

# R A D I O N I C S

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## D9124 Addressable 24 VDC Control/Communicator Operation and Installation Manual

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## Notice

The material and instructions covered in this manual have been carefully checked for accuracy and are presumed to be reliable. However, Radionics Inc. assumes no responsibility for inaccuracies and reserves the right to modify and revise this manual without notice.

It is our goal at Radionics to always supply accurate and reliable documentation. If a discrepancy is found in this documentation, please mail a photocopy of the corrected material to:

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## FCC Notices

### 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 in a residential installation. This equipment generates, uses and can radiate radio frequency energy, and, if not installed in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

- 1) Reorient or relocate the receiving antenna
- 2) Increase the separation between the equipment and the receiver
- 3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- 4) Consult the dealer or an experienced radio/TV technician for help.

### 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 D9124 24 VDC Addressable Fire System 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 quantity of devices that may be connected to the telephone line. Excessive devices on the telephone line may result in one or more 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.

## Part 68 (continued)

If the D9124 System causes harm to the telephone network, the telephone company may notify you or 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 D9124 Control Panel, 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 equipment's warranty.

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

**FCC Registration Number** AJ9USA-18808-AL-E

**Ringer Equivalence** 0.1A 0.2B

**Service Center in U.S.A.** Radionics, Inc.  
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## UL/NFPA Notices

UL listed for NFPA 72 Central Station, Local, Auxiliary, Remote Station, Household Fire Warning Systems. The D9124 System has been approved by FM, NYC-MEA and CSFM.

The D9124 System is also listed for certificated central station Grade B and Grade C burglary applications. Grade B systems require a local bell. The D1255 Command Center is needed to meet the requirement of UL Central Burglary requirements.

**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.

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# Safety Section

## D9124 and High Voltage

The D9124 System connects directly to a 20 Amp, single phase circuit breaker. The high voltages at these connections are extremely dangerous. Only licensed electricians should make or service these connections.

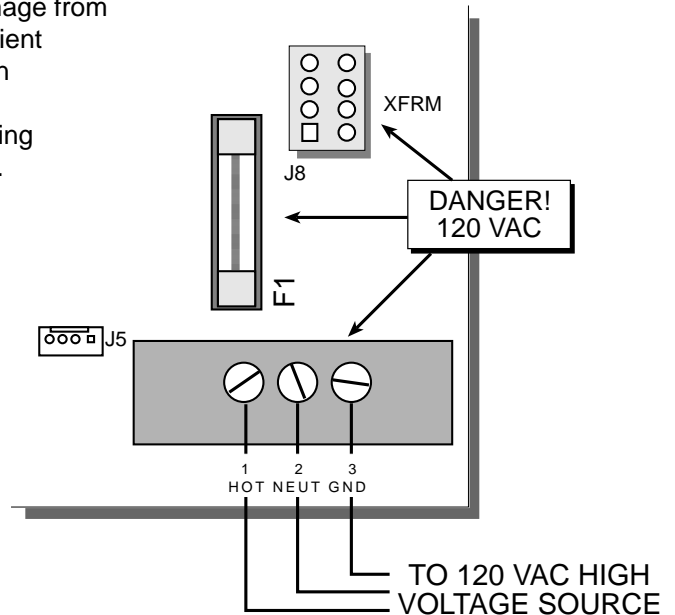
### Ground the System First

For safety and to help prevent damage from electrostatic charges or other transient electrical surges, connect the green ground wire for the 120 VAC to the stud shown in *Figure 6* before making any other connections to the panel. Also connect the two green panel earth ground wires to the earth ground stud. All connections to the ground stud must be made exactly as shown in *Figure 5*.

**All connections to the 120 VAC terminals should be performed as directed by NEC 70.**

### Safety Precautions While Handling High Voltage

**Danger!** High voltage is present at the AC Power input terminals, at Fuse F1, and at connector J8, near the lower right corner of the D9142 Power Supply (see *Figure 1*). Always use the dedicated circuit breaker to remove 120 VAC before removing the covers to the fuse or terminals block. The terminals and fuse must be covered after making connections or testing these connections.



**Figure 1: High Voltage On D9142**

## Safety Precautions While Handling Batteries

Wear rubber gloves and safety goggles while connecting batteries together. Mixing batteries of different battery capacities, or mixing batteries from multiple manufacturers is not recommended.

Unplug the D9142 battery connector J7 before attaching or removing wires at the D9142 Power Supply's terminals.

Refer to battery manufacturer instructions for further information about batteries and applicable safety precautions.

# Introduction

## Protective Points

As shipped, the Radionics D9124 Addressable 24 VDC System provides eight on-board points built into the panel. On-board points 7 and 8 support a 24 volt power supply and notification circuits, and are not for other uses. As shipped, the panel can support 63 added POPITs. In addition, if you use an additional D8125 POPEX Module, another 63 points can be added, for a maximum total of 134 (8+63+63). Each point requires an addressable device for individual annunciation, such as the D462, D290S, D290M, or a POPIT. Each point is programmed separately with options to custom-fit the protection to your installation. Point programming parameters determine the system's response to open and shorted conditions on the sensor loop.

## Communicator

The D9124 Addressable 24 VDC System uses a built-in digital communicator to send reports to the receiver. Up to four receiver phone numbers can be programmed. You can program the panel to send reports to primary, backup, and duplicate phone destinations. The panel transmits reports in either Modem or BFSK format. It is recommended that you use the Modem format to provide full system information to the receiver.

