D6412 Control/Communicator

Installation Guide

radionics

A member of the Bosch Group

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1.0 Introduction

This manual addresses the installation of the D6412 Control/Communicator **only**, and should not be used for any other panel.

1.1 Manual Organization

This manual is divided into 15 sections with two appendices. Table 1 contains a summary of each section.

Section	Description
1.0	**Introduction** - this section.
2.0	**Overview** - provides an overview of the D6412 Control/Communicator, including operational specifications, standard and new features.
3.0	**Installation** - provides basic installation instructions, everything needed to get the panel powered up and ready for programming.
4.0	**Power Supply** - provides information on the primary and secondary power soruces and instructions on connecting them.
5.0	**Power Outputs** - provides information on the available powered outputs, including the alarm output and the built-in siren driver.
6.0	**Telephone Connections** - provides information on connecting the phone line.
7.0	**On-Board Sensor Loops** - provides information on the eight on-board sensor loops available on the D6412.
8.0	**Off-Board Sensor Loops** - provides information on available off-board sensor loops, including detailed instructions for connecting the D9528 Point Expansion Module.
9.0	**On-Board Outputs** - provides information on the four on-board programmable outputs.
10.0	**Off-Board Outputs** - provides information on available off-board programmable outputs, including detailed instructions for connecting the D9529 OctoOutput Module.
11.0	**Arming Devices** - provides information on command centers, keyswitches and independent zone controls.
12.0	**SDI Devices** - provides descriptions and installation instructions for various optional modules that connect to the D6412's data terminals (SDI bus).
13.0	**Installer's Keypad and Installer Mode** - provides information for using an Installer's Keypad and the Installer's Mode.
14.0	**Installation Label** - a copy of the installation label found inside of the D6412's enclosure.
15.0	**Quick Reference Terminal Description** - a chart providing a short description of each D6412 terminal.
16.0	**Troubleshooting** - provides potential solutions to a variety of commonly encountered problems.
Appendix A	Approved Applications and Compliance Guide System Chart System Wiring Diagrams, Issue A Current Rating Chart for Standby Battery Calculations Standby Battery Requirements Standby Battery Calculation for NFPA 72 Fire Alarm Applications
Appendix B	SDI Address Chart

Table 1: D6412 Installation Guide Manual Organization

Introduction

1.2 Other Literature Referenced

Throughout this manual, references will be made to other documentation. Review the documents in the table below for a complete description of the D6412 Control/Communicator. Part numbers are included for ordering purposes.

Name of Document	Part Number
D6412 Program Entry Guide	45351
D6412 Program Record Sheet	45350
D6412 Smoke Detector Compatibility List	46928
User's Guide for LED Command Centers	46840
User's Guide for Text Command Centers	46841
D6412 Firmware Release Notes	46929
D9528 Installation Guide	46413
D9529 Installation Guide	48160
D9533 Installation Guide	48210

Table 2: Other Literature Referenced

1.3 Documentation Conventions

These conventions are intended to call out important features, items, notes, cautions, and warnings that the reader should be aware of in reading this document.

1.3.1 Type Styles Used in this Manual

To help identify important items in the text, the following type styles are used:

Bold text	usually indicates selections that you may use while programming your panel. It may also indicates an important fact that should be noted.
Bold Italicized	used to denote notes, cautions and/or warnings.
Italicized text	refers the user to another part of this manual or another manual entirely.
Courier Text	indicates what may appear on the command center/keypad or in a report received at the central station receiver.
[Text in brackets]	indicates to the user that a specific key should be pressed. **Example:** …press [Cmd] to exit this feature…

1.3.2 Tips, Important Notes, Cautions and Warnings

Throughout this document, helpful tips, important notes, cautions and warnings will be presented for the reader to keep in mind. These appear different from the rest of the text as follows;


IMPORTANT

Important Notes - should be heeded for successful operation and programming. Also tips and shortcuts may be included here.


CAUTION

Caution - These caution the operator that physical damage to the panel and/or optional equipment may occur.


WARNING

Warning - These warn of the possibility of physical damage to the operator and/or equipment.

1.4 FCC Notice

1.4.1 Part 15

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

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this 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 D6412 Control/Communicator is 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 the D6412 Control/Communicator causes harm to the telephone network, the telephone company will notify you in advance. If advance notice isn't practical, the telephone company will notify the customer 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 you to make the necessary modifications in order to maintain uninterrupted service.

If trouble is experienced with the D6412 Control/Communicator, 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 you remove the equipment from the network until the problem is resolved. User repairs must not be made, and doing so will void the user's warranty.

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: ESVMUL-46531-AL-E

Ringer Equivalence: 0.1B

Service Center in USA: National Repair Center
130 Perinton Parkway
Fairport, NY 14450-9199 USA
(800) 289-0096 ext. 4220

Introduction

2.0 Overview

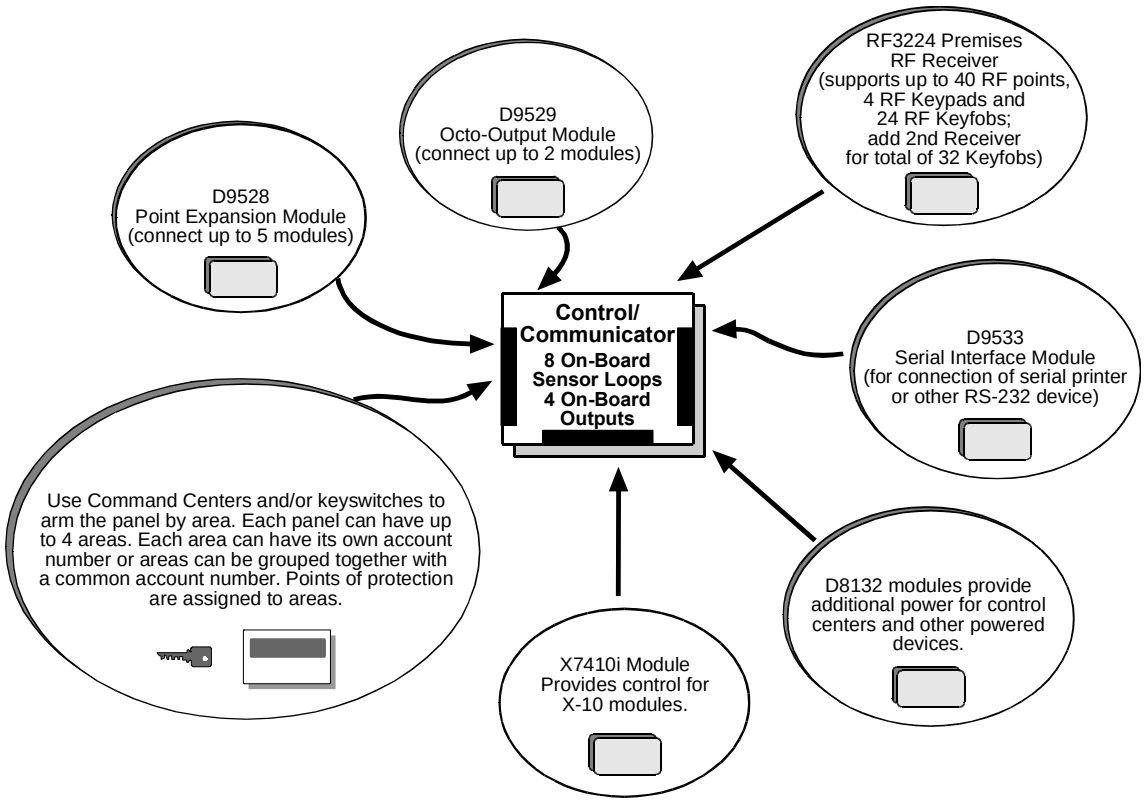


Figure 1: System Configuration

2.1 Specifications

2.1.1 Voltage Input

Primary

18 VAC 22 VA class 2 plug-in transformer (D1825)

Secondary

12 VDC, 7 Ah sealed lead acid rechargeable battery or 12 VDC, 18 Ah sealed lead acid rechargeable battery.

2.1.2 Current Requirements

Panel – 100 mA

See Appendix A for the current requirements of other system components.

2.1.3 Power Outputs

Continuous Power

Up to 600 mA maximum at 11.5 VDC to 12.4 VDC (continuous supply) total for all devices and outputs for non UL applications.

IMPORTANT

Up to 400 mA at 11.5 VDC to 12.4 VDC for UL listed burglary applications, 120 mA for Fire and Combined Burglary/Fire (continuous supply) total for all devices and outputs.

Alarm Power

400 mA for Fire and combined Fire/Burglary; 1500 mA for UL Burglary; 1850 mA for other (not investigated by UL). Applies to all four outputs combined. See the *Outputs* section of the *D6412 Program Entry Guide* (P/N: 45351).

2.1.4 Battery Discharge/Recharge Schedule

Discharge Cycle

AC Off: Command centers indicate trouble. AC Fail report sent as programmed.

13.8 VDC: Charging Float Level

12.1 VDC: Low Battery trouble at command centers. Low Battery report as programmed.

10.2 VDC: Panel shuts down as voltage falls below 10.2 VDC

Recharge Cycle

AC On: Panel restarts, battery charging begins, AC restoral report sent as programmed, AC trouble clears from command centers.

13.0 VDC: Battery restoral reports sent, battery trouble clears from command centers.

13.8 VDC: Battery float charged.

2.1.5 Minimum Operating Voltage

10.2 VDC

2.1.6 SDI Bus (Data)

12 VDC nominal. 1,000 ft. (305 m) of 22 AWG (0.8 mm) cable.

2.1.7 Telephone Connections

RJ31X or RJ38X jack can be interfaced with the D6412.

2.1.8 Environmental

Temperature: +32° to +122°F (0° to +50°C)

Relative Humidity: 5-85% at 86°F (30°C) non-condensing

2.1.9 Arming Stations

D625 VF Text Command Center

D623 LCD Text Command Center

D621 LED Command Centers

Keyswitch

2.1.10 Compatible Enclosures

D2203 Universal Enclosure (included with D6412), D8103 Universal Enclosure*, D8109 Fire Enclosure*, D8108A Attack Resistant Enclosure*

*Order D6412M which includes mounting skirt for this optional enclosure.

2.1.11 Compatible Accessories

D621 LED Command Center

D623 Text Command Center, LCD Display

D624 Telephone Command Module (not investigated by UL)

D625 Text Command Center, Vacuum Fluorescent Display

D9528 Point Expansion Module

D9529 Octo-Output Module

X7410i Module (not investigated by UL)

D9533 Serial Output Module (not investigated by UL)

DS RF3224 Premises RF Receiver

DS RF3332/3334 Keyfob (not investigated by UL)

DS RF3341 Keypad (not investigated by UL)

Programming Key (PK32)

2.2 SIA Control Panel Standard

The D6412 has not been tested by UL to be fully compliant with the SIA Control Panel Standard, Features for False Alarm Reduction, SIA CP-01-1994.02 (R2000.01). SIA features are noted in the *D6412 Program Entry Guide* (P/N: 45351). The standard is available through the Security Industry Association (SIA), 635 Slaters Lane, Suite 110, Alexandria, Virginia 22314. You can e-mail requests for standards to: Standards@SIAOnline.org.

2.3 Standard Features

2.3.1 Points

Radionics' D6412 Control/Communicator panel provides up to 40 separate 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 customize the protection to your installation.

There are eight sensor loops available on the panel (for 'on-board' points). Off-board point locations can be standard wired sensor loops (D9528 Point Expander) or premises RF transmitters (premises RF receiver is required).

The 40 points of protection can be located on any combination of wired and RF locations.

2.3.2 Areas and Accounts

The system supports up to four separate areas. You can assign all points to a single area or spread them out over a maximum of four areas.

You arm and disarm the panel by area. You can arm and disarm several areas with one function. You can also assign a passcode 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 four 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 auto opening and closing skeds. Area 1 can be programmed as a 'common' area. A 'First to Open, Last to Close' arming feature is available.

2.3.3 Communicator

The D6412 uses a built-in digital communicator to send reports to the receiver. The panel transmits reports in either Modem IIIa², Contact ID or Pager format.

Only the following Central Station Receivers support the D6412 Modem Format:

- D6600 with CPU v01.01.03 (or higher)
- D6500 with D6511 MPU v1.05 (or higher)


IMPORTANT

The D6500 with D6510 MPU does not support the D6412 Modem Format.

The panel connects to an RJ31X jack for phone line seizure. Connection to the RJ31X complies with FCC regulations for using the public telephone network. You can program the panel to route reports to one of two routing destinations.

The system has routing capabilities that allow you to direct groups of system event reports and individual point reports to two different routing destinations. The reports can be routed to either destination, both destinations, or to Destination 2 only on failure of Destination 1.

Each routing destination can be programmed with two phone numbers.


IMPORTANT

Check panel communications (from panel to Central Station) to verify that the panel is communicating properly in the selected reporting format at least once annually.

2.3.4 Command Centers

You can connect a maximum of 8 fully supervised Command Centers to the system. The available power affects the total number of Command Centers you can connect without providing an auxiliary power supply.

The panel transmits a serial device trouble report, **`SDI MISSING`** in the Modem IIIa² format or **`Sys Peripheral Trouble`** in the Contact ID format, if it loses communication with a Command Center. Table 1 shows the Command Centers compatible with the D6412 Control/Communicator . See *Command Center* in the *D6412 Program Entry Guide* (P/N: 45351) for complete details on programming Command Center options.

Model	Display
D621	16-Point LED
D623	2 lines of 16 characters, LCD
D625	2 lines of 16 characters, vacuum fluorescent

Table 3: Compatible Command Centers

2.3.5 Keyswitch

You can arm and disarm any of the four available areas with maintained or momentary closure devices such as keyswitches. Point programming determines loop responses and which area a keyswitch controls. Sub-control units (D279) can arm and disarm individual points.

2.3.6 Alarm Event Memory

The system uses alarm event memory to store alarm events for each area. You can view the area alarm events at a Command Center assigned to the area. The panel clears the area's alarm event memory and starts storing new alarm events when you turn the area On.

2.3.7 Event Log

The system stores 254 events from all areas in its event log.

All events can be stored even if the panel does not send a report for them. You can view the log at a text Command Center (the D623 for example), print it locally using the D9533 Serial Interface Module and a serial printer, or upload it to the Remote Account Manager (RAM IV).

See *Appendix B* in the *D6412 Program Entry Guide* (P/N: 45351) for a listing of log events and how to view them.

2.3.8 EMI/Lightning Transient Protection

The D6412 Control/Communicator maintains Radionics' high level of quality and field dependability. Its design significantly reduces electromagnetic interference and malfunction generally caused by lightning.

2.3.9 Programming

Use either a text keypad or the Remote Account Manager (RAM IV) to program the D6412 Control/Communicator. Refer to the *D6412 Program Entry Guide* (P/N: 45351) for programming options.

2.3.10 Other Features

- The D6412 Control/Communicator has many programmable features. A short list of some of the features follows. Complete details on all the features can be found in the D6412 Program Entry Guide (P/N: 45351).
- Supervision of AC (primary power), battery (secondary power), SDI bus devices (keypads, point expanders, programmable output modules, alternate communication modules, etc.), CPU (Central Processing Unit), and the telephone line (voltage only).
- Automatic system test reports
- Remote access for programming, diagnostics, and log uploads using the Remote Account Manager (RAM IV)
- Fire Alarm Verification
- Up to 20 Programmable Outputs, including a supervised siren driver
- Skeds (scheduled events)

2.3.11 Control/Communicator Assembly

The Radionics Control/Communicator is shipped pre-assembled from the factory. You should receive the following parts with your panel.

Literature Pack

- D6412 Installation Guide (P/N: 45349)
- D6412 Program Record Sheet (P/N: 45350)
- D6412 Program Entry Guide (P/N: 45351)
- D6412 Smoke Detector Compatibility Technogram (P/N: 46928)
- D6412 Release Notes (P/N: 46929)

Assembly

- PC board
- D1825 Transformer
- Two Mounting Clips
- Two #6 x 3/4" screws
- Eight 2.2 k Ω end-of-line resistors (8-pack P/N: 47819, single resistor P/N: 25944B)
- Eight 3.65 k Ω point-doubling end-of-line resistors (8-pack P/N: 47821, single resistor P/N: 38130B)
- One 2.21 k Ω fire end-of-line resistor (P/N: 25899)
- Two 14", 18 AWG (1.2 mm), color-coded battery leads

Ordered Separately

Order the following to complete a basic 8-point installation.

- Command Center (or keyswitch)
- D118 Speaker (for PO2 in supervised configuration) ***D118 not investigated by UL***
- D126 Battery
- D164 Phone Cord

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

The following literature is available in a separate literature package for dealers.

- D6412 Installation Guide (P/N: 45349)
- D6412 Program Record Sheet (P/N: 45350)
- D6412 Program Entry Guide (P/N: 45351)
- D6412 Smoke Detector Compatibility Technogram (P/N: 46928)
- D6412 Specifications Sheet (P/N: 48392)

2.3.12 Listings and Approvals

Fire

Underwriters Laboratories

Household Fire Warning UL985

CSFM

Approved by the California State Fire Marshal for Control Units (Household).

Burglary

Underwriters Laboratories
UL1023 Household
UL365 Police Connect
UL609 Local
UL1076 Proprietary
UL1610 Central Station
UL1635 Digital Alarm

3.0 Installation

3.1 Before You Begin

This section contains a general installation procedure. It refers to other sections of the manual for detailed instructions.

Radionics recommends you review this manual and the *D6412 Program Entry Guide* (P/N: 45351) before you begin the installation to determine the hardware and wiring requirements for the features you want to use.

Have the following additional documents handy as you read through this manual:

- *D6412 Program Record Sheet* (P/N: 45350)
- User's Guide (Text Command Center - P/N: 46841; LED Command Center - 46840). A condensed version of the User's guide can be found in the *D6412 Program Entry Guide* [P/N: 45351].
- The installation manual for each model of Command Center you intend to install.

Before you begin the installation of the D6412 you should be familiar with keypad programming or the Remote Account Manager (RAM IV).

3.2 Enclosure Options

The D2203 Enclosure is supplied with the standard D6412 Control/Communicator. To mount the D6412 in one of the Radionics enclosures listed below, order the D6412M version. The 'M' version substitutes a D2202 Mounting Skirt for the D2203 enclosure. The skirt allows installation in the alternative enclosures. The 'M' does not include a transformer. Order a D1825 separately. Refer to the *D6412 Approved Applications Compliance Guide* (Appendix A) to determine if your application requires a specific enclosure.

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

3.3 Beginning the Installation

3.3.1 Mounting the Enclosure

Mount the enclosure in the desired location.

3.4 Premises Wiring

Run the necessary wiring throughout the premises and route the wires into the enclosure.

EMI (Electro Magnetic Interference) may cause problems: EMI may occur if you install the system or run system wires near the following:

- ***Computer network system***
- ***Electrical lines, fluorescent fixtures or telephone cabling***
- ***Ham radio transmitter site***
- ***Heavy machinery and motors***
- ***High voltage electrical equipment or transformers***
- ***PBX telephone system***
- ***Public service (police, fire departments, etc.) using radio communications***
- ***Radio station transmitter site, or other broadcast station equipment***
- ***Welding shop***

If you think that EMI may be a problem, use shielded cable. The drain wire for the shielded cable must have continuity from the earth ground terminal on the panel to the end of the wire run. If continuity is not maintained, the shielded cable may aggravate potential noise problems rather than eliminate them.

Connecting the drain wire to ground at any place other than the earth ground terminal may also produce problems. If you cut the drain wire to install devices, be certain to splice it together. Carefully solder and tape all splices.

3.5 Installing the Assembly

1) Place the panel mounting clips on the appropriate standoff in the enclosure (see Figure 2).
2) Slide the panel into the slots at the top of the enclosure and then secure it with the two screws provided (see Figure 2).
3) Connect earth ground to the panel before making any other connections (see Section 3.5.1, *Connecting Earth Ground*).

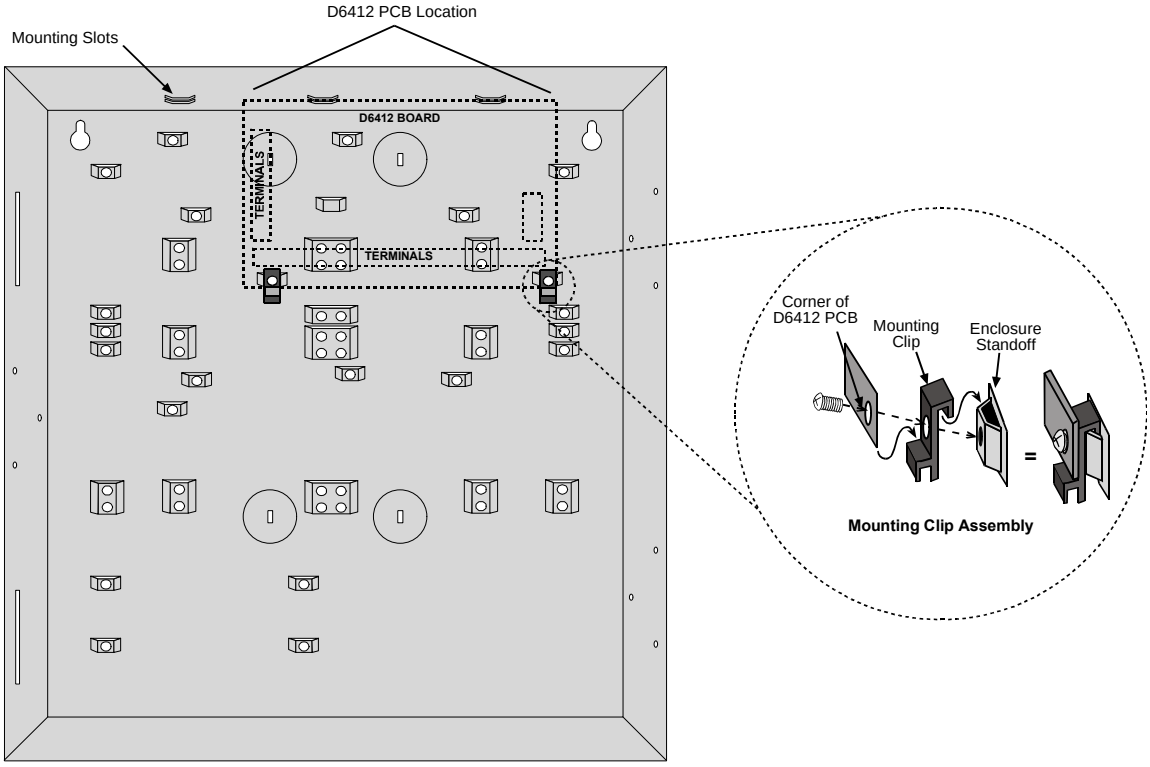


Figure 2: Enclosure Mounting

3.5.1 Connecting Earth Ground

To help prevent damage from electrostatic charges or other transient electrical surges, connect the system to earth ground 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 (1.8 to 1.5 mm) wire when making the connection. Use only the earth ground terminal. Do not connect any other panel terminals to earth ground.

3.5.2 Closing the Installer Switch

Closing the Installer Switch disables the panel (see Figure 3). System reporting is disabled and the system cannot be armed. A system trouble shows at all keypads.

Opening the Installer Switch 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 do not generate restoral reports.

Leaving the Installer Switch in the closed position allows you to power up the panel and charge the battery as you install the detection devices and Command Centers.

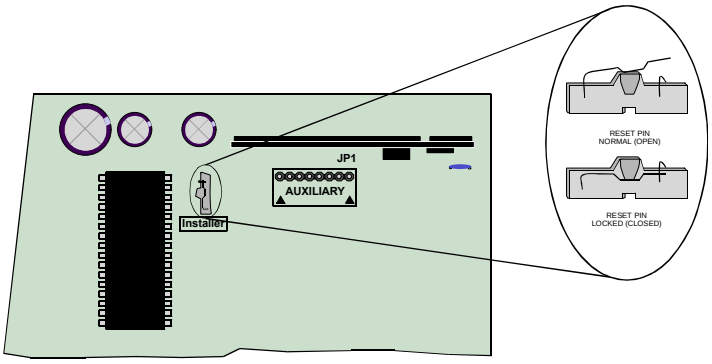


Figure 3: Installer Switch

3.6 Finishing the Installation

3.6.1 Earth Ground and Installer Switch

First, make the earth ground connection and close the Installer Switch if you have not already done so.

