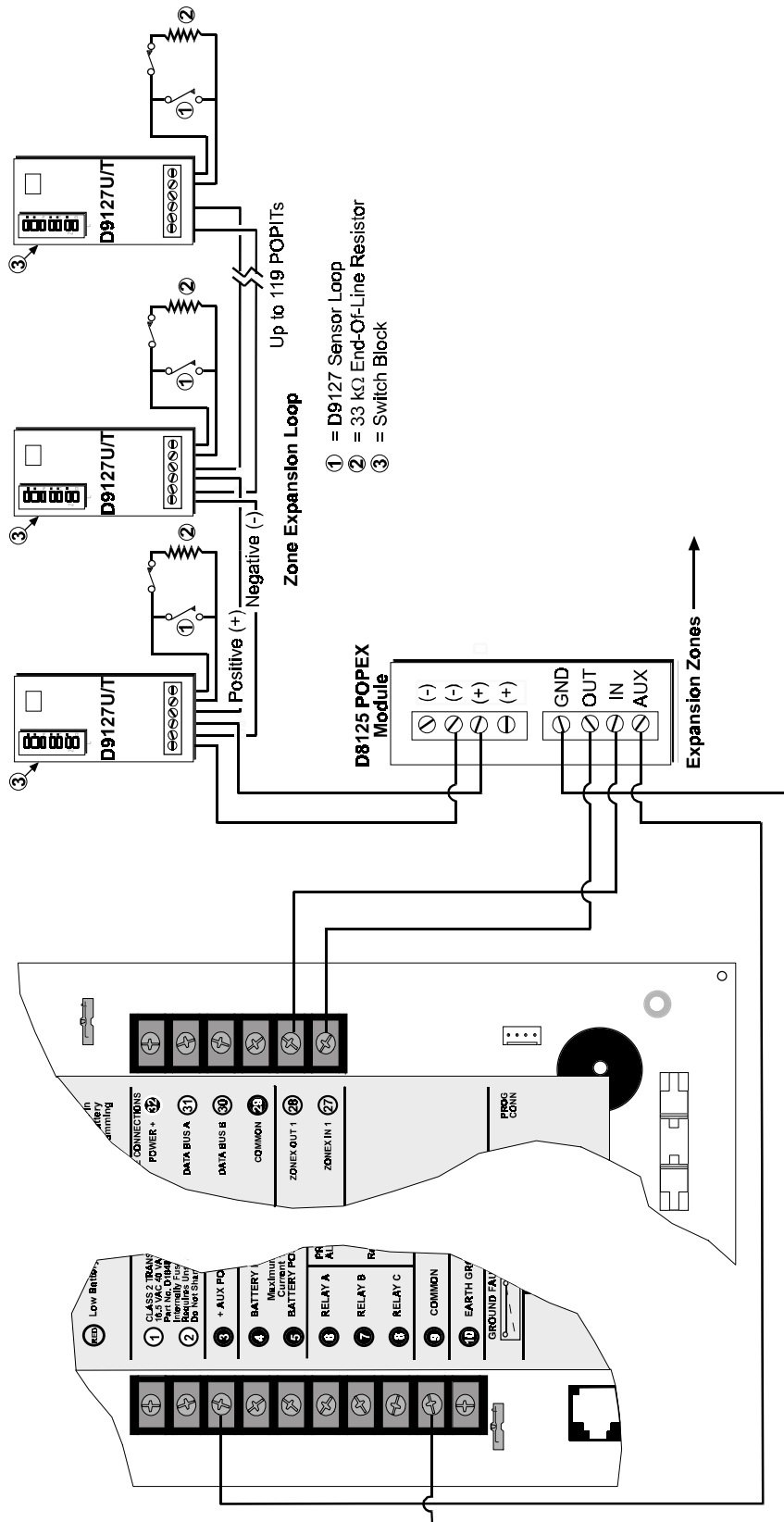


Figure 13b: Connecting the D8125 POPEX to the D7412G Panel

## Off-board Points

### 8.3 Installing the D8125 POPEX Module



**For information on the Multiplex Bus Interface, see the D8125MUX Multiplex Bus Interface Operation & Installation Manual.**

IMPORTANT

**Save the POPIT Label Sheets:** The D8125 is packaged with two sets of POPIT label sheets. One is marked for use with the D9412/D9112. Save this set for use with the D9412G/D7412G. It will be used later to label the POPITs.

#### 8.3.1 Mounting

Follow the procedure below to install the D8125 in the enclosure with the panel.

1. Align the D8125 POPEX Module with any of the four mounting locations in the enclosure. See *Figure 2*.
2. Use the screws provided with the module to secure it in the enclosure.

#### 8.3.2 Wiring the D8125 to the Control/Communicator

Follow the procedure below to wire one or two D8125 Modules to the panel. See *Figure 13*.

**Power down first:** Power down the panel by disconnecting the positive (red) battery lead at the battery and unplugging the transformer.

For points 9 to 127 (9 to 75 on D7412G):

1. Connect the GND terminal of the D8125 to Terminal 23 on the D9412G or to Terminal 9 on the D7412G.
2. Connect the OUT terminal of the D8125 POPEX Module to ZONEX IN 1, Terminal 27.
3. Connect the IN terminal of the D8125 POPEX Module to ZONEX OUT 1, Terminal 28.
4. Connect the AUX terminal of the D8125 to Terminal 24 on the D9412G or to Terminal 3 on the D7412G.

For point numbers from 129 to 247 (D9412G only):

1. Connect the GND terminal of the D8125 to Terminal 23.
2. Connect the OUT terminal of the D8125 POPEX Module to ZONEX IN 2, Terminal 25 .
3. Connect the IN terminal of the D8125 POPEX Module to ZONEX OUT 2, Terminal 26 .
4. Connect the AUX terminal of the D8125 to Terminal 24.

See *Wiring Data Expansion Loops to POPEX Modules* for instructions on connecting POPITs to the D8125 POPEX Module.

#### 8.3.3 Wiring POPITs to the Data Expansion Loop

Use one 2-wire data expansion loop or distribute the POPITs on up to three loops. Setting DIP switches on the POPIT Modules assigns them to point numbers. See *POPIT Module Point Assignments*.

Review *Premises Wiring* in the *Installation* section of this manual to determine if shielded wire is required. Determine the required wire gauge for the length of each data expansion loop using *Table 8*.

**Combine data expansion loops:** The maximum lengths shown in *Table 8* are for all data expansion loops connected to the same POPEX Module combined.

Maximum Length of all Data Expansion Loops Combined	
AWG	Length in feet (meters)
22	1,800 (548)
20	2,890 (881)
18	4,600 (1,402)
16	7,320 (2,231)
14	11,650 (3,551)

**Table 8: Data Expansion Loop Wire Specifications**



**Before installing the POPITs, make sure the resistance on the data expansion loop is no more than 40  $\Omega$ .**

IMPORTANT

**Wiring POPITs together:** Do NOT connect POPITs to each other in series, or with a T-tap. Doing so may cause random missing POPIT conditions. Follow the procedure below to connect POPITs to one another in parallel.

1. Connect the positive (+) Data terminal from one POPIT to the positive (+) Data terminal on the next POPIT.
2. Connect the negative (-) Data terminal from one POPIT to the negative (-) Data terminal on the next POPIT.
3. Repeat steps 1 and 2 to connect all POPITs to the expansion loop. The POPITs don't need to be wired in any particular order on the loop. The switch setting on each POPIT assigns it a point number, regardless of its physical location.

**Three inch clearance for tampered POPITs:** Mount tampered POPIT Modules at least three inches apart to prevent the tamper magnets from interfering with each other.

### 8.3.4 Wiring Data Expansion Loops to POPEX Modules

There are two positive (+) and two negative (-) data expansion loop terminals on each POPEX Module. Follow the procedure below to connect the data expansion loops to the D8125 POPEX Module. See Figure 13. Remember, a maximum of 119 POPITs can be connected to one D8125 on the D9412G and 67 for the D7412G.

1. Connect the positive (+) Data terminal from the first POPIT on the data expansion loop to one of the D8125 Module's positive (+) terminals.
2. Connect the negative (-) Data terminal from the first POPIT on the data expansion loop to one of the D8125 Module's negative (-) terminals.

### 8.3.5 POPIT Sensor Loops

The number of normally-open and/or normally-closed detection devices each sensor loop can supervise is limited only by the resistance on the loop. Resistance on each sensor loop must be less than 100  $\Omega$  not including the EOL resistor.

Certain UL and NFPA applications may limit the number of detection devices. Consult the appropriate UL or NFPA standards.

POPITs detect open, shorted, normal, and grounded circuit conditions on their sensor loops. They transmit the condition of their loops to the panel. A ground on the sensor loop reports as an open condition. Each POPIT is programmed and transmits to the panel separately.

Terminate each POPIT sensor loop with the 33 k $\Omega$  end-of-line resistor [D106F] included with each POPIT.

Radionics recommends the use of twisted-pair wire (six twists per foot) in all POPEX/POPIT installations for both the data expansion loop wiring and the POPIT sensor loops. Run wires away from AC sources to prevent AC induction. If a noisy environment is suspected, use shielded cable. See *Premises Wiring* in the *Installation* section.

### 8.3.6 POPIT Module Point Assignments

Six switches on each POPIT assign the module to a point number. POPIT switch settings are found in the *Point Assignment* section of the *Program Record Sheet*. See *Figure 14*.



**For the D9412G, point numbers 73 to 127 and 193 to 247 must use D9127 POPITs. Points 9 to 72 and 129 to 192 may use either D8127 or D9127 POPITs. For the D7412G, points 9 to 72 may use either D8127 or D9127 POPITs; however, D9127 POPITs must be used for points 73-75.**

#### Program Record Sheet

The first column on the program record sheet contains the switch settings for the D8127 POPITs. Switches are numbered 1 to 6, left to right on the D8127 POPIT. Switches are numbered 0 to 6, left to right on the D9127 POPIT. Set switches whose number appears in the setting to the ON position. Set switches with a dash (-) in the switch position to the OFF position. See *Figure 14*.

The second column contains the translation of the point number into the ZONEX format. See *Point User Flag* in the *Panel Wide Parameters* section of the *D9412G/D7412G Program Entry Guide* for an explanation of this feature.

The third column contains the point number as it is displayed at command centers.

The fourth column contains the point index. See the *Point Index Parameters* section in the *D9412G/D7412G Program Entry Guide* for an explanation of the point index.

The fifth column of the Program Record Sheet shows the area the point is assigned to.

## Off-board Points

The sixth column shows the Debounce Count for the point. See *Debounce Count* in the *Point Assignments* section in the *D9412G/D7412G Program Entry Guide*.

The seventh column shows the BFSK report code. It is the point number reported for this point when the panel is using the BFSK format.

The eighth column contains the text displayed at command centers for the point. The text is transmitted to the receiver when the panel is using the Modem IIIa<sup>2</sup> format.

### POPIT Labels

Off-board points for the D9412G are numbered 9 to 127 and 129 to 247 (D7412G uses points 9-75 only). The D9412G reserves points 128 and 248 for internal use. POPITs must be connected for points 129 to 247 to expansion loops connected to POPEX #2.

Two sheets of peel-off POPIT labels are supplied with the D8125 POPEX Module. Use the sheet marked *Bank1* for points 9 to 127. Use the sheet marked *Bank2* for points 129 to 247.

Each label has two parts. Place the smaller part, with just the point number on it, on the chip. Place the larger part with the switch settings on the base of the POPIT. Set the switches and cover the POPIT.

Do not program two POPITs for the same point number. After programming all the points, perform a service walk test. The Troubleshooting section of this manual contains instructions for performing a service walk test. If a point does not test, check the programming for a duplicated address.

**Walk test does not show extra points:** Only the Service Walk Test shows extra points. If the point assignment switches on a POPIT or OctoPOPIT are set incorrectly, it may create both missing and extra points. If the same point number is assigned to two or more POPITs or OctoPOPITs, none of the points with that number will test correctly.

## 8.4 D8128D OctoPOPIT Module



**D8128, D8128A or D8128B modules are not compatible with the D9412G or D7412G. Only use the D8128D OctoPOPIT module. Using D8128, D8128A or D8128B modules may cause intermittent missing and restoral reports.**

### 8.4.1 Description

The D8128D OctoPOPIT Module combines the functions of the D8125 POPEX module and the D8127/D9127 POPIT modules to provide eight off-board points in a single module. You can wire both D8128D OctoPOPIT and D8125 POPEX modules in parallel to the ZONEX Bus terminals on the same panel.

Review the *Power Outputs* section of this manual to be sure to provide enough power for the OctoPOPITs and other powered devices that will be connected to the system.

### 8.4.2 Listing

The D8128D OctoPOPIT Module is UL listed for Local or Police Connected Burglary Alarm, Central Station Burglary Alarm, and Household Burglary Alarm applications. The D8128D is also suitable for fire supervisory applications, such as indicating circuit supervision (using the D192C Bell Circuit Supervision Module), sprinkler supervision, and valve tamper protection.

**Do not connect fire alarm initiating devices directly to the D8128D.**

You must use the D125B Powered Loop Interface Module or D129 Dual Class A initiation Circuit Module for fire initiation applications. Connect the initiating devices, smoke detectors for example, to the D125B powered loops or D129 Class A loops.

### RADXPNTS Handler

#### Point Assignments (001 through 045)

POPIT Switch Setting	Trans #	Point #	Point Index	Area Assign	Debounce (1-15)	BFSK/Relay	Point Text
<i>Note: D7412G uses points 001 - 075; D9412G uses points from 001 - 127, 129 - 247</i>							
[	001	3	1	2	1	E1	FIRE
200	002	1	1	2	2	E2	PANIC
300	003	2	5	1	2	E3	DELAY
400	004	1	3	1	2	E4	FOLLOW
500	005	7	1	2	5	E5	INSTANT
600	006	7	1	2	6	E6	INSTANT
700	007	7	1	2	7	E7	INSTANT
800	008	7	1	2	8	E8	INSTANT
0 1 2 3 4 5 6	101	009	---	1	2	---	E9
0 1 2 3 4 5 -	102	010	---	1	2	---	E10
0 1 2 3 4 - 6	103	011	---	1	2	---	E11
0 1 2 3 4 - -	104	012	---	1	2	---	E12
0 1 2 3 - 5 6	105	013	---	1	2	---	E13
0 1 2 3 - 5 -	106	014	---	1	2	---	E14
0 1 2 3 - - 6	107	015	---	1	2	---	E15
0 1 2 3 - - -	108	016	---	1	2	---	E16
0 1 2 - 4 5 6	109	017	---	1	2	---	E17
0 1 2 - 4 5 -	110	018	---	1	2	---	E18
0 1 2 - 4 - 6	111	019	---	1	2	---	E19
0 1 2 - 4 - -	112	020	---	1	2	---	E20
0 1 2 - - 5 6	113	021	---	1	2	---	E21

Figure 14: Program Record Sheet

Connect the zone outputs on the D125B or D129 to the OctoPOPIT sensor loop inputs. The D125B or D129 and the OctoPOPIT must be mounted in the enclosure with the panel or in a separate enclosure connected to the panel's enclosure by conduit not more than 20 feet (6 m) in length.

### 8.4.3 Installing the OctoPOPIT

You can install the D8128D OctoPOPIT Module in the enclosure with the panel, or in a separate enclosure (model D8103, D8108A, or D8109) up to 200 feet (61 meters) from the panel using standard four-conductor 22 AWG (0.8 mm) wire. If you mount the OctoPOPIT in a separate enclosure, use shielded cable to avoid electro-magnetic interference. See *EMI on Long Wire Runs* in the *Troubleshooting* section of this manual.

**Tampered enclosures for UL certified systems:** The D125B or D129 and the OctoPOPIT must be mounted in the enclosure with the panel or in a separate enclosure connected to the panel's enclosure by conduit not more than 20 feet in length.

#### Mounting

Follow the procedure below to install OctoPOPITs in the enclosure.

1. It is easier to set the switches on the D8128D before mounting it in the enclosure. See *Line Termination and Point Assignment Switches*.
2. Align the OctoPOPIT Module with any of the four mounting locations in the enclosure. See *Figure 2*.
3. Use the screws provided with the module to secure it in the enclosure.

Use the D137 Mounting Bracket to install OctoPOPITs in enclosures with no module mounting locations available.

### 8.4.4 Wiring OctoPOPITs

Follow the procedure below to wire D8128D OctoPOPIT Modules to the D9412G/D7412G. Both OctoPOPIT and POPEX Modules can be connected to the same Point Bus terminals. The modules wire in parallel. Remember **never** assign the same point number to more than one point.

1. **Power down first:** Power down the panel by disconnecting the positive (red) battery lead at the battery and unplugging the transformer.
2. Connect Terminal 1 on the OctoPOPIT to Terminal 23 on the D9412G (Terminal 9 on the D7412G).
3. Connect Terminal 2 on the OctoPOPIT to Terminal 28 on the panel if assigning point numbers from 9 to 120 (or 9 to 75 if using a D7412G) to this OctoPOPIT. See *OctoPOPIT Point Assignments*.  
If assigning point numbers from 129 to 240, connect Terminal 2 on the OctoPOPIT to Terminal 26 on the D9412G.
4. Connect Terminal 3 on the OctoPOPIT to Terminal 27 on the D9412G if assigning point numbers from 9 to 120 (or 9 to 75 if using a D7412G) to this OctoPOPIT.  
If assigning point numbers from 129 to 240, connect Terminal 3 on the OctoPOPIT to Terminal 25 on the D9412G.
5. Connect Terminal 4 on the OctoPOPIT to Terminal 24 on the D9412G (Terminal 3 on the D7412G).
6. See *OctoPOPIT Sensor Loops* for instructions on connecting devices to the OctoPOPIT's sensor loops.

### 8.4.5 Line Termination

Switch 5 sets line termination.

- If there is no D8125 POPEX module connected to ZONEX 1, set switch 5 of only one D8128D connected to those terminals to the ON position.
- If there is a D8125 POPEX module connected to ZONEX 1, set switch 5 of all D8128Ds connected to those terminals to the OFF position.
- If there is no D8125 POPEX module connected to ZONEX 2, set switch 5 of only one D8128D connected to those terminals to the ON position.
- If there is a D8125 POPEX module connected to ZONEX 2, set switch 5 of all D8128Ds connected to those terminals to the OFF position.

See *Figure 13* for the location of the switches on the OctoPOPIT.

# D9412G/D7412G

## Off-board Points

### 8.4.6 OctoPOPIT Sensor Loops

Only the resistance on the loop limits the number of normally-open and/or normally-closed detection devices each sensor loop can supervise. Resistance on each sensor loop must be less than 100 ohms with the detection devices connected.

Certain UL and NFPA applications may limit the number of detection devices. Consult the appropriate UL or NFPA standards.

The OctoPOPIT detects open, short, closed, normal, and grounded circuit conditions on its sensor loops and transmits the conditions to the panel. A ground on the positive leg of the sensor loop transmits a shorted condition for the point. Each sensor loop is assigned a point number and transmits to the panel separately.

Radionics recommends you use twisted-pair wire for the OctoPOPIT sensor loops to avoid EMI problems. Run wires away from the premises telephone and AC wiring. If you suspect a noisy environment, use shielded cable.

There are two rows of terminal numbers on the OctoPOPIT. In the row closest to the terminal blocks, the positive outputs for the sensor loops are labeled P1 to P8. Sensor loop outputs P1 and P2, P3 and P4, P5 and P6, and P7 and P8 share common terminals. The common terminals for each pair are labeled COM.

Terminate each OctoPOPIT sensor loop with a 1 k $\Omega$  end-of-line resistor. Attach a resistor even if you don't enable the loop. The OctoPOPIT comes with a D105BL resistor for each sensor loop.

Take care not to duplicate point assignments. Points assigned to both an OctoPOPIT sensor loop and a POPIT, two OctoPOPIT sensor loops, or two POPITs do not function properly.

### 8.4.7 Address Assignment Switches

Switches 0, 1, 2, and 3 assign the OctoPOPIT sensor loops to point numbers on the panel. *Table 9* shows the OctoPOPIT switch settings for point assignments.