The D9124 System connects to two D166 RJ31X (or RJ38X) jacks for phone line seizure. Connection to the jacks complies with FCC regulations for using the public telephone network. The D9124 System uses the built-in D928 Dual Phone Line Switcher to supervise two phone lines.

## 24 Volt DC Outputs

The D9124 Control Communicator provides a 24 volt DC power supply. This power supply is rated at 4 amps. The operating voltage range of this output is from 18.9 VDC to 28 VDC. All Radionics 24 volt indicating devices are compatible with this power supply. For other indicating and initiating devices refer to the manufacturer's installation instructions and verify the devices **minimum** operating voltage is equal to or less than 18.9 volts DC and the **maximum** operating voltage is equal to or greater than 28 volts DC.

***Important: Connection of 24 volt indicating and initiating devices that have a minimum operating voltage greater than 18.9 VDC or a maximum operating voltage less than 28 volts DC may be damaged or fail to operate!***

## Time and Date

To set the time and date you need a D1255 Command Center or RAM II.

## Event Logger

The D9124 System stores up to 500 system events and event modifiers in its Event log. Event modifiers add information about an event to the log. Some events are always followed by a modifier. For example, the D9124 System adds at least two items to the log each time it reports a phone line failure or keypad failure. It sends the event name and then an event modifier showing the number of the failed device.

All events and their modifiers are stored even if the D9124 System does not send a report for them. You can view the log at a D1256 Fire Command Center, print it locally using the D9131 Parallel Printer Interface and a parallel printer, or upload it to a D5300 Remote Account Manager II (RAM II).

## Skeds (scheduled events)

The Skeds feature of the D9124 System uses the panel's internal clock and calendar.

Each Sked is programmed for a time, and either a day of the week schedule or a date of the year schedule. The user can change the time a Sked occurs if it is programmed for time editing.

For example, the D9124 System can use the Skeds for a service reminder feature. In this application, a system fault that activates the panel trouble sounder can be acknowledged and the sounder silenced. Skeds and an optional D8129 Relay Module can then be used to reactivate the panel trouble sounder on a daily or weekly basis until the system fault is corrected.

## Local Printer

The D9124 System can print events recorded on a standard parallel printer, using the D9131 Parallel Printer Interface. The D9131 uses an 80 character print format. The format includes the time, date, account number, event, point number, and point text. The 80 character format also provides additional system status information.

## EMI/Lightning Transient Protection

The D9124 System maintains the Radionics high level of quality and field dependability. Its design significantly reduces electromagnetic interference and malfunction generally caused by lightning.

## Programming

Use the Radionics D5200 Programmer, or the D5300 Remote Account Manager II (RAM II) to program the D9124 System. You must use D9112 handlers. See *Programming* in this manual for parameters. The D9124 System comes from the factory with a partial program already loaded. It is necessary for you to complete this program in order for the D9124 System to function. The *D9124 Program Record Training Sheet (74-06802-000)* contains the program entries that are loaded into a new D9124 System before it's shipped from the factory. Radionics recommends that you copy the program from a new D9124 System. Save and lock the copied program in your D5200 or RAM II.

## Other Features

The D9124 System has many programmable features. A short list of some of the features follows.

- Supervision of: AC (primary power), battery (secondary power), Auxiliary Power Outputs, ZONEX and SDI (Serial Device Interface) buses, CPU (Central Processing Unit), up to 3 printers, and telephone lines
- Automatic system test reports
- Remote access for programming, diagnostics, and log uploads using the Radionics D5300 Remote Account Manager II (RAM II)
- Fire Alarm Verification
- Programmable Alarm Output

## Before You Begin

Before you install the D9124 Addressable 24 VDC System, you should be familiar with the operation of the D5200 Programmer, or the D5300 Remote Account Manager II. You should also be familiar with the D9112. Contact a licensed electrician to make the D9124's AC Power connections to a dedicated 120 VAC circuit breaker.

# Installation

## D9124 Assembly

### System Components

The D9124 Addressable 24 VDC System ships in three separate packages. The D9112LTB Control/Communicator comes in one package; the D9101 enclosure comes in another package; the D9100 accessory module carrier, a D1601 transformer, the transformer enclosure and literature ship in a third package.

You should have the following components when you receive your D9124 Addressable 24 VDC System:

- One D9112LTB Control/Communicator (without terminal blocks)
- One D9101 Enclosure assembly
- One D9100 Accessory Module Carrier, which includes the following:
  - One D8125 POPEX Module
  - Two D192C Indicating Circuit Supervision Modules
  - One Literature Pack
  - One D928 Dual Phone Line Switcher Module (with cables)
  - One D1256 Fire Command Center
  - One D9142 24 VDC Power Supply
  - One D1601 hard-wired Dual (16.5/24 VAC) Secondary Transformer
  - One motherboard
  - One wiring harness
  - One extra wiring harness for D8125 Popex Module
  - Two 560 Ohm Resistors (for D192C modules)
  - Two D161 Dual Modular Telephone Cords
  - One D162 Dual Modular Telephone Cord

### Minimum Battery Requirements

You also need two D126 12V, 7Ah batteries (or D1218 12V, 17.2Ah batteries) for standby power for the D9112LTB, the command centers and modules. Two additional batteries (D126 12V, 7Ah) are needed to provide standby 24 volt power for the 24V devices connected to the D9124 System. If more than 7Ah capacity is needed, use a UL listed enclosure for additional batteries. Mount the battery enclosure adjacent to the D9124. Use conduit to connect the two enclosures. These batteries are not provided, but are available from Radionics (also contact Radionics for other enclosures and power supplies). See *Auxiliary Current and Standby Battery Requirements* for information about meeting minimum battery requirements.