To reduce the occurence of false alarms upon toggling of the Installer Switch, the D6412 ignores all point faults for approximately 10 seconds while the devices stabilize. This process is part of the panel's start-up process, and it occurs at power-up and when the panel resets (Installer Switch OPEN). See Sections 3.6.7, *Power Up*, and 13.3.10, *Exiting the Installer's Menu*, for more information. During this period, the following display appears on the text command center:

```
D6412    Rev X.XX
Please Wait...
```

After the 10-second wait period, the text command center display returns to normal (disarmed, no fault/trouble conditions).

3.6.2 Charge the Battery as You Finish

Connect the battery and then the transformer so that the panel can charge the battery as you finish the installation. See Section 4.0 for instructions.

Self Diagnostics 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. They take about 60 seconds to complete. Command centers may display 'System Fault' and sound during the power up and reset interval.

If the panel fails any of the tests, a system trouble message appears at the Command Centers.

Touch the Earth Ground Terminal first: To discharge any static charge you may be carrying, always touch the panel's earth ground terminal before beginning work on the panel.

3.6.3 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.

Section 7.*0, On-Board Sensor Loops,* contains instructions for wiring the on-board point locations to detection devices. Section 11.0, *Arming Devices,* contains instructions for wiring the Command Centers.

Instructions for wiring the off-board point locations are found in the instructions packaged with the point expansion devices.

3.6.4 Install Modules

1. **Power Down First:** Power down the unit by unplugging the transformer and disconnecting the battery. Radionics recommends that you power down the unit when installing modules, or when making wiring connections to the panel.
2. Install and wire any modules required for your installation as described in the module's installation instructions.

Instructions for the D9528 Point Expansion Module and the D9529 Output Expansion Module are included in this manual.

See Section 8.0, *Off-board Sensor Loops,* for D9528 instructions. See Section 10.0,*Off-Board Outputs* for D9529 instructions.

3.6.5 Make the Telephone Connections

If you are connecting the panel to a ground start phone system, you need to install a D133/D134 Relay. See Section 6.0,*Telephone Connections,* for complete instructions.

3.6.6 Connect the On-Board Points and Command Centers

Connect the on-board points and Command Center wiring to the system. See Section 7.0, *On-Board Sensor Loops*, and Section 11.0, *Arming Devices*, for instructions.

3.6.7 Power Up

Reconnect the battery and then plug in the transformer.

Leave the Installer Switch in the CLOSED position for now (see Figure 3). The following sequence of events occurs:

1. "System Fault" appears on the Text Command Center(s) and all Command Centers emit a single tone for approximately 10 seconds.
2. A screen showing the panel model number (D6412), firmware revision number and a "Please Wait..." message appears for approximately 10 seconds.

```
D6412    Rev X.XX
Please Wait...
```

3. "Trouble! Press Cmd 4 to View" appears. Press [Cmd] + [4] key. A new message appears: Date/Time lost! Press 5 to set." Press the [5] key to enter the Date/Time window and set accordingly.

   To reduce the occurence of false alarms upon panel power-up (or restoration of power after a complete loss of primary and secondary power), the D6412 ignores all point faults for approximately 60 seconds while the devices stabilize. This process is part of the panel's start-up process, and it occurs at power-up. This 60-second period begins when the "Please Wait..." screen appears.

   The "Trouble! Press Cmd 4 to View" message reappears, indicating that the Installer Switch is closed. To return the system to normal (disarmed, no fault/trouble conditions), open the Installer Switch (unless you are ready to program the panel).

3.7 Programming the Panel

If you have not created a program for the panel, review the *D6412 Program Entry Guide* (P/N: 45351). Check to be certain you have all the required accessory modules installed for the features you want to use. **The Installer Switch must be in the closed position to program the panel from a keypad.**

You can enter your custom program at a text keypad, or send it to the panel from the Remote Account Manager (RAM IV). There is a connector provided on the panel for quick connection of an 'installers' keypad to the system for programming. See Section 13.0, *Installer's Keypad and Installer Mode,* for complete instructions for the installer keypad.

After you finish programming, move the Installer Switch to the open position (see Figure 3). If it is programmed for reporting, the D6412 transmits a reboot report to the receiver when you move the Installer Switch to the open position.

3.8 Check for Fire Alarm Verification

You must check the Alarm Verification Box in the lower left corner of the label if you programmed Point 1 for Fire with Verification. See *Point Index* in the *D6412 Program Entry Guide* (P/N: 45351).

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 you first program the panel and after any subsequent programming session.

Walk Test: Use the walk test (Cmd 44) or the point test available in the Installer Mode (see Section 13.0) to perform a complete test of the panel.

If you test a device, and the panel does not respond, there may be a problem with the device, the wiring, a module setting, or the programming for the point.

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

4.0 Power Supply

4.1 Primary Power

4.1.1 Primary (AC) Power Circuit

A 18 VAC, 22 VA internally fused transformer (Radionics model D1825) is the primary power source. The AC power circuit provides 700 mA of rectified AC power. The panel reserves 100 mA of this power for internal operations leaving 600 mA for powered devices.

Transient suppressors and spark gaps protect the circuit from power surges. This protection relies on the panel's earth ground connection. Make sure you connect the earth ground terminal to a proper ground. See Section 3.5.1, *Connecting Earth Ground.*

AC Power Failure

The system indicates an AC power failure when the power at the terminals marked '18 VAC' is interrupted. Power must be missing for 120 seconds before the panel acknowledges the failure . Power must be maintained at those terminals for 120 seconds before the panel acknowledges the restoral of power.

4.1.2 Installing the Transformer

Do not short the terminals of the transformer: Shorting the terminals for prolonged periods of time may cause permanent damage. Connect the transformer to the panel terminals before plugging it into the power source.

Use 18 AWG (1.2 mm) (minimum) wire to connect the transformer to the panel. Wire length should be kept as short as possible. Maximum length is 50 ft. (15.2 m).

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 you always connect the battery first and then plug in the transformer. Instructions for *Installing the Battery* follow.

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

4.2 Secondary Power

4.2.1 Secondary (DC) Power

A 12V, 7 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.

Larger Battery Increases Back-up Time: To increase battery back-up time, connect a 12V, 18 Ah 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. Push one connector on the black battery lead to panel's 'Batt-' connector, and then push the lead's other connector to the negative (-) side of the battery. Push one connector on the red battery lead to panel's 'Batt+' connector, and then push the lead's other connector to the positive (+) side of the battery.


WARNING

High Current Arcs Possible: The positive (red) battery lead and the panel's 'Batt+' connector can create high current arcs if shorted to terminals or the enclosure. Use caution when working with the positive lead and the panel's 'Batt +' . Always disconnect the positive (red) lead from the battery before removing it from the panel.

4.2.3 Replacement

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.

4.2.4 Battery Supervision

When the battery drops to 12.1 VDC, the panel, if programmed for power supervision, transmits a BATTERY LOW report.

If the battery is missing or shorted and the panel is programmed for power supervision, it transmits a BATTERY MISSING report.

When battery voltage returns to 13.0 VDC, the panel, if programmed for power supervision, transmits a BATTERY RESTORAL report.

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.

4.2.6 Battery Discharge/Recharge Schedule

Discharge Cycle

AC Off: Command centers indicate trouble. AC Fail report sent as programmed.

13.8 VDC: Charging Float Level

12.1 VDC: Low Battery trouble at command centers. Low Battery report as programmed.

10.2 VDC: Panel shuts down as voltage falls below 10.2 VDC

Recharge Cycle

AC On: Panel restarts, battery charging begins, AC restoral report sent as programmed, AC trouble clears from command centers.

13.0 VDC: Battery restoral reports sent, battery trouble clears from command centers.

13.8 VDC: Battery float charged.

4.2.7 System Status LED

The System Status LED shows system status, including power supply status as described below. Figure 4 shows the location of the LED on the panel.

System Normal	on for 50 msec, off for 1 second.
Battery Missing	off for 200ms, on for 1 sec.
AC Missing	off for 200ms, on for 200ms, off for 200ms, on for 1 second
Phone Ringing	flickers for 1 second as each ring is detected.
Phone Line Seized (panel using phone line)	on solid.
Shut Down (system voltage below 10.2 VDC)	off 200ms, on for 200ms, off 200ms, on for 200ms, off 200ms, on for 1 sec.

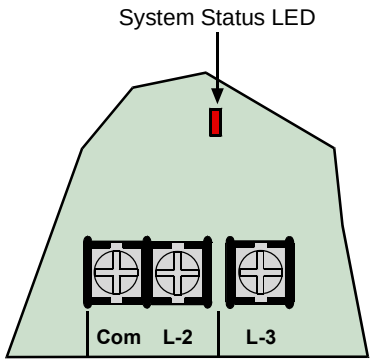


Figure 4: System Status LED

4.3 External Power Supply

The external power supply (not supplied) is not intended to provide power to indicating devices for burlgary and fire applications.

- **Burglary Applications:** use a UL603 Listed burglar alarm power supply with an operating voltage range of 11.8 to 12.4 VDC for Bank Safe/Vault applications (72 hours of standby battery required).
- **Fire Applications:** use a UL1481 Listed power supply operating voltage range of 11.8 to 12.4 VDC for fire applications.

5.0 Power Outputs

5.1 Circuit Protection

Three self-resetting thermal circuit breakers protect the panel from short circuits on both the continuous and programmable power outputs. If the panel is programmed for power supervision and a short is sustained on one of the power outputs, the panel transmits a BATTERY LOW or BATTERY MISSING report.

One breaker protects Auxiliary Power and the Installer's Keypad Connector. A short on one disrupts the power to the other.

One breaker protects the Alarm Power Output, (Alrm + Terminal) and one breaker protects the battery.

5.2 Available Power

5.2.1 Auxiliary Power

Use the auxiliary power terminals to power devices requiring continuous power. See Sections 14 and 15 for the location and description of these terminals.

5.2.2 Installer's Keypad Connector

Use this connector to connect an installer's keypad to the panel for programming and diagnostics.

5.2.3 Alarm Power

Provides positive 12 VDC for PO2 (Programmable Output 2) when it is configured as a siren driver and PO1 when it is configured as the alarm output.

5.3 Continuous Power Output

5.3.1 Continuous Current Draw

The **continuous** current draw for powered devices connected to the Aux Power terminals, the Installer's Keypad Connector and Outputs PO1 to PO4 (when programmed for continuous output) are restricted as follows:

- 120 mA for Fire and Combined Fire/Burglary systems
- 400 mA for UL Burglary systems
- 600 mA for other applications (not investigated by UL)

5.4 Alarm Power

5.4.1 Available Power

The system combines the 600 mA of primary power produced by the power supply with the secondary power source (the battery) to produce a total of 1.5 A of **alarm** power at 11.5 to 12.4 VDC. Alarm power is available at the Alrm + terminal. The panel uses Programmable Output 1 (PO1) through Programmable Output 4 (PO4) to activate Alarm power (see Section 5.5).


IMPORTANT

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.

Power Outputs

Fire System Power Formula

To calculate the current available at the Alrm + terminal for fire and combined fire/burglary systems:

1. Add together the current draws for all devices connected to the Aux terminals and the Installer's Keypad Connector. This total is the total current required for the Normal Standby Condition (NSC).
2. The current available for Normal Standby Condition (NSC) is 600 mA. Subtract the NSC current required calculated in Step 1 from the NSC current available, 600 mA. The difference is the Alarm Current available the Alrm + terminal (480 mA maximum).

In formula format:

600 mA – NSC current required (Step 1) = Alarm Current available (480 mA maximum)

Refer to *Appendix A: Current Rating for Standby Battery Calculations Chart* for module/accessory current requirements.

5.5 Output Programming

Programmable Output 2 (PO2) can be configured as a supervised siren driver. See *Global Output Configuration* in the *D6412 Program Entry Guide* (P/N: 45351) for programming instructions. When programmed as a siren driver, PO2 draws power from the Alrm + terminal. When connected to a 4 Ω horn/speaker, PO2 draws 380 mA of power. When connected to an 8 Ω horn/speaker, it draws 330 mA of power. Use the appropriate current draw in your total alarm power calculation.

- **Programmable Output 1 (PO1):** PO1 terminals can be configured as an alarm power output. JP2-PO1 Jumper must be closed. The default configuration for Programmable Output 1 makes it a dry contact, normally open relay. The PO1 Jumper is open. See Figure 5 for jumper location.
- **Programmable Output 2 (PO2):** Output PO2 can be used with Alarm+ as a supervised siren driver. Connect an approved 4 or 8 Ω siren. Alternatively, PO2 can sink up to 500 mA 12 VDC. For larger loads, use a Radionics D133 Relay Module or a Radionics D134 Dual Relay Module.
- **Programmable Outputs 3 & 4 (PO3 & PO4):** Outputs PO3 and PO4 can be configured for Alarm Output. These outputs can sink up to 500 mA 12 VDC each. For larger loads, use a Radionics D133 Relay Module or a Radionics D134 Dual Relay Module.

Power restricted for fire and combined fire/burglary systems: Use the *Fire System Power Formula* (see Section 5.4.1, *Available Power*) above to calculate the current available for fire and combined fire/burglary systems.

Unexpected Output at PO1 to PO4: If these outputs do not provide the alarm output you expect:

- Check the programming for Programmable Outputs in the *Outputs* section of the *D6412 Program Entry Guide* (P/N: 45351).
- Check the Point Index Configuration section of the *D6412 Program Entry Guide* to verify the points you are activating are programmed for alarm output.

IMPORTANT

If Programmable Output 2 is configured as a supervised siren driver (in combination with the Alrm + terminal), you must connect a 4 W or 8 W siren/speaker to PO 2 to clear the siren/speaker supervision trouble.

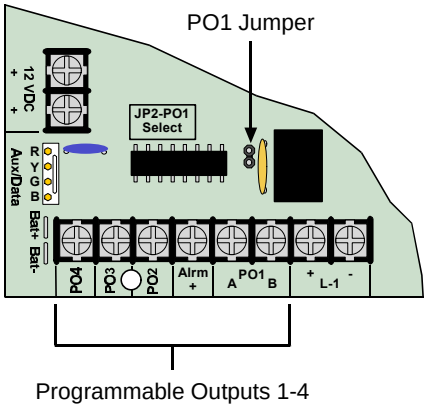


Figure 5: On-Board Outputs

6.0 Telephone Connections

6.1 Registration

Radionics' D6412 Control/Communicator panel is registered with the Federal Communication Commission (FCC) under Part 68, for connection to the public telephone system using an RJ31X or RJ38X jack installed by your local phone company.

6.2 Notification

Do not connect registered equipment to party lines or coin-operated telephones. You must notify the local telephone company and supply them with the following information before connecting the panel to the telephone network.

- The particular line you are going to connect the panel to
- Make (Radionics), model D6412 and serial number of the panel
- FCC registration number: ESVMUL-46531-AL-E
- Ringer equivalence for the panel: 0.1B

6.3 Location

To prevent jamming of signals, wire the RJ31X jack or RJ38X jack to support line seizure as shown in Figure 6. Install the jack on the street side of the phone switch, wired ahead of any PBX equipment. Line seizure temporarily interrupts 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.

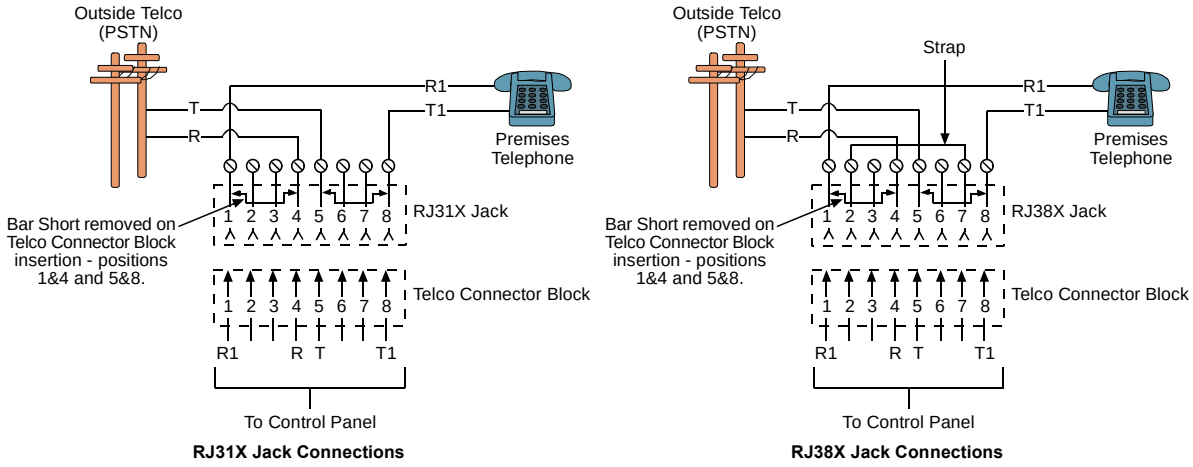


Figure 6: RJ31X/RJ38X Wiring

6.4 Phone Cord Connection

Connect the flying leads of a D164 Telephone Cord to the telephone terminals labeled **R**, **R1**, **T1**,**T**. The terminals are located on the right side of the panel. Connect the other end of the cord to the RJ31X jack or RJ38X jack.

Telephone Connections

6.5 System Status LED (Red)

The System Status LED shows system status, including phone status as described below. Figure 7 shows the location of the LED on the panel.

System Normal	on for 50 ms, off for 1 sec.
Battery Missing	off for 200 ms, on for 1 sec.
AC Missing	off for 200 ms, on for 200 ms, off for 200 ms, on for 1 sec.
Phone Ringing	flickers for 1 sec. as each ring is detected.
Phone Line Seized (panel using phone line)	on solid.
Shut Down (system voltage below 10.2 VDC)	off for 200 ms, on for 200 ms, off for 200 ms, on for 200 ms, off for 200 ms, on for 1 sec.

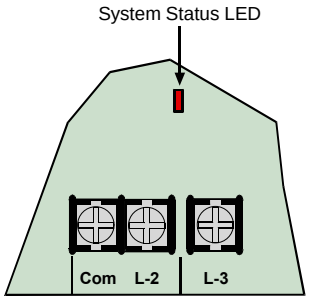


Figure 7: System Status LED

6.6 Dialing Format

You can program the system to use DTMF or pulse dialing. See *Phone* in the *D6412 Program Entry Guide* (P/N: 45351).

6.7 Phone Line Fault

The panel has a circuit that tests the phone line for voltage. 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 3 VDC.

If the panel senses trouble, it starts a phone line trouble timer. The timer continues to run as long as the panel senses trouble. It resets to zero when the panel senses a normal line. If the timer reaches 40 seconds, it begins a phone line trouble response. Programming determines what the response is. See *Phone* in the *D6412 Program Entry Guide (*P/N: 45351).

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 test circuit uses the voltage level 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.

6.8 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. The D6412 provides “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.

6.9 Communication Failure

The D6412 routes reports to two routing destinations. Each of the destinations can be programmed with two phone numbers. See *Routing Dialing Tables* in *Appendix A: D6412 Program Entry Guide* (P/N: 45351). The numbers in [ ] are the numbers assigned to panel events. For more panel event information, see Appendix B in the *D6412 Program Entry Guide*.

The Routing Dialing tables show the circumstances when Communication Failure Events are created. A communication fail event is:

1. Clear (dump) the initiating report and any pending reports from the dialer buffer for the destination where the Comm Fail event occurred.
2. Create a `Comm Fail [69]` or `AltComm Comm Fail [70]` report that includes the Destination Number (1 or 2). Modem IIIa² reports report the destination number as a Route Group (RG). The Alternate Comm Fail report is used when an alternate communications path is used (SAFECOM for example).
3. The `Comm Fail`, `Comm Restoral [71]`, `Alternate Comm Restore [72]` reports follow the System Status Reports routing.
4. If the `Comm Fail` occurred on Destination 1 and System Status Reports routing is set to Destination 2 or set to Destination 2 on Destination 1 fail, then send `Comm Fail` report.
5. If the `Comm Fail` occurred on Destination 1 and System Status Reports routing is set to Destination 1 then send a `Comm Restore` report with the next report for destination 1.
6. If the `Comm Fail` occurred on Destination 2 and System Status Reports routing is set to Destination 1, then send `Comm Fail` report.
7. If the `Comm Fail` occurred on Destination 2 and System Status Reports routing is set to Destination 2 then send a `Comm Restore` report with the next report for destination 2.
8. If a `Comm Fail` report is sent successfully to the other destination, a `Comm Restore` event should be sent when there is a successful communication on the failed destination.

6.10 Ground Start

Some telephone systems require a momentary ground input to initiate a dial tone. To interface with a ground start system you must wire PO1 as shown in Figure 8. PO1 Jumper must be open.

Program PO1 for Ground Start. See the *D6412 Program Entry Guide, Outputs* section (P/N: 45351) for programming instructions.

PO2, 3, and 4 can be used to interface with a ground start system using either a D133 Relay Module or a D134 Dual Relay Module.

The PO1 jumper is not used when interfacing PO2, 3 or 4 to a D133 or D134.

See Figure 8 for details.


IMPORTANT

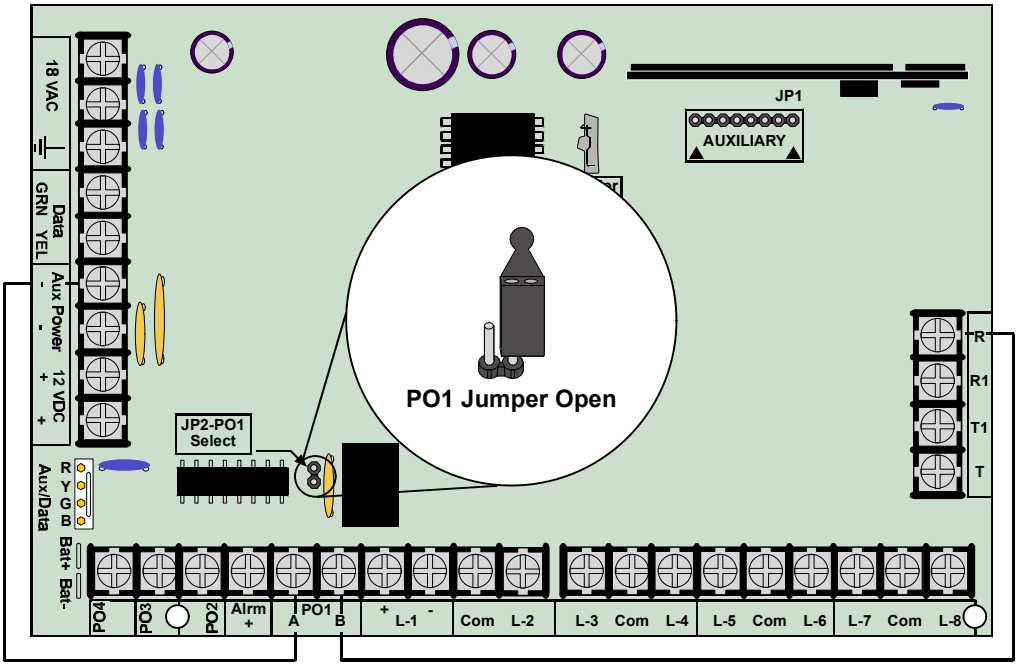
You must connect a proper earth ground reference to the earth ground terminal.


WARNING

Ground start not for use in Fire or combined Fire/Burglary applications. You can not use ground start telephone systems for Fire or combined Fire/Burglary applications.