ZONEX 1	D8128D Address Switches					ZONEX 2
Points 9-127	1	2	3	4	5	Points 129-247
9-16	ON	ON	ON	ON	*	129-136
17-24	ON	ON	ON	OFF	*	137-144
25-32	ON	ON	OFF	ON	*	145-152
33-40	ON	ON	OFF	OFF	*	153-160
41-48	ON	OFF	ON	ON	*	161-168
49-56	ON	OFF	ON	OFF	*	169-176
57-64	ON	OFF	OFF	ON	*	177-184
65-72	ON	OFF	OFF	OFF	*	185-192
73-80	OFF	ON	ON	ON	*	193-200
81-88	OFF	ON	ON	OFF	*	201-208
89-96	OFF	ON	OFF	ON	*	209-216
97-104	OFF	ON	OFF	OFF	*	217-224
105-112	OFF	OFF	ON	ON	*	225-232
113-120	OFF	OFF	ON	OFF	*	233-240
121-127	OFF	OFF	OFF	ON	*	241-247

\* Line Termination Switch (See *Section 8.4.5* for line termination switch settings).

**Table 9: D8128D OctoPOPIT Switch Settings for D9412G/D7412G**

**Note:** For the OctoPOPITs assigned to points 121-127 and 241-247, be sure to set Point Input Switch 8 to the OPEN position.

Dipswitch 4 is not used for setting addresses. See *Line Termination* for further instructions.

D9412G uses points 9-120 on ZONEX 1 and points 129-240 on ZONEX 2.

D7412G uses points 9-75 on ZONEX 1 only; however, Points 73-75 must use POPITs.

## 8.5 Testing Off-board Points

Use the Service Walk Test to test off-board points. See the *Service Walk Test* in the *Troubleshooting* section of this manual for instructions. Test to be sure that all off-board points operate properly.

**Walk test does not show extra points:** Only the Service Walk Test shows extra points. If the point assignment switches on a POPIT or OctoPOPIT are set incorrectly, it may create both missing and extra points. If the same point number is assigned to two or more POPITs or OctoPOPITs, none of the points with that number will test correctly.



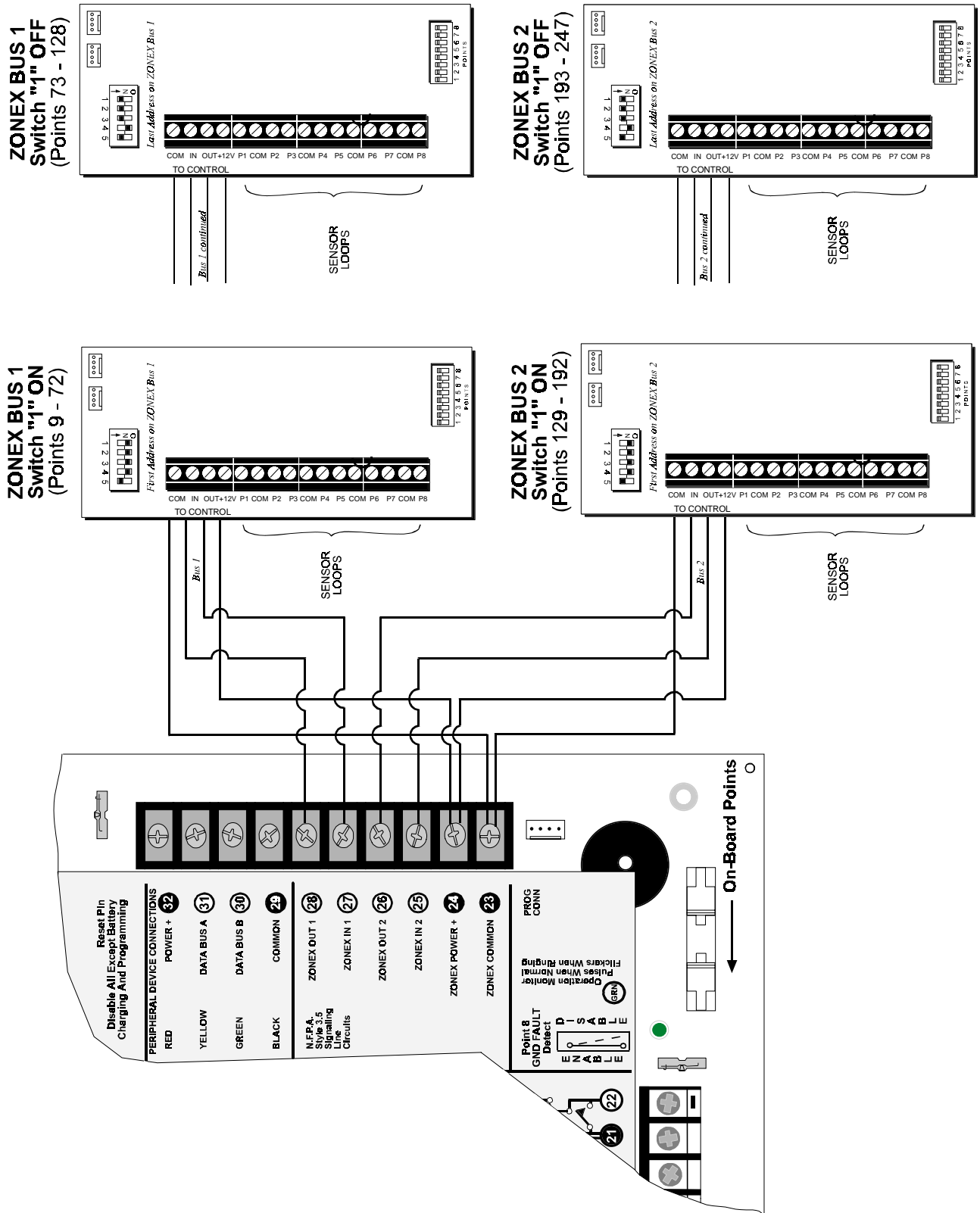


Figure 15a: Connecting D8128D OctoPOPITs to the D9412G

## Off-board Points

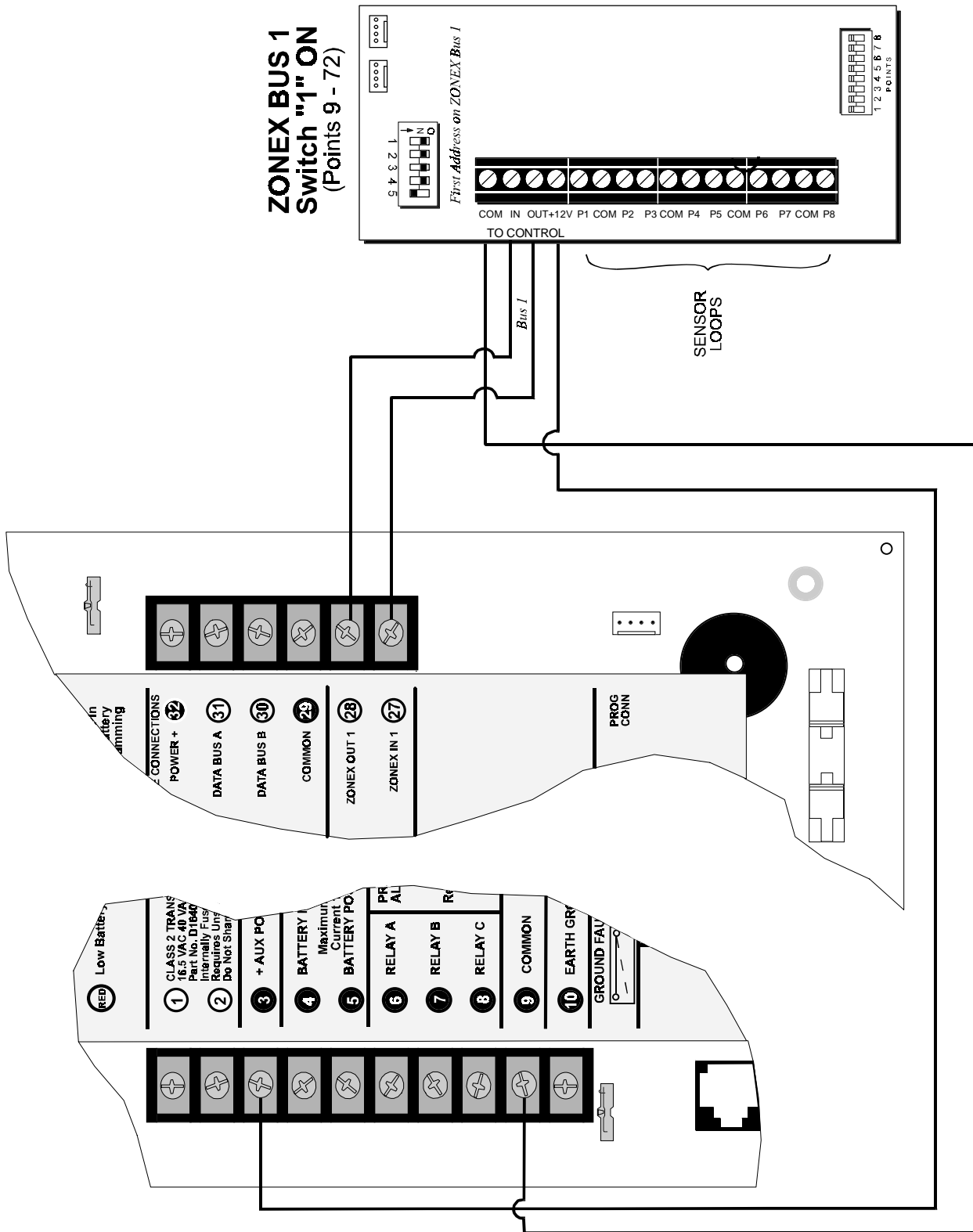


Figure 15b: Connecting D8128D OctoPOPITs to the D7412G

## 9.0 Off-board Relays

### 9.1 D8129 OctoRelay

The D8129 OctoRelay allows the addition of relay outputs to the system in groups of eight. On the D9412G, up to 128 OctoRelay outputs (relay numbers 1 to 128) can be added to the system using 16 OctoRelays. The D7412G allows up to 64 relay outputs. Review the *Power Outputs* section of this manual to be sure to provide enough power for the OctoRelays and other powered devices that will be connected to the system.

OctoRelays for relay numbers 1 - 64 connect to ZONEX 1, Terminal 28. OctoRelays for relay numbers 65-128 connect to ZONEX 2 (D9412G only), Terminal 26 on the D9412G. See Figure 16.

Alarm output, auxiliary relay, sensor reset, arming status, point status, alarm memory, or remote functions can be assigned to the OctoRelay outputs individually. See *Relay Parameters* in the *D9412G/D7412G Program Entry Guide* for programming details.

**D8129 restricted for fire systems:** The D8129 relay outputs are not supervised and can not be used in fire or combined fire/burglary installations for primary indicating devices.

#### 9.1.1 Configuring the D8129 OctoRelay

Five switches on the OctoRelay determine the relay numbers for the eight relay outputs. Table 10 shows the switch settings.



**Relay outputs may activate while setting the OctoRelay switches or programming the panel. You may wish to disconnect equipment connected to relay outputs while performing these functions.**

#### 9.1.2 Relay Outputs

Each OctoRelay output provides a Form C dry contact rated for 1.0 A at 12 VDC.

Normally-open, common, and normally-closed terminals are available for each relay output. When an individual output is activated, there is continuity between the normally-open and common terminals. When the output is not activated, there is continuity between the normally-closed and common terminals.

#### 9.1.3 Installation

Set the switches on the OctoRelay before installing it in the enclosure. See *Configuring the D8129 OctoRelay*. Install the OctoRelay in the enclosure with the panel (see Figure 2) or in an adjacent enclosure **NOT MORE THAN 5 FEET** from the panel. Use 16 to 22 AWG wire.

Panel Relay Number	D8129 OctoRelay Switch Settings					On Panel, Connect D8129 to:
1 to 8	OFF	ON	ON	ON	ON	Zonex 1 Terminal 28
9 to 16	ON	OFF	ON	ON	ON	Zonex 1 Terminal 28
17 to 24	OFF	OFF	ON	ON	ON	Zonex 1 Terminal 28
25 to 32	ON	ON	OFF	ON	ON	Zonex 1 Terminal 28
33 to 40	OFF	ON	OFF	ON	ON	Zonex 1 Terminal 28
41 to 48	ON	OFF	OFF	ON	ON	Zonex 1 Terminal 28
49 to 56	OFF	OFF	OFF	ON	ON	Zonex 1 Terminal 28
57 to 64	ON	ON	ON	OFF	ON	Zonex 1 Terminal 28
<b>D7412G Maximum</b>						
65 to 72	OFF	ON	ON	ON	ON	Zonex 2 Terminal 26
73 to 80	ON	OFF	ON	ON	ON	Zonex 2 Terminal 26
81 to 88	OFF	OFF	ON	ON	ON	Zonex 2 Terminal 26
89 to 96	ON	ON	OFF	ON	ON	Zonex 2 Terminal 26
97 to 104	OFF	ON	OFF	ON	ON	Zonex 2 Terminal 26
105 to 112	ON	OFF	OFF	ON	ON	Zonex 2 Terminal 26
113 to 120	OFF	OFF	OFF	ON	ON	Zonex 2 Terminal 26
121 to 128	ON	ON	ON	OFF	ON	Zonex 2 Terminal 26

**Table 10: D8129 OctoRelay Switch Settings**

Follow the procedure below to install OctoRelays in the enclosure with the panel.

1. Align the module with one of the mounting locations in the enclosure. See *Figure 2*.
2. Use the screws provided with the module to secure it in the enclosure.

Use the D137 Mounting Bracket or D9002 Mounting Skirt to install OctoRelays in enclosures with no module mounting locations available.

#### 9.1.4 Wiring Connections

Power down the panel to connect OctoRelays as shown in Figure 16. Note that OctoRelays for relay numbers 1 to 64 connect to ZONEX 1, Terminal 28. OctoRelays for relay numbers 65 to 128 connect to ZONEX 2, Terminal 26 on the D9412G.

Only one OctoRelay is shown wired to each ZONEX bus in *Figure 16*. Wire additional OctoRelays in parallel. Review the *Power Outputs* section of this manual to be sure to provide enough power for the relays.

# D9412G/D7412G

## Off-board Relays

The number of D8129 OctoRelays that can be connected to each Zonex terminal on the D9412G panels is limited by the number of D8128D OctoPOPITs connected.



**Using D8129 OctoRelays and D8128D OctoPOPITs together on the same Zonex Terminals is limited and depends on the number of D8128D OctoPOPITs and D8129 OctoRelays connected to a single Zonex Bus. Refer to the table below for information on the maximum number of D8128Ds and D8129s that may be connected to a single Zonex Bus.**

If the # of D8128Ds connected to a single ZONEX bus is:	Then do not connect more than this # of D8129s:
9	6
10	5
11	4
12	3
13	1
14	1

Table 11: Number of D8128Ds used with D8129s

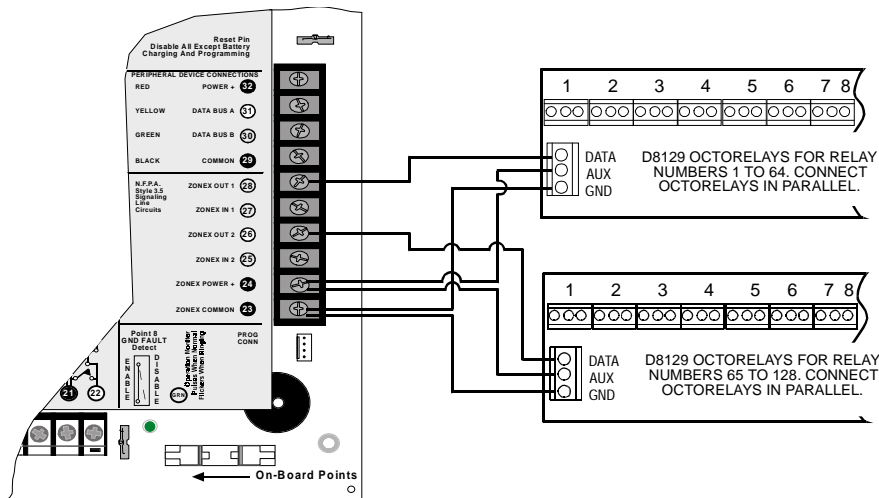


Figure 16a: D8129 Connections to the D9412G

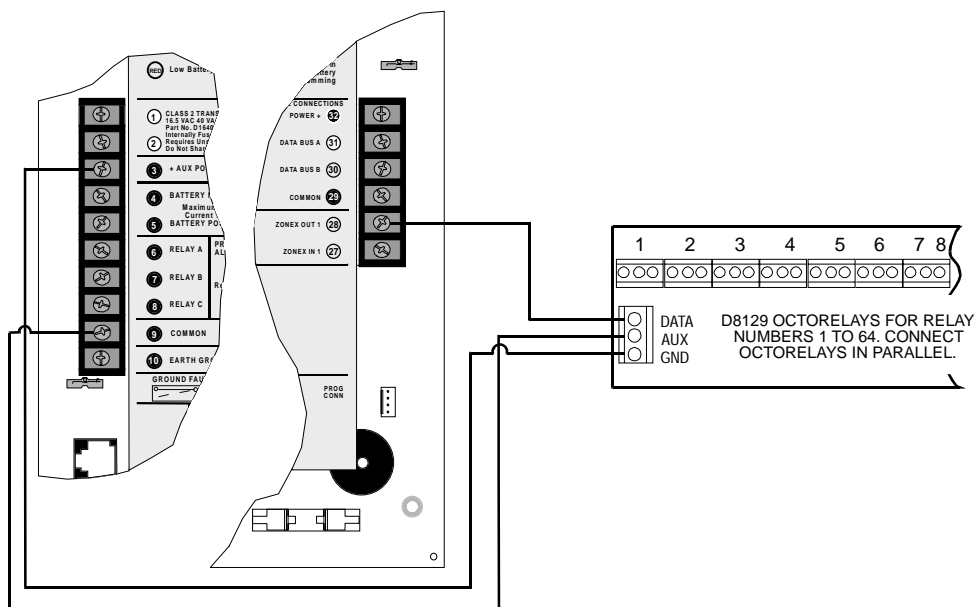


Figure 16b: D8129 Connections to the D7412G

## 9.2 D811 Arm Status Relay Module

The D811 Arm Status Relay Module allows the addition of a single off-board relay output to the system. Alarm output, auxiliary relay, sensor reset, arming status, point status, alarm memory, or remote functions can be assigned to the D811 relay output. It is not restricted to the arming status mode only.

**Relay numbers for D811 not programmable:** If the D811 is connected to ZONEX 1, Terminal 28, relay number 53 must be used for the relay output. If the D811 is connected to ZONEX 2, Terminal 26 on the D9412G, relay number 117 must be used for the relay output.

D811 Modules connect as shown in *Figure 17*. Review the *Power Outputs* section of this manual to be sure to provide enough power for the powered devices that will be connected to the system. See *Relay Parameters* in the *D9412G/D7412G Program Entry Guide* for programming details.

**D811 restricted for fire systems:** The D811 relay output is not supervised and can not be used in fire or combined fire/burglary installations for primary indication devices.

### 9.2.1 Relay Output

Each D811 relay output provides a Form C dry contact rated for 1.0 A at 12 VDC. Normally-open, common, and normally-closed terminals are available. When an individual output is activated, there is continuity between the normally-open and common terminals. When the output is not activated, there is continuity between the normally-closed and common terminals.



**Relay outputs may activate while programming the panel. You may wish to disconnect equipment connected to relay outputs while performing these functions.**

### 9.2.2 Installation

Install the D811 in the enclosure with the panel (see *Figure 2*) or in an adjacent enclosure **NOT MORE THAN 5 FEET** from the panel. Use 16 to 22 AWG wire.