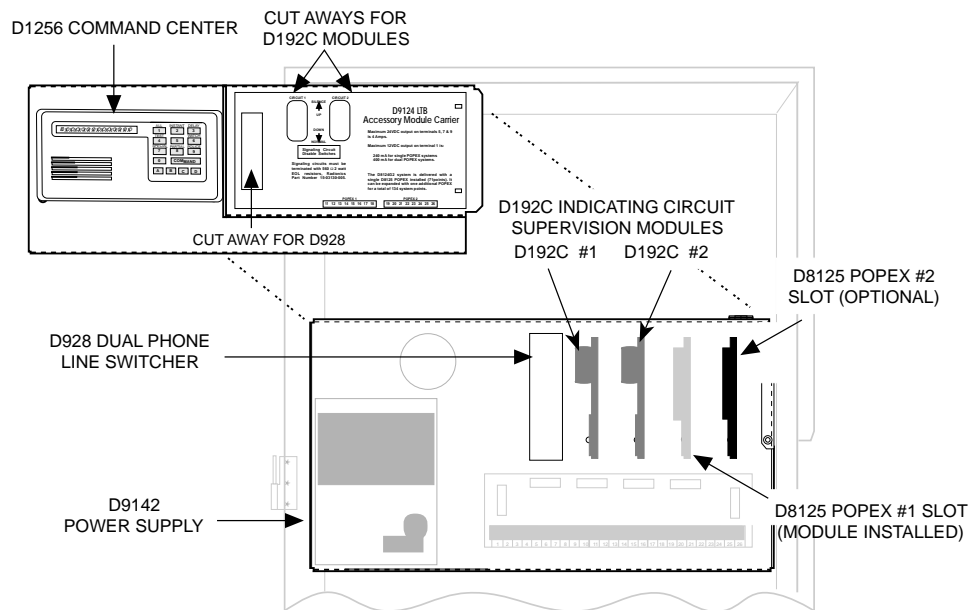
**Caution:** all battery lead connects are not power limited!

**Use only sealed lead acid batteries:** The power supplies in the D9124 System are designed to operate with sealed lead acid batteries. Using any other type of battery can cause damage to the D9124 System's power supplies.

### D9100 Accessory Module Carrier

The accessory module carrier comes with the following modules installed: D8125 POPEX Module (1), D192C Indicating Circuit Supervision Modules (2), D928 Dual Phone Line Switcher (1), Motherboard (1), D9142 24 VDC Power Supply (1).





**Figure 2: Modules Installed on Module Carrier**

The accessory module carrier also includes a D1256 Fire Command Center. The right hand side of the carrier's faceplate has three cutaway sections. The one nearest the D1256 allows you to see the LEDs of the D928; the next two provide you easy access to the alarm switches on the D192C modules.

The wiring harness is assembled at the factory, and terminal blocks need only be snapped into place in the designated locations on the D9112LTB.

## Literature Pack

The literature package (70-06934-000) shipped with the D9100 consists of:

- *D9124 Installation and Operation Manual (74-06799-000)*
- *D9112 Control/Communicator Program Entry Guide (74-06145-000)*
- *D9112 Program Record Sheet (74-06100-000)*
- *D9112 Program Record Training Sheet for the D9124 (74-06802-000)*
- *D1256 Fire Command Center User's Guide (71-06991-000)*
- *Technogram: Smoke Detectors Compatible with the D9112 (73-06143-000)*
- *Information Booklet on Security Alarm Systems (71-05834-000)*
- Vertical Grid for POPEX #1 (79-04252-002-D)
- Vertical Grid for POPEX #2 (79-04252-003-D)

Use these labels to mark POPITs installed in the D9124 system. Popit number programming and address settings are the same for the D9124 System as for the D9112.

- Point Chart Label (79-06660-000)

**Point chart label required for fire systems with verification points:** You must install the point chart label for fire or combined fire/burglary systems using verification points.

Use the program record sheet to gather the information you need to fill out the point chart. Install the label inside the enclosure door. To avoid smearing your entries on the chart, use the label's peel off backing to press the label in place.

## Mounting the D9101 Enclosure

When attaching the enclosure to a surface, use mounting hardware capable of supporting at least 74 pounds of equipment. You may need to mount a plywood sheet to the wall in order to support the weight of the panel and batteries.

**The enclosure door is removable:** To make mounting the D9124 System easier, open the door and slide it up and off the hinges.

The enclosure door has a lock and can be tampered. It has a smoke gray window, with a different lock, so you can see the D1256 Fire Command Center display and access the keypad without having to open the enclosure. The lock to the window uses the same key as the Radionics manual pull stations.

The enclosure can be flush or surface mounted.