Telephone Connections

PO1 Configuration for Ground Start



PO2, 3, 4 Configuration using a D133/D134 for Ground Start

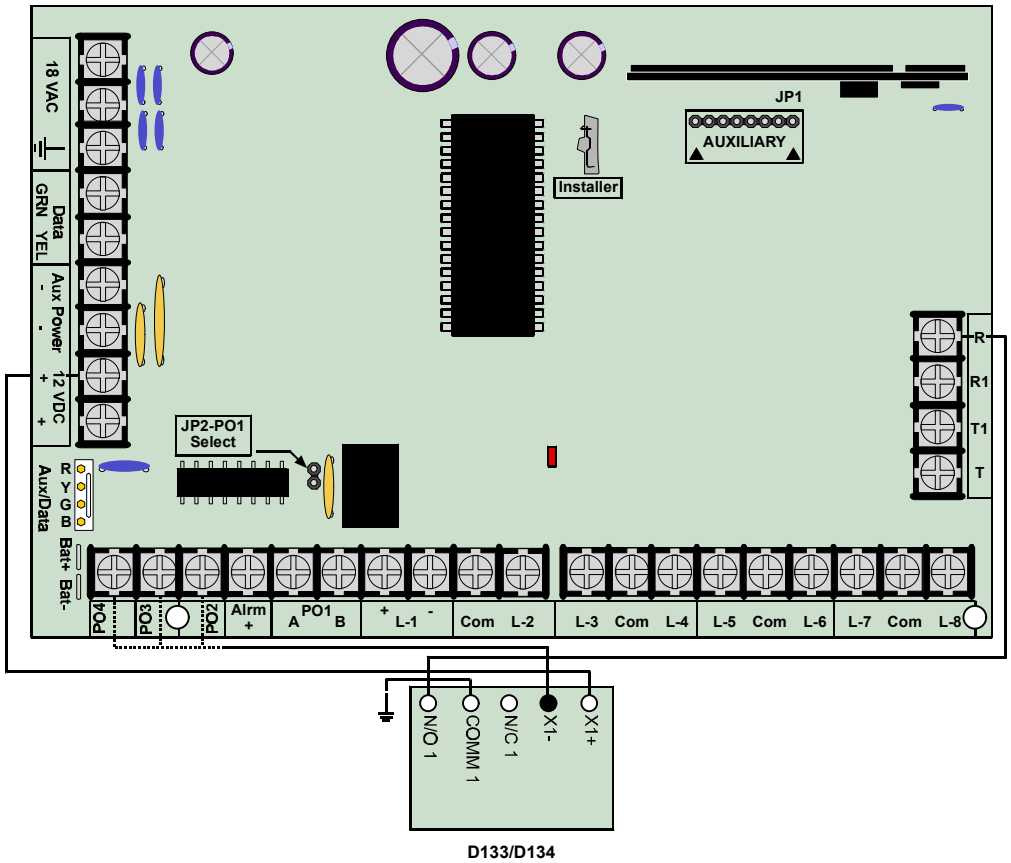


Figure 8: Ground Start

The PO1 jumper is not used when interfacing PO2, 3 or 4 to a D133 or D134.

7.0 On-Board Sensor Loops

7.1 Description

The panel provides eight on-board sensor loops. Each sensor loop functions independently and does not interfere with the operation of the others. The on-board sensor loops can be set to the default single point configuration with a 2.2 k Ω End of Line (EOL) resistor, a single point configuration with 1 k Ω EOL resistor, a single point configuration with a 3.65 k Ω EOL resistor, or in a doubled point configuration that utilizes two resistors per sensor loop, one 2.2 k Ω and one 3.65 k Ω. The panel monitors two points per sensor loop in the doubled configuration, making 15 on-boards available (see Section 7.4, *Doubled Point Configuration*).

The panel monitors the sensor loops for normal, shorted, or open conditions. Point programming determines how the panel responds to those conditions. See the *D6412 Program Entry Guide* (P/N: 45351) for point programming options.

The panel ignores sensor loops (both On-Board and Off-Board) for 60 seconds after power up to ensure that any connected devices have stabilized.

7.2 Point 1 Configuration

On-board Point 1 is dedicated as a fire point for connection of smoke detectors. This point cannot be used for point doubling and must be terminated with a 2.21 k Ω EOL resistor (P/N: 25899). 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 Ω.

See the *D6412 Smoke Detector Compatibility List* (P/N: 46928) for the maximum number of devices allowed on Point 1.

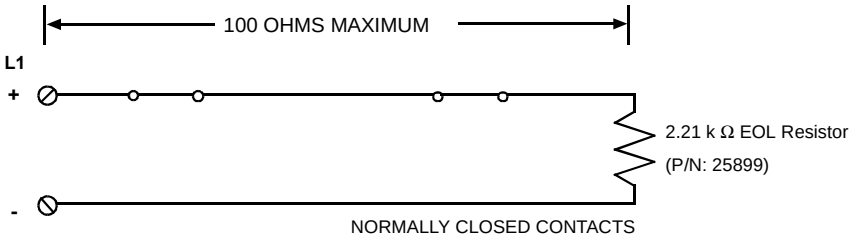


Figure 9: Point 1 Sensor Loop Wiring

7.3 Single Point Configuration (Points 2-8)

When wiring the on-board sensor loops in the single point configuration, install the resistor of the appropriate value (2.2 k Ω and 3.65 k Ω are provided) at the far end of the sensor loop to provide a reference for supervision. You can connect dry contact sensing devices in series (normally-closed) and/or in parallel (normally-open) to any of these loops (see Figure 10).

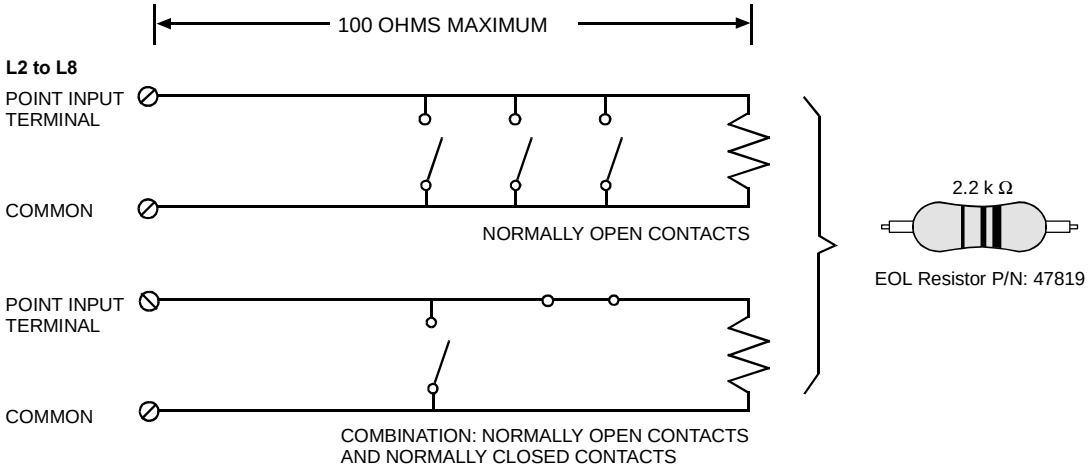


Figure 10: Single Point Sensor Loop Wiring

On-Board 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. The total resistance for wire length and contacts, minus the end-of-line resistor, must not exceed 100 Ω.

You can determine the condition of the on-board sensor loops in the default configuration (single point, 2.2 k Ω end-of-line resistor) by measuring the voltage across the point input terminal and one of the common terminals. The sensor loops must be connected and the 2.2 k Ω end-of-line resistor in place.

D6412 Loops 2-8:

For a 2.21 k EOL resistor:

Open Loop:	Greater than 7.7 VDC.
Normal Loop:	Greater than 6.3 VDC, less than 7.3 VDC.
Shorted Loop:	Less than 6.0 VDC.

For a 3.65 k EOL resistor:

Open Loop:	Greater than 9.1 VDC.
Normal Loop:	Greater than 7.7 VDC, less than 8.6 VDC.
Shorted Loop:	Less than 7.3 VDC.

For a 1.0 k EOL resistor:

Open Loop:	Greater than 5.0 VDC.
Normal Loop:	Greater than 3.8 VDC, less than 4.7 VDC.
Shorted Loop:	Less than 3.5 VDC.

7.4 Doubled Point Configuration

When wiring the on-board sensor loops in the doubled point configuration, install the resistors of the appropriate value (2.2 k Ω and 3.65 k Ω) as shown in Figure 11.

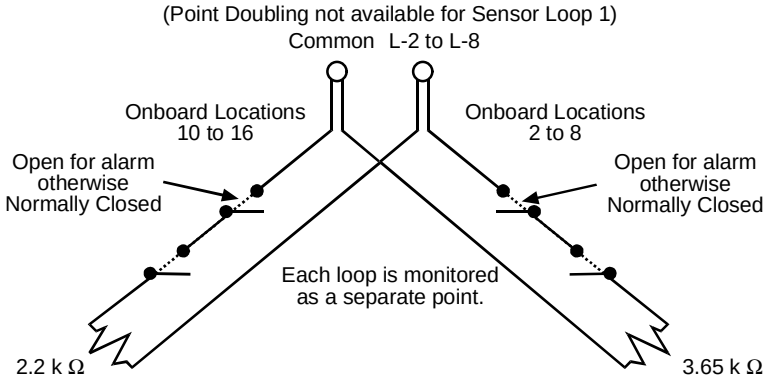


Figure 11: On-board Doubled Point Sensor Loop Wiring

7.5 Sensor Loop Response Time

The D6412 scans both on and off-board sensor loops per Point Index programming. See *Point Index* in the *D6412 Program Entry Guide* (P/N: 45351).

The panel scans sensor loops for 'pulses' (electrically off normal events). The Point Index determines the Pulse Count and Pulse Count Time for each sensor loop. If the panel sees enough pulses within an interval defined by the Pulse Count Time to reach the Pulse Count, it puts the sensor loop in a faulted condition.

The panel scans the sensor loops at one of two scan rates as shown in Table 4.

Pulse Count Time Selections for 20 ms Point Scan Time (on-board points only)		Pulse Count Time Selections for 300 ms Point Scan Time (on-and off-board points only)	
Selection	**Actual Pulse Count Time**	**Selection**	**Actual Pulse Count Time**
0	0.5 seconds	**8**	20 seconds
1	1 second	**9**	30 seconds
2	2 seconds	**10**	40 seconds
3	3 seconds	**11**	50 seconds
4	4 seconds	**12**	60 seconds
5	5 seconds	**13**	90 seconds
6	10 seconds	**14**	120 seconds
7	15 seconds	**15**	200 seconds

Table 4: Point Scan Time/Pulse Count Time Selections

The scan rates for off-board sensor loops are determined by the point expansion modules they are associated with. The panel scans modules with off-board points at the 300 ms scan rate.

Increasing the Pulse Count and Pulse Count Time may cause missed alarms: If you increase the Pulse Count and Pulse Count Time, detection devices may go into alarm and reset without exceeding the Pulse Count or Pulse Count Time.

Radionics recommends using the default settings for Pulse Count and Pulse Count Time.

8.0 Off-Board Sensor Loops

8.1 SDI Point Expanders

You can expand the number of points on the D6412 by connecting modules to the panel's SDI (data) Bus. Use the D9528 Point Expansion module to add wired points. Use a compatible Premises RF Receiver to add wireless points. Table 6 shows how point expansion devices map to the panel's point locations. See the *Locations* section in the *D6412 Program Entry Guide* (P/N: 45351) for a description of the relationship between locations and points.

The panel ignores sensor loops (both On-Board and Off-Board) for 60 seconds after power up to ensure that any connected devices have stabilized.

	Location Parameters These columns show the default Nibble programming for each of the 4 Location parameters. These 4 parameters configure each of the 40 locations.				**Device Parameter Selections** These columns show the selections for the "Device" parameter that tells the D6412 where to find the sensor loop (or transmitter) status for each location. The cells in these columns tell you which loop to use on each device and which EOL resistor value to use on each loop.				
Location #	**Device (default)**	**Pt Index (default)**	**Area (default)**	**Point # (default)**	**1 Onboard**	**2 D9528**	**3 D9528, Doubled**	**4 RF Receiver 1**	**5 RF Receiver 2**
1	Nibble: 0706 (1)	Nibble: 0707 (1)	Nibble: 0708 (1)	Nibble: 0709-0710 (0-1)	2.2 k Ω only	SDI Addr 101 Loop 1, 2.2 k Ω		SDI Addr 50 Transmitter 1	SDI Addr 51 Transmitter 1
2	Nibble: 0711 (1)	Nibble: 0712 (11)	Nibble: 0713 (1)	Nibble: 0714-0715 (0-2)	3.65 k Ω when doubled w/ 10	SDI Addr 101 Loop 2, 2.2 k Ω		SDI Addr 50 Transmitter 2	SDI Addr 51 Transmitter 2
3	Nibble: 0716 (1)	Nibble: 0717 (11)	Nibble: 0718 (1)	Nibble: 0719-0720 (0-3)	3.65 k Ω when doubled w/ 11	SDI Addr 101 Loop 3, 2.2 k Ω		SDI Addr 50 Transmitter 3	SDI Addr 51 Transmitter 3
4	Nibble: 0721 (1)	Nibble: 0722 (13)	Nibble: 0723 (1)	Nibble: 0724-0725 (0-4)	3.65 k Ω when doubled w/ 12	SDI Addr 101 Loop 4, 2.2 k Ω		SDI Addr 50 Transmitter 4	SDI Addr 51 Transmitter 4
5	Nibble: 0726 (1)	Nibble: 0727 (13)	Nibble: 0728 (1)	Nibble: 0729-0730 (0-5)	3.65 k Ω when doubled w/ 13	SDI Addr 101 Loop 5, 2.2 k Ω		SDI Addr 50 Transmitter 5	SDI Addr 51 Transmitter 5
6	Nibble: 0731 (1)	Nibble: 0732 (14)	Nibble: 0733 (1)	Nibble: 0734-0735 (0-6)	3.65 k Ω when doubled w/ 14	SDI Addr 101 Loop 6, 2.2 k Ω		SDI Addr 50 Transmitter 6	SDI Addr 51 Transmitter 6
7	Nibble: 0736 (1)	Nibble: 0737 (14)	Nibble: 0738 (1)	Nibble: 0739-0740 (0-7)	3.65 k Ω when doubled w/ 15	SDI Addr 101 Loop 7, 2.2 k Ω		SDI Addr 50 Transmitter 7	SDI Addr 51 Transmitter 7
8	Nibble: 0741 (1)	Nibble: 0742 (4)	Nibble: 0743 (1)	Nibble: 0744-0745 (0-8)	3.65 k Ω when doubled w/ 16	SDI Addr 101 Loop 8, 2.2 k Ω		SDI Addr 50 Transmitter 8	SDI Addr 51 Transmitter 8
9	Nibble: 0746 (0)	Nibble: 0747 (0)	Nibble: 0748 (1)	Nibble: 0749-0750 (0-9)	Not available as double pt	SDI Addr 102 Loop 1, 2.2 k Ω	SDI Addr 106 Loop 1, 3.65 k Ω	SDI Addr 50 Transmitter 9	SDI Addr 51 Transmitter 9
10	Nibble: 0751 (0)	Nibble: 0752 (0)	Nibble: 0753 (1)	Nibble: 0754-0755 (1-0)	Doubled w/ 2, 2.2 k Ω	SDI Addr 102 Loop 2, 2.2 k Ω	SDI Addr 106 Loop 2, 3.65 k Ω	SDI Addr 50 Transmitter 10	SDI Addr 51 Transmitter 10
11	Nibble: 0756 (0)	Nibble: 0757 (0)	Nibble: 0758 (1)	Nibble: 0759-0760 (1-1)	Doubled w/ 3, 2.2 k Ω	SDI Addr 102 Loop 3, 2.2 k Ω	SDI Addr 106 Loop 3, 3.65 k Ω	SDI Addr 50 Transmitter 11	SDI Addr 51 Transmitter 11
12	Nibble: 0761 (0)	Nibble: 0762 (0)	Nibble: 0763 (1)	Nibble: 0764-0765 (1-2)	Doubled w/ 4, 2.2 k Ω	SDI Addr 102 Loop 4, 2.2 k Ω	SDI Addr 106 Loop 4, 3.65 k Ω	SDI Addr 50 Transmitter 12	SDI Addr 51 Transmitter 12
13	Nibble: 0766 (0)	Nibble: 0767 (0)	Nibble: 0768 (1)	Nibble: 0769-0770 (1-3)	Doubled w/ 5, 2.2 k Ω	SDI Addr 102 Loop 5, 2.2 k Ω	SDI Addr 106 Loop 5, 3.65 k Ω	SDI Addr 50 Transmitter 13	SDI Addr 51 Transmitter 13
14	Nibble: 0771 (0)	Nibble: 0772 (0)	Nibble: 0773 (1)	Nibble: 0774-0775 (1-4)	Doubled w/ 6, 2.2 k Ω	SDI Addr 102 Loop 6, 2.2 k Ω	SDI Addr 106 Loop 6, 3.65 k Ω	SDI Addr 50 Transmitter 14	SDI Addr 51 Transmitter 14
15	Nibble: 0776 (0)	Nibble: 0777 (0)	Nibble: 0778 (1)	Nibble: 0779-0780 (1-5)	Doubled w/ 7, 2.2 k Ω	SDI Addr 102 Loop 7, 2.2 k Ω	SDI Addr 106 Loop 7, 3.65 k Ω	SDI Addr 50 Transmitter 15	SDI Addr 51 Transmitter 15
16	Nibble: 0781 (0)	Nibble: 0782 (0)	Nibble: 0783 (1)	Nibble: 0784-0785 (1-6)	Doubled w/ 8, 2.2 k Ω	SDI Addr 102 Loop 8, 2.2 k Ω	SDI Addr 106 Loop 8, 3.65 k Ω	SDI Addr 50 Transmitter 16	SDI Addr 51 Transmitter 16
17	Nibble: 0786 (0)	Nibble: 0787 (0)	Nibble: 0788 (1)	Nibble: 0789-0790 (1-7)		SDI Addr 103 Loop 1, 2.2 k Ω	SDI Addr 106 Loop 1, 2.2 k Ω	SDI Addr 50 Transmitter 17	SDI Addr 51 Transmitter 17
18	Nibble: 0791 (0)	Nibble: 0792 (0)	Nibble: 0793 (1)	Nibble: 0794-0795 (1-8)		SDI Addr 103 Loop 2, 2.2 k Ω	SDI Addr 106 Loop 2, 2.2 k Ω	SDI Addr 50 Transmitter 18	SDI Addr 51 Transmitter 18
19	Nibble: 0796 (0)	Nibble: 0797 (0)	Nibble: 0798 (1)	Nibble: 0799-0800 (1-9)		SDI Addr 103 Loop 3, 2.2 k Ω	SDI Addr 106 Loop 3, 2.2 k Ω	SDI Addr 50 Transmitter 19	SDI Addr 51 Transmitter 19

Off-Board Sensor Loops

Location #	Device (Default)	Pt Index (Default)	Area (Default)	Point # (Default)	1 On-Board	2 D9528	3 D9528 Doubled	4 RF Receiver 1	5 RF Receiver 2
20	Nibble: 0801 (0)	Nibble: 0802 (0)	Nibble: 0803 (1)	Nibble: 0804-0805 (2-0)		SDI Addr 103 Loop 4, 2.2 k Ω	SDI Addr 106 Loop 4, 2.2 k Ω	SDI Addr 50 Transmitter 20	SDI Addr 51 Transmitter 20
21	Nibble: 0806 (0)	Nibble: 0807 (0)	Nibble: 0808 (1)	Nibble: 0809-0810 (2-1)		SDI Addr 103 Loop 5, 2.2 k Ω	SDI Addr 106 Loop 5, 2.2 k Ω	SDI Addr 50 Transmitter 21	SDI Addr 51 Transmitter 21
22	Nibble: 0811 (0)	Nibble: 0812 (0)	Nibble: 0813 (1)	Nibble: 0814-0815 (2-2)		SDI Addr 103 Loop 6, 2.2 k Ω	SDI Addr 106 Loop 6, 2.2 k Ω	SDI Addr 50 Transmitter 22	SDI Addr 51 Transmitter 22
23	Nibble: 0816 (0)	Nibble: 0817 (0)	Nibble: 0818 (1)	Nibble: 0819-0820 (2-3)		SDI Addr 103 Loop 7, 2.2 k Ω	SDI Addr 106 Loop 7, 2.2 k Ω	SDI Addr 50 Transmitter 23	SDI Addr 51 Transmitter 23
24	Nibble: 0821 (0)	Nibble: 0822 (0)	Nibble: 0823 (1)	Nibble: 0824-0825 (2-4)		SDI Addr 103 Loop 8, 2.2 k Ω	SDI Addr 106 Loop 8, 2.2 k Ω	SDI Addr 50 Transmitter 24	SDI Addr 51 Transmitter 24
25	Nibble: 0826 (0)	Nibble: 0827 (0)	Nibble: 0828 (1)	Nibble: 0829-0830 (2-5)		SDI Addr 104 Loop 1, 2.2 k Ω	SDI Addr 107 Loop 1, 3.65 k Ω	SDI Addr 50 Transmitter 25	SDI Addr 51 Transmitter 25
26	Nibble: 0831 (0)	Nibble: 0832 (0)	Nibble: 0833 (1)	Nibble: 0834-0835 (2-6)		SDI Addr 104 Loop 2, 2.2 k Ω	SDI Addr 107 Loop 2, 3.65 k Ω	SDI Addr 50 Transmitter 26	SDI Addr 51 Transmitter 26
27	Nibble: 0836 (0)	Nibble: 0837 (0)	Nibble: 0838 (1)	Nibble: 0839-0840 (2-7)		SDI Addr 104 Loop 3, 2.2 k Ω	SDI Addr 107 Loop 3, 3.65 k Ω	SDI Addr 50 Transmitter 27	SDI Addr 51 Transmitter 27
28	Nibble: 0841 (0)	Nibble: 0842 (0)	Nibble: 0843 (1)	Nibble: 0844-0845 (2-8)		SDI Addr 104 Loop 4, 2.2 k Ω	SDI Addr 107 Loop 4, 3.65 k Ω	SDI Addr 50 Transmitter 28	SDI Addr 51 Transmitter 28
29	Nibble: 0846 (0)	Nibble: 0847 (0)	Nibble: 0848 (1)	Nibble: 0849-0850 (2-9)		SDI Addr 104 Loop 5, 2.2 k Ω	SDI Addr 107 Loop 5, 3.65 k Ω	SDI Addr 50 Transmitter 29	SDI Addr 51 Transmitter 29
30	Nibble: 0851 (0)	Nibble: 0852 (0)	Nibble: 0853 (1)	Nibble: 0851-0852 (3-0)		SDI Addr 104 Loop 6, 2.2 k Ω	SDI Addr 107 Loop 6, 3.65 k Ω	SDI Addr 50 Transmitter 30	SDI Addr 51 Transmitter 30
31	Nibble: 0856 (0)	Nibble: 0857 (0)	Nibble: 0858 (1)	Nibble: 0859-0860 (3-1)		SDI Addr 104 Loop 7, 2.2 k Ω	SDI Addr 107 Loop 7, 3.65 k Ω	SDI Addr 50 Transmitter 31	SDI Addr 51 Transmitter 31
32	Nibble: 0861 (0)	Nibble: 0862 (0)	Nibble: 0863 (1)	Nibble: 0864-0865 (3-2)		SDI Addr 104 Loop 8, 2.2 k Ω	SDI Addr 107 Loop 8, 3.65 k Ω	SDI Addr 50 Transmitter 32	SDI Addr 51 Transmitter 32
33	Nibble: 0866 (0)	Nibble: 0867 (0)	Nibble: 0868 (1)	Nibble: 0869-0870 (3-3)		SDI Addr 105 Loop 1, 2.2 k Ω	SDI Addr 107 Loop 1, 2.2 k Ω	SDI Addr 50 Transmitter 33	SDI Addr 51 Transmitter 33
34	Nibble: 0871 (0)	Nibble: 0872 (0)	Nibble: 0873 (1)	Nibble: 0874-0875 (3-4)		SDI Addr 105 Loop 2, 2.2 k Ω	SDI Addr 107 Loop 2, 2.2 k Ω	SDI Addr 50 Transmitter 34	SDI Addr 51 Transmitter 34
35	Nibble: 0876 (0)	Nibble: 0877 (0)	Nibble: 0878 (1)	Nibble: 0879-0880 (3-5)		SDI Addr 105 Loop 3, 2.2 k Ω	SDI Addr 107 Loop 3, 2.2 k Ω	SDI Addr 50 Transmitter 35	SDI Addr 51 Transmitter 35
36	Nibble: 0881 (0)	Nibble: 0882 (0)	Nibble: 0883 (1)	Nibble: 0884-0885 (3-6)		SDI Addr 105 Loop 4, 2.2 k Ω	SDI Addr 107 Loop 4, 2.2 k Ω	SDI Addr 50 Transmitter 36	SDI Addr 51 Transmitter 36
37	Nibble: 0886 (0)	Nibble: 0887 (0)	Nibble: 0888 (1)	Nibble: 0889-0890 (3-7)		SDI Addr 105 Loop 5, 2.2 k Ω	SDI Addr 107 Loop 5, 2.2 k Ω	SDI Addr 50 Transmitter 37	SDI Addr 51 Transmitter 37
38	Nibble: 0891 (0)	Nibble: 0892 (0)	Nibble: 0893 (1)	Nibble: 0894-0895 (3-8)		SDI Addr 105 Loop 6, 2.2 k Ω	SDI Addr 107 Loop 6, 2.2 k Ω	SDI Addr 50 Transmitter 38	SDI Addr 51 Transmitter 38
39	Nibble: 0896 (0)	Nibble: 0897 (0)	Nibble: 0898 (1)	Nibble: 0899-0900 (3-9)		SDI Addr 105 Loop 7, 2.2 k Ω	SDI Addr 107 Loop 7, 2.2 k Ω	SDI Addr 50 Transmitter 39	SDI Addr 51 Transmitter 39
40	Nibble: 0901 (0)	Nibble: 0902 (0)	Nibble: 0903 (1)	Nibble: 0904-0905 (4-0)		SDI Addr 105 Loop 8, 2.2 k Ω	SDI Addr 107 Loop 8, 2.2 k Ω	SDI Addr 50 Transmitter 40	SDI Addr 51 Transmitter 40

Table 5: Off-Board Sensor Loops - Location /Address Assignment

8.2 D9528 Point Expander Module

8.2.1 D9528 Overview

You can connect up to five D9528 Point Expander Modules to the D6412. In the single point configuration, each D9528 adds eight points to the system. In the doubled point configuration, each D9528 adds 16 points to the system. Table 5 shows how the D9528 Point Expander sensor loops are assigned to point locations.