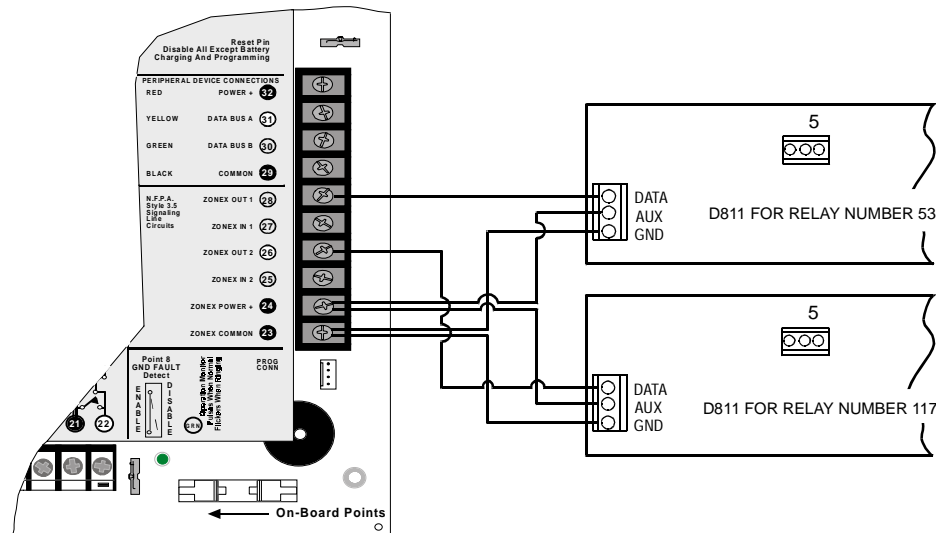
Follow the procedure below to install D811 Modules in the enclosure with the panel.

1. Align the D811 Module with any of the four mounting locations in the enclosure. See *Figure 2*.
2. Use the screws provided with the module to secure it in the enclosure.

Use the D137 Mounting Bracket or D9002 Mounting Skirt to install D811 Modules in enclosures with no module mounting locations available.

### 9.2.3 Wiring Connections

Power down the panel to connect D811 Modules as shown in *Figure 17*. Note that the D811 for relay number 53 connects to ZONEX 1. The D811 for relay number 117 connects to ZONEX 2 on the D9412G.



**Figure 17a: D811 Module Wiring to the D9412G**

# D9412G/D7412G

## Off-board Relays

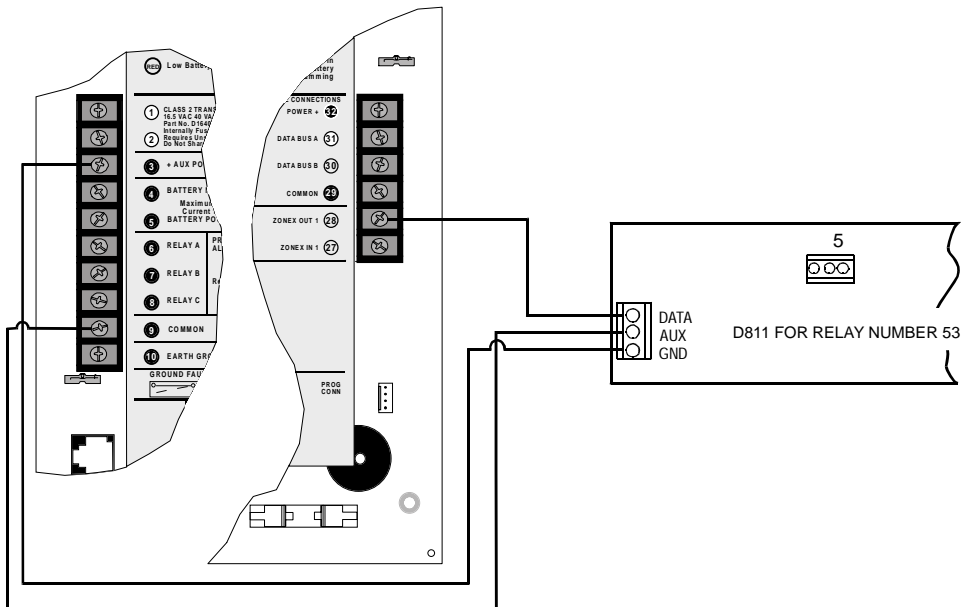


Figure 17b: D811 Module Wiring to the D7412G

## 10.0 Arming Devices

### 10.1 Description

Command centers, maintained or momentary contact keyswitches, or a combination of the two are used to arm and disarm areas. The panel may contain up to 8 areas. See the *Introduction* section for a description of areas.

### 10.2 Command Center Terminals 29 to 32

The Radionics command center is a 4-wire powered device used to arm and disarm areas, annunciate complete system status, initiate system tests, and control many functions of the security system.

The system can supervise up to eight command centers. The panel transmits a serial device trouble report, SDI FAILURE in the Modem IIIa<sup>2</sup> format or TROUBLE ZN D in the BFSK format, if it loses communication with a supervised command center. CALL FOR SERVICE appears in any command center with text display capability that loses communication with the panel. SERVC KEYPAD appears at all other command centers connected to the system.

A total of 32 command centers can be connected to the system. The number of supervised command centers, number of areas, and the available power affect the total number of command centers that can be connected to the system. See *Command Center* in the *D9412G/D7412G Program Entry Guide* for complete programming details on command center options.

There are four command centers available for use with the system. The D1255 features a 16-character alphanumeric display for general use. The D1256 is also a text display command center with functional keys optimized for local fire alarm control. The D1257 is a text display command center for fire annunciation. The D720 is an LED display command center appropriate for use as a single area command center with up to eight points.

The D1255 and D720 are also available in white (P/Ns D1255W and D720W) or red (P/Ns D1255R and D720R) versions as well.

See the command center's *User's Guide* for operational information.

#### 10.2.1 Assigning the command center an address

Switches on the command center assign an address (1 to 8) to the command center. The address determines if the command center is supervised, the command center's scope, and what area the command center is assigned to. See *Command Center Assignment* in the *D9412G/D7412G Program Entry Guide* for a complete description of addresses.

Table 12 shows the correct switch setting for each address.

Address	Switch					
	1	2	3	4	5	6
Address #1	ON	ON	ON	ON	Encoding Tone ON/OFF	ON
Address #2	OFF	ON	ON	ON		ON
Address #3	ON	OFF	ON	ON		ON
Address #4	OFF	OFF	ON	ON		ON
Address #5	ON	ON	OFF	ON		ON
Address #6	OFF	ON	OFF	ON		ON
Address #7	ON	OFF	OFF	ON		ON
Address #8	OFF	OFF	OFF	ON		ON

Table 12: Command Center Address Settings

#### 10.2.2 Installation

Consult the command center installation manuals for installation and mounting instructions. Command centers connect to the panel in parallel as shown in *Table 13*.

D9412G		Command Center	
Terminal	Function	Wire Color	Function
32*	POWER +	Red	12 VDC
31	DATA BUS A	Yellow	Data-In
30	DATA BUS B	Green	Data-Out
29	COMMON	Black	Common

\* Connect with at least 5 ft. of 22 AWG wire (14 ft. of 18 AWG wire).

Table 13: Command Center Connections

## Arming Devices

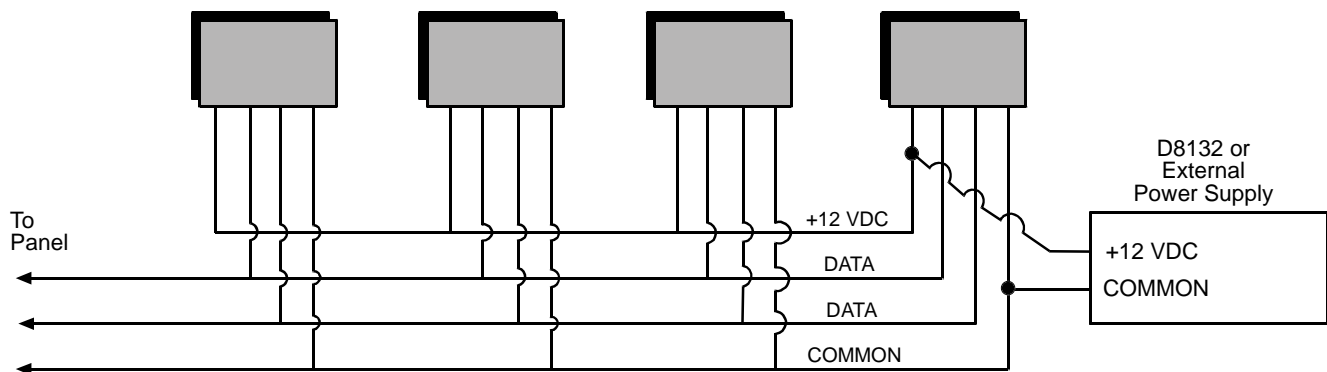


Figure 18: Power at Command Centers

**Switching the green and yellow wires affects other command centers:** Incorrectly connecting the green wire from the command center to Terminal 31 and the yellow wire to Terminal 30, causes other command centers connected to the panel to go blank and/or sound random beep tones.

Devices can be connected to the data bus, Terminals 30 and 31, by parallel wire runs from the panel to each device, wire from device to device, or a combination of the two as long as a maximum of 15,000 feet of 22 AWG wire **for all devices connected to the SDI Bus combined** is used.

It is recommended, however, that command centers be limited to **2,000 feet** per run; D9210B Modules be limited to **1,500 feet** per run (**2,500 feet** if using an external power supply), and the D9131A be limited to **1,000 feet** per run.

**Extra power needed for more command centers:** The D1255 Command Center draws 104 mA when it is idle. It draws 206 mA with the keys lit and the sounder activated. Review the *Power Outputs* section to determine the total power output requirements for the system.

One or more D8132 Battery Charger/Power Supply Modules may need to be added for the number of command centers that will be used. Figure 18 shows the D8132 powering command centers in a stand-alone configuration.

**For UL certificated accounts** use a UL listed power supply. The D8132 is not UL listed as a stand-alone power supply.



IMPORTANT

**Control/Communicator and D8132 (or other power supply) must share COMMON:** Note that Figure 18 shows the common from the D8132 Module connected to both the command centers' common and the common on the control/communicator. Any stand-alone power supply powering any device connected to the panel must also be connected to a common terminal on the panel. **Do not connect the stand-alone power supply's earth ground to Terminal 10.**

### 10.3 D268/D269 Independent Zone Control D279A Independent Zone Control

Any **on-board** or **OctoPOPIT** point can be programmed so that the D268/D269 or D279A Independent Zone Control operates as independent point control (arms and disarms the point).

See the *Point Assignments* in the *D9412G/D7412G Program Entry Guide* for programming information. See the *D268/D269 Operation and Installation Instructions* (74-05439-000) or the *D279A Operation and Installation Instructions* (46456) for wiring and operation instructions.



## 10.4 Keyswitch

### 10.4.1 Description

A maintained or momentary contact arming station (keyswitch) can be connected to master arm/disarm any of the areas in the system. The keyswitch is connected to an on-board or off-board point's sensor loop. Relays can be programmed to activate arming status LEDs for keyswitch arming stations. See the *Relays* section of the *D9412G/D7412G Program Entry Guide*.

### 10.4.2 Programming

See the *Point Assignments* section of the *D9412G/D7412G Program Entry Guide* for the correct programming for points used for keyswitches.

### 10.4.3 Installation

For maintained switches, connect the end-of-line resistor for the point at the keyswitch so that the switch opens the circuit when it operates. A short on the circuit produces an alarm if the area is armed and a trouble if it is disarmed. See *Figure 19*.

For momentary switches, connect the end-of-line resistor for the point at the keyswitch so that the switch shorts the resistor when it operates. An open on the circuit produces an alarm if the area is armed and a trouble if it is disarmed. See *Figure 19*.

### 10.4.4 Keyswitch Operation

#### Maintained Contact

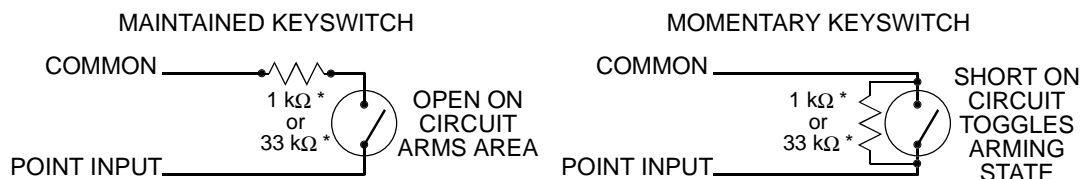
If the point to which the keyswitch is connected is programmed for a maintained contact, an open on the arming circuit arms the area. All faulted points are force armed, regardless of the entry in the **FA Bypass Max** program item. Returning the circuit to normal disarms the area. See *Area Wide Parameters* and *Point Assignments* in the *D9412G/D7412G Program Entry Guide*.

#### Momentary Contact

If the point to which the keyswitch is connected is programmed for a momentary contact, shorting the arming circuit toggles the area's arming state between armed and disarmed. All faulted points are force armed, regardless of the entry in the **FA Bypass Max** program item. See *Point Assignments* in the *D9412G/D7412G Program Entry Guide*.

#### Silencing the Bell

To silence the bell (stop Alarm Bell output ) if the system is armed, operate the keyswitch to disarm the area. If the area is disarmed, operate the keyswitch once to start the arming process and a second time to stop the arming process and silence the bell.



\* Use 1 kΩ end-of-line resistors if using one of the zones on the panel or an OctoPOPIT.  
Use a 33 kΩ resistor if using a POPIT.

Figure 19: Keyswitch Wiring

**Notes:**

## 11.0 SDI Devices

### 11.1 Description

The D9412G/D7412G panels can support a number of accessory devices off the SDI bus using Terminals 29 through 32. Some devices include the D1255 Command Center (discussed in the previous section), the D9131A Parallel Printer Interface, the D9210B Access Control Module, the D9133 Serial Interface Module, and the D9133TTL-E Ethernet Interface module.

### 11.2 Installation

Consult the *Operation and Installation Manual* of the specific SDI device for complete installation instructions. SDI devices connect to the panel in parallel as shown in *Table 14*.

These devices may share power with the panel or be powered by a stand-alone power source.

D9412G/D7412G		SDI Devices	
Terminal	Function	Wire Color	Function
32	POWER +	Red	+12 VDC
31	DATA BUS A	Yellow	Data-In
30	DATA BUS B	Green	Data-Out
29	COMMON	Black	Common

Table 14: SDI Device Connections



**A stand-alone power supply powering any SDI device must also be connected to a common terminal on the panel. Do not connect the stand-alone power supply's earth ground to Terminal 10 on the panel.**

### 11.3 D9131A Parallel Printer Interface Module

The Radionics D9131A Parallel Printer Interface is a 4-wire powered device used to connect a standard parallel printer to a panel. The D9412G can supervise three printers, and the D7412G can supervise one printer. Each printer requires a separate D9131A Printer Interface Module. The D9131A connects to the printer using a standard parallel printer cable.

#### 11.3.1 Switch Settings

Switches on the D9131A assign a unique address (17 to 19) to each printer. The address determines if the printer is supervised, the printer's scope, and the area to which the printer is assigned. See *Printer Parameters* in the *D9412G/D7412G Program Entry Guide* for a complete description of addresses.

Table 15 shows the correct switch setting for each address.

Printer	Switch					
	1	2	3	4	5	6
17	ON	ON	ON	*	ON	ON
18 <sup>†</sup>	OFF	ON	ON	*	ON	ON
19 <sup>†</sup>	ON	OFF	ON	*	ON	ON

<sup>†</sup> = D9412G only  
 \* ON = Header and Form Feed  
 OFF = No Header and No Form Feed

Table 15: Printer Address Switch Settings

#### 11.3.2 Supervision

Supervision includes proper operation of the SDI bus, proper connection of the printer cable between the printer and the D9131A, printer paper supply, printer selected (on-line), and printer power.

The panel sends an SDI failure report to the receiver if it fails to communicate with the printer interface, and `SERVC PRINTER` displays at the command center. The report to the receiver includes the address of the troubled D9131A to indicate which printer needs service.

# D9412G/D7412G

## SDI Devices

### 11.4 D9210B Access Control Module

The Radionics D9210B Access Control Interface is a 4-wire powered device providing connections for an access door point and door strike. The D9412G can supervise eight Access Control Modules, and the D7412G can supervise two Access Control Modules. Each Access Control Module supports one door to control access. Programming allows each access door to be configured independently.

Using Weigand-style cards or tokens, the D9210B can allow access for up to 996 cards/tokens on the D9412G, 396 on the D7412G. User access authority can be configured to restrict access to certain doors or to certain periods of time. The reading of access cards, in addition to granting access, can control whether the system will disarm. Used with the D9412G, the D9210B recognizes 249 master users by user name, passcode, and access authority. The D9210B recognizes 99 master users when used with the D7412G. Each master user will support three sub-users with unique cards/tokens having the same access level as the master user.

Door Module	1	2	3	4	5	6
1	ON	ON	ON	*	ON	ON
2	OFF	ON	ON	*	ON	ON
<b>D7412G maximum</b>						
3	ON	OFF	ON	*	ON	ON
4	OFF	OFF	ON	*	ON	ON
5	ON	ON	OFF	*	ON	ON
6	OFF	ON	OFF	*	ON	ON
7	ON	OFF	OFF	*	ON	ON
8	OFF	OFF	OFF	*	ON	ON
<p><b>* Fail Safe Mode (Switch 4)</b>            ON = If SDI Bus Fails, relay energizes.            OFF = If SDI Bus Fails, relay de-energizes.            NOTE: Switches 5 and 6 MUST remain in the ON position.</p>						

**Table 16: Access Control Module Address Switch Settings**

#### 11.4.1 Switch Settings

Switches on the D9210B assign a unique address (1 to 8) to each module. Table 16 shows the correct switch setting for each D9210B address.

### 11.5 SDI Address 80

SDI Address 80 is available on the D9412G/D7412G panels and allows bi-directional SDI to RS232 information. The intent of this address is for use with home or building automation software. A D9133 Serial Interface Module is required for this application.

#### 11.5.1 D9133 Serial Interface Module

The Radionics D9133 Serial Interface Module is a four-wire powered SDI device providing connection for RS232 devices to the D9412G/D7412G panels. The D9133 uses a specific communication protocol that is provided upon request. Please contact Radionics Technical Support Monday through Friday from 5 AM to 5 PM Pacific Time at 800-538-5807.

The D9133 can be installed up to 1000 feet away from the panel using 18 AWG wire.

#### 11.5.2 Address Settings

<p><b>D9133 Serial Interface Module</b></p> <p>There are no jumper settings required for the D9133 (SDI Address 80) for home or building automation purposes. All Jumper shunts must be removed for this setting.</p>	<table border="1" style="margin: auto;"> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td style="vertical-align: middle;">80</td> <td style="text-align: center;">○</td> <td style="text-align: center;">○</td> <td style="text-align: center;">○</td> <td style="text-align: center;">○</td> </tr> <tr> <td></td> <td style="text-align: center;">○</td> <td style="text-align: center;">○</td> <td style="text-align: center;">○</td> <td style="text-align: center;">○</td> </tr> </table>		1	2	3	4	80	○	○	○	○		○	○	○	○
	1	2	3	4												
80	○	○	○	○												
	○	○	○	○												

#### 11.5.3 Supervision

The supervision of the D9133 is available through programming which includes proper operation between the D9133 and the control panel.

If supervised and the D9133 does not respond to panel supervision polls, the panel sends an SDI failure report to the receiver if it fails to communicate with the D9133 and `SERVC SDI 80` displays at the command center. The report to the receiver includes the address of the troubled module to indicate which module needs service.

**11.6 SDI Address 88**

SDI Address 88 is available with the D9412G/D7412G panels and is used for several different applications. When using SDI Address 88, only one of the listed devices may be connected at a time.

**11.6.1 D9133DC Serial Interface Module**

The D9133DC Serial Interface Module can be used to locally program the D9412G/D7412G panels. In addition to this, the D9133DC allows Diagnostics and History retrieval to be performed.

**Connecting the D9133DC**

1. Configure the D9133DC for SDI Address 88. To program the panel when the reset pin is in the unlocked position, program **Enable SDI RAM** to Yes in the RADXAUX1 handler.
2. Connect the D9133DC to Com Port 1 or Com Port 2 on the PC. The D9133DC has a DB-9 female serial connector. A null modem cable must be purchased seperately to connect the D9133DC to a PC.
3. Using 22 AWG or 18 AWG wire, connect the D9133DC SDI terminals (SDI PWR, SDI A, SDI B, and SDI COM) to the panel's SDI terminals (Terminals 29 to 32).

To send or receive the panel's program, the Reset Pin can be in the Locked or Unlocked position.