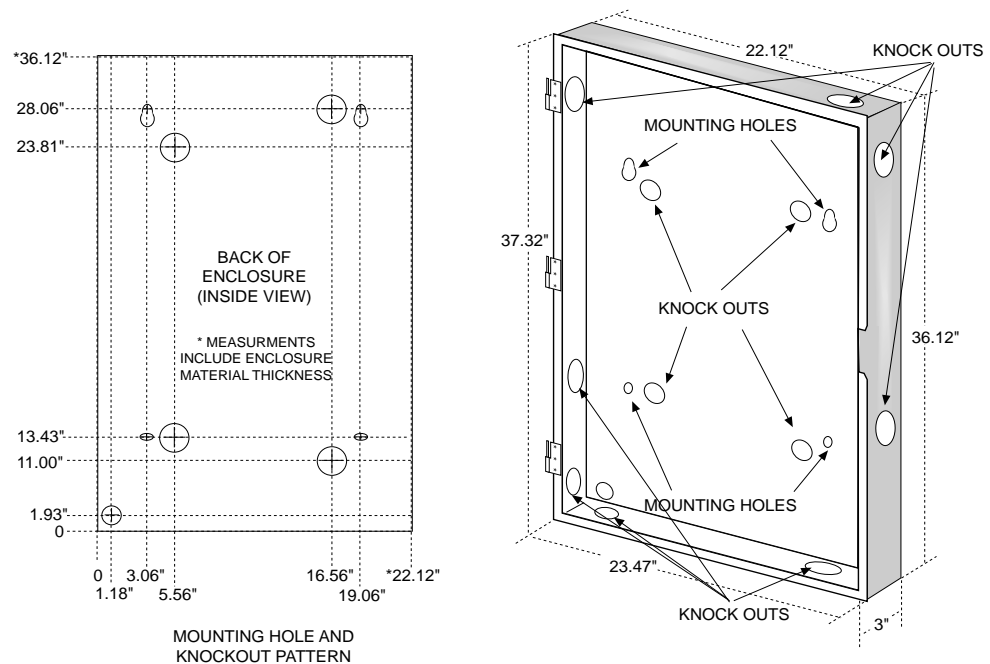


Figure 3: Enclosure Dimensions

### Flush Mounting

If you are flush mounting the enclosure, cut and frame an opening 22 1/4" x 36 1/4" x 3" to accept the enclosure base box. See *Figure 3*.

### Surface Mounting

1. Remove the door from the enclosure.
2. Remove the necessary knockouts for external connections. See *Figure 3*.
3. Mount the enclosure in the desired location. Use all four mounting holes.
4. Run the necessary wiring throughout the premises and pull the wires into the enclosure. A single knockout is provided at the top right side of the enclosure. If you punch other holes, be sure not to let them interfere with the component mounting locations.

**Only route AC conduit into the D1601 Transformer's enclosure.**

### Clean Up

Strapping tape is used to hold the door closed during shipping. Sometimes the tape leaves an adhesive residue. Use alcohol to remove the adhesive residue.

## Installing the D1601 Transformer

The D1601 is a 120 VAC, 16.5V/24VAC dual secondary transformer that is the primary power supply for the control/communicator and initiating devices of the D9124 system. Install the transformer in the lower left corner of the D9101 Enclosure (see *Figure 6*).

**If the 120 VAC cabling for the transformer is already installed:** Make sure the dedicated circuit breaker for the system is turned **OFF** and route the 120 VAC cables away from the transformer mounting studs. To install the D1601 Transformer:

1. Remove the hardware taped to the side of the transformer. Be sure not to leave behind any part of the plastic bag or tape.
2. Place the star washers over the transformer studs the lower left corner of the D9100 Enclosure (see *Figure 6*).
3. Place the transformer over the star washers on the four transformer mounting studs. Make sure the transformer cables are routed up as shown in *Figure 4*.
4. Place the washers over the transformer mounting brackets.
5. Finally, place the nuts over the washers and tighten securely into place.

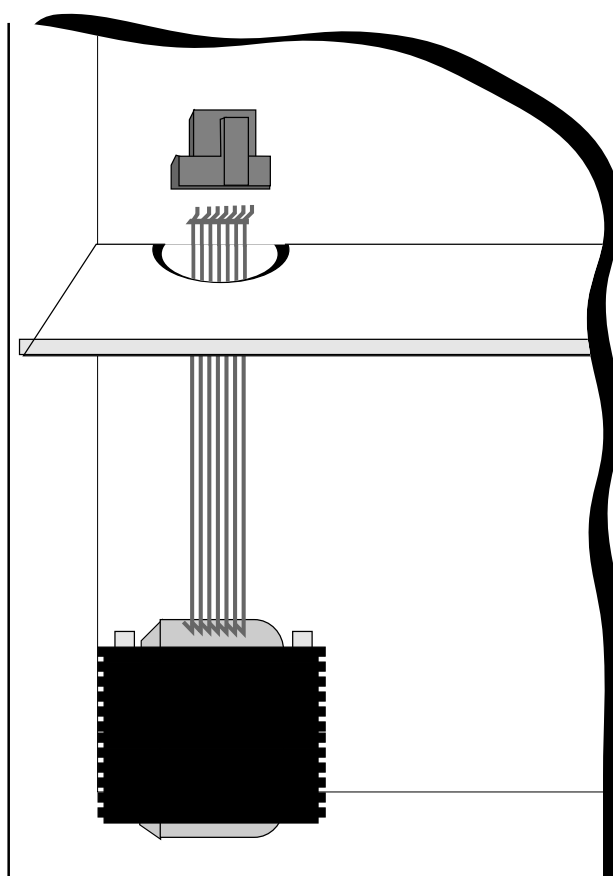
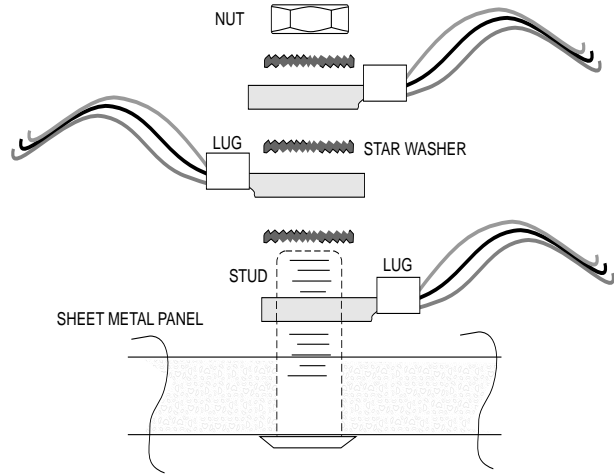


Figure 4: D1601 Installation

## Connecting the Earth Ground

For safety and to help prevent damage from electrostatic charges or other transient electrical surges you must first ground the system before making any other connections. Before connecting the green wire from the 120 VAC service, crimp a connector to the end of it. Place objects on this stud in the following order:

1. Place a star washer on the stud.
2. Slip the green wire from the 120 VAC service onto the star washer on the stud.
3. Place the hex nut on the stud and tighten firmly.
4. Repeat steps 1 through 3 for the two green wires in wiring harness J1 on the upper battery shelf.