Current Draw without Aux Output Terminals: 35 mA Standby 135 mA maximum with connected accessories.

Current Draw with Aux Output Terminals: 100 mA, 12 VDC supervised output for accessories

Review the *Power Outputs* section of this manual to be sure you provide enough power for the Point Expander Modules and any other powered devices you connect to the panel.

Refer to the *D9528 Installation Guide* (P/N: 46413) for complete installation, addressing and operating instructions.

8.2.2 D9528 Installation

Failure to follow the mounting instructions in this manual may result in damage to the module.

The D9528 contains static-sensitive components and must be handled with care. Follow anti-static procedures when handling the modules.

The D9528 module can be mounted in a D203 Enclosure. Mount the module in the enclosure as shown in Figure 12.

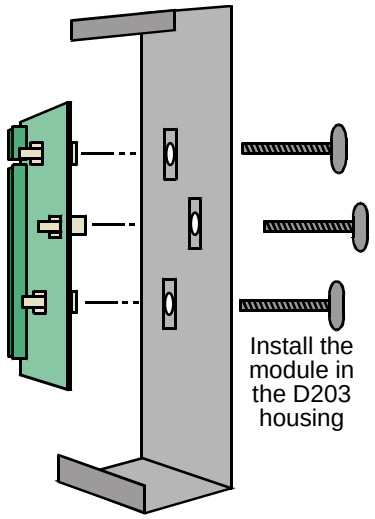


Figure 12: Installing the D9528 in D203 Enclosure

You can also install the D9528 board in the control panel's enclosure. The panel's D2203 enclosure can hold up to five D9528 modules (see Figures 13 and 14).

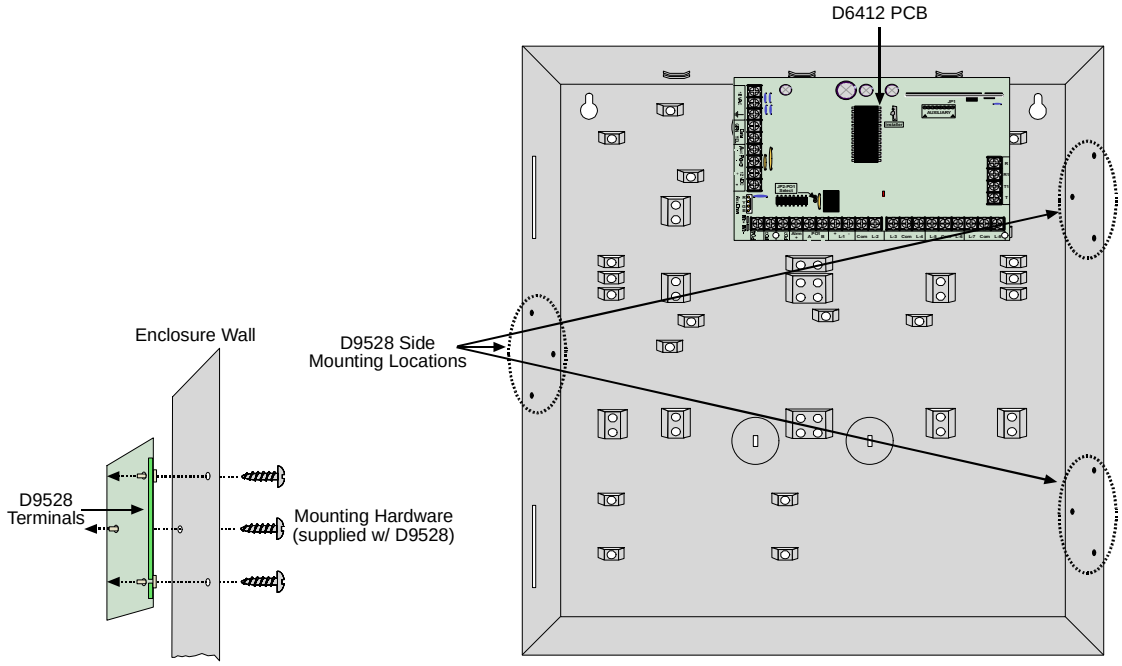


Figure 13: Installing the D9528 in the Panel's Enclosure

The D9528 can also be mounted to the back wall of the control/communicator's enclosure. See Figure 14.

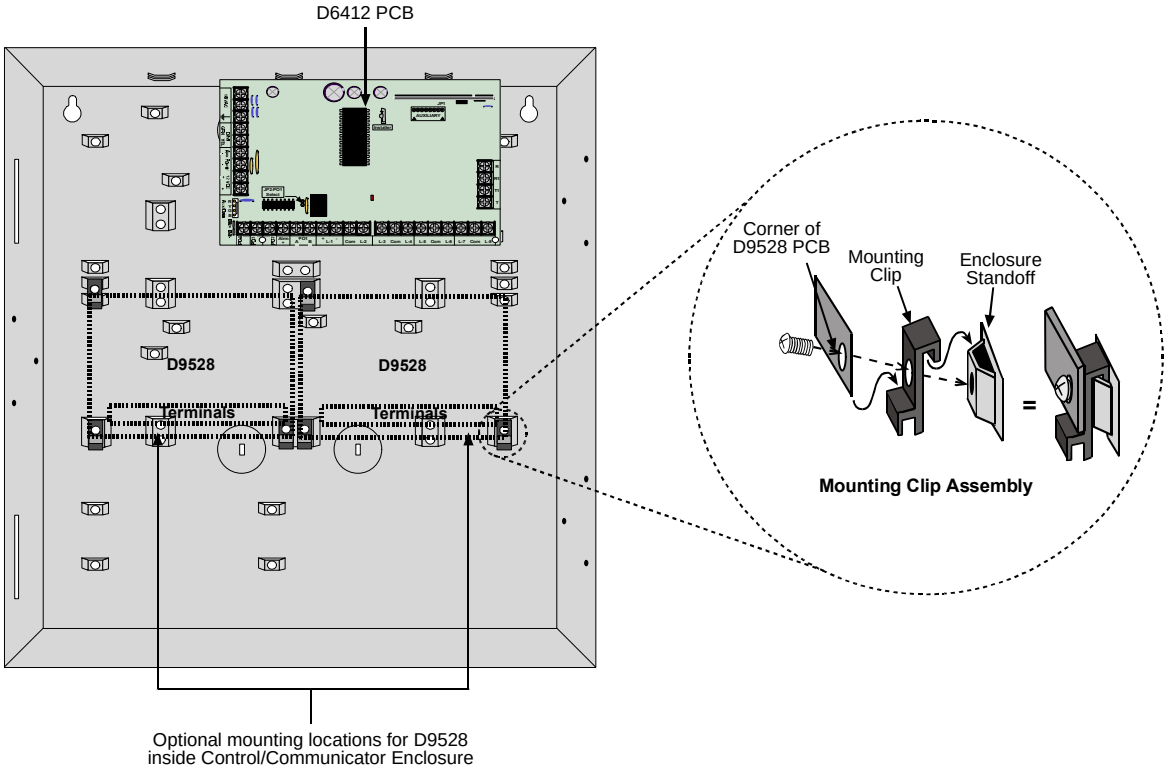


Figure 14: Optional Enclosure Mounting Locations for the D9528

8.2.3 D9528 to D6412 SDI Bus Connections

Connect the D6412's Data and Aux Power terminals to the D9528 module as shown in Figure 15.

Refer to Table 6 for the SDI bus wiring length requirements.

	22 AWG (0.8 mm)	18 AWG (1.2 mm)
Panel to D9528 D9528 AUX Output **NOT** Used	1000 ft. (305 m)*	2000 ft. (610 m)*
Panel to D9528 D9528 AUX Output supplying 100 mA	100 ft. (30 m)**	250 ft. (76 m)**

Table 6: D9528 Wire Lengths

* Wire length may be restricted by panel limitations. See the panel's installation guide for more information.

** If the D9528 is powered directly by an external auxiliary power supply (Figure 16), use the wire lengths specified in the first row of Table 6.

The wire lengths shown in Table 6 must be shared by all devices connected to the terminals.

Note: *Do not use twisted pair or shielded cable. Do not share cable with the keypad lines. The maximum distance may be limited to 250 ft. (75 m) if the Aux Output is used. See Section 8.2.4 "D9528 Auxiliary Output Connections."*

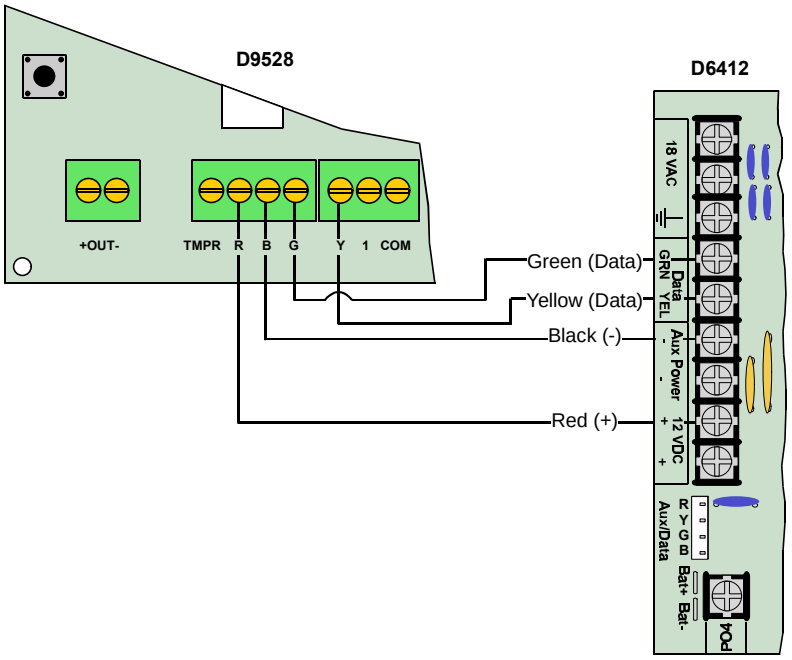


Figure 15: Wiring the D9528 to the D6412

If you need to power the D9528 with an external 12 VDC power supply, wire it as shown in Figure 16. See Section 4.3, *External Power Supply,* for external power supply restrictions.

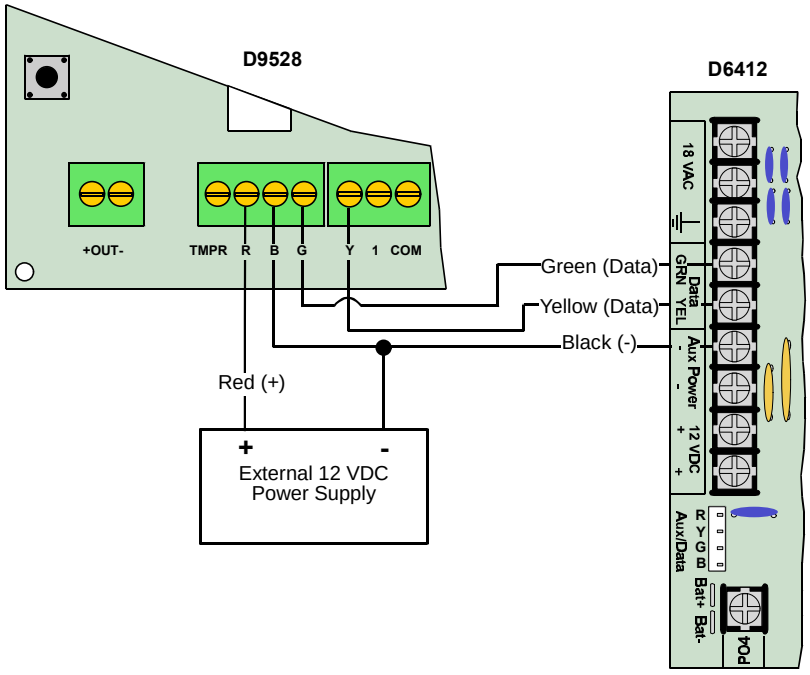


Figure 16: Wiring the D9528 for External Power Supply

8.2.4 D9528 Auxiliary Output Connections

The D9528 has the capacity to provide 12 VDC at up to 100 mA from the Auxiliary Output (-) OUT (+) terminals to power external devices such as motion detectors. See Figure 17.

IMPORTANT

When using the D9528's auxiliary output, the maximum distance between the D6412 and the D9528 must be limited to 250 ft. (76 m) when using #18 AWG (1.2 mm) wire, or 100 ft. (30 m) when using #22 AWG (0.8 mm) wire. The maximum distance from the D9528 Output terminals and the remotely powered devices (PIRs, smoke detectors, etc.) must be limited to 50 ft. (15 m) for #22 AWG (0.8 mm) or 100 ft. (30 m) for #18 AWG (1.2 mm) wire.

If the D9528 module is powered by an external 12 VDC power supply, the Output terminals can supply power for up to 450 ft. (138 m) from the D9528 to the remotely powered devices.

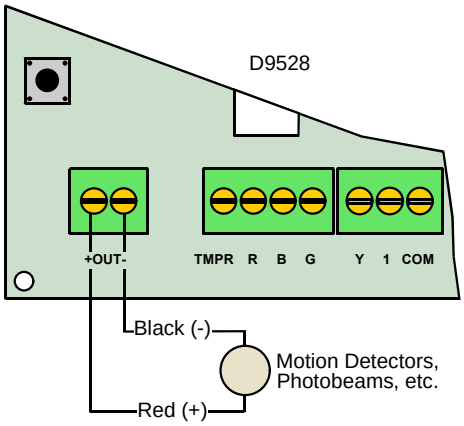


Figure 17: Auxiliary Output Connections

Off-Board Sensor Loops

8.2.5 D9528 Tamper Input Connections

Each D9528 module provides an input for tamper devices. The tamper input is in addition to the point sensor loops. Supervising an enclosure tamper does not consume a point. A fault on the tamper input is reported as a tamper event for the SDI address the D9528 is set to.

The tamper output may monitor external Normally Closed (N/C) tamper switches when wired as shown in Figure 18. Although an EOL resistor is not required for the tamper circuit, the tamper circuit must be closed to provide proper D9528 tamper supervision to the D6412.

The D9528 also provides an on-board tamper switch for use if the D9528 is installed inside the AE20 plastic enclosure. The cover tamper spring is supplied with the D9528. The on-board tamper switch cannot be used if the D9528 is mounted inside the D6412's enclosure (wire the tamper input as shown in Figure 18 if installed in the control panel's enclosure).

If neither the tamper input or the on-board tamper switch is used, a wire jumper must be placed as shown in Figure 18.

Use either the tamper input or the on-board tamper switch. Both cannot be used simultaneously.

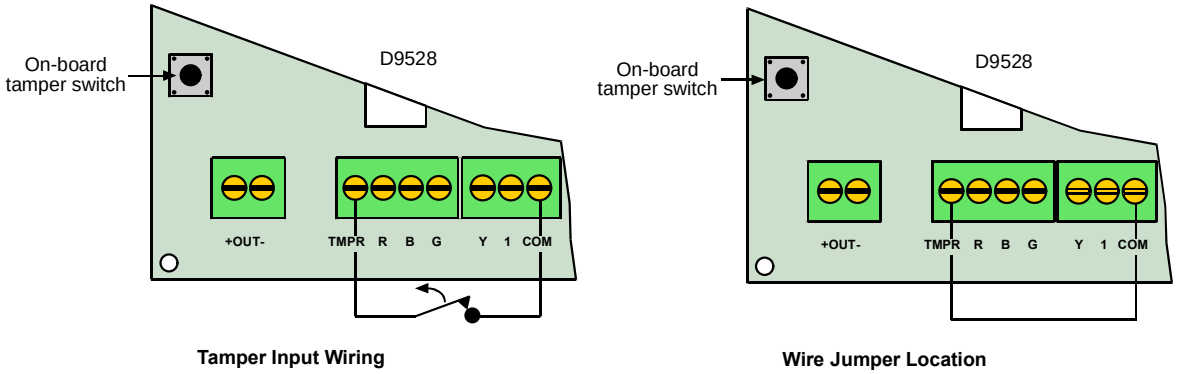


Figure 18: D9528 Tamper Input Wiring

8.2.7 D9528 Sensor Loop (Point) Connections

The D9528 supports both Normally Open and Normally Closed contacts in the standard sensor loop configuration. It supports Normally Closed contacts in the doubled sensor loop configuration.

The D9528 is not designed for use with two-wire smoke detectors.

8.2.7.1 D9528 Standard Sensor Loop Wiring

Wire as shown in Figure 19.

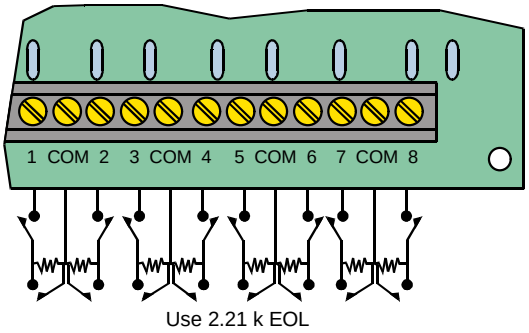


Figure 19: D9528 Sensor Loop Wiring, Single Loop Configuration

8.2.7.2 D9528 Doubled Sensor Loop (Point) Wiring

Wire as shown in Figure 20.

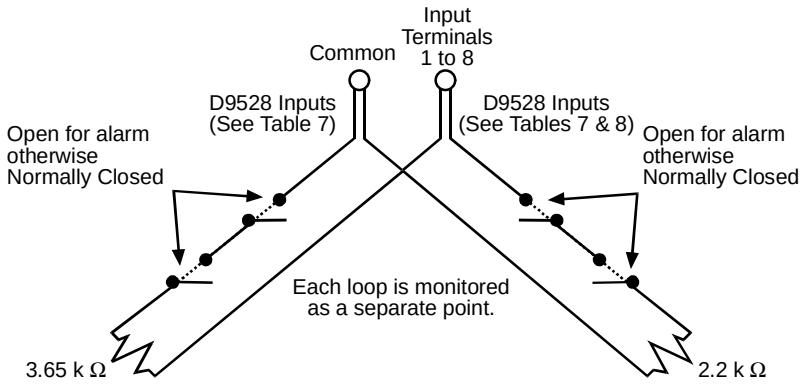


Figure 20: D9528 Sensor Loop Wiring, Doubled Loop Configuration

	D9528 Sensor Loop							
EOL	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
3.65 k	9	10	11	12	13	14	15	16
2.2 k	17	18	19	20	21	22	23	24

Table 7: D9528 Address 106

	D9528 Sensor Loop							
EOL	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
3.65 k	25	26	27	28	29	30	31	32
2.2 k	33	34	35	36	37	38	39	40

Table 8: D9528 Address 107

8.2.6 D9528 Address Programming

Each D9528 module connected to the D6412 must have its address jumpers set to the addresses shown in Table 9.

Location #	For Standard Sensor Loop: Set Location's 'Device' Parameter to '2' Set D9528 Address as shown below	For Doubled Sensor Loop: Set Location's 'Device' Parameter to '3' Set D9528 Address as shown below
1 to 8	SDI Address 101	
9 to 16	SDI Address 102	SDI Address 106
17 to 24	SDI Address 103	SDI Address 106
25 to 32	SDI Address 104	SDI Address 107
33 to 40	SDI Address 105	SDI Address 107

Table 9: D9528 Address Settings

For example: You want to use a D9528 sensor loop for panel Point Location 9 (see *Locations* in the *D6412 Program Entry Guide* (P/N: 45351) for a detailed description of locations and their relationship to points). You must connect a D9528 and set its address DIP switches to 102.

Any time the address DIP switches are changed, you must cycle the power to the module **OFF** and then **ON** for the changes to take effect.

Set the address DIP switches as shown in the Table 10. See Figure 21 for proper D9528 DIP switch configuration.

An “X” indicates that the DIP Switch is ON. See Figure 21 for DIP Switch configuration.

	DIP Switch Settings					
DIP Switches	**S1**	**S2**	**S3**	**S4**	**S5**	**S6**
Module Address	**32**	**16**	**8**	**4**	**2**	**1**
101						
102						X
103					X	
104					X	X
105				X		
106				X		X
107				X	X	

Table 10: D9528 Address Jumper Settings

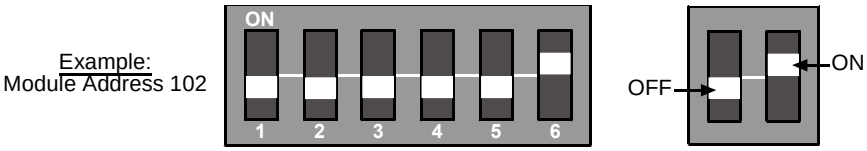


Figure 21: D9528 DIP Switch Configuration

8.2.8 D9528 Status LED

- One flash per second indicates normal operation.
- LED steady ON can indicate any of the following:

- G wire is not connected or there is a communications problem between the control panel and the D9528.
- No locations (points) are assigned to the D9528 with this address. See the *Locations* section in the *D6412 Program Entry Guide* (P/N: 45351).
- Address on the D9528 is not set correctly.

- LED OFF indicates that there is no power to the module.

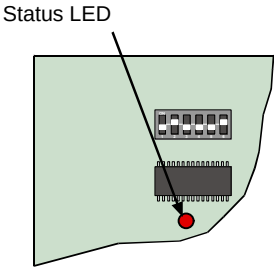


Figure 22: D9528 Status LED

9.0 On-Board Outputs

There are four on-board programmable outputs on the D6412.