**Note:** *Locking the Reset Pin when programming the panel improves upload/download time.*

**11.6.2 D9133TTL-E Network Interface Module**

The Radionics D9133TTL-E Network Interface Module is a four-wire powered SDI device providing connection for bi-directional communication over Ethernet networks to D9412G/D7412G panels. For programming information on enhanced communications, please refer to the *D9412G/D7412G Program Entry Guide*.

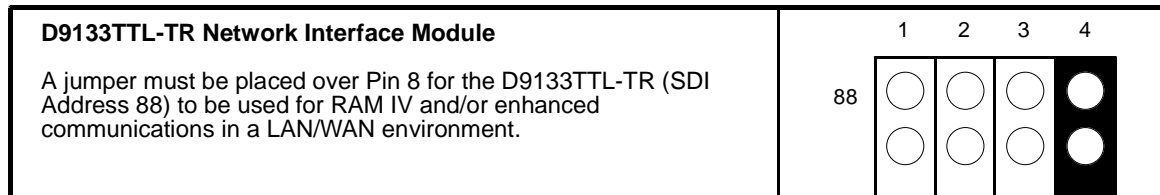
The D9133TTL-E can be installed up to 1000 feet away from the panel using 18 AWG wire.

**11.6.3 D9133TTL-TR Network Interface Module**

The Radionics D9133TTL-TR Network Interface Module is a four-wire powered SDI device providing connection for bi-directional communication over a Token Ring network to D9412G/D7412G panels. For programming information on enhanced communications, please refer to the *D9412G/D7412G Program Entry Guide*.

The D9133TTL-TR can be installed up to 1000 feet away from the panel using 18 AWG wire.

**11.6.4 Address Settings**



**11.6.5 Supervision**

Supervision of the D9133DC, D9133TTL-E, and D9133TTL-TR at SDI Address 88 is available through programming that ensures operation between the module and the control panel.

If supervised and the module does not respond to panel supervision polls, `SERV SDI 88` displays at the command center. The report to the receiver includes the address of the troubled module to indicate which module needs service.

**Notes:**

Programmer and Accessory Connections

12.0 Programmer and Accessory Connections

12.1 Programmer Connector

The procedure below shows how to connect and disconnect the programmer. Refer to *D5200 Programmer Operation Manual* for complete information on using the D5200 programmer.

1. **Lock Reset Pin:** See *Figure 20*.
2. Connect the D5200 Data/Power cord into the programmer connector.
3. Perform the desired programming function (send or receive program).
4. Disconnect the programmer.

12.1.2 Programmer Access Reports

When a program is sent to the panel, the panel sends a `PROG ACCESS OK` report ten seconds after the handler is exited or when the programmer is disconnected. The Diagnostic Reports prompt in Routing must be programmed YES for this report to be sent.

12.2 Accessory Connector

Use the **Accessory Connector** to connect the panel to the D928 Dual Phone Line Switcher. The Accessory Connector is on the bottom right corner of the I/O board. See *Figure 21*. The D928 allows the panel to use two telephone lines to transmit reports.

See *D928 Dual Phone Line Switcher* in the *Telephone Connections* section of this manual for installation and operating instructions.

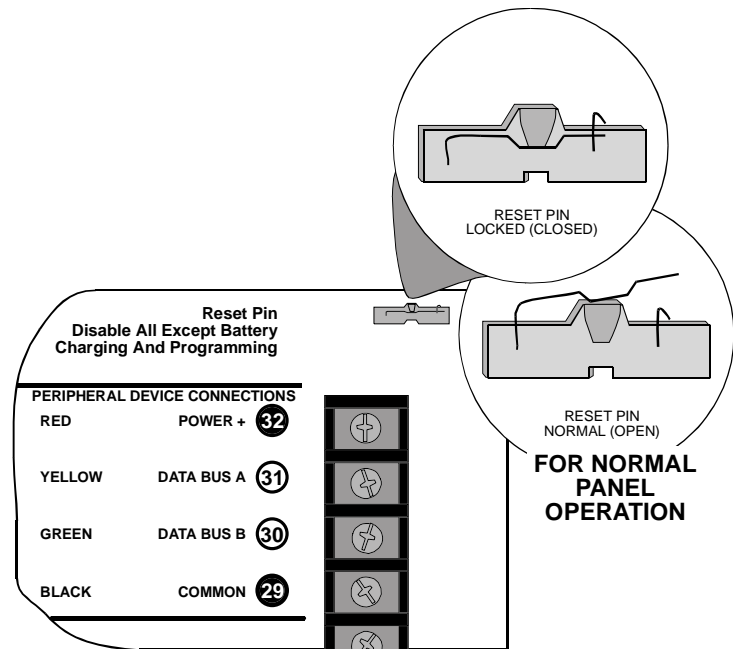


Figure 20: Reset Pin

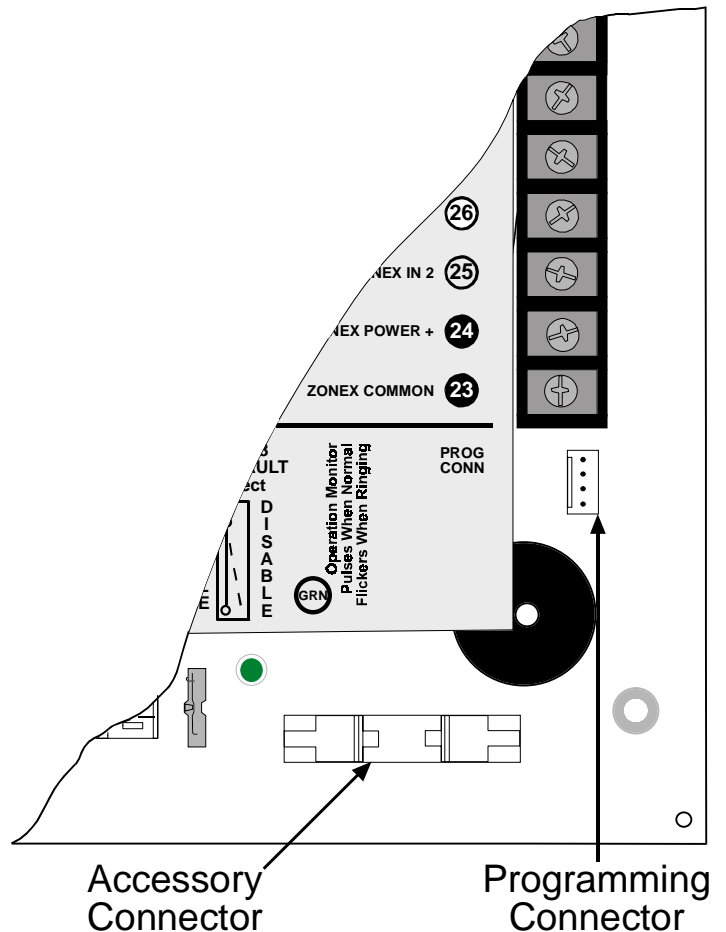


Figure 21: Programmer and Accessory Connections

**Notes:**



13.0 Faceplates

13.1 D9412G Faceplate

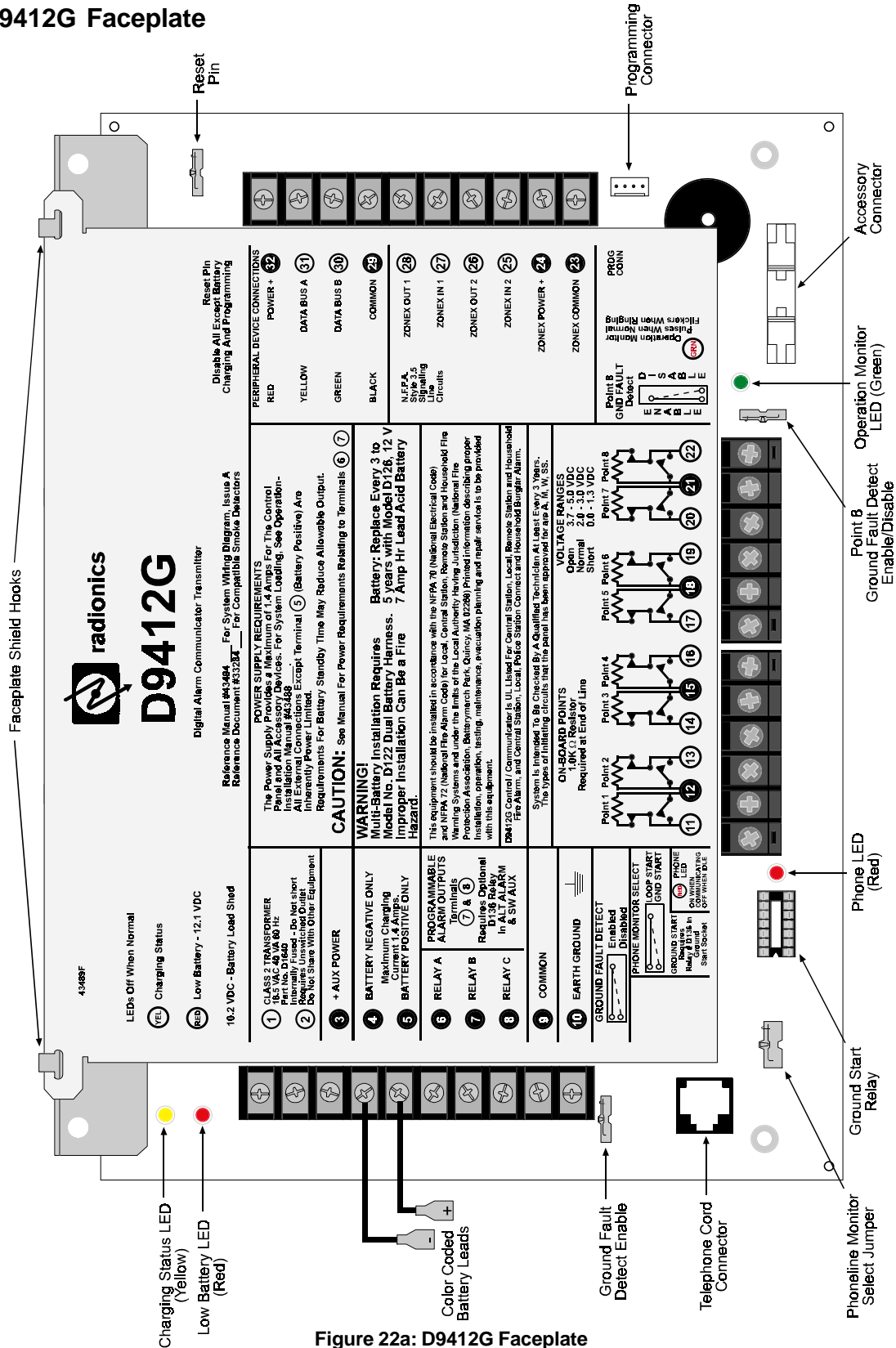


Figure 22a: D9412G Faceplate

FACEPLATES

13.2 D7412G Faceplate

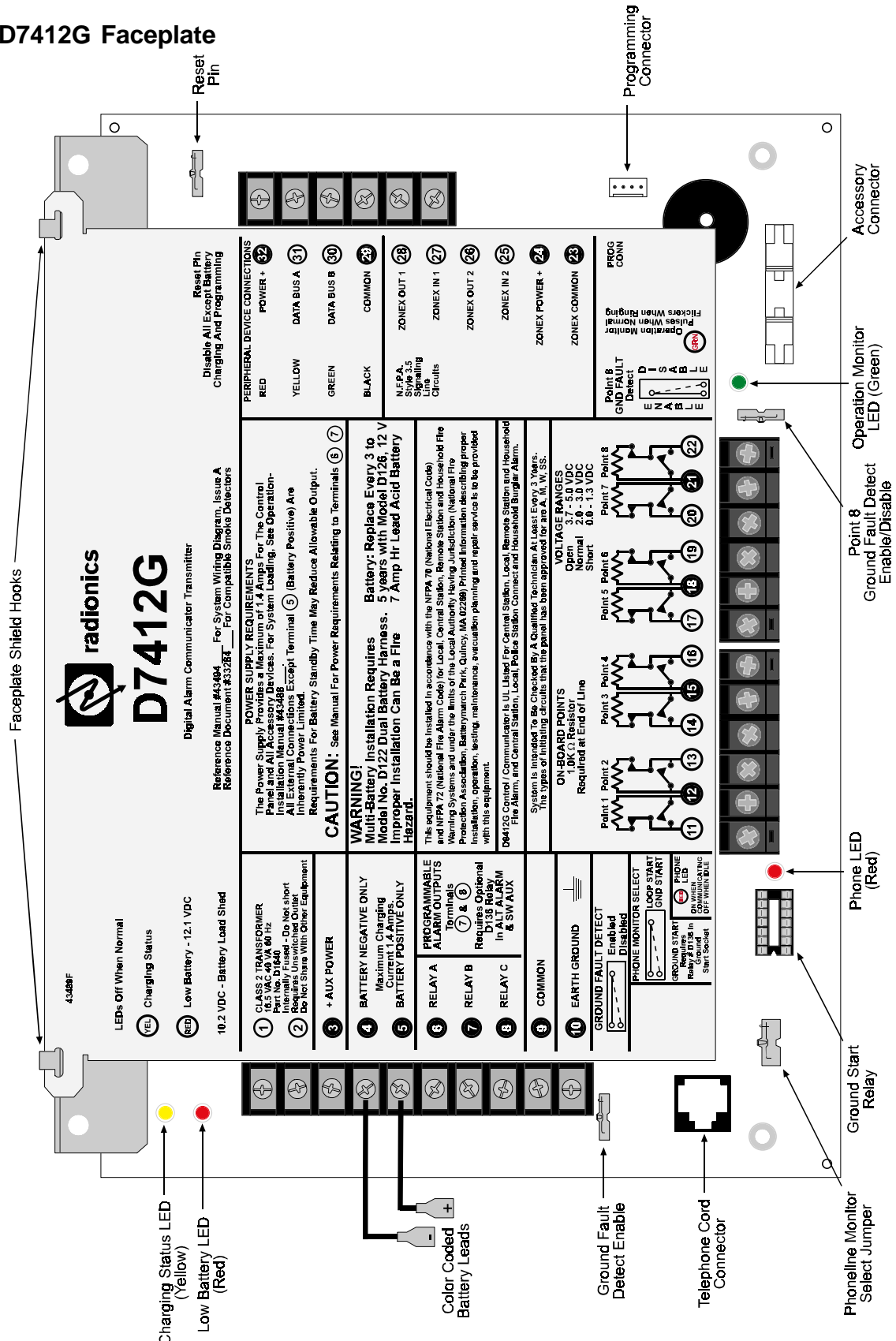


Figure 22b: D7412G Faceplate

Quick Reference Terminal Description

14.0 Quick Reference Terminal Description

Terminal	Name	Description
1, 2	CLASS 2 TRANSFORMER	Connect 16.5 VAC, 40 VA transformer for primary power supply.
3	+ AUX POWER	Supplies up to 1.4 A at 10.2 VDC to 13.9 VDC to powered devices. Use Terminal 9 for common. Shares PTC with Terminal 24.
4	BATTERY NEGATIVE ONLY	Connect rechargeable lead acid type battery's negative terminal (-) to Terminal 4. (See <i>Appendix D</i> to determine battery size requirements.)
5 (+)	BATTERY POSITIVE ONLY	Connect rechargeable lead acid type battery's positive terminal (+). (See <i>Appendix D</i> to determine battery size requirements.)
6 (+)	+ STEADY OR PULSED ALARM POWER	Supplies up to 2 A at 10.2 VDC to 13.9 VDC for steady or pulsed alarm output. Use Terminal 9 for common. Programmed as Relay A. Shares PTC with Terminals 7 and 8.
7 (+)	+ ALTERNATE ALARM POWER	Supplies up to 2 A at 10.2 VDC to 13.9 VDC for steady or pulsed alarm output. Use Terminal 9 for common. Programmed as Relay B. Shares PTC with Terminals 6 and 8. <b>D136 Plug-in Relay required:</b> Install a D136 in the ALT ALARM socket for output at Terminal 7.
8 (+)	+ SWITCHED AUX POWER	Supplies up to 1.4 A at 10.2 VDC to 13.9 VDC. Use Terminal 9 for common. Programmed as Relay C. Continuous output interrupted by RESET SENSORS or alarm verification. Shares PTC with Terminals 6 and 7. <b>D136 Plug-in Relay required:</b> Install a D136 in the SW AUX socket for output at Terminal 8.
9	COMMON	Terminal 9 is common for Auxiliary Power, Steady or Pulsed Alarm Power, Alternate Alarm Power, and Switched Aux Power (Terminals 3, 6, 7, and 8).
10	EARTH GROUND	Connect to earth ground. A cold water pipe or grounding rod is preferred. Do not connect to telephone or electrical ground.
11, 13, 14, 16, 17, 19, 20, 22	ON-BOARD POINTS (Inputs)	Connect normally open and/or normally closed detection devices to loop wiring. 1 kΩ resistor required at end of loop.
12, 15, 18, 21	ON-BOARD POINTS (Common)	Loop returns for on-board points.
23 (-) 24 (+)	ZONEX COMMON ZONEX POWER +	[D9412G only] Use Terminals 23 and 24 to power ZONEX modules such as the D8125 POPEX module, the D8128D OctoPOPIT, and the D8129 OctoRelay. Shares PTC with Terminal 3.
25 26	ZONEX IN 2 ZONEX OUT 2	[D9412G only] Connect ZONEX modules for Points 129 to 247 and Relays 65 to 128 to these terminals.
27 28	ZONEX IN 1 ZONEX OUT 1	Connect ZONEX modules for Points 9 to 127 and Relays 1 to 64 to these terminals. (The D7412G uses Points 9 to 75.)
29 (-)	COMMON	Common terminal for SDI devices.
30 31	DATA BUS B DATA BUS A	Terminals 30 and 31 are a two-wire bus that drives the command centers, printer interface, and access control modules.
32 (+)	POWER +	Power for SDI devices. This separate, protected power output for SDI devices is not affected by shorts on any other terminal.

Table 17: Quick Reference Terminal Description

## Quick Reference Terminal Description

**Notes:**

## 15.0 Troubleshooting

### 15.1 Introduction

Radionics provides this guide to help troubleshoot problems with the D9412G/D7412G. To prevent problems from occurring, read the preceding sections of this manual and the Program Entry Guide to verify that the panel is correctly installed and programmed.

### 15.2 Problems Found During Self Diagnostics

The D9412G/D7412G Control/Communicators perform a series of self-diagnostic tests of hardware, software, and program at start up and reset.

**Buzzer sounding is normal at start-up:** The on-board buzzer located on the lower right corner of the panel sounds as the D9412G/D7412G performs its self diagnostic tests at start up and reset. The tests take less than two seconds. If all tests are completed successfully, the buzzer turns off. The panel continues periodic internal testing during normal operation. If a fault is detected during this testing, the buzzer begins sounding. One of the system messages listed below displays at the command centers.

Symptom	Diagnosis	Remedy
CALL FOR SERVICE appears in the command center's display. No buzzer sounds at the Command Center.	A command center has stopped receiving data from the panel.	Call the installer for service.
COMM FAIL ROUTE # appears in command center displays.	The panel has made ten unsuccessful attempts to report to the receiver.	See <i>Communication Failure</i> in this section. See also <i>Communication Failure</i> in the <i>Telephone Connections</i> section for a complete description. Pressing [ESC] silences the buzzer. The display clears when communication restores (i.e., the receiver acknowledges a report).
PANEL BROKEN appears in the displays of all command centers, the command center buzzer sounds, and the green operation monitor LED stops flickering or is off.	A hardware or software problem has occurred.	Pressing [ESC] does not silence the buzzer. The panel must be returned to Radionics for repair.
PARAM FAIL alternates with the idle text at the command centers, the command center buzzer sounds, the green operation monitor LED continues to flicker, and the panel sends a BAD PARAM CKSUM report to the receiver.	The program is corrupted.	Pressing [ESC] may silence the buzzer. <b>Silencing the buzzer does not correct the problem:</b> The corrupted copy of the program in the panel must be replaced. Load a new copy of the complete program. The displays clear when the panel is reset after loading a new program.
SERV AC FAIL appears in command center displays.	AC power has been interrupted at Terminals 1 and 2.	Pressing [ESC] silences the buzzer. Restoring power clears the display. <b>NOTE:</b> You can program the panel to send an AC FAIL report to the receiver.
SERV BATT LOW appears in command center displays.	Battery voltage at Terminals 4 and 5 has fallen below 12.1 VDC.	See <i>Battery and Power Reports</i> in this section for probable causes and remedies. Pressing [ESC] silences the buzzer. The display clears when battery voltage reaches 13.7 VDC.
SERV BATT MSING appears in command center displays.	The panel cannot detect a battery at Terminals 4 and 5.	Pressing [ESC] silences the buzzer. Restoring the battery clears the display. <b>NOTE:</b> The panel can be programmed to send a BATTERY MISSING report to the receiver.