**Figure 5: Wire Connections to Ground Stud**

## Connecting the 120 VAC Power Input

Radionics recommends that only a licensed electrician make 120 VAC connections to the D9124 System. The electrician should make all connections conform to NEC 70 and connect the D9124 system to a suitable ground connection.

**Danger: Turn off the circuit breaker before connecting the 120 VAC to the system. Leaving the circuit breaker on can cause injury or death by electrocution.**

To connect the 120 VAC service to the D9124, follow these steps:

1. If the 120 VAC cabling is already installed go to step 5, if not, go to step 2.
2. Make sure the incoming High Voltage (120 VAC) from the D9124 is disconnected. **Important!** Be sure that the circuit breaker is **OFF**.
3. Remove the knockout cover on the lower left side of the D9101 enclosure and install appropriate hardware for connection to conduit.
4. Pull the 120 VAC Power wires through the conduit hardware installed in the knockout, and into the transformer enclosure.
5. Using appropriate hardware, connect wires to the flying leads from connector J1 as shown in *Table 1*.

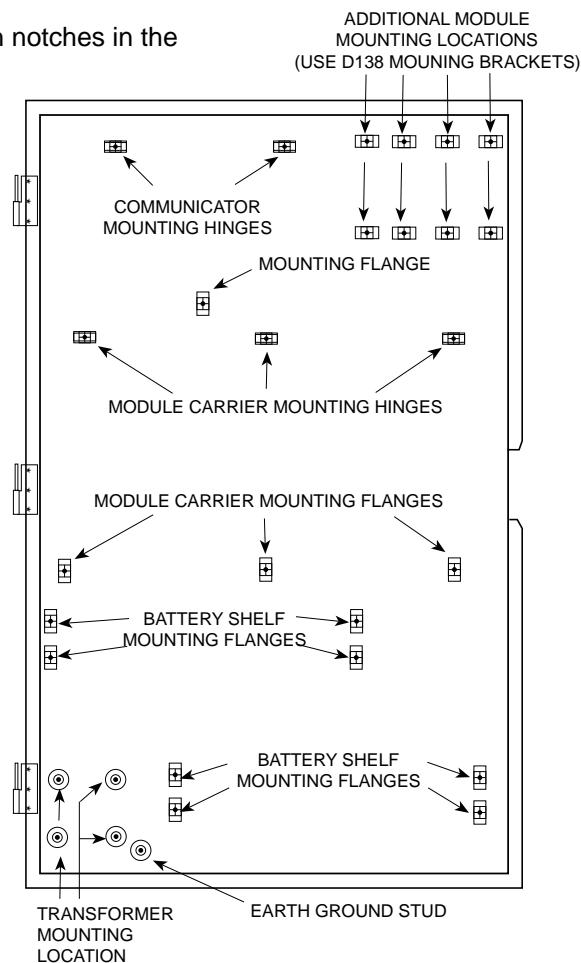
Wire From 120 Volt Service	Connect to D9124 System on...
Green	Ground Stud Below D1601
White	White (on J1)
Black	Black (on J1)
<b>Do NOT turn on the Breaker. LEAVE IT OFF!</b>	

**Table 1: Connect High Voltage to D9124**

## Installing Battery Shelves and Transformer Cover

Battery and transformer cables route through notches in the upper battery shelf and the right side of the transformer cover. The mounting hardware for the battery shelf is taped to the battery shelf. The mounting hardware for the transformer cover is taped to the cover. Follow these steps to route cables and install the hardware:

1. Insert the connector for wire harness J1 into the upper battery shelf so that the leads hang down from the bottom of the shelf.
2. Loosely screw the four screws provided with each shelf into the four shelf mounting holes. See *Figure 4* for locations.
3. Route the cable connected to the transformer **up**, and the battery cables **down** through the notch at the back of the upper battery shelf. All wire connections to J1 stay below the battery shelf.
4. Push the upper battery shelf back into place and align the four holes in the shelf with the screws. Slip the shelf down over the screws. Do NOT tighten the screws yet.
5. Install the bottom battery shelf by loosely driving the screws into the mounting flanges, slipping the shelf over the screws and tightening the screws.
6. Replace the protective cover over the transformer while routing the battery cables through the notch on the right side of the transformers enclosure cover. Make sure the shrink wrapped circuit breaker is **outside** the notch so that it hangs over the lower battery shelf.
7. Plug the transformer cable into J8 on the lower left-hand side of the D9142 Power Supply.
8. Inspect the notch in the battery shelf to verify that the transformer and battery cables route through and have not slipped outside of the notch as you tighten the screws on the battery shelf.
9. Verify that the covers are securely installed over Fuse F1 and TB1, and that connector P8 is plugged into J8 on the D9142 Power Supply.