Programmable Output 2 (PO2) can be configured as a supervised siren driver. See *Global Output Configuration* in the *D6412 Program Entry Guide* (P/N: 45351) for programming instructions. When programmed as a siren driver, PO2 draws power from the Alrm + terminal. When connected to a 4 Ω horn/speaker, PO2 draws 380 mA of power. When connected to an 8 Ω horn/speaker, it draws 330 mA of power. Use the appropriate current draw in your total alarm power calculation.

- **Programmable Output 1 (PO1):** PO1 terminals can be configured as an alarm power output. JP2-PO1 Jumper must be closed. See Figure 6.
- **Programmable Output 2 (PO2):** Output PO2 can be used with Alarm+ as a supervised siren driver. Connect an approved 4 or 8 Ω siren. Alternatively, PO2 can sink up to 500 mA 12 VDC. For larger loads, use a Radionics D133 Relay Module or a Radionics D134 Dual Relay Module.
- **Programmable Outputs 3 & 4 (PO3 & PO4):** Outputs PO3 and PO4 can be configured for Alarm Output. These outputs can sink up to 500 mA 12 VDC each. For larger loads, use a Radionics D133 Relay Module or a Radionics D134 Dual Relay Module.

Power restricted for fire and combined fire/burglary systems: Use the *Fire System Power Formula* (see Section 5.4.1, *Available Power*) above to calculate the current available for fire and combined fire/burglary systems.

Unexpected Output at PO1 to PO4: If these outputs do not provide the alarm output you expect:

- Check the programming for Programmable Outputs in the *Outputs* section of the *D6412 Program Entry Guide* (P/N: 45351).
- Check the Point Index Configuration section of the *D6412 Program Entry Guide* to verify the points you are activating are programmed for alarm output.

The default configuration for Programmable Output 1 makes it a dry contact, normally open relay. The PO1 Jumper is open (see Figure 23).

IMPORTANT

If Programmable Output 2 is configured as a supervised siren driver (in combination with the Alrm + terminal), you must connect a 4 W or 8 W siren/speaker to PO 2 to clear the siren/speaker supervision trouble.

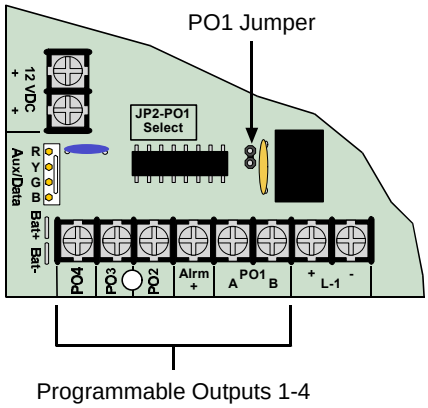


Figure 23: On-Board Outputs

10.0 Off-Board Outputs

10.1 Overview

You can expand the total number of D6412 programmable outputs to 20 using the D9529 Octo-Output Module (two required for 20 outputs) or X7410i Module. Instructions for the D9529 Module are included in this manual (as well as with the module). The X7410i Module emulates two D9529 Modules. X7410i specific instructions are included with the module.

10.2 D9529 Octo-Output Module

10.2.1 Overview

The D9529 Octo-Output Module allows you to add outputs to your system in groups of eight. You can add up to two D9529 Octo-Output Modules to the D6412. Combining the four on-board programmable outputs with two D9529 Octo-Output Modules makes a total of 20 programmable outputs available. Review Section 5.0, *Power Outputs*, to be sure you provide enough power for the Octo-Output Modules and any other powered devices you connect to the panel.

You can assign any of the programmable output functions to the Octo-Output Module's individual outputs separately. See *Outputs* in the *D6412 Program Entry Guide* (P/N: 45351) for programming details.

D9529 restricted from fire systems: The D9529 relay outputs are not supervised and cannot be used in fire or combined fire/burglary installations for primary indicating devices.

Current Draw: 10 mA Standby plus 40 mA for each energized output (relay) for a total of 330 mA maximum with all eight outputs energized.

Refer to the *D9529 Installation Guide* (P/N: 46925) for complete installation, addressing and operating instructions.

10.2.2 Configuring the D9529 Octo-Output Module


WARNING

Outputs may activate when setting the D9529's switches, programming the panel, resetting the panel or applying power to the panel . You may wish to disconnect equipment connected to outputs while performing these functions.

10.2.3 Relay Outputs

Each D9529 output provides a Form C dry contact rated for 5.0 A at 28 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.

10.2.4 Installation

You can install the D9529 in the enclosure with the panel (see Figure 24) with the mounting hardware supplied with the D9529.

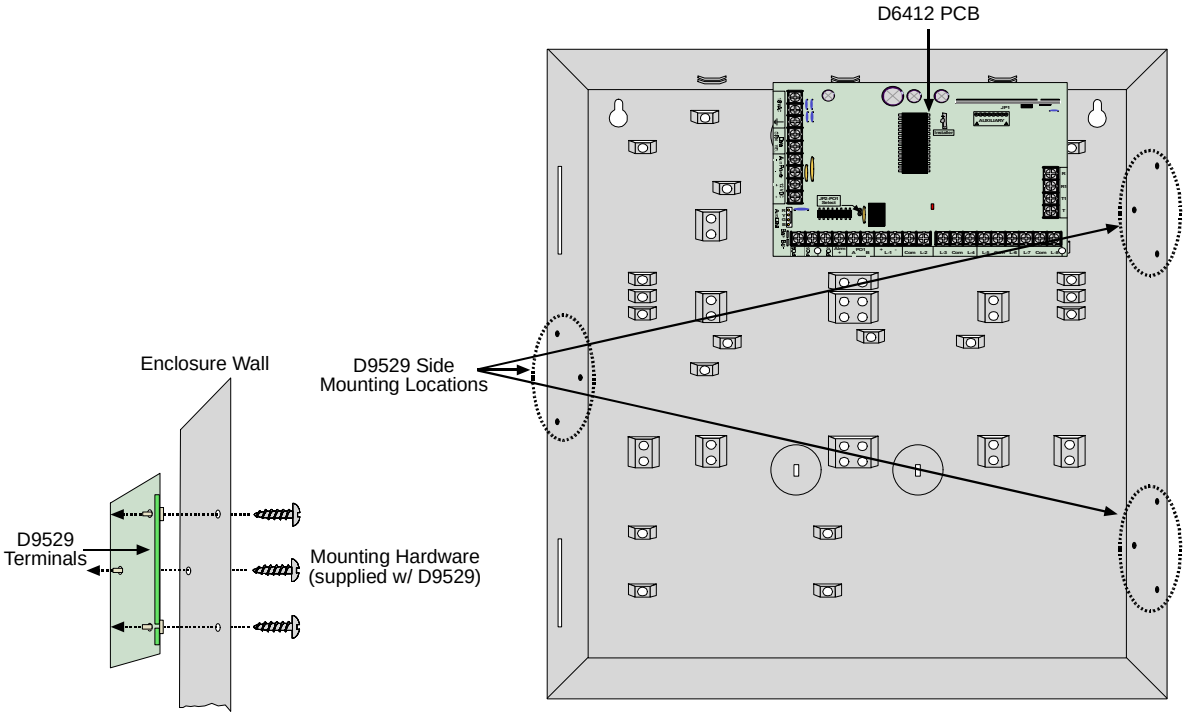


Figure 24: D9529 - Control Panel Enclosure Side Mounting

Alternatively, you can mount the D9529 remotely in its own D203 enclosure (see Figure 25).

Distance from the panel is determined by the total combined wire length of all devices (including keypads) connected to the panels Data terminals. The combined total wire length must not exceed 1000 ft. (305 m) (22 AWG [0.8 mm]).

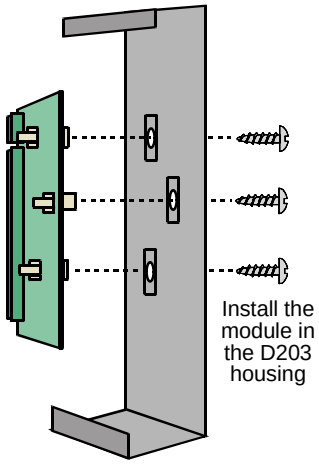


Figure 25: Installing the D9529 in a Remote Enclosure

Off-Board Outputs

10.2.5 D9529 to D6412 SDI Bus Wiring Connections

Refer to Table 11 for the SDI bus wiring length requirements.

IMPORTANT

If the D9529 is to be installed far from the control panel, then the control panel cannot be used to power the D9529. An external power supply must be used. See Figure 27 for external power supply connections.

	Power Source	#22 AWG (0.8 mm)	#18 AWG (0.8 mm)
D6412 to D9529	D6412	40 ft. (12.2 m)	80 ft. (24.4 m)
D6412 to D9529	External Power Supply	1000 ft. (305 m)	2000 ft. (610 m)
External Power Supply to D9529		40 ft. (12.2 m)	80 ft. (24.4 m)

Table 11: D9529 Wire Lengths

Power down the panel to connect the D9529 as shown in Figure 26.

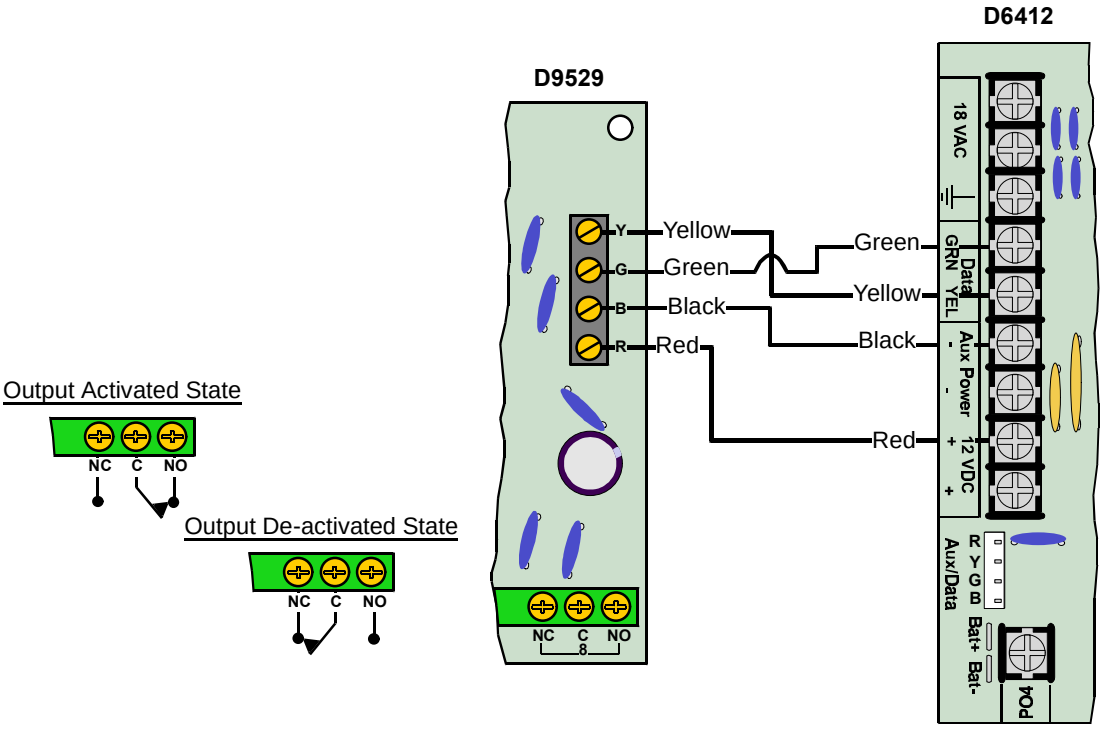


Figure 26: Wiring the D9529 to the D6412

If you need to power the D9529 from an external power source, connect it to the power source and the panel as shown in Figure 27. See Section 4.3, *External Power Supply,* for external power supply restrictions.

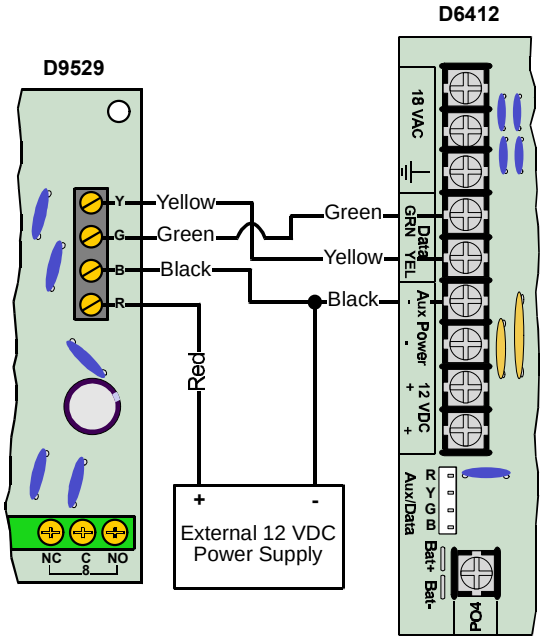


Figure 27: Wiring for External Power Supply

10.2.6 Address Programming

Each D9529 module connected to the D6412 must have its address jumpers set to the address shown in Table 12.

Output #	SDI Address
5 to 12	SDI Address 150
13 to 20	SDI Address 151

Table 12: D9529 Address Settings

Any time the address jumpers are changed, you must cycle the control panel power **OFF** and then **ON** for the changes to take effect. Set the address jumpers as shown in the Table 13. An "X" indicates that the DIP switch is CLOSED (Down). See Figure 28 for DIP Switch configuration.

SDI Address	DIP Switch, X=DIP Switch is CLOSED					
	1	2	4	8	16	MODE
150						X
151	X					X

Table 13: D9529 Address Jumper Settings

Example:
Module Address 150

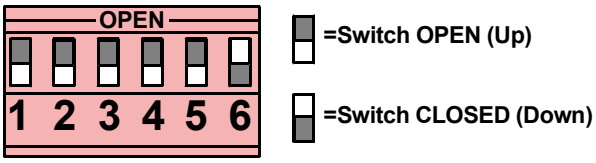


Figure 28: D9529 Address DIP Switches

11.0 Arming Devices

11.1 Description

Command Centers, maintained or momentary contact keyswitches, Premises RF arming devices, or any combination are used to arm and disarm areas. The panel may contain up to four areas that can be armed and disarmed individually.

11.2 Command Centers

A Radionics Command Center is a 4-wire SDI device used to arm and disarm areas, annunciate complete system status, initiate system tests, and control many functions of the security system.

The D6412 can supervise up to eight wired Command Centers and 4 RF Keypads. The panel transmits a serial device trouble report, **SDI MISSING** in the Modem IIIa^2 format or **SYS PERIPHERAL TROUBLE** in the CONTACT ID format, if it loses communication with a wired supervised Command Center. RF Keypads are shown as missing by SDI address. See *RF Keypads* in the *D6412 Program Entry Guide* (P/N: 45351).

SYSTEM FAULT appears in any Command Center with text display capability that loses communication with the panel. A system trouble appears at all other Command Centers connected to the system. SYSTEM FAULT also appears for approximately 10 seconds during power-up.

See *Command Center* in the *D6412 Program Entry Guide* (P/N: 45351) for complete programming details for Command Centers.

The *D6412 Program Entry Guide* (P/N: 45351) also contains a summary of operational information.

11.2.1 Assigning the Command Center an Address

Switches on the Command Center assign an address to it. Command Centers 1 to 8 are assigned to SDI address 1 to 8. See *Command Centers* in the *D6412 Program Entry Guide* (P/N: 45351) for a complete description of command center programming (area assignment, etc.).

Table 14 shows the correct address setting for each Command Center address. See Figure 27 for proper Command Center DIP switch orientation.

SDI Address	Switch Number, X = Switch On					
	1	2	4	8	16	MODE
0*						
1	X					X
2		X				X
3	X	X				X
4			X			X
5	X		X			X
6		X	X			X
7	X	X	X			X
8				X		X

Table 14: Command Center Address Assignments DIP Switch Settings

* Address 0 is reserved for the installer's keypad. This keypad is not intended for permanent installation and should remain on-premises for future programming sessions. See Section 13.0, *Installer's Keypad and Installer's Mode*, for more information.

Figure 29: Command Center DIP Switch Orientation

11.2.2 Command Center Installation

Consult the Command Center installation manual for installation and mounting instructions. Command Centers connect to the panel in parallel as shown in Figure 30.

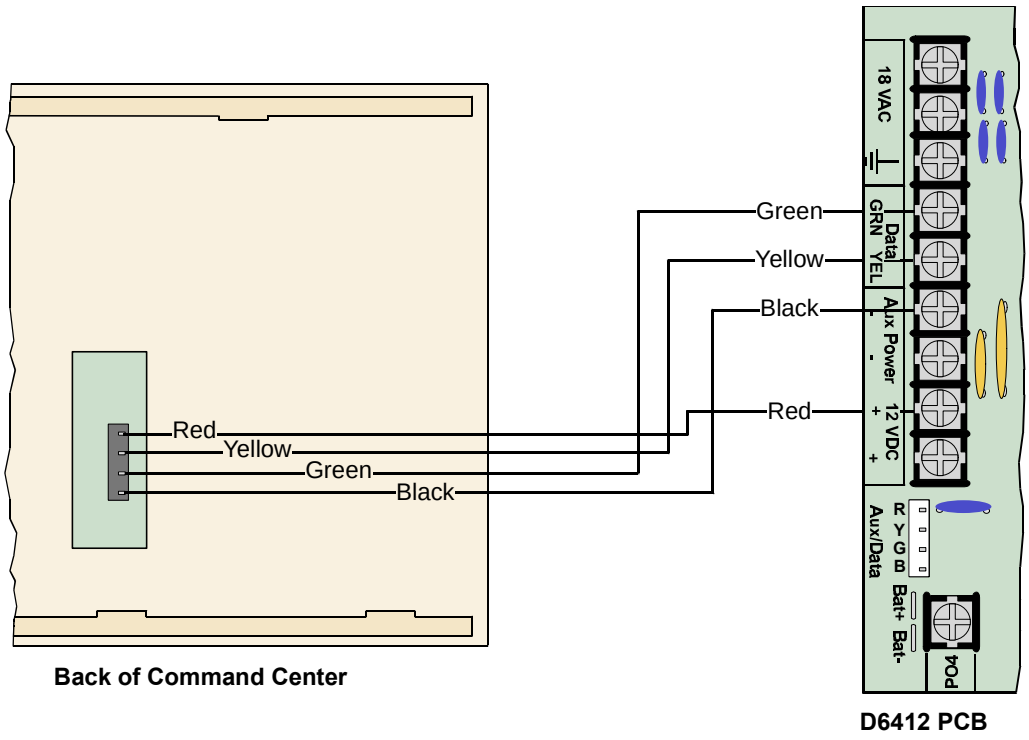


Figure 30: Wiring Command Centers to the D6412

Refer to Table 15 for D6412 SDI Bus to Command Center wiring length requirements.

	#22 AWG (0.8 mm)	#18 AWG (1.2 mm)
D6412 to D621/D623	1000 ft. (305 m)	2000 ft. (610 m)
D6412 to D625*	225 ft. (69 m)	600 ft. (183 m)
D6412 to D621/D623/D625 using an External Power Supply	1000 ft. (305 m)	2000 ft. (610 m)

Table 15: Command Center Wire Lengths

* Due to higher current requirements for the D625 Vacuum Fluorescent Command Center, the wire lengths shown in Table 15 must be used when wiring it from the control panel.

If an external power supply is used, follow the lengths as shown in Table 15.

Extra power needed for more Command Centers: Review Section 5.0, *Power Outputs*, to determine the total power output requirements for your system. You may need to add one or more External Power Supply Modules for the number of Command Centers you want to use. Figure 31 shows an external power supply powering Command Centers in a stand-alone configuration.

For UL certificated accounts use a UL listed power supply.

See Section 4.3, *External Power Supply,* for external power supply restrictions.

Control/Communicator and External Power Supply must share COMMON: Figure 31 shows the common from the External Power Supply Module connected to both the Command Centers' common and the common on the Control/Communicator.

A stand-alone power supply powering any device connected to the panel must also be connected to the Aux - (Aux negative) terminal on the panel.

WARNING

Do not connect the stand-alone power supply to earth ground.

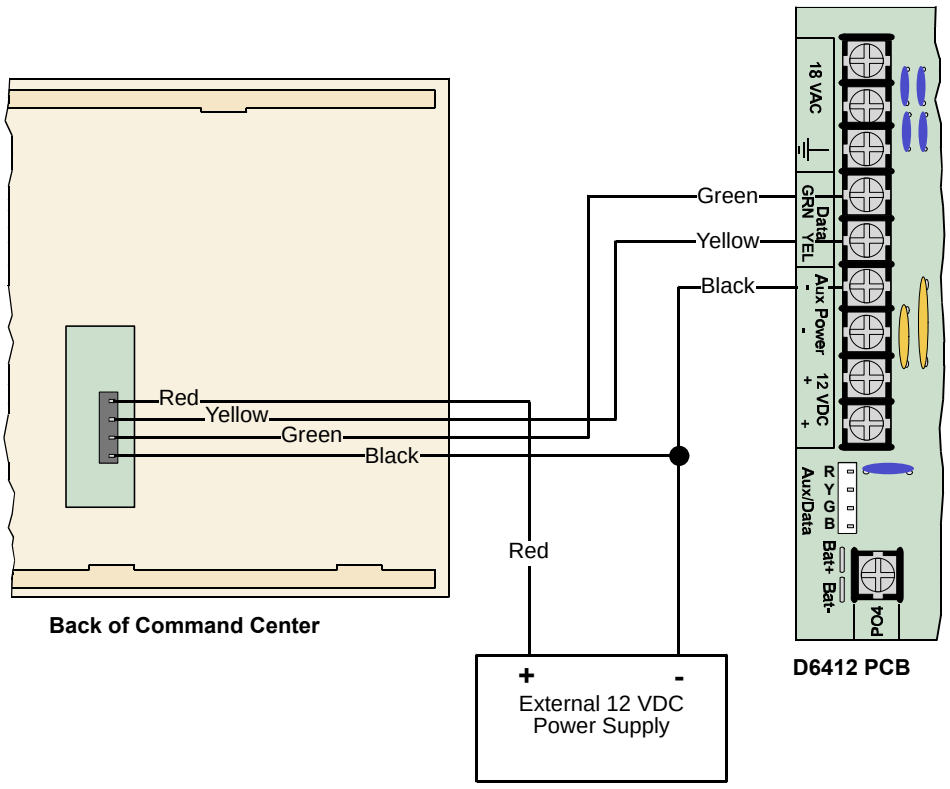


Figure 31: External Power for Command Centers

11.3 D268/D269, D279 Independent Zone Control

You can program on-board points 2 to 8 so that the D268, D269 or D279 (or later versions) Independent Zone Controls operate as independent point controls (arms and disarms the point).

See the *Point Index* in the *D6412 Program Entry Guide* (P/N: 45351) for programming information. See the installation literature that accompanies the D268, D269 and D279 (or later versions) for wiring and operation instructions.

IMPORTANT

In order to use the D268, D269 or D279 (or later versions) Independent Zone Control, you must program the D6412 on-board points for 1 k Ω End of Line resistors. Points 2 to 8 must all be supervised with 1 k Ω resistors, even if an Independent Zone Control is only used for one point. See* Global Point Configuration *in the* D6412 Program Entry Guide *(P/N: 45351) for programming instructions. Only use on-board points 2-8 with an Independent Point Control. No EOL resistor is used on the points connected to the IZC.

11.4 Keyswitch

11.4.1 Keyswitch Description

You can connect a maintained or momentary contact arming station (UL Listed security device keyswitch) 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. Outputs can be programmed to activate arming status LEDs for keyswitch arming stations. See the *Outputs* section of the *D6412 Program Entry Guide* (P/N: 45351) for more information.

11.4.2 Keyswitch Programming

See the *Point Index* section of the *D6412 Program Entry Guide* (P/N: 45351) for point programming for keyswitches.

11.4.3 Keyswitch 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 32).

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 32).