Table continued on next page

## Troubleshooting

Symptom	Diagnosis	Remedy
SERV GND FAULT appears in command center displays.	The panel has detected an earth ground fault.	Follow the procedure in section 15.16 <i>Problems with Ground Faults</i> . See also <i>Connecting Earth Ground</i> in the <i>Installation</i> section of this manual.
SERV KEY PAD appears at other command centers connected to the panel, and the panel transmits an SDI FAILURE report to the receiver.	The panel has lost contact with a supervised command center.	Call the installer for service. Pressing [ESC] silences the buzzer. The displays clear when contact with the missing Command Center restores.
SERV 9210 #n appears at the other command centers connected to the panel, and the panel transmits an SDI FAILURE ## report to the receiver.	The panel has lost contact with a D9210B Access Interface Module.	Call the installer for service.
SERV PH LINE #1 (SERV PH LINE #2) appears in command center displays.	The panel has detected a phone line as faulted.	See <i>Phone Line Trouble</i> in this section. See also <i>Phone Line Monitor</i> in the <i>Telephone Connections</i> section for a complete description.
SERV PRINTER appears in command center displays.	The panel has lost contact with a supervised printer.	Pressing [ESC] silences the buzzer. The displays clear when contact with the missing printer restores.

**Table 18: Troubleshooting Problems Found During Self Diagnostics**

### 15.3 Problems Programming the Panel

Before attempting to program the panel, become familiar with the basic operation of the D5200 programmer. See the *D5200 Operation Manual*. If problems are still experienced, check for the symptoms below:

Symptom	Diagnosis	Remedy
The programmer displays PLUG IN PANEL when you press [SEND] or [RECEIVE].	The programmer is not correctly connected to the panel.	Verify that the data/power cord is plugged into the COMMUNICATOR port on the D5200. Verify that the data/power cord is plugged securely into the panel's Programmer Connector. Check each conductor in the data/power cord for continuity.
	AC induction through the on-board point sensor loops, the DATA bus, or the ZONEX bus.	Verify a proper earth ground at Terminal 10. Disconnect on-board point sensor loops, the DATA bus (Terminals 30 & 31), and the ZONEX bus (Terminals 25 – 28).
After plugging in the programmer, the panel transmits SDI TROUBLE reports for supervised SDI devices (command centers, Printer Interface Modules, etc.). All SDI devices stop operating.	You haven't entered the panel handler within 30 seconds of plugging in the programmer.	Enter the panel handler within 30 seconds of plugging in the Programmer. Once the SDI reports are generated, sending or receiving a handler or disconnecting the programmer returns the SDI devices to normal operation.

**Table 19: Troubleshooting Problems Programming the Panel**

15.4 Problems With Command Centers

Symptom	Diagnosis	Remedy
Command centers show erratic behavior. For example, the pip that confirms you pressed a key echoes.	More than one command center has the same supervised address.	Use a supervised address in one command center only or use a different supervised address for each command center.
	Data connections (yellow and green wires) on one or more command centers are reversed, or only one wire is connected.	Check that yellow and green data wires are correctly connected on all command centers.
NO AUTHORITY displays at the command center when you enter your passcode to perform a function.	<p>Check the <i>User Interface</i> section of the program to be sure the function is enabled for the authority level assigned to the passcode in the <i>Passcode Worksheet</i> section of the program.</p> <p>Check the <i>Passcode Worksheet</i> section of the program to be certain the passcode is assigned to the area where you are attempting to perform the function.</p> <p>Check the <i>Passcode Worksheet</i> section of the program to see if the passcode is restricted by a user window.</p> <p>Check the <i>Area Parameters</i> section of the program to be certain the area in which you are attempting to perform the function is turned on.</p>	

Table 20: Troubleshooting Command Center Problems

15.5 Phone Line Trouble

Phone line problems that are not corrected can result in the panel going into Communications Failure. The D9412G/D7412G can be programmed to monitor one or two phone lines. See the *D9412G/D7412G Program Entry Guide* for programming instructions. If the phone line monitor is enabled, SERVC PHONE LINE #1 (or 2 if two lines are used) appears in the command center's display when the panel detects a problem on the phone line.

Symptom	Diagnosis	Remedy
SERV PH LINE #1 (or #2 if two lines are used) appears in the command center display.	The panel's phone line monitor detects a phone line as faulted.	<p>Verify that the telephone cord is correctly connected to the phone jack and the panel.</p> <p>Verify the Ground Start Jumper is in the correct position.</p> <p>If using a ground start phone line, verify a D136 relay is correctly installed in the Ground Start Relay socket.</p> <p>Verify that the phone jack (RJ31X or RJ38X) is wired correctly. The incoming phone line must be wired to Terminals 4 and 5. The in-house phone system must be wired to Terminals 1 and 8.</p> <p>Verify that all telephones are on-hook. Leaving a telephone on hold after the other party hangs up creates an off-hook condition. Verify that no phones are on-hold.</p> <p>If completing the steps above does not restore the phone line, meter the line. You should meter at least 4.5 to 7.5 VDC. If your readings are below the minimum values, contact your telephone company repair service.</p>

Table 21: Troubleshooting Phone Line Problems

## Troubleshooting

### 15.6 Communications Failure

The panel goes into Communications Failure after ten unsuccessful attempts to reach the receiver. Follow the *Phone Line Trouble* procedure to verify that there is no problem with the phone lines at the installation. If the phone lines are good, monitor the lines (preferably at the receiver) for the symptoms listed below.

Symptom	Diagnosis	Remedy
The line rings but the D6500 receiver does not pick up. The Ring indicator LED on line card does not light. You cannot hear ring with headset at receiver location.	Line is not ringing at the receiver.	Verify that the lines are correctly connected to the receiver. Verify that correct prefixes and phone numbers for the receiver have been programmed into the panel. If completing the steps above does not correct the problem, contact your telephone company repair service.
The panel is unable to call out when all 246 points are faulted.	The total current draw is too much for the panel.	Put command centers on a separate power supply to get maximum current draw from points in alarm.
The line rings but the receiver does not pick up. The Ring Indicator LED on line card lights. You can hear ring with test set at receiver location.	Line card in receiver may be faulty.	Review receiver manuals for trouble shooting procedures.
The panel reaches a busy signal for all ten attempts to reach the receiver.	Calls are not reaching the receiver.	Verify that correct prefixes and phone numbers for the receiver have been programmed into the panel. Verify that the phone lines are not shorted between the phone company's equipment and the receiver by placing a call to the number for the receiver. If you hear the line ring, but the ring detector doesn't light, or if you hear a busy signal and the green on line (OL) indicator is not lit, call the phone company for service.
	The receiver's call load is too great.	Additional line cards and phone lines may be needed for the receiver
The receiver answers the call and provides an acknowledgment tone, but the communicator does not transmit reports.	The receiver is not producing the correct acknowledgment tone.	Verify that the receiver is producing a 1400 Hz, 2300 Hz, or Modem IIIa <sup>2</sup> acknowledgment tone.
Panel does not connect to central station.	The D136 relay used for ground start phone systems is inserted incorrectly.	Insert the D136 relay in the GND START socket correctly. Also check that phone line is connected and that phone jack is wired properly. See the <i>Relays</i> section of this manual for instructions.
The receiver answers the call and provides an initial "handshake" acknowledgment, but does not acknowledge the panel's report transmission with a "kiss-off" acknowledgment	The receiver is not compatible with the panel's transmission format.	Verify that the receiver is compatible with the format the panel is using (either BFSK or Radionics' Modem IIIa <sup>2</sup> Communications Format). See <i>Phone</i> in the <i>D9412G/D7412G Program Entry Guide</i> . The panel requires D6500 MPU and Line Card EPROM revision 8.00 or higher.
	Noisy phone lines are interfering with report transmission.	Try making a voice call to the receiver on the line to verify the noisy condition. It may be necessary to have the phone company check the lines.

**Table 22: Troubleshooting Communication Failures**



### 15.7 Problems with Points

If the switches on a POPIT are set incorrectly, it may create both a missing and extra point. When a missing point is found, perform a Service Walk Test to search for extra points. See the *Owner's Manual* for test instructions.

Symptom	Diagnosis	Remedy
Point appears as missing at command centers and in reports to the receiver.	POPIT is not connected or incorrectly connected to the data expansion loop.	Verify that a POPIT module programmed for the missing point number is connected to the data expansion loop of the correct ZONEX module. Points 9 to 127 connect to ZONEX module 1. Points 129 to 247 connect to ZONEX module 2. Meter each POPIT to verify the polarity of the data expansion loop. Voltage should be 9 to 13 VDC at each POPIT.
	D8128C OctoPOPIT is installed at the last address on the ZONEX bus.	Install a D8125 POPEX and D9127 POPITs for points 121-127 on ZONEX 1 and for points 241-247 on ZONEX 2 when using D8128D OctoPOPITs.
	Sensor loop switch (1 to 8) is turned off on OctoPOPIT.	If the sensor loop switch on D8128D OctoPOPIT is turned off for a programmed point, the point reports as missing.
	POPIT is not programmed correctly.	Verify that the switches on the POPIT are set for the missing POPIT number. Switches set incorrectly can cause both missing and extra POPITs. Performing a Service Walk Test to search for extra points may help diagnose the problem.
Points intermittently appear as missing. Points are erratic.	Problem with data expansion loop.	See <i>Problems with the D8125 POPEX Data Expansion Loops</i> .
	Debounce Count parameter set at 1. If an off-board point is in transition between normal and faulted conditions as the panel scans it, it appears as missing.	It is recommended that the Debounce Count be left at the default of 2. Decreasing the Debounce Count to 1 may cause points to appear as missing. Increasing the Debounce may cause missed alarms.
One or more points remain in trouble or alarm with all devices connected to the sensor loops normal.	The sensor loop is open, shorted, or grounded. Opens, shorts, or grounds cause troubles or alarms depending on point programming.	Remove the sensor loop from the panel or POPIT and meter it for continuity. There should be no more than 100 ohm resistance, plus the value of the end of line resistor on the wires. If you meter less resistance than the value of the end of line resistor, check the wiring for shorts. With the wires for the loop removed, meter them for continuity to ground. A ground before the end of line resistor on an on-board point's sensor loop is interpreted as a short. A ground on a sensor loop for a POPIT point is interpreted as an open.
Faulted points do not generate alarms or troubles as programmed.	Sensor Reset pressed at the time the alarm or trouble was generated.	The panel ignores input from all points in the same area programmed for sensor reset during sensor reset.
	Two points are programmed with the same address.	Points programmed with the same address do not function correctly. Check to be certain that you have not duplicated point addresses.

Table continued on next page

## Troubleshooting

Symptom	Diagnosis	Remedy
Panel transmits PT BUS TROUBLE reports. Erroneous alarm and/or trouble reports may follow PT BUS TROUBLE report. Erroneous alarm and/or trouble events for off-board points appear at command centers.	Short on D8125 POPEX module's Data Expansion Loop or short on panel's ZONEX data terminals (25 & 26, or 27 & 28).	A short on either the Data Expansion Loop or the ZONEX data terminals generates a PT BUS TROUBLE report. While the short remains, the panel responds as though the sensor loop for each point connected to the POPEX module was shorted. Check wiring for shorts.
	The POPIT address switches are set incorrectly (for Points 128 or 248) or the OctoPOPIT address switches are set incorrectly (for Points 121-128 or Points 241-248).	Check to be certain all POPIT and OctoPOPIT address switches are set correctly. D8128C and D8128D POPITs cannot be used for points 128 or 248 (these are reserved for panel functions). OctoPOPITs cannot be used for points 121-128 or 241-248.
All off-board points are MISSING.	Short on Aux Power, Terminal 3 or ZONEX power, Terminal 24.	Terminals 3 and 24 share a common circuit breaker. Check wiring and devices connected to these terminals for shorts or grounds.
	If only one POPEX module is connected to the panel, POPEX module may be incorrectly connected to the panel or Data Expansion Loop may be disconnected from POPEX module.	Check POPEX module for correct connections to the panel and the Data Expansion Loop. If missing points are found, the service walk test may help with problem diagnosis (see <i>Extra Points</i> ).
Keyswitch points ( <b>P## Type</b> is programmed as 4, 5, 6, 7, or 9) report as missing. If area is armed, the point reports a MISSING ALARM. If the area is disarmed, the point reports a MISSING TROUBLE.	Point is disconnected from the SDI data bus. The POPIT cover may have been removed and not replaced or the cover is not seated properly.	The point will restore when the SDI bus is reconnected or when the POPIT cover is seated firmly on the POPIT.
Connected points show as extra points when the point bus is shorted beyond the programmed debounce time.	The points have no point index programmed.	This will be corrected when the short is returned to normal.

**Table 23: Troubleshooting Problems with Points**

### 15.7.1 Extra Points

If the panel is not in the service walk test mode when an extra point trips, the panel responds to it as a local TROUBLE event at the command center or central station (see *Routing* in the Program Entry Guide). It displays the custom text for the point number set in the point's dipswitch or on-board point location.

When an extra point is tripped during the service walk test, it reports as an EXTRA point in the panel's event log and at the local printer (if installed). Once an extra point is identified, check the programming to see if it has a **Point Index** programmed. Whether the point index is appropriate for the application and the area assignment is correct can then be determined.

## 15.8 Problems with the D8125 POPEX Data Expansion Loops

EMI (Electro-magnetic Interference), excessive resistance, or intermittent grounds, shorts, or opens on the data expansion loop can cause erratic or intermittent functioning of points. If EMI may be a problem, see *EMI on Long Wire Runs* in this section. AC induction on the data expansion loops must be less than 1.0 VAC. If EMI is **not** suspected as the cause of the problem, follow the procedures below to find the source of problems on the data expansion loop or use the *Zonex Point Identification Validation Process (43049)* for a detailed procedure and worksheets to identify and validate all points.

### 15.8.1 Metering the Loops

Before following the procedures below to meter the data expansion loops, check *Table 8* to verify the correct gauge wire for the length of the data expansion loops was used.

When metering the loop, monitor it long enough to observe an intermittent problem.

**To meter the data expansion loop without POPITs connected to it:**

1. Disconnect the loop from the POPEX Module.
2. Twist the positive and then the negative wires together at each POPIT location so that the positive and negative wires are continuous to the last POPIT location.
3. At the last POPIT location twist the end of the positive wire to the negative wire to form one continuous loop.
4. Meter the loop for continuity from the point where it connected to the POPEX Module. Resistance for the entire loop must be less than 60 ohm. If there is no continuity, find and repair the open on the loop.
5. Still metering for continuity, untwist the negative and positive wires at the last POPIT location. If the meter does not show an open condition, find and repair the short on the loop.
6. Twist the positive and negative wires at the last POPIT location back together.
7. Meter the loop for continuity to Terminal 10 (earth ground). If there is continuity, find and remove the foreign ground on the loop.
8. Meter the loop to Terminal 10 for AC voltage. AC induction on data expansion loops must be less than 1 VAC. Try using shielded cable to reduce AC induction if the AC voltage exceeds 1 VAC.

## 15.9 EMI on Long Wire Runs

EMI (ElectroMagnetic Interference) can cause problems on long wire runs for serial devices (command centers, POPITs, etc.). The use of shielded cable reduces the effect of this interference. Some potential sources of noise on a long wire run include:

- Radio or television transmitter site.
- Ham radio operator's transmitter site.
- Computer network system.
- Heavy machinery (large electrical motors).
- PBX telephone system.
- High voltage electrical equipment or transformers (arc welders, certain medical and dental equipment, etc.).
- Public service office using radio communications (fire department, police department, etc.).
- Close proximity to electrical lines, telephone cabling, or fluorescent lighting fixtures.

There are many other possible sources of noise. If noise may be a problem, the use of shielded wire is strongly recommended. Connect the drain wire from the shielded cable to Terminal 10 on the panel.

The drain wire must have continuity from the panel to the last serial device on the wire run. If the cable is cut to install devices between the last device and the panel, be certain to reconnect the drain wire to insure continuity to the last serial device.

If continuity is not maintained between the panel and the last serial device, the shielded cable may aggravate potential noise problems rather than eliminate them. Connecting the drain wire to ground at other than Terminal 10 on the panel may also produce problems. Do not connect the drain wire to any other ground source.

## Troubleshooting

### 15.10 Checking Shielded Cable

If improperly installed, shielded cable can create problems rather than solve them. Follow the procedure below to check shielded cable for proper installation:

1. Remove the drain wire for the shield from Terminal 10.
2. Meter the drain wire for continuity to Terminal 10 (earth ground). If there is continuity, find and remove the foreign ground on the drain wire.
3. Reconnect the drain wire to Terminal 10.
4. Meter the shield at the far end of the cable (last POPIT location on data expansion loops) for continuity to a ground reference. If there is no continuity, find and repair the open in the shield. Solder and tape all connections.

### 15.11 Battery and Power Reports

The panel can be programmed to transmit both battery and AC power status reports. See the *D9412G/D7412G Program Entry Guide*. If battery or AC power reports are a problem check the following:

1. Check to be sure the panel's power supply is not overloaded. Review the *Power Outputs* section and *Overloaded Power Supply* in this section.
2. Verify that there is at least 16.5 VAC on Terminals 1 and 2.
3. The outlet the transformer is plugged into should meter between 110 VAC and 120 VAC.
4. Verify that the output for the transformer connected to Terminals 1 and 2 is rated for 16.5 VAC and at least 40 VA.
5. Disconnect the transformer from Terminals 1 and 2 and meter the battery at Terminals 3 and 4. A fully charged battery will show approximately 13.8 volts.
6. Make sure the battery is a 12 V sealed lead acid type. It should be rated at 7 Ah or greater, depending on the NFPA classification of the installation.
7. If it takes longer than 60 seconds to detect a missing battery, make sure there are good earth ground connection. Also check that there are no external devices that may be inducing voltage.

### 15.12 Watchdog Reset Reports

The panel sends a `WATCHDOG RESET` report whenever the panel's CPU (Central Processing Unit) is interrupted and has to start its normal operating sequence over. The on-board buzzer sounds briefly during the Watchdog Reset. The panel returns to normal operation immediately after resetting.

The most common cause of CPU interruption and `WATCHDOG RESET` reports is static discharge to the panel. Static discharges may also corrupt the panel's program. The D9412G/D7412G displays a `PARAM FAIL` message at the command centers and sends `PARAM CKSUM FAIL` report if the program is corrupted.

Shorting Terminals 3, 6, 7, 8, or 24, or the Programming Connector to ground may also cause a Watchdog Reset. Remove the short to continue normal operation.

A single isolated `WATCHDOG RESET` report does not mean the panel must be replaced. If experiencing frequent reports, contact Radionics Customer Service for help.

**Touch Terminal 10 first:** If the on-board buzzer sounds briefly when the panel is first touched, any static charge that is being carried is being discharged to the panel. The panel may generate `WATCHDOG RESET` and/or `PARAM FAIL` events. Always touch Terminal 10, the panel's earth ground connection, before beginning work on the panel.

### 15.13 Runaway Reports to the Receiver

Using the D8128 or D8128A in place of the D8128D OctoPOPIT Module may cause runaway reports to the receiver on AC failure. Be sure to replace all D8128 or D8128A OctoPOPITS with the D8128D Module.

### 15.14 Overloaded Power Supply

If the load on the panel's power supply exceeds its capacity, the panel follows a routine to protect itself and the battery. It sends reports to the Central Station at several points during this routine.