**Figure 6: Mounting Locations**

## Mounting the Components

1. Hang the Accessory Module Carrier on the three mounting hinges shown in *Figure 6*. Secure the three screws attached in the bottom three mounting holes.
2. Hang the control/communicator panel on the two mounting hinges shown in *Figure 6*. Secure the screw attached to the panel in the mounting flange.

## Mounting Additional Modules

The D9101 Enclosure provides four locations for mounting additional modules on D138 mounting brackets. Use D138 mounting brackets to mount modules like the D192C Bell Circuit Supervision Module, D125B Powered Loop Interface, D129 Dual Class A Initiating Module, or D8130 Release Modules. See *Figure 6* for mounting locations.

**Additional modules affect standby battery calculations:** Due to increased power consumption, you may need to increase the size of the standby batteries attached to the D9112LTB or the D9142 Power Supply. See *Auxiliary Current and Standby Battery Requirements* to determine the type and number of batteries that you will need for your application.

**Additional D8125 POPEX Module:** If you are installing an additional D8125 POPEX Module, install it in the D9100 Accessory Carrier Module (see *Figure 2*) as described in *ZONEX, Addressable Points: Connecting the Additional D8125 Module*.

## Connecting Cables Between D9124 System Components

Before you start, review the *Safety Section* of this manual. **Do NOT turn AC power on until instructed to do so.**

1. Make sure the dedicated AC power source is **OFF**. For information about power specifications see *Power Supply*.
2. Connect the four terminal blocks to the locations of the D9112LTB shown in *Figure 7*. Make sure each terminal block clicks firmly into place.
3. Connect the flat ribbon cable between connector J4 on the D928 and connector J2 on the D9112LTB. The ends of the flat ribbon cable are keyed so they only plug in one way. Do NOT force the cable in the wrong way. For more information about the D928, see *Telephone Connections*.
4. If this is a communicating fire system, plug one end of a D161 (8') or D162 (2') modular phone cord into J1 on the D928. Plug the other end into the RJ31X (D166) for the primary phone line, then plug one end of a D161 or D162 phone cord into J2 on the D928. Plug the other end into the RJ31X (D166) for the secondary phone line.
5. Connect flying lead P1 into J1 (in the upper battery shelf).
6. Verify that transformer cable P8 is connected to J8 on the lower left side of the D9142 Power Supply.

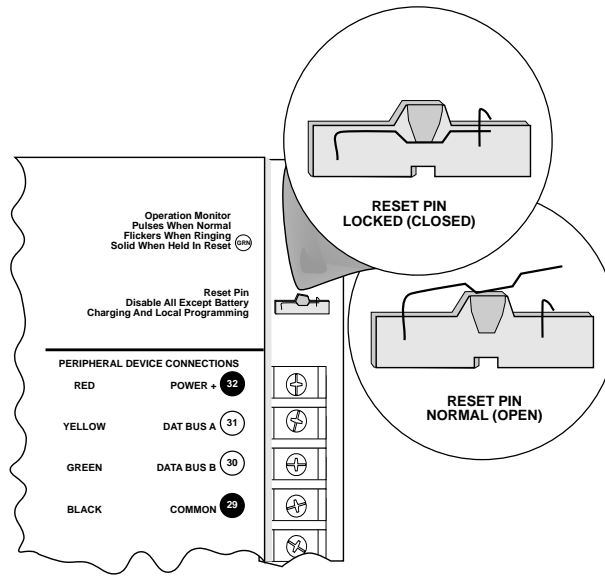


Figure 7: Reset Pin

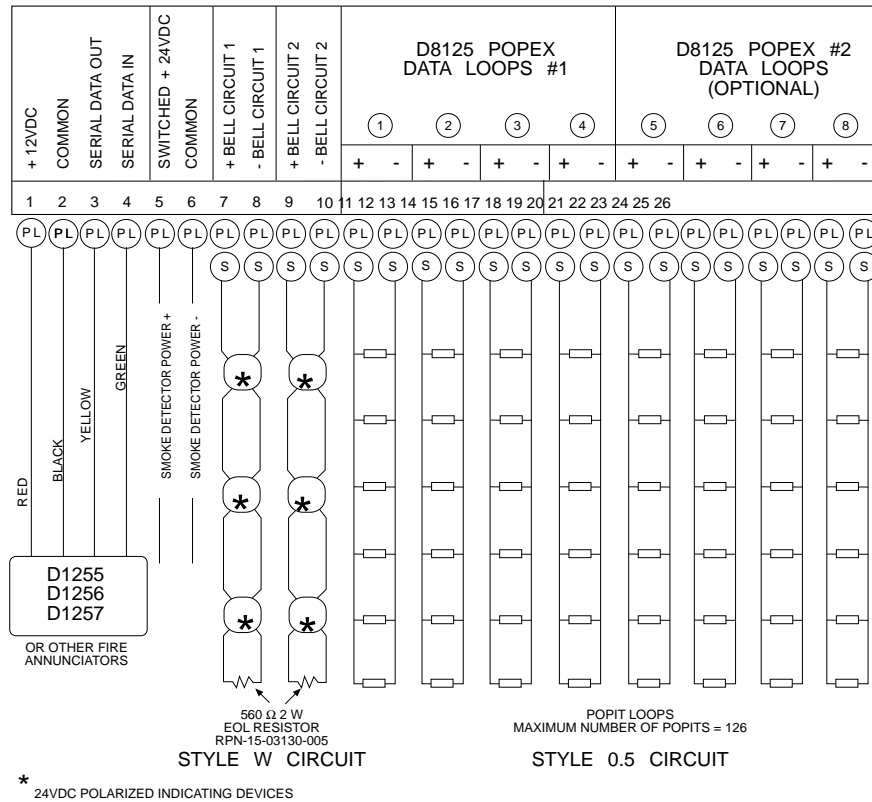


Figure 8: Connecting Field Wiring to the Motherboard

## Wiring Additional Modules

Table 2 shows additional modules that you can install with the D9124 System, and where to connect module cables to the D9124 System. Connect additional modules (except for D8125 POPEX Modules) to the D9124 System as shown in Table 2. Refer to the module's installation instructions for remote device wiring instructions. Table 2 shows only connections to the D9124 System.