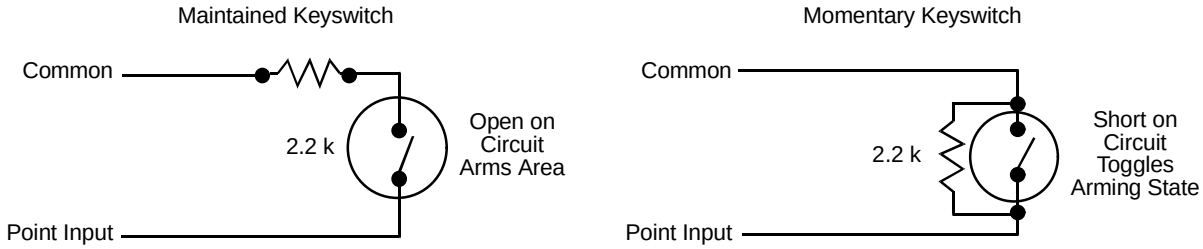


Figure 32: Keyswitches

11.4.4 Keyswitch Operation

Arming/Disarming

The D6412 offers a wide variety of keyswitch arming options. See *Point Index Configuration* in the *D6412 Program Entry Guide* (P/N: 45351) for details on configuring keyswitch arming options.

Silencing Alarms

- **Momentary Keyswitch:** To silence alarms (stop Alarm output), operate the keyswitch. If the area is armed, operating the keyswitch to silence the alarm will also disarm the area. If the area is disarmed, operating a momentary keyswitch to silence the alarm will not arm the area.
- **Maintained Keyswitch:** If the area is armed, turn the keyswitch to the disarmed position. The D6412 will disarm the area and silence the alarm. If the area is disarmed, turn the keyswitch to the armed position (the D6412 will not arm) and then return to the disarmed position.

12.0 SDI Devices

12.1 Description

The panel supports a variety of SDI devices, including the Command Centers, D9528 Point Expanders, and D9529 Octo-Outputs discussed in previous sections.

12.2 Installation

Consult the installation manual for the specific SDI device for complete installation instructions. SDI devices connect to the panel in parallel as shown in Figure 33.

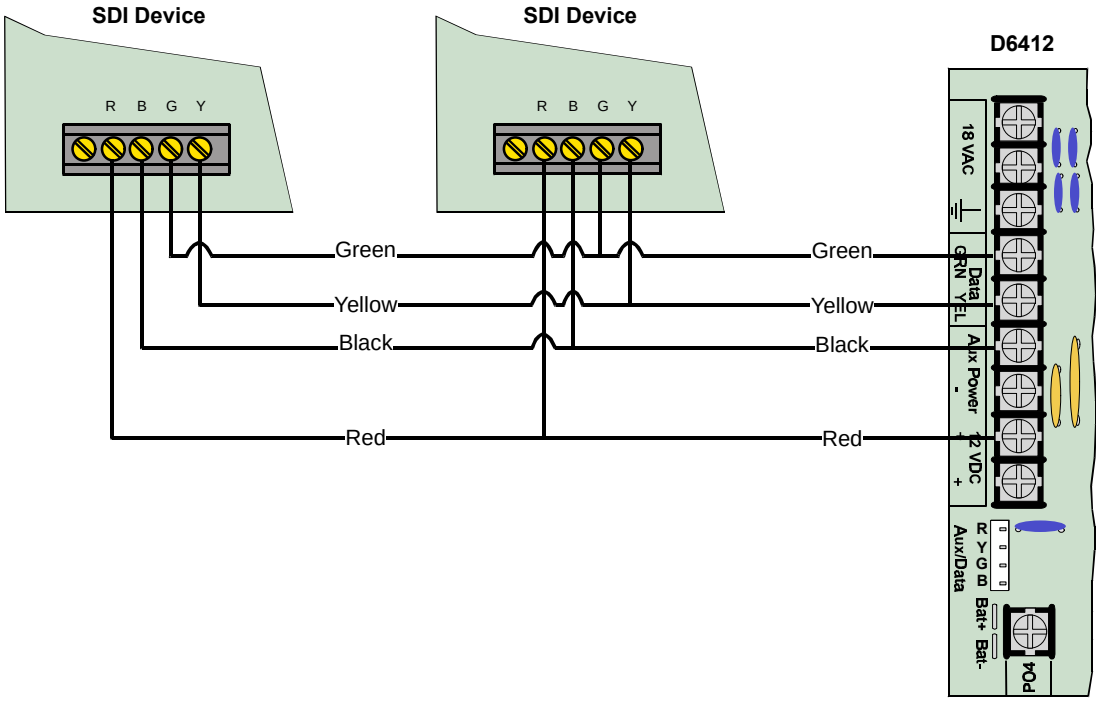


Figure 33: SDI Device Wiring

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

Extra power needed for additional SDI Devices: Review Section 5.0, *Power Outputs*, to determine the total power output requirements for your system. You may need to add one or more External Power Supply Modules for the number of devices you want to use. Figure 31 shows an external power supply powering Command Centers.

For UL certificated accounts use a UL listed power supply.

Control/Communicator and External Power Supply must share COMMON: Figure 34 shows the common from the External Power Supply Module connected to both the Command Centers' common and the common on the Control/Communicator.

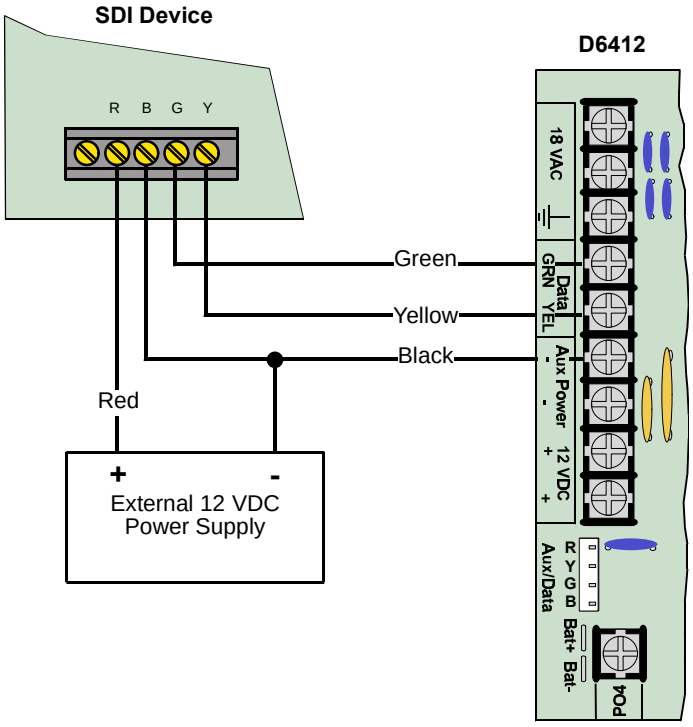


Figure 34: External Power for SDI Devices

12.3 D9533 RS-232 Serial Interface Module

Radionics' D9533 RS-232 Serial Interface Module can be used to connect a standard serial printer, or other serial devices, to the panel. It can also be used for a RAM IV remote programming direct connection. Refer to the *D9533 Installation Guide* (P/N: 48210) for complete installation, addressing and operating instructions.

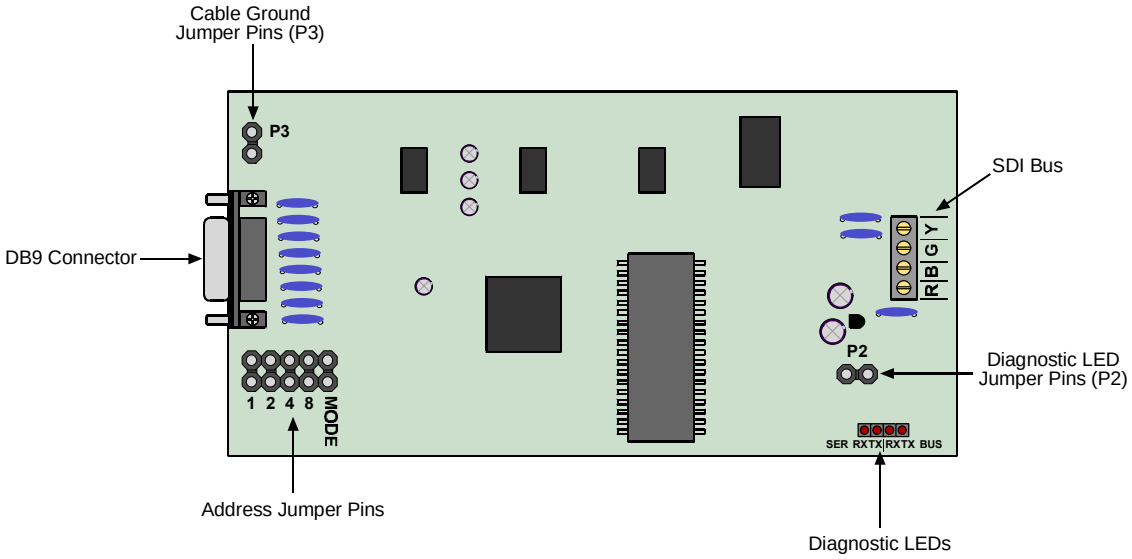


Figure 35: D9533 RS-232 Serial Interface Module

12.3.1 D9533 Installation

The intended installation location for the D9533 is in the plastic enclosure that it is shipped in. This is a low-profile, aesthetically appealing housing that can be placed on a desktop or similar surface.

Distance from the panel is determined by the total combined wire length of all devices (including keypads) connected to the panels Data terminals. The combined total wire length must not exceed 1000 ft. (305 m) for #22 AWG (0.8 mm), or 2,000 ft. (610 m) for #18 AWG (1.2 mm).

12.3.2 D9533 to D6412 SDI Bus Wiring Connections

See Figure 36 for acceptable power wiring connections. See Section 4.3, *External Power Supply,* for external power supply restrictions.

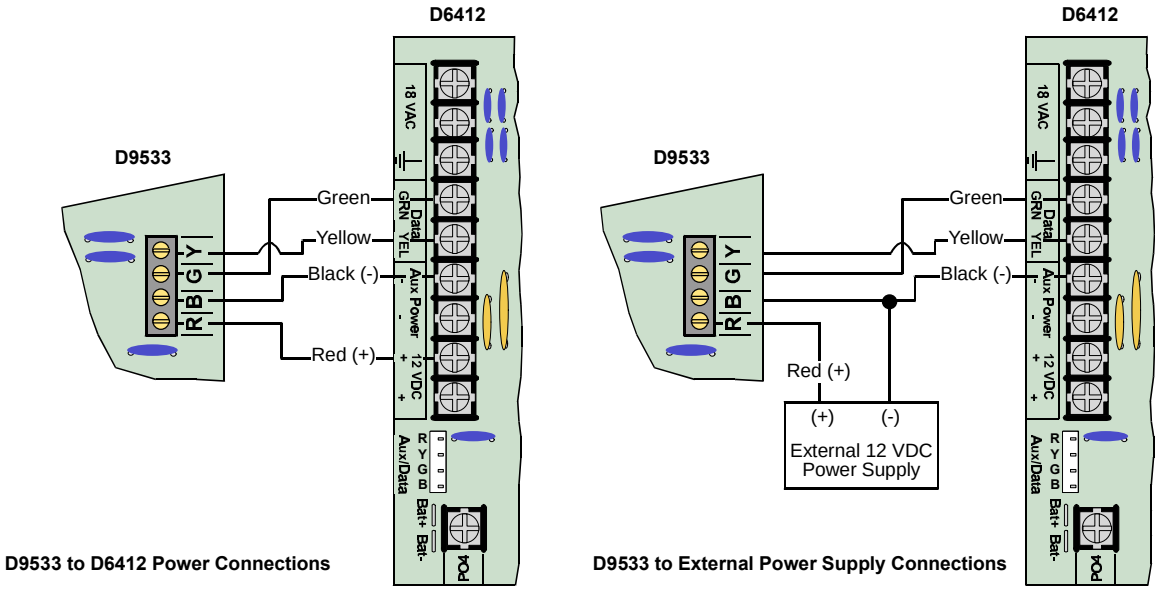


Figure 36: D9533 Power Connections

12.3.3 RAM IV Direct Connection

The D9533 can be used to connect directly to the D6412 for RAM IV remote programming. It also allows the user to perform diagnostic and history retrievals in RAM IV.

To connect directly to the D6412 for a RAM IV session, use these steps:

1. Make sure all address jumper plugs are in the OFF position on the D9533. See Figure 35 for address jumper pin location.
2. Connect the D9533 to Com Port 1 or 2 (or an available Com Port) on your computer. The D9533 has a DB-9 male serial connector. If this does not fit your computer, you will need an adapter.

IMPORTANT

A null modem cable (not included with the D6412 or the D9533) is required.

3. Wire the flying leads of the colored cable connector (included with D9533) to the D9533's SDI Bus terminals. Plug the connector end onto the D6412. See Figure 37 for details.

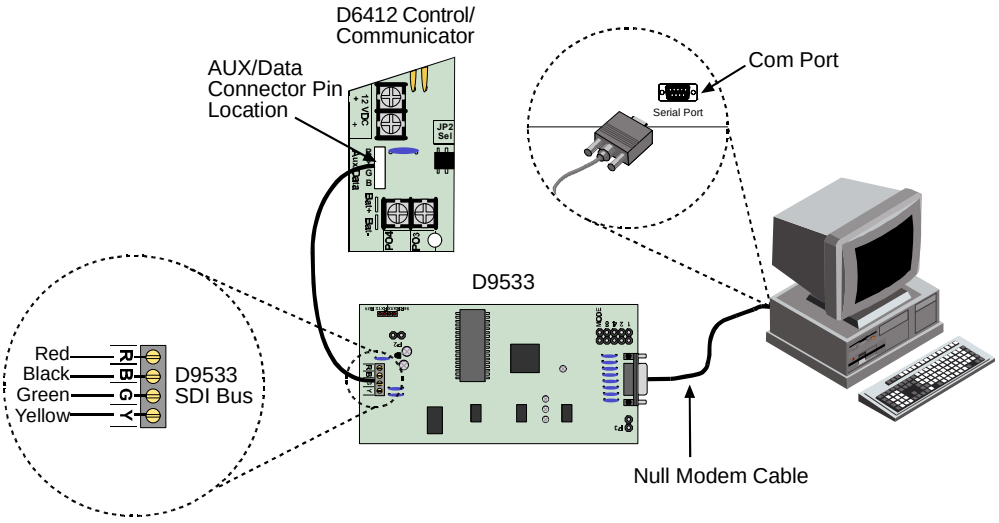


Figure 37: Creating a RAM IV Direct Connection

12.3.4 Configuration Jumpers

P2 – Diagnostic LED Pins

The diagnostic LEDs can be used for troubleshooting purposes. See Figure 38 for jumper plug placements.

IMPORTANT

The D9533 will draw more current when the diagnostic LEDs are enabled. Do not enable the diagnostic LEDs under normal operating conditions.

- **BUS RX LED:** SDI bus receive data from control panel.
- **BUS TX LED:** SDI bus transmit data to control panel.
- **SER RX LED:** RS-232 receive data from printer (or other serial device connected to D9533).
- **SER TX LED:** RS-232 transmit data to printer (or other serial device connected to D9533).

P3 – RS232 Cable Ground Pins

Some devices connected to the DB9 connector may cause a ground fault condition on the control/communicator. If this occurs, removing the plug across the P3 jumper pins may clear the ground condition.

Some devices can cause a ground fault even if the P3 jumper plug is removed.

- **P3 Jumper Pins Disabled:** Isolate DB9 Shield from SDI Common (Black)
- **P3 Jumper Pins Enabled:** Connect DB9 Shield to SDI Common (Black)

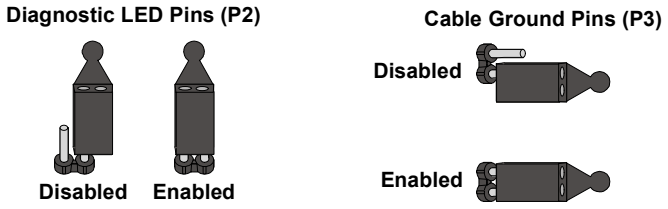


Figure 38: D9533 P2/P3 Jumper Pin Settings

Address Pins

The Address Jumper Pins are used to assign an address to the D9533. Remove the jumper plugs from the MODE pins for RAM IV direct connection.

12.3.5 Supervision

Supervision includes proper operation of the SDI bus, printer paper supply, and serial printer (or device) selected (on-line).

The panel sends an SDI missing report to the receiver if it fails to communicate with the D9533 module.

12.3.6 D9533 Module's DB9 Connector

The DB9 Pins are configured as follows:

1	DCD	4	DTR	7	RTS
2	RxD	5	GND	8	CTS
3	TxD	6	DSR	9	RI

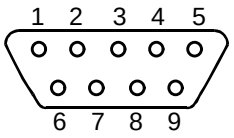


Figure 39: D9533 DB9 Connector Layout

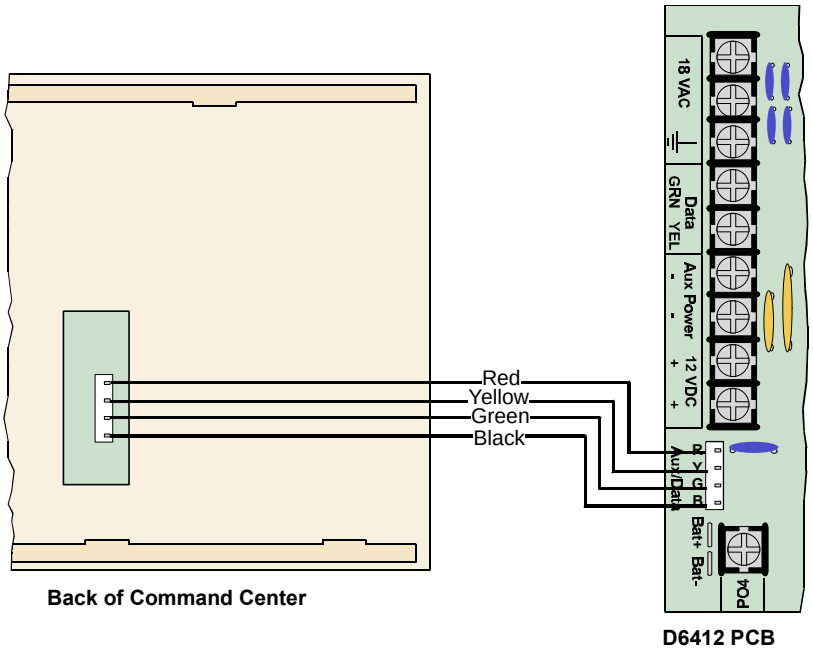
13.0 Installer's Keypad and Installer Mode

13.1 Installer's Keypad Connector

IMPORTANT

The Installer's Keypad must be set to Address 0 (set MODE to OFF) and the Installer Switch must be closed in order to program the D6412 from the keypad.

Figure 40 shows you how to connect and disconnect an Installer's Keypad and enter the Installer's Mode. Refer to *D6412 Program Entry Guide* (P/N: 45351) for complete information on programming the panel from a keypad.



Use Wire Assembly P/N: 15-04298-000 to connect the Command Center to the D6412.

Figure 40: Installer's Keypad

13.2 Entering the Installer Mode

IMPORTANT

Press the [Cmd] key when the Text Command Center display prompts you to press the [#] key.

13.2.1 Installer's Passcode

To enter the Installer's Mode, first enter the installer's passcode and then press **[Cmd] + [4] + [1]**. The default Installer Passcode is 6543210. The passcode length can be between 3 and 7 digits in length (default length is 4 digits, which shortens the default Installer passcode to 6543). To change the default passcode length, see Section 2.9, *Passcode Configuration, Installer Passcode*, in the *D6412 Program Entry Guide* (P/N: 45351).

The system displays the installer's menu described in Section 13.3, *Installer's Menu*.

IMPORTANT

The Installer Switch must be closed to select Keypad Program from the Installer's Menu (see Figure 41).

13.2.2 Service Start/Service End Reports

After you enter your installer passcode and press Cmd 41 to enter the Installer's Mode, the D6412 sends a Service Start report. When you exit the installer's mode, it sends a Service End Report.

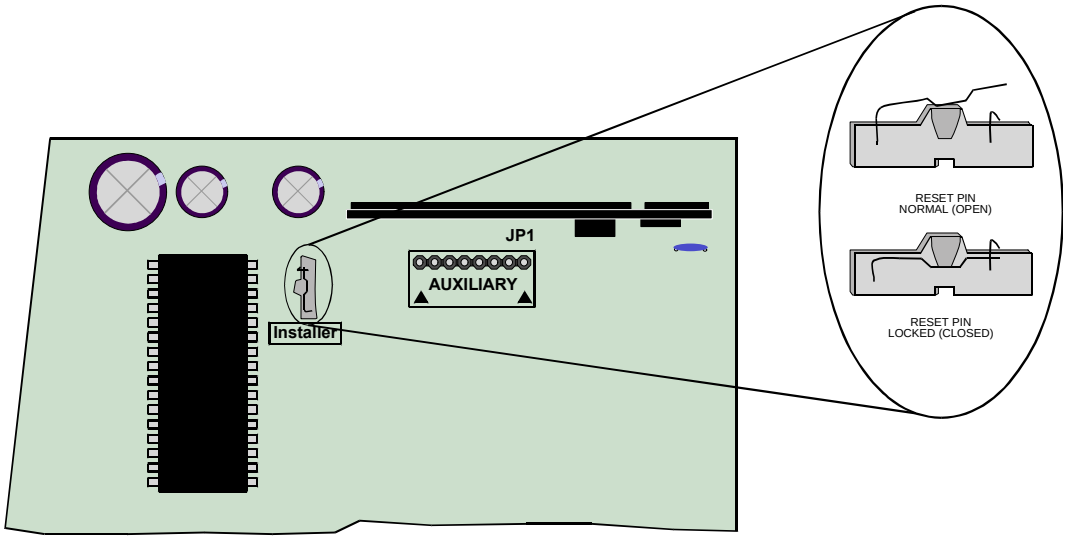


Figure 41: Installer Switch

13.3 Installer's Menu

13.3.1 Press [1] for Bell Test

The panel activates the Bell Time (1-8) and Alarm Output (1-8, 1-9, 1-10, 1-11, and 1-12.) functions for 3 seconds. See *Outputs*, in the *D6412 Program Entry Guide* (P/N: 45351) for a complete description of output functions.

13.3.2 Press [2] for Strobe Test

The panel activates the Strobe Output functions and waits for the installer to press the [Cmd] key to end the test. If the installer fails to press the [Cmd] key within 20 minutes the D6412 automatically terminates the strobe test.

13.3.3 Press [3] for Battery Test

The battery test causes the system to run on battery only for four minutes. If the battery voltage falls below 12.1 volts during the four minute test or if the battery is missing, the system restores AC power and displays a system trouble at all keypads.

13.3.4 Press [4] for Test Report

When you press the [4] key, the panel will attempt to send a Test report. If there is a system trouble present at the time of the test, the panel sends a Test, Off Normal report

The test report follows the routing for the Automatic Test report.

If the test communication is unsuccessful, the panel creates a system trouble and a communication failure.

IMPORTANT

This test report is the only report sent when the Installer Switch is closed.

13.3.5 Press [5] for Point Status

Pressing [5] displays the sensor loop status for the first location in the system. The location, area, point number, and electrical status (open, short, or normal) are shown. See *Locations* in the *D6412 Program Entry Guide* (P/N: 45351) for a complete description of the relationship between locations, areas, and points.

Pressing the [*] key advances the display to the status for the next point.

Pressing the [Cmd] key exits the Point Status mode.

13.3.6 Press [6] for Output Test

When you press [6] for Output test, the display shows **`Output 1, Hold [*] to test`**. Holding [*] activates Output 1 for as long as you hold [*] down. When you release the [*] key, the display advances to the next output.

Pressing the [*] key (without holding) advances to the next output, without activating the output displayed.

13.3.7 Press [7] for RF Menu

Pressing [7] moves the system into the RF Menu. This menu consists of three scrolling choices that allow you to add RF ID codes, test RF devices and view or remove RF ID codes.