Keep in mind that AC power remains at Terminals 1 and 2 throughout the scenario that follows:

- The panel is operating normally with a good battery, AC is present at Terminals 1 and 2, and auxiliary power load is under 1.4 A.
- Combined load on Terminals 3, 6, 7, 8, 24, and 32, the Accessory Connector, and the Programming Connector exceeds and remains above 1.4 A. Device failure or premises wiring ground faults might cause the increased load.
- The panel begins drawing on the battery to support the increased load. The yellow Charging Status LED turns on.
- The battery begins to drain. When voltage drops to 12.1 volts, the panel sends a `LOW BATTERY` report and turns on the red Low Battery LED.
- When the battery drops to 10.2 volts the panel disconnects it to protect it from deep discharge.
- If AC is still present, the panel removes power to Terminals 3, 6, 7, 8, 24, and 32, and the Programming Connector to protect its power supply. The green Operation Monitor LED turns off, but the panel is still operating.
- The panel sends `BATTERY MISSING`, `PT BUS TROUBLE`, and `SDI FAILURE` reports.
- If a D928 Module is connected, it begins sounding.
- After approximately 60 seconds the panel attempts to return to normal operation by returning power to Terminals 3, 6, 7, 8, 24, and 32, and the Programming Connector.
- If the overload condition is still present, the panel removes power.
- The panel attempts to return to normal operation approximately every 60 seconds.
- The cause of the overload is removed. Combined load on Terminals 3, 6, 7, 8, 24, and 32, and the Accessory and Programming Connectors remains below 1.4 A.
- With the overload removed, the panel returns power to Terminals 3, 6, 7, 8, 24, and 32, and the Programming Connector. The panel sends `PT BUS RESTORAL` and `SDI RESTORAL` reports.
- If a D928 Module is connected, it stops sounding.
- If the battery voltage is below 8.4 volts, the panel does not reconnect it. The battery must be replaced.
- When the battery reaches 13.7 volts the panel sends a `BATTERY RESTORE` report and turns off the red Low Battery LED.
- When the battery reaches 13.9 volts the panel turns off the yellow Charging Status LED.

## Troubleshooting

### 15.15 Service Walk Test

The Service Walk Test differs from the standard Walk Test in that POPITs whose switches are set for a point number not programmed in the panel appear in the test.

The Service Walk Test allows a user to walk test all 246 points (246 PTS TO TEST will appear in the D7412G as well even though there are a maximum of 75 points available) from a panel-wide command center, regardless of the point index type. Service Walk Tests may also be initiated by account-wide or area-wide command centers but will only test those points that fall within the scope of the command center that initiated the function. The Service Walk Test will not test points in areas that are currently armed.



**Fire and other 24-hour points do not transmit reports during Service Walk Test!**

The steps below outline a simple Service Walk Test procedure. The flow chart (*Figure 23*) shows all the Service Walk Test options.

1. Choose a command center to conduct the test. Be certain the display shows the idle disarmed text.
2. Press the [MENU] key to enter the Function List. Press [NEXT] repeatedly until reaching the SERVICE WALK ? prompt. Press [ENT]. Or press [99] followed by [ENT] to reach the Service Menu to access the Service Walk Test.

**Note:** The D7412G does NOT include the Service Walk Test in the Service Menu. Therefore, the D7412G must have the Service Walk Test function enabled in the Function List in order for the Service Walk Test to be accessed.

3. The display shows ### PTS TO TEST . Test the first detection device.
4. As the detection devices are faulted, the command center emits a brief tone and displays the point text of the point tested for 60 seconds. After 60 seconds, the display returns to the points to test message.

**Extra Points display default text:** If the switches on a POPIT are set incorrectly to a point number that is not in the program for the panel, the default text for that point number (**PT ###**) displays when the point is faulted. The Program Record Sheet shows the default text for all points.

Faulting the point a second time produces the tone and displays the point text, but does not reduce the **PTS TO TEST** count.

5. During the Service Walk Test, to see the points that remain untested, press [ESC] when point text is displayed. The display shows ## PTS TO TEST. Press the [ESC] key. VIEW UNTESTED ? is displayed. Press [ENT]. ## PTS UNTESTED is displayed. Press [NEXT] to see a list of the points that have not yet been tested. Move through this list by pressing the [NEXT] key. To resume the Service Walk Test, press [ESC]. ## PTS UNTESTED is displayed. Press [ESC]. ## PTS TO TEST is displayed. Resume testing points. To end the Service Walk Test, press [ESC] twice.
6. After testing the last point, 0 PTS TO TEST\* displays. Press [ESC]. The display momentarily shows ALL PTS TESTED before returning to idle text.

**\*Note:** The Service Walk Test, when performed on a D7412G, cannot display "0 points to test" as it is physically unable to connect to the second POPEX Module (used for points 129-247).

**Automatic time-out returns the system to idle text:** If there is no point or command center activity for 20 minutes, the walk test ends automatically. The command center returns to idle text.

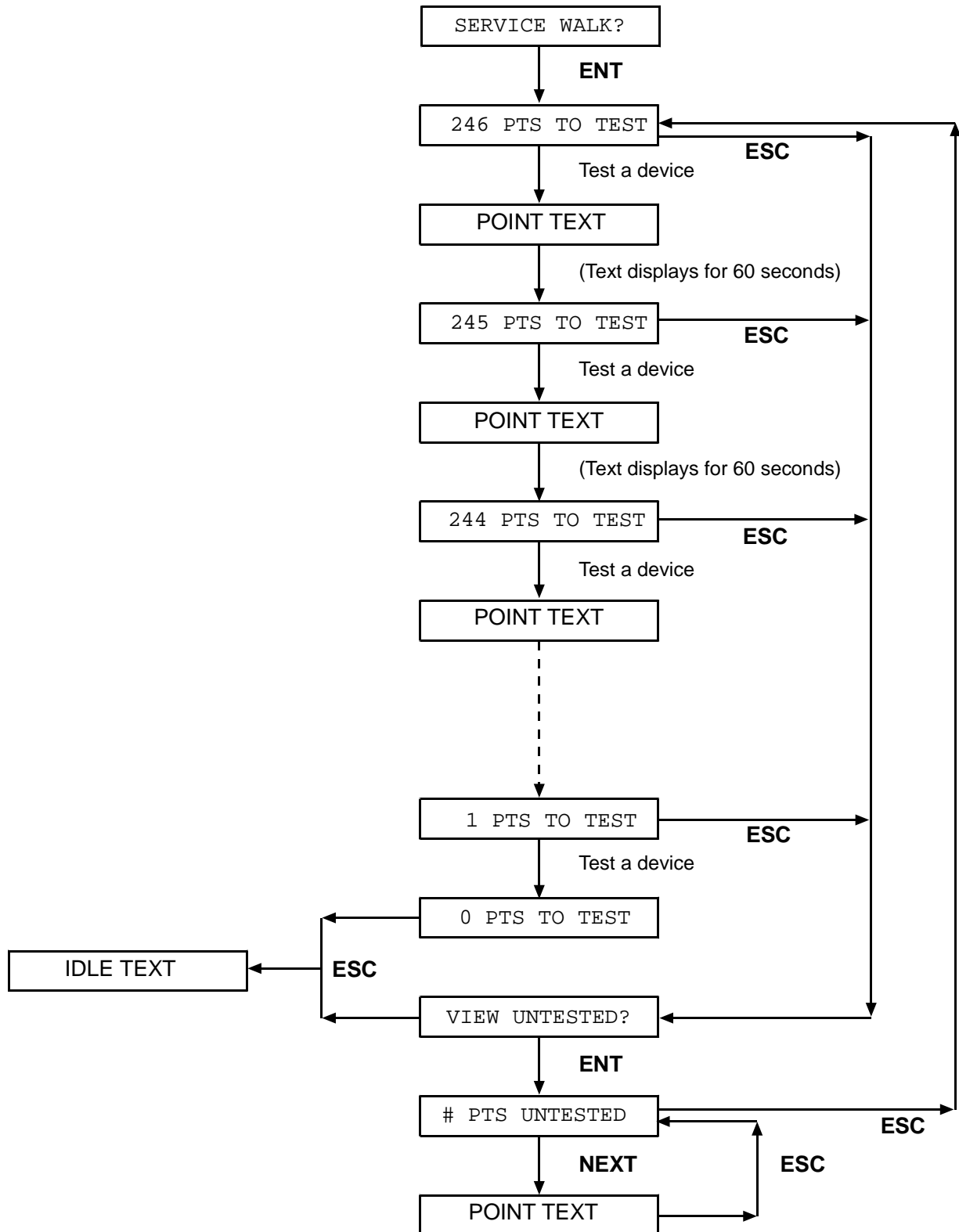


Figure 23: Service Walk Test Flow Chart

## Troubleshooting

### 15.16 Problems with Ground Faults

If the system detects a high impedance earth ground fault, the control panel's command center displays SERVC GND FAULT. To isolate the cause of the earth ground fault, follow the procedure below:

#### Procedure For Isolating Earth Ground Faults:

This procedure requires the use of a Digital Volt Meter (DVM) and a 13-inch Jumper Wire (JW).

- Connect the Positive (red) lead to of the DVM to Terminal 10 (Earth Ground) and the Negative (black) lead to Terminal 9 of the control panel. The approximate normal voltage is 6.5 to 7.0 V DC.
- Attach one of end of the JW to Terminal 10 (Earth Ground). The other end will be used to isolate the ground fault.
- Measure the voltage at Terminals 9 and 10, and use the following chart to determine which terminal grouping has the ground fault:

If the voltage at Terminals 9 and 10 is:	then the ground fault is on Terminal:
0 VDC	4, 9, 12, 15, 18, 21, 23, and/or 29
approximately 1.7 VDC	6, and/or 7
approximately 2.5 VDC	11, 13, 14, 16, 17, 19, and/or 20,
approximately 7 VDC fluctuation	30, and/or 31
approximately 7.6 VDC fluctuation	1, and/or 2
approximately 11to12 VDC fluctuation	25, 26, and/or 28
approximately 13.8 VDC	3, 5, 8, 24 (D9412G only), and/or 32

#### Note: Terminals 6 and 7 are not energized. Terminal 8 is energized

- After the voltage has been verified take the JW end that is not connected and touch it to one terminal at a time while watching the DVM. When the DVM changes voltage reading, the terminal with the ground fault has been isolated. Make a note of the terminal number and continue checking the remaining terminals in that group.
- Remove the wire and verify the voltage on Terminals 9 and 10 is approximately 6.5 to 7 V DC. If the voltage does not measure within this range after removing the suspected wire, continue to check the remaining wires connected to the terminal group.
- To verify that the wire removed has an earth ground short, disconnect the DVM and switch the DVM to read Ohms. Attach the red lead of the DVM to the end of the wire that was removed (making sure that the connection is on the conductor of the wire and not the jacket). Attach the black lead of the DVM to Terminal 10 of the control panel. If there is an earth ground short, the reading will be approximately 0 ohms.
- Continue troubleshooting the field wiring to eliminate the ground. Use the divide and conquer method by starting in the middle of the wire run and check which side of the wire run has the earth ground short. A known earth ground is needed for the test.
- Once the earth ground fault is isolated either remove the ground, repair the wire, or replace the wire.



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## Appendix A: Approved Applications Compliance Guide

### Appendix A: Approved Applications Compliance Guide

#### A.1 Listings and Approvals

##### A.1.1 Fire

###### UL

Underwriters Laboratories lists the D9412G/D7412G Control/Communicators as Signal System Control Units for: Central Station, Local, Auxiliary, Remote Station, and Household Fire Warning.

###### CSFM

Approved by the California State Fire Marshal for highrise and non-highrise.

##### A.1.2 Burglary

###### UL

Underwriters Laboratories lists the D9412G/D7412G Control/Communicators for:

Central Station, Local, Police Connect, Bank Safe and Vault, Mercantile Safe and Vault, and Grade A Household Systems.

###### Department of Defense (DOD)

The D9412G/D7412G have been granted approval for Department of Defense (DOD) installations in Sensitive Compartmented Information Facilities (SCIF).

#### A.2 Introduction

The *System Chart* references components evaluated and listed by Underwriters Laboratories for compatibility with the control/communicator. These components meet the basic system requirements for the applicable standard.

The *System Wiring Diagram, Issue A* shows the relationship between the panel and the accessory components referred to in the *System Chart*.

#### A.3 Optional Compatible Equipment

UL listed components that do not require evaluation for electrical compatibility can be used in many applications when installed according to the manufacturer's instructions.

##### A.3.1 Burglary Applications

UL listed burglary alarm sensors that do not require evaluation for electrical compatibility can be used in burglary applications. In some cases a UL listed Radionics interface module must be used in conjunction with the sensors. Consult the individual component specification and installation documents to determine suitability.

**Test weekly:** UL Standard 1023 requires a weekly test for residential burglary applications.

##### A.3.2 Bank Safe and Vault Applications

The UL listed Model 5110 Bell and Model 4001-42 External Line Balancer (both made by Rothenbuhler) must be used for the bell and balanced line module in bank safe and vault applications. Modifications must be made to the Radionics D8108A enclosure to meet UL standard 681. See the Radionics Technogram *D7212/D9112 UL Certificated Bank Safe and Vault Applications*.

**Test bell at arming:** UL Standard 365 requires a bell test at arming for bank safe and vault applications.

## Appendix A: Approved Applications Compliance Guide

### A.3.3 Fire Applications

UL listed fire initiating devices not requiring electrical compatibility evaluation can be used in any application. For example: 4-wire smoke detectors, heat detectors, water flow switches, and manual pull stations are suitable fire initiating devices. Consult the individual component specification and installation documents to determine suitability.

Two-wire smoke detectors only connect to the panel through the D125B Powered Loop Interface so that an earth ground will not cause an alarm. Two-wire detectors must be evaluated for electrical compatibility, and must be UL listed for use with the panel. See the Radionics Technogram *Smoke Detectors Compatible with the 9000/9000G Series* (33284), or contact the detector manufacturer.

Other initiating devices, including four-wire smoke detectors connect to the panel through the D129 Dual Class A Initiation Circuit Module, the D125B Powered Loop Interface, D8127 or D9127 POPITs, or on-board points. When using 4-wire smoke detectors, install a suitable power supervision unit according to the manufacturer's instructions. Use the D130 Relay Module, D8129 OctoRelay, or Terminal 8, Switched Aux Power to provide reset capability. See the *Off-board Relays* section of this manual for details on the installation of the D8129.

For battery calculations, refer to *Current Rating Chart for Standby Battery Calculations*, *Standby Battery Requirements*, and *Standby Battery Calculation for NFPA 72 Fire Alarm Applications*.

**Test weekly:** Radionics recommends a Fire Test be performed weekly. The AC power is automatically tested as is the battery per UL 864.

### A.3.4 Enclosures

Radionics offers three optional enclosures for the control/communicator.

- The **D8103** enclosure is suitable for residential fire and/or burglary installations and commercial burglary applications that do not require attack resistance or approval by Factory Mutual or NYC-MEA. (See the *System Chart* for acceptable applications.)
- The **D8108A** is attack resistant. It is intended primarily for UL commercial burglar alarm and mercantile safe and vault applications requiring a local bell. The D8108A can be used in any burglar or fire alarm application where the D8109 enclosure is suitable. The D8108A, with some modification, can be used for bank safe and vault applications (see the Radionics Technogram *D7212/D9112 UL Certificated Bank Safe and Vault Applications*, RPN: 73-07302-000). UL lists the D8108A for all commercial fire alarm applications. The D8108A is approved by Factory Mutual, California State Fire Marshal, and the New York City Materials and Equipment Acceptance System.
- The **D8109** is normally used for commercial fire alarm applications. UL lists the D8109 for all commercial fire alarm applications. The D8109 is approved by the California State Fire Marshal, NYC-MEA and FM.

**Note:** *All references to NFPA and related requirements are based upon compliance with the 1993 edition of NFPA 72, National Fire Alarm Code. Since installation specifications are nearly always based upon a specific edition of a standard which has been legally adopted by the Authority Having Jurisdiction (AHJ), earlier editions of NFPA standards will generally apply. Consult with the appropriate AHJ for confirmation.*

Appendix B: System Chart

Appendix B: System Chart

	Household Burglary	Household Fire	Household Fire/ Burglary Combined	Central Station Burglary (Grade C)	Police Connected Burglary	Local Burglary	Remote Station or Auxiliary Fire	Local Fire/Burglary Combined	Local Fire	Local and Central Station Fire Combined	Local and Central Station Fire/Burglary (Grade C)	Central Station Fire/ Burglary Combined	Central Station Fire	Electrically Actuated Transmitter
Minimum Hours of Standby Battery	4	24 + 4 mins alarm	24 + 4 mins alarm	4	4	4	60 + 5 mins alarm	24 + 5 mins alarm	24 + 5 mins alarm	24 + 5 mins alarm	24 + 5 mins alarm	24 + 5 mins alarm	24 + 5 mins alarm	24 + 5 mins alarm
D8103 Enclosure	Choose one. D101 lock required for enclosure.				No	No	No	No	No	No	No	No	No	No
D8108A Enclosure					Req.	Req.	Choose one.	Req.	Choose one.					
D8109 Enclosure					No	No		No						
D122 and D122L Dual Battery Harness	Calculate current draw to determine if second battery is required.						Req.	Calculate current draw to determine if second battery is required.						
D125B Class B, Style A Powered Loop Interface	Opt.	#	#	Opt.	Opt.	Opt.	# - D125 and D129 required to connect fire alarm initiating devices to zones 1-8. D125 provides two powered loops for connecting listed 2-wire smoke detectors. D129 provides two non-powered Class A initiating circuits.							
D129 Class A, Style D Initiating Module		#	#											
D126/D1218 Battery	1+	1+	1+	1+	1+	1+	2+	1+	1+	1+	1+	1+	1+	1+
D127 Reversing Relay	Opt.	No	Opt.	Opt.	Opt.	Opt.	No	Opt.	No	No	Opt.	Opt.	No	No
D928 Dual Phone Line Module	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Required for communication on two phone lines and/or CPU watchdog function.							
D161 Telephone Cord	Required to connect panel to RJ31X TelCo. Block						2 Req.			Required to connect panel to RJ31X TelCo. Block				
D185 Auxiliary Interface Kit							*							
D192A/D192C/D192D Class B, Style W Bell Circuit Supervision	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Required for indicating circuits.					Opt.	Opt.	
Smoke Detector Base		1++	1++				Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	
D268/D269H Independent Zone Control	Optional, <b>only</b> connect to zones 1 to 8.													
Indicating Device	1+	1+	1+	Opt.	**	**	1+	1+	1+,**	1+	1+	Opt.	Opt.	
D461 Pull Station	Optional, may be required by job specifications and/or Authority Having Jurisdiction.													
D1255 Command Center	1+	1+	1+	1+	1+	1+	1+	1+	1+	1+	1+	1+	Opt.	
D1256	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.
D1257	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.
D1640 Transformer	Required for <b>all</b> applications.													
D8004 Transformer Enclosure	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Required							
D8122 Derived Channel S.T.U.	Optional, contact TelCo. for availability of derived channel service.													
D8125 Class B, Style 3.5 POPEX Module	Required for D8127T/U and D9127T/U POPITs.													
D8127T/U & D9127T/U Class B, Style A POPIT Modules	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	
D8128D OctoPOPIT	Opt.	No	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.
D8129 OctoRelay	Optional, for remote annunciation of system functions.													
D8130 Release Module	Optional													
D8132 Battery Charger	See Current Rating Chart and Standby Battery Requirements to determine if system requires a D8132 Module for increased battery standby.													
D9131A Parallel Printer Interface	Optional, use with parallel printer to print events from panel log locally.													
D9210B Access Control Interface	No	No	No	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.	No

No = Not acceptable for this application. Req. = Required for this application. Opt. = Optional for this application.

# - D125 and D129 required to connect fire alarm initiating devices to zones 1-8. D125 provides two powered loops for connecting listed 2-wire smoke detectors. D129 provides two non-powered Class A initiating circuits.

1+ = One or more required for this application. Consult the appropriate standard.

2+ = Two or more required for this application. Consult the appropriate standard.

1++ = At least one detector required. You can substitute other 2-wire detectors listed for use with the D125.

You could also use the D262 with the D270 4-wire base and a listed power supervision relay.

\* = Auxiliary requires the D184 Auxiliary Local Energy Interface Kit. \*\* = Listed bell (siren) housing required for burglary alarm bell or siren.

[Empty Box] = Not used for this application.