Route cables above the D9100 Accessory Module Carrier to locations on the D9112LTB. Space is provided at the right side of the accessory module carrier to route cables around and below the accessory carrier to destinations on the motherboard and the D9142 Power Supply. Use wire ties to bundle multiple cables.

**Do NOT pass cables through the D9100 Accessory Module Carrier:** The carrier is designed to protect enclosed modules from EMI or other interference that can affect module operation. Route all additional module cables around the outside of the accessory module carrier.

D9124 Terminals	D125B Terminal	D127 Terminal	D129 Terminal	D192C Terminal	D8129 Terminal	D8130 Terminal
Motherboard TB1 1 (12 VDC)	-	8	6	-	AUX	3
Motherboard TB1 2 (COM)	4 AND 10	1 AND 3	8	COM	GND	1
Motherboard TB1 3 (Data Out)	-	-	-	-	DATA	-
Motherboard TB1 4 (Data In)	-	-	-	-	-	-
Motherboard TB1 5 (Switched 24 VDC)	1	-	-	-	-	-
Motherboard TB1 6 (COM)	5	-	7	-	-	-
D9112LTB TB2/3 Point 1 - 6	2 AND/OR 3	-	5 AND/OR 9	SUPV ZONE	-	4
D9112LTB TB1 6 (Alarm Output)	-	9 OR 10	-	ALARM TRIG	-	2

Table 2: Wiring Additional Modules

## Turning on the Power

Lock the Reset Pin on the D9112LTB before turning on the power. Locking the Reset Pin disables the D9124 System. The panel ignores the command centers and points while disabled. After power is connected, CALL FOR SERVICE appears in command center displays while the reset pin is locked down.

1. Lock the Reset Pin on the D9112LTB (see Figure 7).
2. Connect the two sets of batteries. See the *Power Supply* section: *Installing the 12V Standby Source Batteries*, and *Installing the 24V Standby Source Batteries*.
3. Turn the AC power on. The batteries begin to charge, even though the D9112LTB is still disabled. The yellow LED on the D9112LTB illuminates if the batteries require charging.

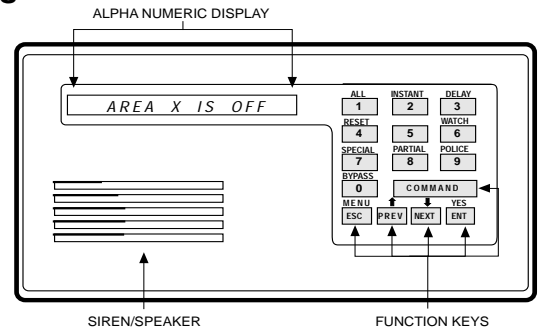


# Command Centers and Annunciation Devices

## Descriptions

### D1255 and D1255R Command Centers

The D1255 Command Center is a digital system control station with a 16-character alphanumeric display. It provides system control for the D9124 System. Housed in white plastic, it displays text identifying specific initiating and supervisory devices. Its keypad has numbers 0 - 9, a command key, and four menu keys, allowing you to passcode protect selected system control functions so that you can install it more exposed to the public. You can mount the D1255 on the D56 surface mount box.



**Figure 9A:**  
**D1255/D1255R Command Center**

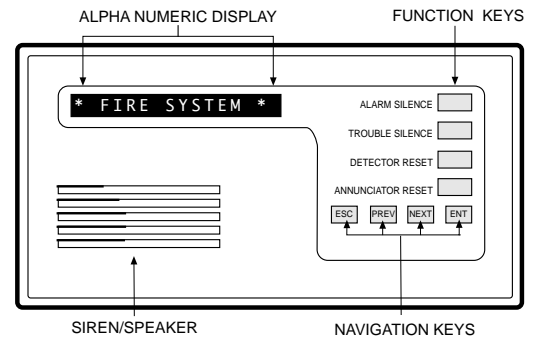
The D1255R has the same features as the D1255, but it is housed in red plastic. You can mount the D1255R on the D56R red surface mount box.

### D1256 Fire Command Center

The D1256 Fire Command Center is a digital fire system control station with a 16-character alphanumeric display. It provides system control for the D9124 System. Housed in red plastic, it displays text identifying specific initiating and supervisory devices.

#### **One D1256 included installed on D9100:**

The D9100 Accessory Module includes an installed D1256 Fire Command Center. To make the installed D1256 operational, refer to the *D1256 Fire Command Center and D1257 Fire Alarm Annunciator Installation Instructions* (74-06925-000). Only for the D1256 installed in the D9100 module, disregard the sections titled *Mounting the D1256* and *D1257* and *Wiring the D1256*, and follow the instruction in the section titled *Programming the Control Communicator*.