13.3.7.1 Adding RF ID Codes

To add RF ID codes into the system, press [1] when "Add RF ID? Press 1." scrolls across the display. The display will then show the following:

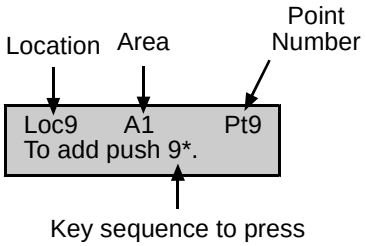


Figure 42: Adding RF ID Codes Menu Display

To add the location shown in Figure 42 as an RF device to the system (Location 9 used as an example), press [9] followed by [*]. The following display will then be shown:

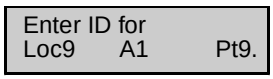


Figure 43: RF ID Code Display

Enter the 9-digit ID code found on the back of the RF device and then press [Cmd]. "ID added. Press #." will appear on the second line of the display, indicating that the code has been successfully entered and accepted. Press [Cmd].

If an error message appears instead of "#," make sure you enter the code as printed on the back of the device and that you only enter nine digits.

Press [Cmd]. The display returns to the first location designated as an RF device and scrolls through other RF device locations (if any). You may enter the desired location number and add the ID code as described above.

When all RF ID codes have been entered, press [Cmd] twice. The first line of the display will show "Configuring RF Please Wait." During this period, the RF Receiver's LED will blink approximately once every second until all ID bytes have been recognized. If the devices are successfully configured, the display will return to the scrolling RF Menu.

If an error message appears, make sure the RF Receiver's transmit lines are properly connected to the D6412 and that no shorted conditions are present.

From the RF Menu, you may choose 1 to enter additional RF ID codes or you may select one of the other RF Menu choices. If you are finished with the RF Menu, press [Cmd] to return to the main programming menu.

- **Locations 41-44:** RF Keypads (4 max – 1 per Location)
- **Locations 45-68:** RF Keyfobs on RF Receiver 1*
- **Locations 69-76:** RF Keyfobs on RF Receiver 2*

* 32 RF Keyfobs available with **BOTH** RF Receivers 1 and 2 connected to system.

13.3.7.2 Testing RF Devices

To test RF devices that have been added to the system, press [2] when "Test RF Devices? Press 2." scrolls across the display. The display will then show the following:

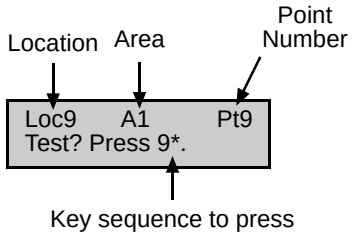


Figure 44: Test RF Devices Display

The display scrolls through all of the properly configured devices (Figure 44 shows Location 9 as an example) and asks whether you wish to test. Using Location 9 as an example, press [9] followed by [*] to test the RF device at Location 9. The first line of the display will show "Activate device!", indicating that the device must be activated in order to test it. Once the device is activated, the following display will appear:

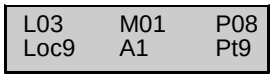


Figure 45: RF Device Test Status Display

The first line in Figure 45 shows the RF device's test status:

- **L03:** System recognizes the device and that the device is operating properly. Other status displays include:
  - **L02:** System recognizes the device and that the device operation is fair.
  - **L01:** The device must be relocated to allow for proper operation.
- **M01:** Counts the number of device activations. For example, an RF3401 Point Transmitter is the device being tested. When the magnetic assembly is removed from the point transmitter base, the activation counter will count one activation. When the magnetic assembly is returned to the point transmitter base, the counter will count a second activation. Opening and closing the point transmitter's case are also considered activations.
- **P08:** Message packet transmission.
  - Alarm, Panic and Restoral messages are transmitted with 8 packets (Alarm and Restoral refer to the transitions in and out of alarm conditions).
  - Supervisory and Test transmissions (smoke detectors) consist of 4 packets.
  - RF keypads transmit 4 packets for all keys except the Emergency keys, which transmit 8 packets.
  - RF key fobs transmit 4 packets for normal operation and 8 packets for the Panic button (Arm and Disarm pressed simultaneously).

RF receivers need to receive 7 or 8 data packets from a transmitter in order for that transmitter to be considered "Good." When testing RF keypads or key fobs, the panic functions must be used, otherwise the units will only transmit 4 packets (see packet count above). When testing the installation of a smoke unit, the test button should not be used. Doing so will result in a 4 packet transmission.

When you have finished testing a device, press [Cmd]. The list of RF devices will begin to scroll beginning with the first (lowest) location assigned to an RF device. You may select another location to test by entering the location number followed by the [*] and repeating the procedure described above. If you are finished testing, press [Cmd] again and the RF Menu will be displayed.

13.3.7.3 Viewing/Removing RF ID Codes

To view or remove RF ID codes that have been added to the system, press [3] when "View or Remove RF ID? Press 3." scrolls across the display. The display will then scroll through the properly configured RF devices:

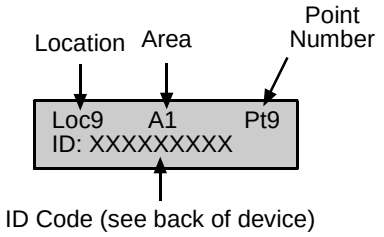


Figure 46: RF ID Code Display

After each ID code is shown, the display will toggle to the following message before moving to the next ID code: "To remove ID press 9* (the number "9" represents the location number and is used as an example here and in Figure 46).

To remove the ID code, press the number key(s) that corresponds with the location number (for this example, [9]). Then press the [*] key. The display will then ask you to confirm your removal. Press the appropriate number key(s) followed by the [*] key. The display will then show "Removed ID" on the first line with the location, area and point numbers of the removed ID on the second line.

If you wish to remove additional ID codes, press [Cmd]. The scrolling list of RF devices will return. Press [Cmd] again to return to the RF Menu when you have finished removing all ID codes. Pressing [Cmd] a third time will return you to the main programming menu.

13.3.8 Press [8] for Keypad Program

Pressing [8] moves the system into keypad programming mode ***ONLY*** if the Installer Switch is closed (see Figure 38).

See *Appendix E, Keypad Programming* in the *D6412 Program Entry Guide* (P/N: 45351) for complete instructions for programming from the keypad.

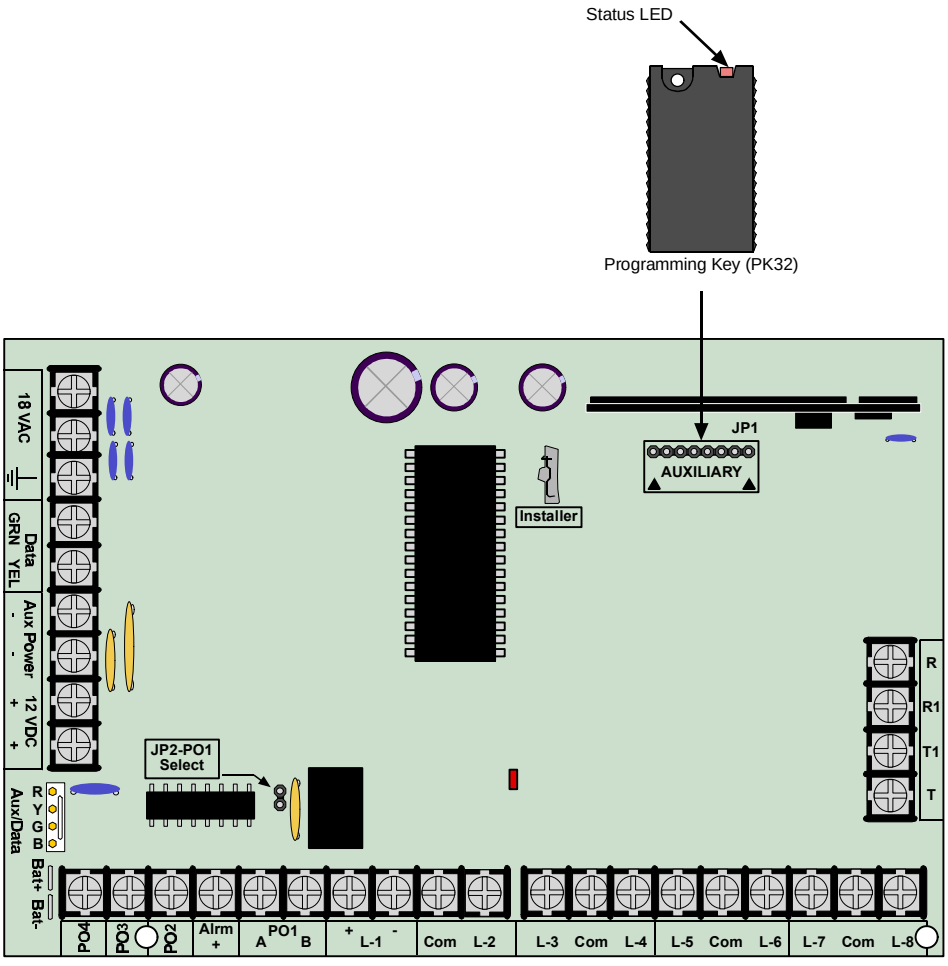
13.3.9 Press [9] Program Key

The PK32 Programming Key functions much like a blank floppy disk and can be used to copy a system's programming to another system. This key can also be used as a backup in the event that the system's programming entries are lost.

To access the PK32 Programming Key Menu, press [9] from the main programming menu. This menu contains the following selections:

- **Key to Panel:** Press [1] to send information from the Programming Key to the D6412.
- **Panel to Key:** Press [2] to send information from the D6412 to the Programming Key.
- **Check Key:** Press [3] to perform a functional diagnostic on the Programming Key. The status LED on the Programming Key will blink during the check. When the display shows "Check OK," the Programming Key is OK for use. Press [Cmd] to abort the check.
- **Erase Key:** Press [4] to erase the contents of the Programming Key.

The PK32 connects to the pins marked AUXILIARY (JP1) on the D6412 board.



D6412 PCB

Figure 47: PK32 to D6412 Connections

13.3.10 Exiting the Installer's Menu

When you are ready to exit the Installer's Menu and return the system to normal operation, open the Installer's Switch. The following screen appears for approximately 10 seconds:

```
D6412    Rev X.XX
Please Wait...
```

After the 10-second wait period, the text command center display returns to normal (disarmed, no fault/trouble conditions).

13.3.11 Press [0] Call for Service Details

The system displays **`Call for Service`** to end users when they press [Cmd 42] to display System Troubles and there is a Call for Service condition present.

The first line of the display is fixed. The second line is programmable text that can be used to enter the preferred phone number to use if a call for service must be place. This number could be the central station's phone number or a different number. The second line could also be used to show an instructional message, such as "PRESS 0 TO VIEW." This message would instruct the user to press the [0] key to view system trouble details.

There are a variety of system conditions that can bring up the Call for Service display. The exact nature of the trouble is not shown to the end user because none of the conditions can be serviced by them (they require attention from the servicing company).

Call for Service Details

Comm Fail, Destination 1 [2] – system attempted to send report to this routing destination, but failed. See *Appendix A, Routing Dialing Tables* in the *D6412 Program Entry Guide* (P/N: 45351) for details on the communication failed event.

System battery is low – The battery connected to the D6412 has fallen below 12.1 volts.

System battery is missing – The battery connected to the D6412 is badly discharged, damaged, or disconnected.

Data bus missing, Device ### – The SDI data bus device set to the address shown in the display (###) is missing or has stopped responding.

Data bus tamper, Device ### – The tamper on the SDI data bus device set to the address shown in the display (###) is open.

Data bus reset, Device ### - The SDI data bus device set to the address shown in the display (###) has reset its microprocessor.

Data bus trouble, Device ### – The SDI data bus device set to the address shown in the display (###) is sending a trouble message to the panel. Troubles are defined per device type. See the instructions for the device shown to learn the exact nature of the trouble.

Bell supervision fault PO 2 – Programmable Output 2 (marked PO 2 on the panel) can be programmed as a supervised siren/speaker. See *Outputs* in the *D6412 Program Entry Guide* (P/N: 45351). When PO 2 is programmed for supervision, disconnecting or shorting the siren or speaker generates this fault condition.

RF Rcvr Trouble, Device ### – The premises RF receiver set to the displayed SDI address (Device ###) is sending a trouble message to the D6412. Troubles are defined per receiver type. See the instructions for the receiver shown to learn the exact nature of the trouble.

RF Rcvr Jammed, Device ### – The premises RF receiver set to the displayed SDI address (Device ###) is sending a jammed message to the D6412.

14.0 Installation Label

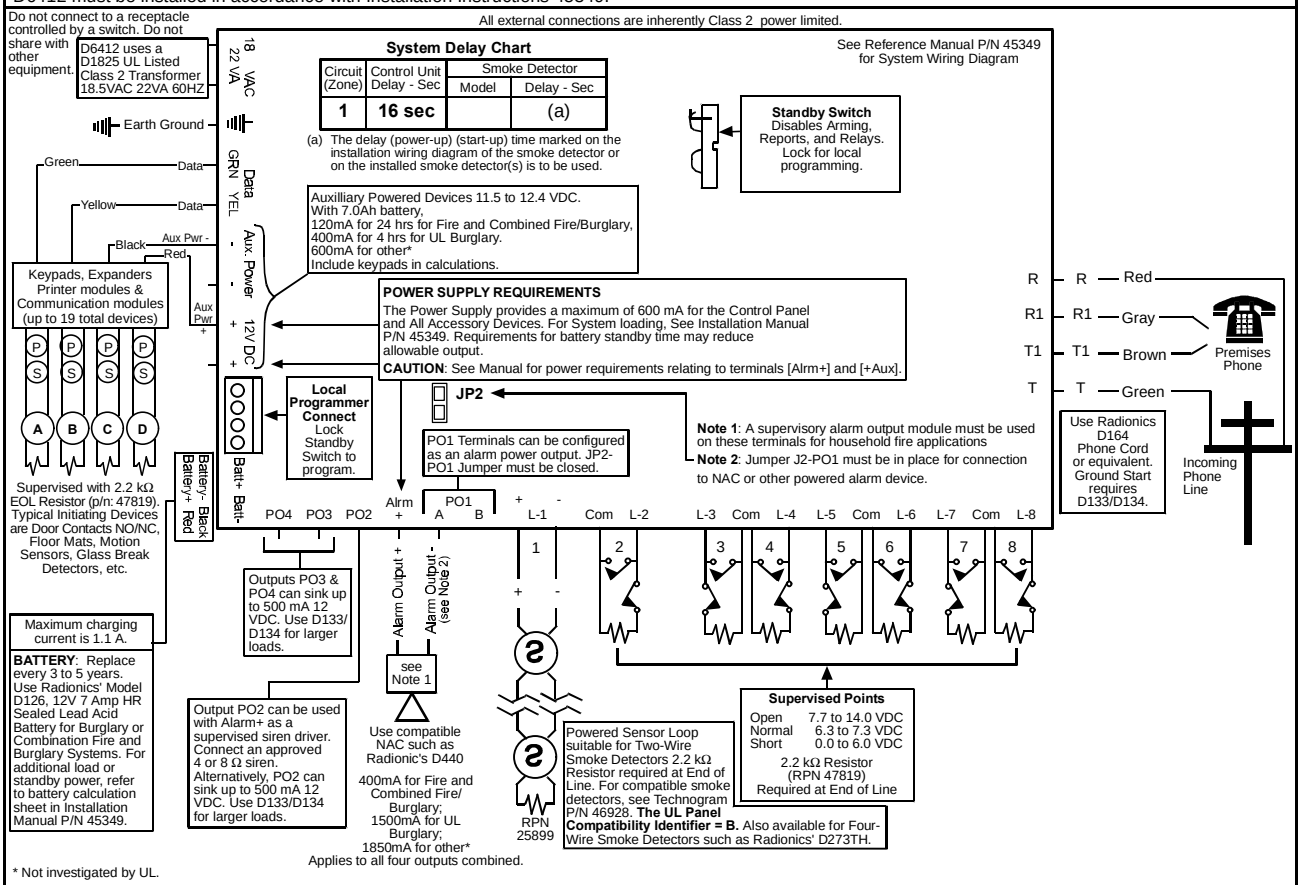
radionics D6412

Radionics recommends testing the entire system at least once a week, and having a qualified technician check the system at a minimum of once every 3 years.

This system should be installed in accordance with the National Electrical Code, NFPA 70, the National Fire Alarm Code, NFPA 72 and the local authority having jurisdiction. Depending on the application, the installation is to be in accordance with one or more of the following UL standards: UL681 Installation and Classification of Mercantile and ank Burglar Alarm Systems; UL1076 Propreietary Burglar Alarm Systems and Units; UL1641 Installation and Classification of Residential Burglar Alarm Systems. Printed information describing proper installation, operation, testing, maintenance, repair service and response to an alarm is to be provided with this equipment.
Warning: Owner's Instruction Notice: Not to be removed by anyone except occupant.

This equipment has been type tested and found to comply with the specifications in Part 15 of FCC rules for Class B Computing Devices. Operation is subject to the two following conditions (1) this device may not cause any interference, and (2) this device must accept any interference received including interference that may cause undesired operation. Complies with Part 68, FCC Rules. **FCC Registration Number:** ESVMUL-46531-AL-E 0.1B

Suitable for the following applications: 1) Household Burglar Alarm System Units, Grade A. 2) Household Fire Warning System Units. 3) Police Station connect, Grade A Mercantile Premise alarm system, Grade A Mercantile Safe and Vault alarm system and Grade AA Mercantile Safe and Vault alarm system when installed in conjunction with Model D8122 derived channel subscriber terminal unit. For all Police Station applications and grades, Model D8108A Attack Resistant Enclosure with a UL Listed local sounding device is required. 4) Local, Grade A Mercantile Premise alarm system and Grade A Mercantile Safe and Vault alarm system. For all local applications and grades, Model D8108A Attack Resistant Enclosure and a UL Listed local sounding device is required. 5) Central Station Mercantile, Grade C application. Central Station Mercantile, Grade B when installed with a UL Listed local sounding device. Central Station Mercantile, Grade AA when installed with Model D8122 derived channel subscriber terminal unit. 6) Proprietary Burglar Alarm units, Grade B, when installed with a UL Listed local sounding device. Proprietary Burglar Alarm unit, Grade BB when installed with the Model D8122 derived channel subscriber terminal unit. D6412 must be installed in accordance with Installation Instructions 45349.



WARNING: THIS UNIT INCLUDES AN ALARM VERIFICATION FEATURE FOR POINT 1 THAT RESULTS IN A DELAY OF THE SYSTEM ALARM SIGNAL WHEN PROGRAMMED FOR THIS FEATURE. THE TOTAL DELAY (CONTROL UNIT PLUS SMOKE DETECTORS) SHALL NOT EXCEED 60 SECONDS. NO OTHER INITIATING DEVICES SHALL BE CONNECTED TO POINT 1 WHEN PROGRAMMED FOR ALARM VERIFICATION, UNLESS APPROVED BY THE LOCAL AUTHORITY HAVING JURISDICTION.

☐ This box will be checked if Point 1 is programmed for Alarm Verification.

Quick Terminal Reference Description

15.0 Quick Reference Terminal Description

Term	Silkscreen (below terminals)	Description
1,2	18 VAC	18 V, 22 VA; up to 50 ft. (15.3 m), #18 AWG (1.2 mm), Stranded.
3	Earth Ground Symbol	Earth Ground.
4	Data, Grn (Green)	SDI data on Terminals 4 &5. Panel supports up to 1,000 ft. (305 m) of #22 AWG (0.8 mm) wire on these terminals (any configuration).
5	Data, Yel (Yellow)	
6,7	Aux Power 12 VDC (-)	Terminals 6-9 are Aux power. 600 mA. Include any programmable outputs (PO 1 to PO 4) not configured for alarm output. PTC protected.
8,9	Aux Power 12 VDC (+)	
JP3	Aux/Data (RYGB)	4-pin connector to Data bus and Aux power. Use to connect an installer keypad for keypad programming.
	Red (Bat +)	Battery (+) spade.
	Black (Bat -)	Battery (-) spade.
10	PO 4	Programmable Output, up to 500 mA (-). Include in Aux Power calculations for all except 'Alarm' output functions. PTC protected.
11	PO 3	Programmable Output, up to 500 mA (-). Include in Aux Power calculations for all except 'Alarm' output functions. PTC protected.
12	PO 2	Programmable Output. 500 mA (-). Include in Aux Power calculations for all except 'Alarm' output functions. Supervised for Horn/Speaker alarm function. PTC protected.
13	Alrm +	Alarm power. Up to 1,850 mA. PTC protected. Provides power for supervised siren driver (PO 2) and Alarm Output (PO 1).
14	PO 1, A	Jumper sets PO 1 terminals A (14) and B (15) for 'dry' Form "A" contact or for Alarm Output.
15	PO 1, B	
16	L-1 (+)	Positive terminal of powered loop. Supports up to 15 D263THS smoke detectors (D132A Reversing Module required). PTC protected.
17	L-1 (-)	Negative terminal of powered loop.
18	Com	Common for Sensor Loop 2.
19	L-2	Sensor Loop 2 input. Wire length for Sensor Loops 2 to 8 are limited only by the resistance on the loop and potential EMI problems. Resistance must be < 100 W with EOL resistor shorted and detection devices connected.
20	L-3	Sensor Loop 3 input.
21	Com	Common for Sensor Loops 3 and 4.
22	L-4	Sensor Loop 4 input.
23	L-5	Sensor Loop 5 input.
24	Com	Common for Sensor Loops 5 and 6.
25	L-6	Sensor Loop 6 input.
26	L-7	Sensor Loop 7 input.
27	Com	Common for Sensor Loops 7 and 8.
28	L-8	Sensor Loop 8 input.
29	T	Tip of telephone line.
30	T1	Tip of house (premises) phones.
31	R1	Ring of house (premises) phones.
32	R	Ring of telephone line.
	JP2, PO1 Select ↘	Configures PO 1 for Form "A" relay or Alarm Output.
	Auxiliary	Auxiliary Module and/or Programming Key Header.
	Installer	Installer Jumper. Jumper required for keypad programming.

16.0 Troubleshooting

16.1 Introduction

Radionics provides this guide to help you troubleshoot problems with the D6412. To prevent problems from occurring, read the preceding sections of this manual and the *D6412 Program Entry Guide* (P/N: 45351) to verify that the panel is correctly installed and programmed.

Below are various problems that may occur followed by explanations of the problems (cause) and solutions.

16.1.1 Arming Issues

- **Problem:** I enter a valid passcode to arm an area, but the area does not arm.
  - **Cause:** No points are programmed for that area; user does not have appropriate authority level to arm system.
  - **Solution:**
    - Add a minimum of one point to each area.
    - Make sure users who should be able to arm/disarm the system have the appropriate authority level. See Section 2.8 *Authority Level Configuration* in the *D6412 Program Entry Guide* (P/N: 45351).
- **Problem:** I cannot tell if my panel is Part On armed or Part 2 On armed.
  - **Cause:** The command center does not display which Part On arming feature is currently in use. There is no solution. The user that turns the system on will have to know which keys were pressed (Cmd 2 is Part On; Cmd 3 is Part 2 On).
- **Problem:** I armed my panel All On, but it keeps changing to Part On all by itself.
  - **Cause:** The All On - No Exit arming option is enabled. When the panel was armed, nobody faulted an Exit Delay point, therefore the panel did not arm those internal points.
  - **Solution:** To disable this feature, see the *D6412 Program Entry Guide* (P/N: 45351), Section 2.6 *Global Open/Close Options*, *Arming Options 1* (Nibble 0258).