Table 24: UL System Chart

**Notes:**

Appendix C: System Wiring Diagrams, Issue A

Appendix C: System Wiring Diagrams, Issue A

C.1 D9412G Control/Communicator, 1 of 3

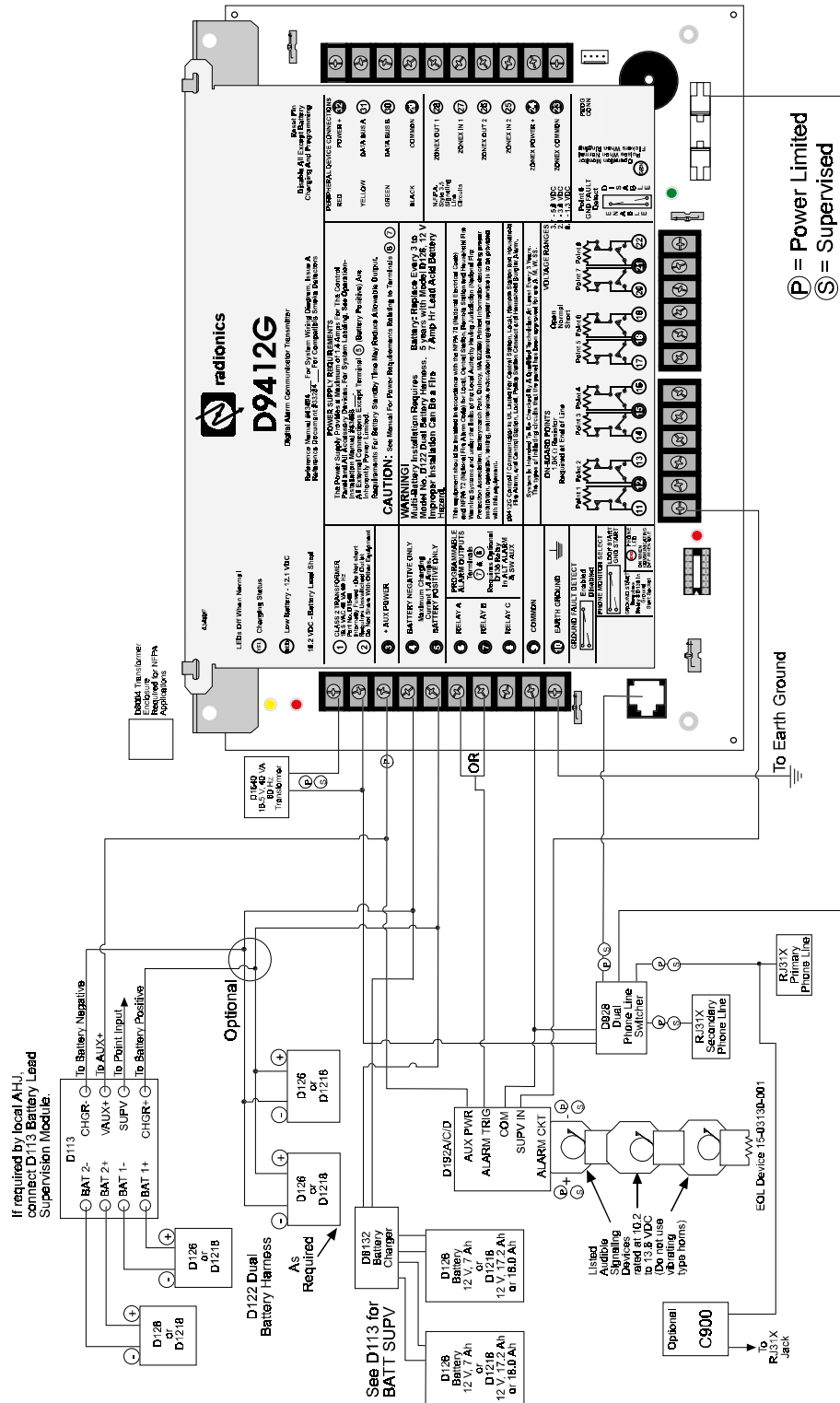


Figure 24a: D9412G System Wiring Diagram

D9412G/D7412G Operation & Installation Guide

Appendix C: System Wiring Diagrams, Issue A

C.2 D9412G Control/Communicator, 2 of 3

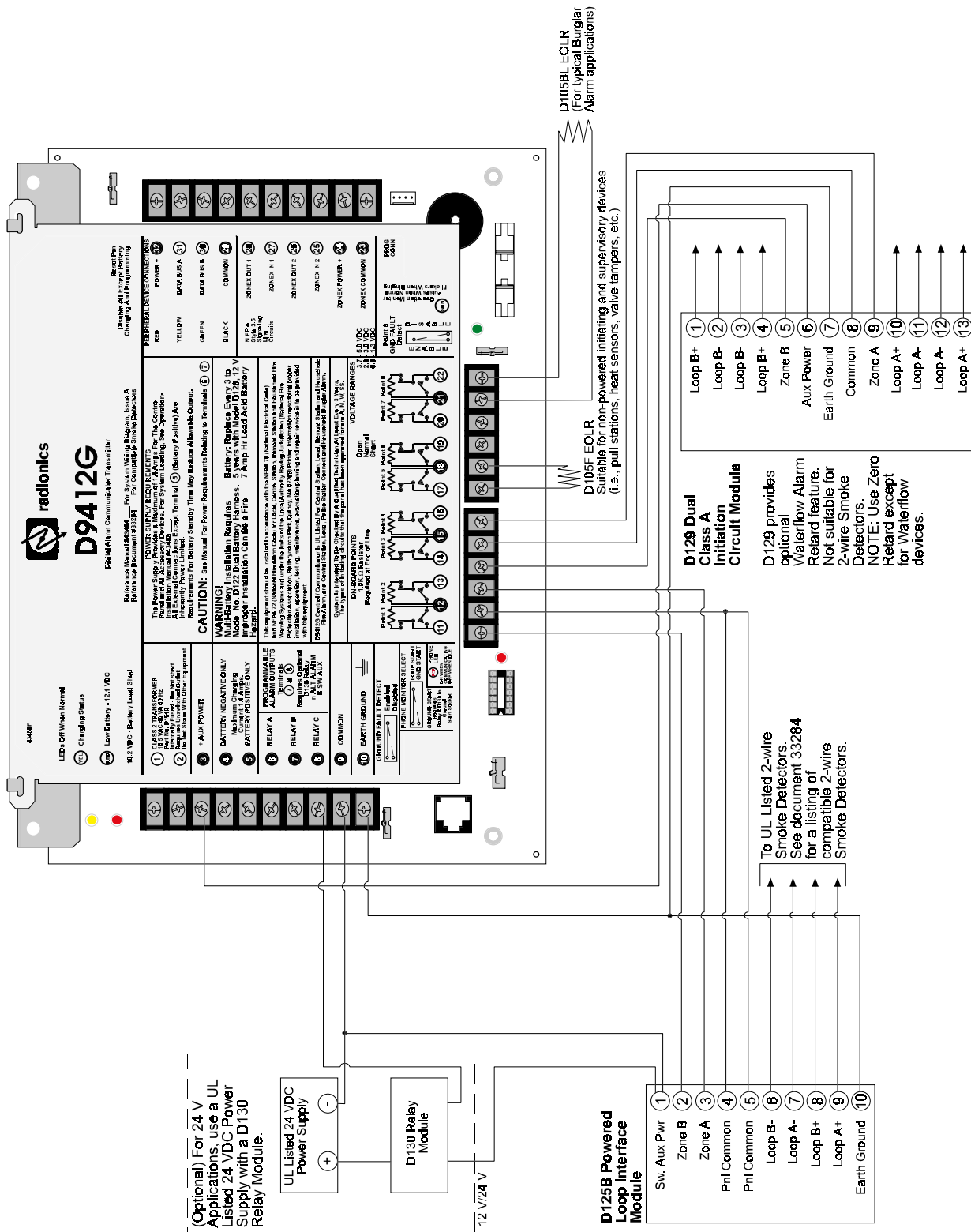


Figure 24b: D9412G System Wiring Diagram

Appendix C: System Wiring Diagrams, Issue A

C.3 D9412G Control/Communicator, 3 of 3

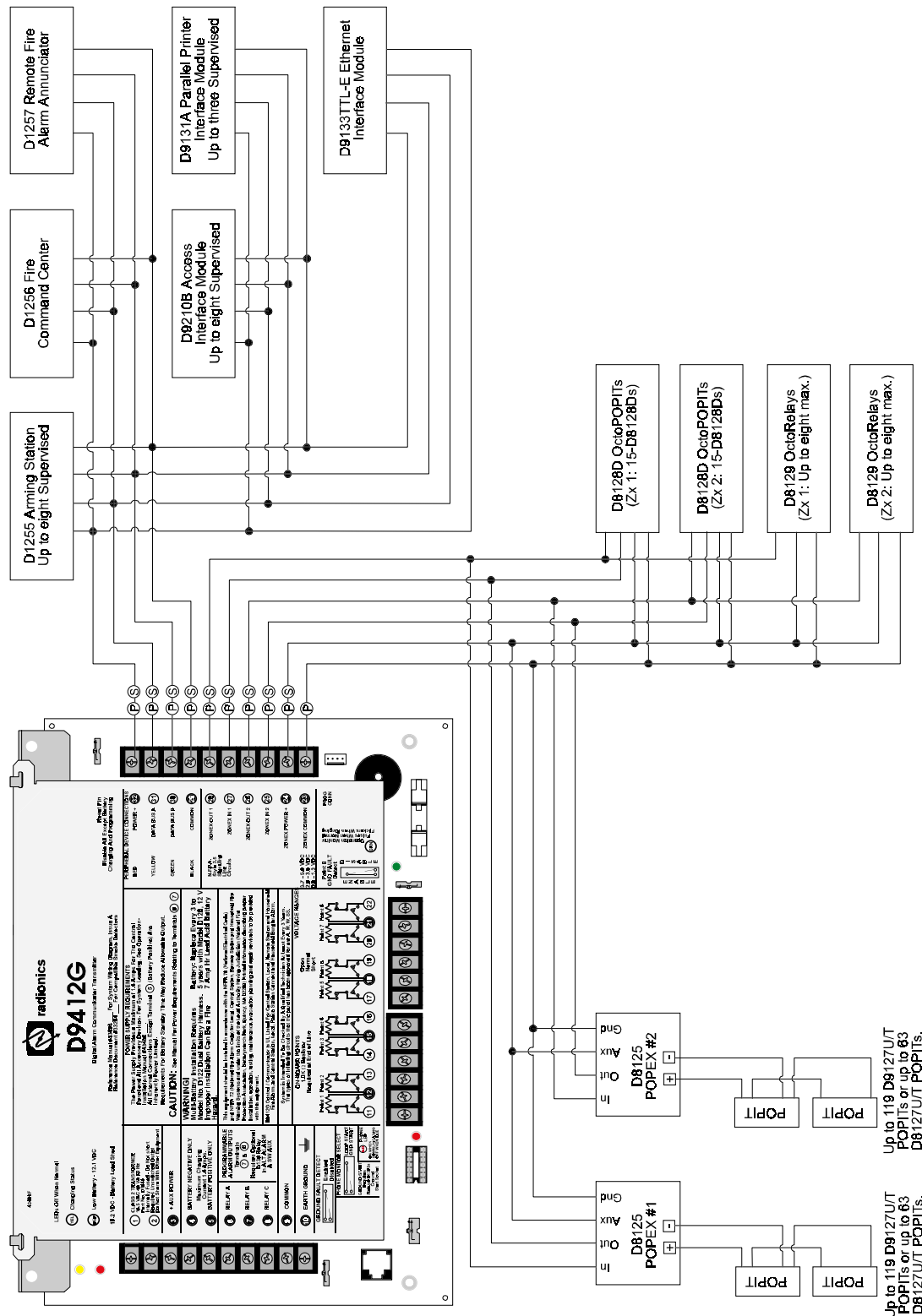


Figure 24c: D9412G System Wiring Diagram

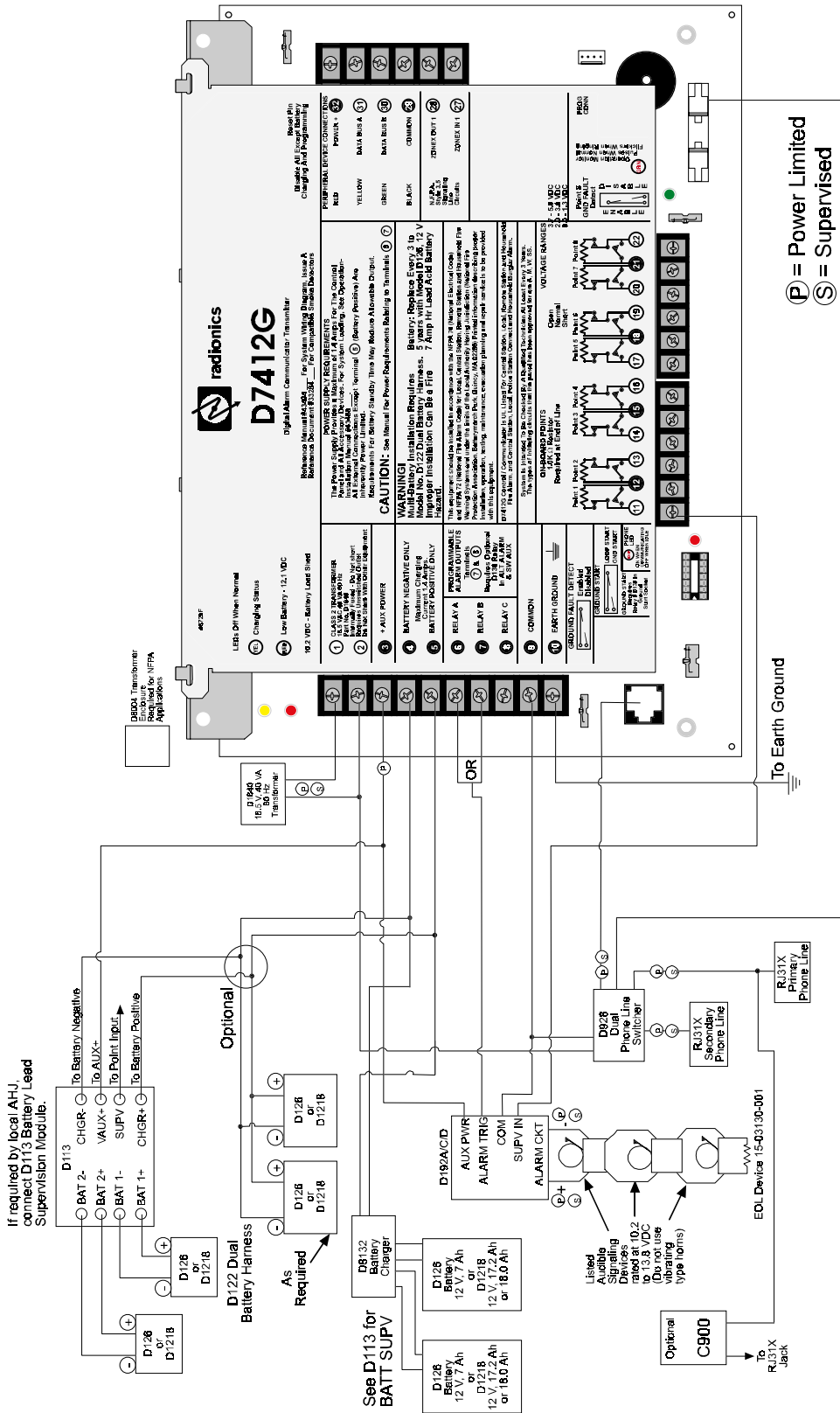


Figure 25a: D7412G System Wiring Diagram



Appendix C: System Wiring Diagrams, Issue A

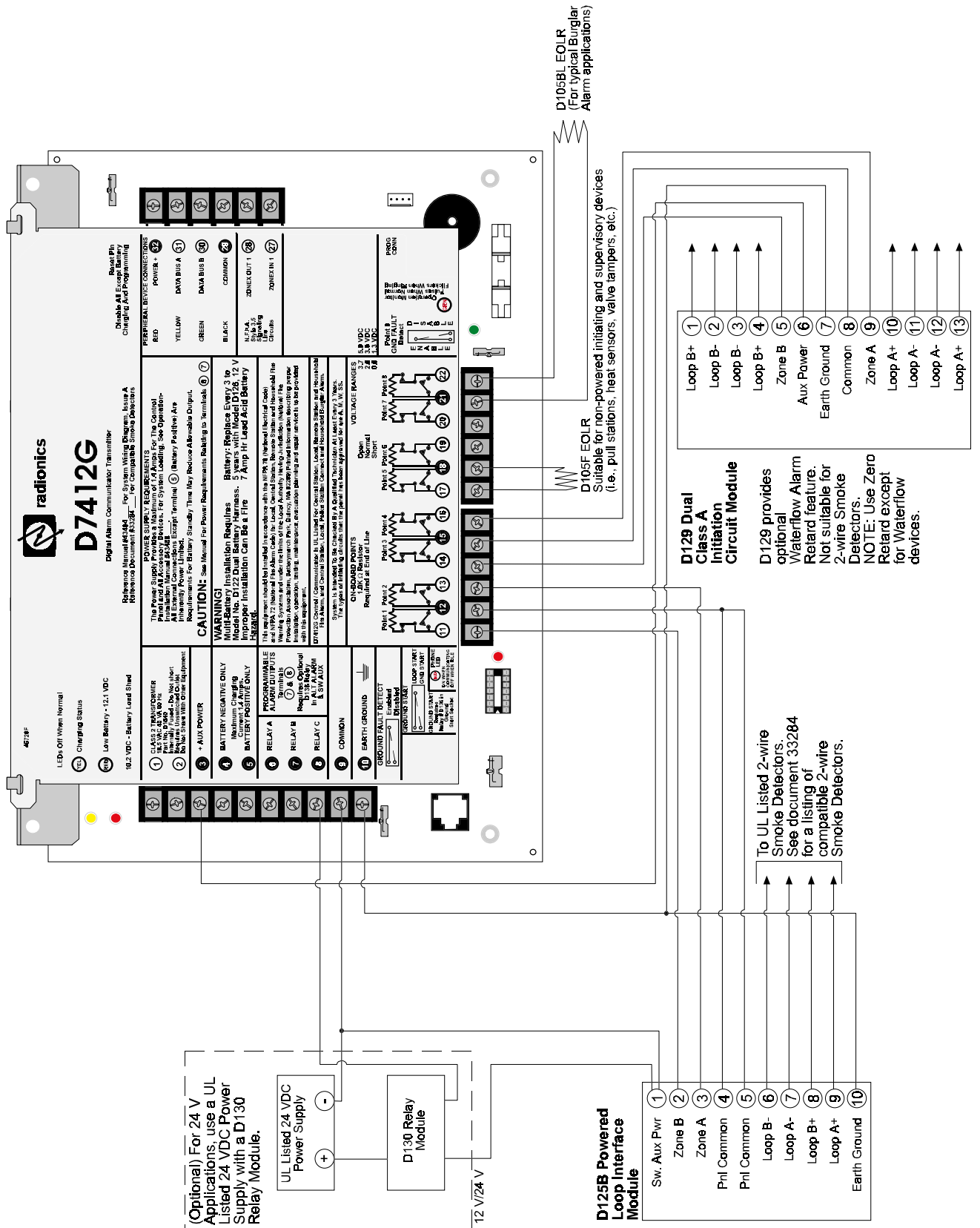


Figure 25b: D7412G System Wiring Diagram

## Appendix C: System Wiring Diagrams, Issue A

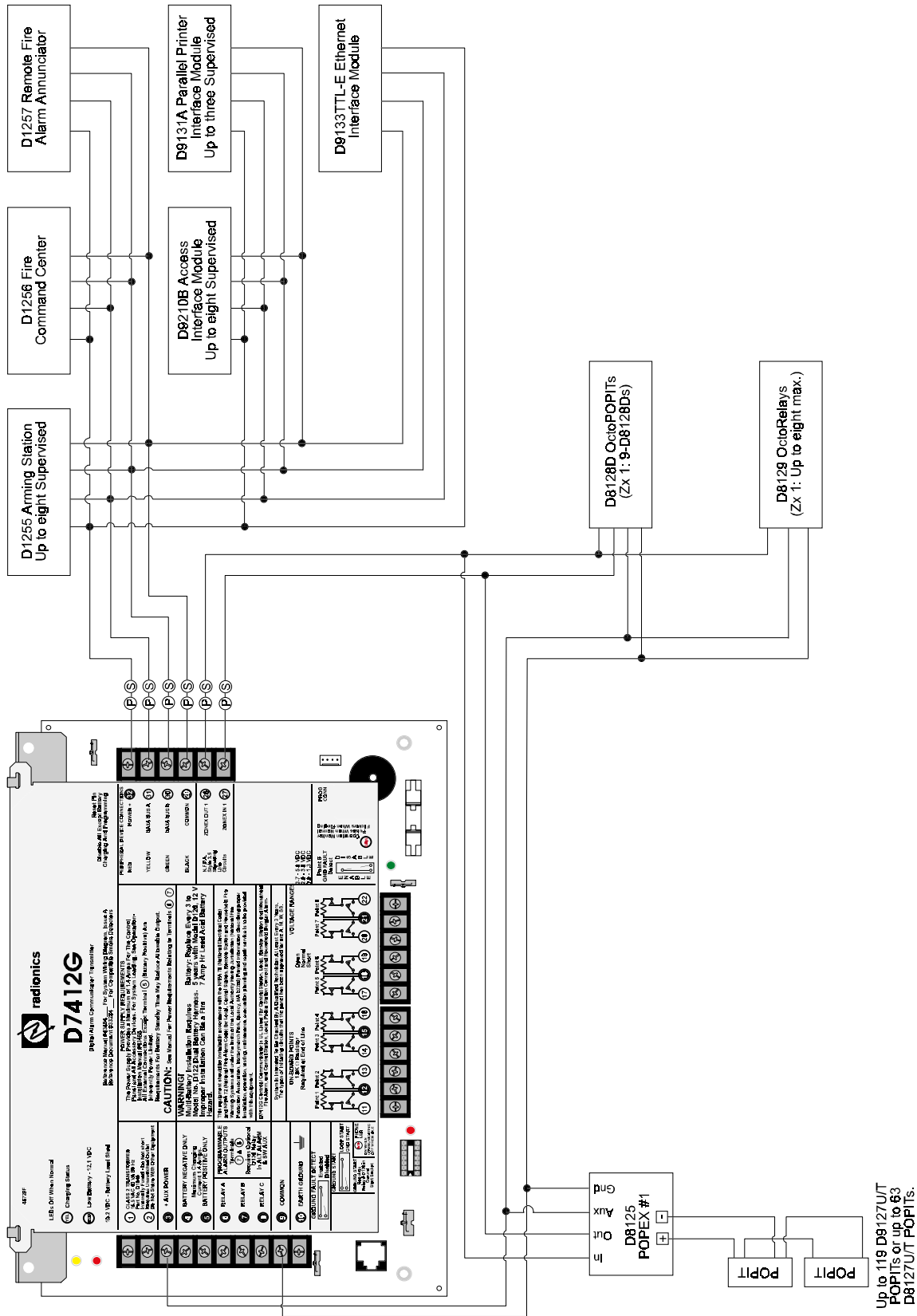


Figure 25c: D7412G System Wiring Diagram

Appendix D: Current Rating Chart for Standby Battery Calculations

Appendix D: Current Rating Chart for Standby Battery Calculations

Model Number	Quantity Used	A AC Power On Normal Current (mA)		B AC Power Off Minimum Current (mA)		C In Alarm Maximum Current (mA)	
		Each Unit*	Total	Each Unit	Total	Each Unit	Total
D9412G/ D7412G	_____	200	x 1 = 200	200	x 1 = 200	500	x 1 = 500
D125B	_____	20	x Quant. = _____	19	x Quant. = _____	123	x Quant. = _____
D127	_____	13	x Quant. = _____	12	x Quant. = _____	45	x Quant. = _____
D129	_____	25	x Quant. = _____	25	x Quant. = _____	25	x Quant. = _____
D185	_____	120	x Quant. = _____	120	x Quant. = _____	350	x Quant. = _____
D192D	_____	15	x Quant. = _____	26	x Quant. = _____	50	x Quant. = _____
D192C	_____	15	x Quant. = _____	26	x Quant. = _____	50	x Quant. = _____
D1255	_____	104	x Quant. = _____	106	x Quant. = _____	206	x Quant. = _____
D1256	_____	104	x Quant. = _____	106	x Quant. = _____	206	x Quant. = _____
D1257	_____	104	x Quant. = _____	106	x Quant. = _____	206	x Quant. = _____
D720	_____	55	x Quant. = _____	20	x Quant. = _____	75	x Quant. = _____
D8125	_____	48	x Quant. = _____	48	x Quant. = _____	48	x Quant. = _____
D8125MUX*	_____				= _____		= _____
D8127T/U	_____	3	x Quant. = _____	3	x Quant. = _____	4	x Quant. = _____
D8128D	_____	51	x Quant. = _____	51	x Quant. = _____	51	x Quant. = _____
D8129	_____	20	x Quant. = _____	20	x Quant. = _____	20x Quant. + 25 x # of relays = _____	
D8130	_____	5	x Quant. = _____	5	x Quant. = _____	54	x Quant. = _____
D9127T/U	_____	0.5	x Quant. = _____	0.5	x Quant. = _____	0.8	x Quant. = _____
D9131A	_____	24	x Quant. = _____	22	x Quant. = _____	36	x Quant. = _____
D9210B	_____	100	x Quant. = _____	100	x Quant. = _____	120	x Quant. = _____
D928	_____	14	x Quant. = _____	14	x Quant. = _____	45	x Quant. = _____
Ratings of other devices in the system which are not shown above:							
_____	_____	_____	x Quant. = _____	_____	x Quant. = _____	_____	x Quant. = _____
_____	_____	_____	x Quant. = _____	_____	x Quant. = _____	_____	x Quant. = _____
_____	_____	_____	x Quant. = _____	_____	x Quant. = _____	_____	x Quant. = _____
_____	_____	_____	x Quant. = _____	_____	x Quant. = _____	_____	x Quant. = _____
_____	_____	_____	x Quant. = _____	_____	x Quant. = _____	_____	x Quant. = _____
		<b>Total A =</b>	_____	<b>Total B =</b>	_____	<b>Total C =</b>	_____

\* See chart on following page for determining maximum currents for the D8125MUX and its accessories.

Table 25a: Current Rating Chart for Standby Battery Calculations

# D9412G/D7412G

## Appendix D: Current Rating Chart for Standby Battery Calculations

### Current Rating Chart for D8125MUX

Fill in the following chart to determine the maximum currents for the D8125MUX and its accessories. Transfer the total figures to the preceeding chart.

**Note:** The maximum current draw for each MUX Bus is 75 mA.

Accessory Model	Qty. Used	AC Power Off Maximum Current (mA)		In Alarm Maximum Current (mA)	
		Each Unit	Total System	Each Unit	Total System
DS7432	_____	10	x Qty. = _____	10	x Qty. = _____
DS7457	_____	0.35	x Qty. = _____	0.35	x Qty. = _____
DS7460	_____	1	x Qty. = _____	1	x Qty. = _____
DS7465	_____	1	x Qty. = _____	1	x Qty. = _____

**Ratings\* of other devices on the MUX Buses which are not shown above:**

_____	_____	_____	x Qty. = _____	_____	x Qty. = _____
_____	_____	_____	x Qty. = _____	_____	x Qty. = _____
_____	_____	_____	x Qty. = _____	_____	x Qty. = _____
_____	_____	_____	x Qty. = _____	_____	x Qty. = _____
_____	_____	_____	x Qty. = _____	_____	x Qty. = _____
_____	_____	_____	x Qty. = _____	_____	x Qty. = _____
_____	_____	_____	x Qty. = _____	_____	x Qty. = _____
_____	_____	_____	x Qty. = _____	_____	x Qty. = _____
_____	_____	_____	x Qty. = _____	_____	x Qty. = _____
_____	_____	_____	x Qty. = _____	_____	x Qty. = _____
_____	_____	_____	x Qty. = _____	_____	x Qty. = _____
_____	_____	_____	x Qty. = _____	_____	x Qty. = _____
_____	_____	_____	x Qty. = _____	_____	x Qty. = _____
_____	_____	_____	x Qty. = _____	_____	x Qty. = _____
_____	_____	_____	x Qty. = _____	_____	x Qty. = _____
_____	_____	_____	x Qty. = _____	_____	x Qty. = _____

**Column A**  
Total = \_\_\_\_\_

**Column B**  
Total = \_\_\_\_\_

\* Refer to the device's Installation Guide for current draw values.

**Table 25b: Current Rating Chart for D8125MUX**

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## Appendix E: Standby Battery Requirements

### Appendix E: Standby Battery Requirements

#### E.1 Household Burglary and Commercial Burglary

Four hours of standby battery capacity required.

#### E.2 Bank Safe and Vault

72 hours of standby battery capacity required (UL 365). Aux Power current for all devices, including control centers, must be limited to 300 mA or less to meet this requirement.

#### E.3 Central Station or Local Fire Alarm

24 hours of standby plus 5 minutes of alarm operation required. See *Central Station or Local Systems Ampere-Hour Calculation Formula* in the *Standby Battery Calculation for NFPA 72 Fire Alarm Applications* section.

#### E.4 Remote Station or Auxiliary Fire Alarm

60 hours of standby plus 5 minutes of alarm operation required. See *Remote Station or Auxiliary System Ampere-Hour Calculation Formula* in the *Standby Battery Calculation for NFPA 72 Fire Alarm Applications* section.

#### E.5 Household Fire Warning Equipment

24 hours of standby plus 4 minutes of alarm operation required. See *Household Fire Ampere-Hour Calculation Formula* in the *Standby Battery Calculation for NFPA 72 Fire Alarm Applications* section.

**Appendix E: Standard Battery Requirements**

**Notes:**

**Appendix F: Standby Battery Calculation for NFPA 72 Fire Alarm Applications**

**Appendix F: Standby Battery Calculation for NFPA 72 Fire Alarm Applications**

**F.1 Current Chart First**

See the *Current Rating Chart for Standby Battery Calculations* for totals B and C used in the formulas below. When connecting two batteries, use either the D122 Dual Battery Wiring Harness or the D8132 Battery Charger Module.

**F.2 Central Station or Local Systems**

Central Station or Local Systems require 24 hours of standby plus 5 minutes of alarm operation at the end of the 24 hour period. A single battery is sometimes adequate for Central Station Systems, but two batteries must be installed to meet the basic standby requirements for a Local System installation. Battery ampere hour (Ah) calculations must be used to verify compliance. The following formula includes the calculation for 5 minutes of alarm operation at the end of the 24 hour period, as well as a 10% contingency factor which allows for depletion of battery capacity with age.