16.1.2 Point Issues

- **Problem:** I have a trouble on a keyswitch point and it will not clear. The point is restored to its normal condition.
  - **Cause:** Swinger Bypass may not be enabled on this point index. The point will not restore until the swinger bypass condition restores.
  - **Solution:** Arm and disarm the panel to clear the current trouble. To prevent this in the future, check the keyswitch point index programming and make sure the swinger bypass feature is disabled.
- **Problem:** My Independent Point Controller does not generate a “point fault” on the command center when it is disarmed. The D9000 Series panels show a point fault during this condition.
  - **Cause:** This is normal operation for the D6412.
- **Problem:** The command center shows Point 1 as being faulted even though the 1k EOL resistor is in place.
  - **Cause:** The EOL Resistor Value Nibble (Nibble 1026) is programmed for 1k EOL resistors, and Point 1 always requires a 2.2k EOL resistor.
  - **Solution:** Replace the 1k EOL resistor on Point 1 with a 2.2k EOL resistor.
- **Problem:** There is no output after alarming a point.
  - **Solution:** Review the following sections in the *D6412 Program Entry Guide* (P/N: 45351): *2.17 Outputs* and *2.14 Point Index Configuration, Point Index Option 2*.

16.1.3 Command Center Issues

- **Problem:** I entered Cmd 50 at my command center, but it will not let me move to specific areas.
  - **Cause:** Cmd 50 (Move to Area) is disabled if there are no points assigned to a particular area.
  - **Solution:** Program at least one point and assign it to the particular area. Cmd 50 should work as defined.

16.1.4 Programming Issues

- **Problem:** I cannot enter into programmer's mode.
  - **Cause:** One or more areas are armed; programming may be disabled; the Installer's Switch may be open.
  - **Solution:**
    - If one or more areas are armed, disarm all armed areas. Programmer's mode cannot be entered while one or more areas are armed.
    - Programming may be disabled. See Section 2.5 *Programming Options*, *Installer Switch and Daylight Savings Time Options* (Nibble 0257) in the *D6412 Program Entry Guide* (P/N: 45351). Make sure the following options are enabled: Installer Switch, Keypad Programming and PK32 (Programming Key).
    - To enter the programmer's mode, the Installer Switch must be closed. See the following section in this installation guide for details: 3.5.2, *Closing the Installer Switch,* and 13.2, *Entering the Installer Mode*.

- **Problem:** I have enabled Open/Close reports, but when I arm the panel Part On, these reports are still not sent.
  - **Cause:** The Open/Close reports for Part On modes is not programmed correctly.
  - **Solution:** In the *D6412 Program Entry Guide* (P/N: 45351), Section 2.7 *Areas*, see the *Area # Opening/ Closing Reporting Options* parameter. Enable "Opening/Closing Reports for Part On Modes" for Nibbles 0296, 0318, 0340 and 0362.

- **Problem:** The PK32 (Programming Key) does not work (upload, download, erase, etc.).
  - **Cause:** The PK32 has not been enabled in the panel firmware.
  - **Solution:** In Nibble 0257, enable the PK32. See the *D6412 Program Entry Guide* (P/N: 45351), Section 2.5 *Programming Options.*

- **Problem:** The off-board points I added to the system display as missing.
  - **Cause:** The device location parameter is not correctly programmed.
  - **Solution:** See Section 2.13 *Locations* in the *D6412 Program Entry Guide* (P/N: 45351). Verify which device type has been added (for example, RF point, off-board point, etc.). In the Device Location parameter, enter in the correct value based on the Device Parameter Selections (1 = on-board; 2 = D9528; 3 = D9528, Doubled; 4 = RF Receiver 1; 5 = RF Receiver 2). Point configuration is locked into only those configuration types in the Device Parameter Selections.

- **Problem:** The panel does not send a Closing report after it is armed Part On.
  - **Cause:** Open/Close reports for Part On mode are not enabled.
  - **Solution:** See Section 2.7 *Areas* in the *D6412 Program Entry Guide* (P/N: 45351). In the *Area # Opening/ Closing Reporting Options* parameter, enable "Open/Close Reports for Part On Modes" by entering a 4, 5, 6, 7 or 12, 13, 14 or 15 in the appropriate Nibble (0296, 0318, 0340, or 0362).

- **Problem:** There are numbers in brackets [###] throughout the *D6412 Program Entry Guide* (P/N: 45351).
  - **Cause:** These numbers [###] refer to the event numbers described in Appendix B of the *D6412 Program Entry Guide* (P/N: 45351).

- **Problem:** There is no output after alarming a point.
  - **Solution:** Review the following sections in the *D6412 Program Entry Guide* (P/N: 45351): 2.17 *Outputs* and 2.14 *Point Index Configuration, Point Index Option 2*.

16.1.5 Miscellaneous Issues

- **Problem:** My printer is printing strange characters and I cannot read it.
  - **Cause:** The settings for the D9533 RS-232 Serial Interface Module will cause unexpected printer output.
  - **Solution:** In the *D6412 Program Entry Guide* (P/N: 45351), see Section 2.19 *SDI Bus Device Configuration*. Verify the settings for the following parameters: D9533 Output Configuration (Nibble 1253), Baud Rate Configuration (Nibble 1254) and Parity/Flow Control/Stop Bit Configuration (Nibble 1255).

- **Problem:** My D9533 is printing out lines of xxxxxxxx's or other strange characters whenever a new event occurs at the panel.
  - **Cause:** The settings for the D9533 RS-232 Serial Interface Module will cause unexpected printer output.
  - **Solution:** In the *D6412 Program Entry Guide* (P/N: 45351), see Section 2.19 *SDI Bus Device Configuration*. Verify the settings for the following parameters: D9533 Output Configuration (Nibble 1253), Baud Rate Configuration (Nibble 1254) and Parity/Flow Control/Stop Bit Configuration (Nibble 1255).

Appendix A

Appendix A: Approved Applications Compliance Guide

Listings and Approvals

Fire

- UL
- CSFM
- NYC-MEA - Approved by New York City's Materials and Equipment Acceptance System.

Burglary

- UL
- SIA (not verified by UL)

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.*

Optional Compatible Equipment

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

Burglary Applications

You can use UL listed burglary alarm sensors that do not require evaluation for electrical compatibility in burglary applications. In some cases you must use a UL listed Radionics interface module 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.

Auto Arming for Bank Safe/Vault Applications (UL 609)

To auto-arm for Bank Safe/Vault applications, use an Auto On/Auto Off Sked (schedule). Set the Auto On Sked to arm the system on a 7 day (1 week) timer no later than 10 p.m.. Set the Auto Off Sked to disarm the system no sooner than 6 a.m. the next business day. Adjust these skeds so that the system is armed during non-business hours (such as holidays and weekends). These times may be adjusted if they conflict with normal business hours and/or any non-business hour carry-over (extended holiday/closed periods). See *Skeds* in the *D6412 Program Entry Guide* (P/N: 45351) for Sked set-up instructions.

Fire Applications

You can use UL listed fire initiating devices not requiring electrical compatibility evaluation 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 on the sensor loop for location 1. 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 D6412* (P/N: 46928), or you may contact the detector manufacturer.

When using 4-wire smoke detectors, install a suitable power supervision unit according to the manufacturer's instructions. Use the D130 Relay Module, D9529 `Octo-Output`, or PO 1 to provide reset capability. See the *Outputs* section of this manual for details on the installation of the D9529.

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*.

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 *Appendix B: 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. You can use the D8108A in any burglar or fire alarm application where the 5591 or D8109 enclosure is suitable. 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.


IMPORTANT

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 A: System Chart

	Household Burglary (Grade A)	Household Fire	Household Fire/Burglary Combined	Central Station Burglary (Grade C)	Police Connected Burglary	Local Burglary	Mercantile (4 hrs) Commercial	Mercantile (72 hrs) Bank Safe/Vault Alarm	Proprietary Burglary
NFPA Standard		72	72						
Min. Hrs of Standby Battery	4	4 hrs + 24 min	4 hrs + 24 min	4	4	4	4	72	4
Entry/Exit Time (sec)*	45/60	45/60	45/60	60/60	60/60	60/60	60/60	60/60	60/60
Bell Time (minutes)	4	4	4	15	15	15	15	15	15
D2203 Enclosure	Included w/ panel			No	No	No	No	No	No
D8103 Enclosure**	Optional			Choose One	No	No	No	No	No
D8108A Enclosure	Optional				Req	Req	Req	Req	Req
D8109 Enclosure	Optional				No	No	No	No	No
D126 Battery (7 Ah)	Req	Req	Req	Req	Req	Req	Req	No	Req
D1218 Battery (18 Ah)	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Req	Opt
D127 Reversing Relay	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt
D132A Smoke Detector Reversing Relay Module	Required if D192C is not used. Use the D132A with compatible smoke detectors only.								
D164 Telephone Cord	Required to connect panel to RJ131X Telco Block.								
D192C NAC Supervision Module	Required if D132A and compatible smoke detectors are not used.								
D621, D623, D625 Command Center	1+	1+	1+	1+	1+	1+	1+	1+	1+
D262 Smoke Detector Head/D261 Base		1•	1•						
D282THS Smoke Detector w/ Sounder	Use with D132A.								
D431, D440, D442, D448 Indicating Device	1+	1+	1+	Opt	♦	♦	♦	♦	♦
D1825 Transformer	Required for all applications.								
D8004 Transformer Enclosure	Opt	Opt	Opt	Opt	Opt	Opt			
D8122 Derived Channel STU	Optional. Contact Telco availability of derived channel service.								
D8130 Release Module	Optional								

Key	
No	Not acceptable for this application.
Req	Required for this application.
Opt	Optional for this application.
1+	1 or more required for this application. Consult the appropriate standard.
2+	2 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 D6412. You could use the D262 with the D270 4-wire base or other manufacturer's 4-wire detectors. You must use a listed power supervision relay with 4-wire detectors.
♦	UL Listed bell (siren) housing required for burglary alarm bell or siren (Rothenbuhler 5110 Bell).
Empty Cell	Not used for this application.
*	Not to exceed these Entry/Exit Delay limits for UL installations.
**	D101 used for this application.

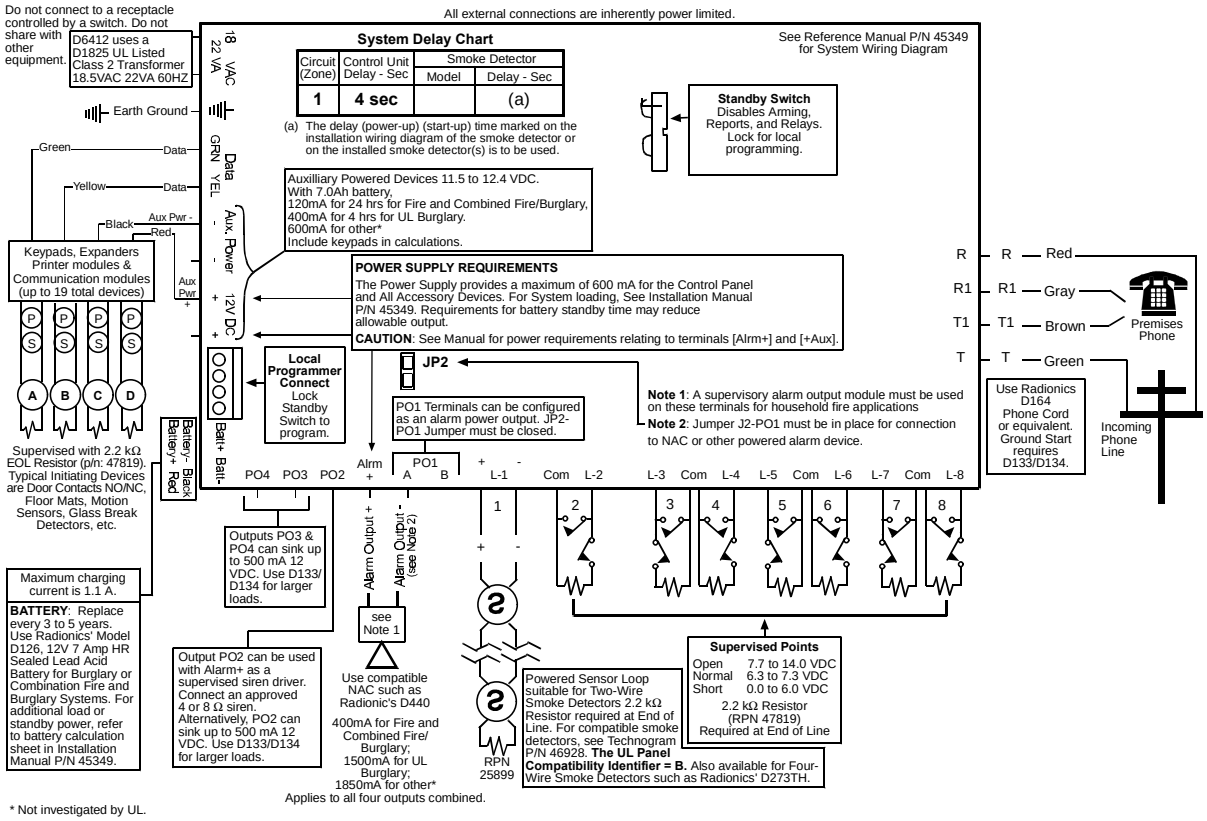
Appendix A

The D6412 control panel is suitable for Police Station connect applications, including Grade A Mercantile Premises and Grade A Mercantile Safe and Vault alarm systems. Suitable for Grade AA Mercantile Premises and Grade AA Mercantile Safe and Vault alarm systems when the Model D6412 DACT unit is installed in conjunction with the Model D8122 derived channel subscriber terminal unit. For all Police Station applications and grades, the Model D8108A Attack Resistant Enclosure with a UL listed local sounding device is required. Per UL 365, keyswitches mounted outside the protected area must employ high security locking cylinders complying with the requirements for key locks, UL 437. Tamper protection must also be provided.

The D6412 control panel is suitable for Local, Grade A Mercantile Premises and Local, Grade A Mercantile Safe and Vault alarm systems. For all Local applications and grades, the D8108A Attack Resistant Enclosure and a UL listed Local sounding device are required. Per UL 609, when keyswitches are mounted outside the protected area, tamper protection must be provided.

The D6412 control panel is suitable for Central Station, Grade C applications. It is suitable for Central Station, Grade B applications when the Model D6412 DACT unit is installed with a UL listed Local sounding device. Also suitable for Central Station Mercantile, Grade AA applications when installed with the Model D8122 derived channel subscriber terminal unit.

Appendix A: System Wiring Diagrams, Issue A



Appendix A: Current Rating Chart for Standby Battery Calculations

		A AC Power On Normal Current				B AC Power Off Minimum Current				C In Alarm Maximum Current			
Model Number	**Quantity Used**	**Each Unit***			**Total**	**Each Unit**			**Total**	**Each Unit**			**Total**
D6412	_____	85	x 1	=	85	85	x 1	=	85	100	x 1	=	100
Keypads													
D621	_____	35	x Qty	=	_____	35	x Qty	=	_____	115	x Qty	=	_____
D623	_____	100	x Qty	=	_____	100	x Qty	=	_____	100	x Qty	=	_____
D625	_____	270	x Qty	=	_____	270	x Qty	=	_____	270	x Qty	=	_____
Accessories													
D9528	_____	35	x Qty	=	_____	35	x Qty	=	_____	35	x Qty	=	_____
D9529	_____	10	x Qty	=	_____	10	x Qty	=	_____	10	x Qty	=	_____
X7410i	_____	10	x Qty	=	_____	10	x Qty	=	_____	10	x Qty	=	_____
D9533	_____	25	x Qty	=	_____	25	x Qty	=	_____	25	x Qty	=	_____
RF3224	_____	30	x Qty	=	_____	30	x Qty	=	_____	30	x Qty	=	_____
Sounders connected to PO2													
D118 8 Ω Speaker***	_____	0	x Qty	=	_____	0	x Qty	=	_____	330	x Qty	=	_____
Ratings of other devices in the system 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	=	_____
			Total A	=	_____		**Total B**	=	_____		**Total C**	=	_____

* Currents shown in milliamperes (1 ampere = 1000 milliampere)

** If the column C total exceeds 400 mA (600 mA for non UL applications), a D8132 is required to provide an additional 1400 mA. You may also use a UL Listed external power supply for this purpose

*** Not investigated by UL

Appendix A

Appendix A: Standby Battery Requirements

Household Burglary and Commercial Burglary

Four hours of standby battery capacity required.

Central Station or Local Fire Alarm

24 hours of standby plus 4 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.

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 A: Standby Battery Calculation for NFPA 72 Fire Alarm Applications

NFPA 72 (Chapter 2) Household Fire Warning Equipment: The NFPA (Chapter 2) Household Fire Warning Equipment Standard requires 24 hours of standby plus 4 minutes (0.067 hours) of alarm operation at the end of the 24 hour period.

You must use battery ampere hour (Ah) calculations to verify compliance, The formula in the next column includes a 10% contingency factor for depletion of battery capacity with age.

NFPA 72 (Chapter 2) Ampere-Hour Calculation Formula:

(Total B ___ x 24 Hrs) + (Total C x 0.067 Hrs) + (10% Contingency) = Total Ah required.

Total Ah requirements must not exceed Ah capacity of batteries.

Appendix B: SDI Address Chart

Appendix B

SDI Address	Device Description
0	Installer Keypad or local connection to RAM IV
1-8	Command Centers 1-8
40, 41	D624 Telephone Control Module
50	Premises RF Receiver 1
51	Premises RF Receiver 2
52-55	Premises RF Keypads Receiver 1
60-63	Premises RF Keypads Receiver 2
101-107	D9528 Wired Point Expanders
150, 151	D9529 Octo Outputs and/orX7410i Module
250	D9533 Serial RS-232 Interface

Glossary

24-Hour Point Points that are always on even when the system is turned off. Two types: Fire Points and Non-Fire 24-Hour Points.

Area An installer specified collection of points that can be armed and disarmed independently. An area can report with it's own account number. Opening, closing, alarm, trouble, and restoral reports are all associated with an area. You can organize the D6412's points and users into up to four independent areas, in essence creating four independent systems with a single control/communicator.

Arming States

- **All On** All controlled points are armed. All On with No Delay (Instant) is an option. No exit or entry delay is provided with the No Delay option.
- **Part On** An installer-defined subset of the controlled points is armed. Part with No Delay (Instant) is an option. No exit or entry delay is provided.
- **Part 2 On** A user-defined subset of the controlled points is armed. Part 2 with No Delay (Instant) is an option. No exit or entry delay is provided.
- **Off** The controlled points are not armed.

Authority Level A programmable feature that determines what a user can do in a given area.

Burglary Alarm Tone A constant warble tone.

Central Station A facility where trained personnel monitor a security system 24 hours a day. The security system may be programmed to contact the central station during alarm conditions, enabling central station personnel to dispatch the proper authorities.

Control/ Communicator A control/communicator combines the functionality of an alarm control panel and the functionality of a digital dialer in a single device. In the past, the control panel and communication functions were provided on separate products. In the D6412 literature, including this document, control/communicator, control panel, control, and panel are used interchangeably.

Controlled Point A point that responds to alarm conditions depending upon whether the system is turned on or off.

Cross Point Two point types that are configured to initiate an alarm when both point types have been faulted. Fire points cannot be set for Cross Point configuration.

Duress Passcode A passcode that arms and disarms a system just like a personal passcode does, however it also sends an alarm signal to the central station without sounding an alarm on the premises.

Entry Delay A programmed delay of the system alarm responses that allow a person to enter the building through the entry door to turn the system off. An alarm response will begin if the building is not exited before the entry delay expires.

Error Tone The same warble tone as the Trouble Tone, but not repeated.

Faulted Point A point that is not normal (e.g. – an open door or window).

Fire Alarm Tone A warble tone that is on for one second, then briefly off (repeatedly).

Follower Point A point programmed to initiate an instant alarm unless a delay point is faulted first. When a delay point is faulted first, the follower point assumes the entry delay time of the delay point.

Force Arming A method of overriding the safety feature that prevents arming with a faulted circuit on a control/communicator.

Global Something that affects the entire system (e.g. – global point configuration refers to the programmable features that affect all points).

Groups The D6412 program parameters described in this manual are organized into groups. Most groups primarily contain parameters that are related in some way. For example, the Authority Levels Group contains parameters that configure the D6412's four Authority Levels.

Hold An instruction to press and hold a key to perform a function.

Independent Point Control A device that allows a single point or zone on a control/communicator to be armed or disarmed independently from the rest of the system.

Instant Alarm A point type that initiates an alarm immediately when faulted. This point type does not follow any Entry/Exit delay time.

Invisible Point A point that does not display at any command center during alarm or trouble conditions.

Keyfob A small, hand-held wireless device usually designed to fit on a key chain that consists of buttons that allow the user to perform various functions, depending on the keyfob, such as arming/disarming the system, operating outputs or sending reports.

Keyswitch

Momentary To operate a momentary keyswitch, insert the key, turn it and then release it. The key returns to its starting position automatically. The key cannot be removed unless it is in the starting position.

Maintained A maintained keyswitch typically has two positions marked "Armed" and "Disarmed." To operate, insert the key, turn the key to the desired position and remove the key.

Latching The locking in of a circuit by means of a holding contact.

Modem IIIa² Modem IIIa² is a Radionics reporting format (protocol) the D6412 uses to communicate to central station receivers. Even though you can program the D6412 to report in other formats only Modem IIIa² reports are referenced in this document. If you choose an alternate reporting format use Appendix B in the *D6412 Program Entry Guide* to determine what report is substituted for the Modem IIIa² report.

Nibble Once the installer selects a value for a parameter, the panel stores the selection in E² memory 'Nibbles'. Each parameter uses one or more Nibbles. When programming from the Command Center, the installer enters their selection directly into the memory Nibbles. When programming from the remote programmer, the installer need only make one entry per parameter.

No Delay Turning the system on without Entry or Exit delay.

Off Display The display that appears when the system is turned off and no keys are pressed (normal display).

Options 'Options' are a unique type of parameter that allow the installer to configure up to four (4) features by entering a value in a single Nibble.

PSTN Public Switched Telephone Network. An assembly of communications facilities and central office equipment operated jointly by authorized common carriers that provides the general public with the ability to establish communications channels via discrete dialing codes.

Parameter Each program parameter sets a specific value or chooses an option.

Points The D6412 reports changing conditions on the sensor loops it monitors as 'point' events. For example when the condition on on-board sensor loop 1, changes from normal (supervised, end of line resistor in place) to 'shorted' the panel can be programmed to create an alarm event for 'point' 1. That alarm event appears in command center displays as 'Alarm, Pt 1'. If programmed for reporting, the panel would send an 'Alarm, Pt 1' report to the central station receiver in the Modem IIIa² format. Other reporting formats typically use 'Zones' (Zn) in their reports in place of point.

Point Index Used to construct "personality types" for points used in the D6412 system. Each unique point index number determines responses to specific conditions occurring on the protective points.

Point Type Describes what the point does (for example – fire point, burglary point, 24-hour point, etc.).

Glossary

Programmable Outputs	The D6412 provides up to 20 programmable outputs. These outputs are activated by installer selectable panel events. Event options include alarms, troubles, and scheduled events (Skeds). The D6412's on-board points provide power or dry contact switching upon activation. When programmed to activate on alarm events outputs are sometimes described as 'bell'. In some Modem IIIa² reports outputs are described as 'relay'.
Pulse Count	A feature of an intrusion detection system in which an alarm is triggered only after there has been a series of detections in a short period of time. A pulse count is used in difficult environments where false alarms area problem.
RAM IV	RAM (**R**emote **A**ccount **M**anager) IV is a Windows®-based account management and panel programming utility designed to remotely set up and program specific control panels.
Remote Programming	System programming by means of the system user's telephone line.
Restoral Report	A signal transmitted upon the removal of a trouble or alarm condition from an alarm circuit.
SDI	**S**erial **D**evice **I**nterface.
SKED	A scheduling parameter that allows a selected event to happen at a specific time.
Trouble	A service condition that needs to be corrected, such as a broken wire.
Trouble Tone	A warble tone that is on briefly, followed by a pause, followed by the warble tone (repeatedly).
Visible Point	A point that displays at command centers during alarm or trouble conditions.
Warble Tone	A tone that is on for one second, then briefly off.
Wink	A slow LED flash rate used to indicate a specified status or condition.
Point Scan Time	The amount of time that passes while a point is electrically off-normal. This duration determines the length of a pulse.
Press/Push	These are used interchangeably instructing you to push down and then release a key.

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