**Central Stations or Local Systems Ampere-Hour Calculation Formula**

$$\begin{array}{cccccc} \text{Total B} & \text{Hours} & \text{Total} & \text{Hours} & \text{Contingency} & \text{Total Ah} \\ ( \quad \quad \quad \times \quad 24 ) + & & ( \quad \quad \quad \times .083 ) + & & 10\% & = \quad \quad \quad \end{array}$$

Total Ah requirements must not exceed Ah capacity of batteries:  
Two D126 Batteries = 14 Ah; one D1218 battery = 17.2 or 18 Ah

**F.3 Remote Station or Auxiliary Systems**

Remote Station or Auxiliary Systems require 60 hours of standby plus 5 minutes of alarm operation at the end of the 60 hour period. A D8132 Battery Charger Module with additional batteries installed in a separate D8109 or D8108A enclosure may be required in the system to meet the basic standby requirements for a Remote Station or Auxiliary System installation. Battery ampere hour (Ah) calculations must be used to verify compliance. The following formula includes the calculation for 5 minutes of alarm operation at the end of the 60 hour period, as well as a 10% contingency factor which allows for depletion of battery capacity with age.

**Remote Station or Auxiliary Systems Ampere-Hour Calculation Formula**

$$\begin{array}{cccccc} \text{Total B} & \text{Hours} & \text{Total C} & \text{Hours} & \text{Contingency} & \text{Total Ah} \\ ( \quad \quad \quad \times \quad 60 ) + & & ( \quad \quad \quad \times .083 ) + & & 10\% & = \quad \quad \quad \end{array}$$

Total Ah requirements must not exceed Ah capacity of batteries:  
Two D126 Batteries = 14 Ah; one D1218 battery = 17.2 or 18 Ah

**F.4 Household Fire Warning Equipment**

The Household Fire Warning Equipment Standard requires 24 hours of standby plus 4 minutes of alarm operation at the end of the 24 hour period. Battery ampere hour (Ah) calculations must be used to verify compliance. The following formula includes the calculation for 4 minutes of alarm operation at the end of the 24 hour period, as well as a 10% contingency factor which allows for depletion of battery capacity with age.

**Household Fire Ampere-Hour Calculation Formula**

$$\begin{array}{cccccc} \text{Total B} & \text{Hours} & \text{Total C} & \text{Hours} & \text{Contingency} & \text{Total Ah} \\ ( \quad \quad \quad \times \quad 24 ) + & & ( \quad \quad \quad \times .067 ) + & & 10\% & = \quad \quad \quad \end{array}$$

Total Ah requirements must not exceed Ah capacity of batteries:  
Two D126 Batteries = 14 Ah; one D1218 battery = 17.2 or 18 Ah

**Appendix F: Standby Battery Calculation for NFPA 72 Fire Alarm Applications**

**Notes:**



Appendix G: Point Address Chart

Appendix G: Point Address Chart

G.1 ZONEX 1, Points 9 to 127 (D9412G); ZONEX 1, Points 9 to 75 (D7412G)

Place the labels on the base of the POPIT. Do **not** attach labels to the POPIT cover.

A number in the switch column indicates that the switch is set to ON.

D8127 or D9127 POPITs maybe used for Points 9 – 72; however, **only** D9127 POPITs may be used for Points 73 – 127. D8127 POPITs have dipswitches 1 – 6, whereas D9127 POPITs have dipswitches 0 – 6.

		Switch								Switch								Switch					
Address	0	1	2	3	4	5	6	Address	0	1	2	3	4	5	6	Address	0	1	2	3	4	5	6
009	0	1	2	3	4	5	6	049	0		2		4	5	6	089		1		3	4	5	6
010	0	1	2	3	4	5		050	0		2		4	5		090		1		3	4	5	
011	0	1	2	3	4		6	051	0		2		4		6	091		1		3	4		6
012	0	1	2	3	4			052	0		2		4			092		1		3	4		
013	0	1	2	3		5	6	053	0		2			5	6	093		1		3		5	6
014	0	1	2	3		5		054	0		2			5		094		1		3		5	
015	0	1	2	3			6	055	0		2				6	095		1		3			6
016	0	1	2	3				056	0		2					096		1		3			
017	0	1	2		4	5	6	057	0			3	4	5	6	097		1			4	5	6
018	0	1	2		4	5		058	0			3	4	5		098		1			4	5	
019	0	1	2		4		6	059	0			3	4		6	099		1			4		6
020	0	1	2		4			060	0			3	4			100		1			4		
021	0	1	2			5	6	061	0			3		5	6	101		1				5	6
022	0	1	2			5		062	0			3		5		102		1				5	
023	0	1	2				6	063	0			3			6	103		1					6
024	0	1	2					064	0			3				104		1					
025	0	1		3	4	5	6	065	0				4	5	6	105			2	3	4	5	6
026	0	1		3	4	5		066	0				4	5		106			2	3	4	5	
027	0	1		3	4		6	067	0				4		6	107			2	3	4		6
028	0	1		3	4			068	0				4			108			2	3	4		
029	0	1		3		5	6	069	0					5	6	109			2	3		5	6
030	0	1		3		5		070	0					5		110			2	3		5	
031	0	1		3			6	071	0						6	111			2	3			6
032	0	1		3				072	0							112			2	3			
033	0	1			4	5	6	073		1	2		4	5	6	113			2		4	5	6
034	0	1			4	5		074		1	2		4	5		114			2		4	5	
035	0	1			4		6	075		1	2		4		6	115			2		4		6
036	0	1			4			076		1	2		4			116			2		4		
037	0	1				5	6	077		1	2			5	6	117			2			5	6
038	0	1				5		078		1	2			5		118			2			5	
039	0	1					6	079		1	2				6	119			2				6
040	0	1						080		1	2					120			2				
041	0		2	3	4	5	6	081		1	2		4	5	6	121				3	4	5	6
042	0		2	3	4	5		082		1	2		4	5		122				3	4	5	
043	0		2	3	4		6	083		1	2		4		6	123				3	4		6
044	0		2	3	4			084		1	2		4			124				3	4		
045	0		2	3		5	6	085		1	2			5	6	125				3		5	6
046	0		2	3		5		086		1	2			5		126				3		5	
047	0		2	3			6	087		1	2				6	127				3			6
048	0		2	3				088		1	2					128*							

\*The panel reserves Point 128 for internal use.

Table 26a: Point Address Chart

# D9412G/D7412G

## Appendix G: Point Address Chart

### G.2 ZONEX 2, Points 129 to 247 (D9412G Only)

Place the labels on the base of the POPIT. Do **not** attach labels to the POPIT cover.

A number in the switch column indicates that the switch is set to ON.

Address	Switch						Address	Switch						Address	Switch								
	0	1	2	3	4	5		6	0	1	2	3	4		5	6	0	1	2	3	4	5	6
129	0	1	2	3	4	5	6	169	0		2	3	4	5	6	209		1		3	4	5	6
130	0	1	2	3	4	5		170	0		2	3	4	5		210		1		3	4	5	
131	0	1	2	3	4		6	171	0		2	3	4		6	211		1		3	4		6
132	0	1	2	3	4			172	0		2	3	4			212		1		3	4		
133	0	1	2	3		5	6	173	0		2	3		5	6	213		1		3		5	6
134	0	1	2	3		5		174	0		2	3		5		214		1		3		5	
135	0	1	2	3			6	175	0		2	3			6	215		1		3			6
136	0	1	2	3				176	0		2	3				216		1		3			
137	0	1	2		4	5	6	177	0				4	5	6	217		1			4	5	6
138	0	1	2		4	5		178	0				4	5		218		1			4	5	
139	0	1	2		4		6	179	0				4		6	219		1			4		6
140	0	1	2		4			180	0				4			220		1			4		
141	0	1	2			5	6	181	0					5	6	221		1				5	6
142	0	1	2			5		182	0					5		222		1				5	
143	0	1	2				6	183	0						6	223		1					6
144	0	1	2					184	0							224		1					
145	0	1		3	4	5	6	185	0			3	4	5	6	225			2	3	4	5	6
146	0	1		3	4	5		186	0			3	4	5		226			2	3	4	5	
147	0	1		3	4		6	187	0			3	4		6	227			2	3	4		6
148	0	1		3	4			188	0			3	4			228			2	3	4		
149	0	1		3		5	6	189	0			3		5	6	229			2	3		5	6
150	0	1		3		5		190	0			3		5		230			2	3		5	
151	0	1		3			6	191	0			3			6	231			2	3			6
152	0	1		3				192	0			3				232			2	3			
153	0	1			4	5	6	193		1	2		4	5	6	233			2		4	5	6
154	0	1			4	5		194		1	2		4	5		234			2		4	5	
155	0	1			4		6	195		1	2		4		6	235			2		4		6
156	0	1			4			196		1	2		4			236			2		4		
157	0	1				5	6	197		1	2			5	6	237			2			5	6
158	0	1				5		198		1	2			5		238			2			5	
159	0	1					6	199		1	2				6	239			2				6
160	0	1						200		1	2					240			2				
161	0		2	3	4	5	6	201		1	2	3	4	5	6	241				3	4	5	6
162	0		2	3	4	5		202		1	2	3	4	5		242				3	4	5	
163	0		2	3	4		6	203		1	2	3	4		6	243				3	4		6
164	0		2	3	4			204		1	2	3	4			244				3	4		
165	0		2	3		5	6	205		1	2	3		5	6	245				3		5	6
166	0		2	3		5		206		1	2	3		5		246				3		5	
167	0		2	3			6	207		1	2	3			6	247				3			6
168	0		2	3				208		1	2	3				248*							

\* The panel reserves Point 248 for internal use.

Table 26b: Point Address Chart

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