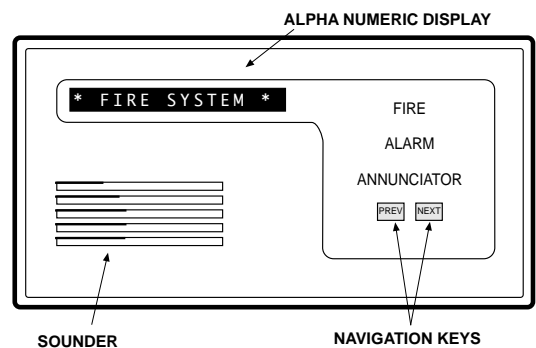


**Figure 9B: D1256 Fire Command Center**

### D1257 Remote Fire Annunciator

The D1257 Remote Fire Annunciator displays system information. It can be mounted in areas of public access because it does not provide system control. It displays text identifying specific initiating and supervisory devices.

Do not mount command centers or annunciators where they will be exposed to sunlight. Sunlight can damage internal components, and interfere with display visibility. Do not mount command centers or annunciators in wet or moist locations.



**Figure 9C: D1257 Remote Fire Annunciator**

**Maximum number of command centers:** You can connect up to eight supervised or 32 unsupervised command centers to the D9124 System. The available power, number of supervised command centers, and number of areas you intend to use affect the total number of command centers you can connect to the D9124 System.

## Installing Command Centers and Annunicators

A four-wire flying lead is required for the data and power connections between the D1255, D1255R, D1256, D1257 and the motherboard. They come with a wiring assembly consisting of four color-coded flying leads and a female four-pin connector plug at one end.

1. Using a small flat-bladed screwdriver, gently push in the two bottom tabs of the command center enclosure cover. As the tabs are pushed back, lift the command center cover away from the base.
2. Set the address settings as shown in *Table 3*. For supervised command centers, assign only one to each address.
3. Turn the command center over and plug in the wiring connector through the opening in the back of the enclosure base.
4. Mount the command center base in the desired location. Secure it in place using the mounting holes inside the enclosure base.

SWITCH	ADDRESS							
	1	2	3	4	5	6	7	8
↓								
1	ON	OFF	ON	OFF	ON	OFF	ON	OFF
2	ON	ON	OFF	OFF	ON	ON	OFF	OFF
3	ON	ON	ON	ON	OFF	OFF	OFF	OFF
4	LEAVE ON - DO NOT USE							
5	ENCODING TONE ON/OFF							
6	LEAVE ON - FACTORY TEST							

**Table 3: Setting the Command Center Address**

5. Replace the cover. Align and insert the top two tabs of the enclosure cover into the top two tab slots of the enclosure base. Hold the top edges of the enclosure cover and base in position. Push the tabs inward and press the enclosure and cover together until the cover snaps into place.
6. Press each key on the keypad toward the top of the command center to ensure proper alignment and operation of each key through the mating keypad faceplate openings.
7. Install the locked cover according to instructions provided. **Lockable covers for remote command centers:** Remote command centers must be protected by a locked cover such as the Safety Technology's 6550 Wide Body Keypad Protector.

8. Connect the flying leads of the wiring assembly (provided) to the wires from the panel, as shown in *Table 4*.

Color of Wire	Terminal on Motherboard
Red	1 +12VDC
Black	2 Common
Yellow	3 Serial Data Out
Green	4 Serial Data In

**Table 4: D1256/D1257 Connections**

**CAUTION: Switching the green and yellow wires affects other command centers:** Incorrectly connecting the green wire from the command center to the motherboard's terminal 4 and the yellow wire to terminal 3, causes other command centers connected to the panel to go blank and/or sound random beep tones.

You can connect a maximum of 15,000 feet of 22 AWG wire **for all command centers and printer modules combined** to the data bus, terminals 3 and 4 on the motherboard. You can connect parallel wire runs from the D9124 System to each device, run wire device to device, or combine the two.

**Extra power needed for more command centers and annunciators:** The D1255, D1255R, D1256, and D1257 each draw 104 mA when idle. Each draws 206 mA with the back lighting for the keys illuminated and the sounder activated. Review the *Power Supply*, and *Auxiliary Current and Standby Battery Requirements* sections to determine the total power output requirements for your system.

You may need to add one or more UL listed power supplies for the number of command centers you want to use.

**D9124 and the additional power supplies must share COMMON:** When using an additional power supply to power command centers, the common from the additional power supply must connect to both the command centers' common and the common on the D9112LTB board.

A stand-alone power supply powering any device connected to the D9124 must also be connected to a common terminal on the D9124. Do not connect the stand-alone power supply to earth ground other than terminal 10 on the D9112LTB board.

## D1256/D1257 Specifications

### Power

Nominal 12 VDC supplied by the panel

### Current Required

Idle: 104 mA, armed or disarmed.

Maximum: 206 mA, with command center illuminated and warning tone ON.

### Wiring

Four-Wire expansion cable supplies Data In, Data Out, +12VDC, and Common.

### Dimensions

Height: 4.56", Width: 8.15", Depth: 0.816"

### Operating Temperature

32° to 122°F (0° to 50°C)

### Relative Humidity

5 to 85% @86°F (30°C) Noncondensing

# Indicating Circuit (24 VDC Horns, Strobes, Bells)

## Description

The D192C Indicating Circuit Module supervises the wiring from the control/communicator to remote alarm indicating devices like horns, strobes, and bells. Wiring is supervised for open, shorted, or grounded circuit faults.

Signaling devices must comply with the following parameters:

- They must be polarized (DC)
- They must match the voltage rating of the alarm power supply (D9142)
- They must not exceed the current rating of the alarm power supply (D9142)
- Combined, they must not exceed 1.8 Amps on motherboard terminals 7 or 9.

**Total output power for the D9124 System must not exceed four Amps:** The total output power for Auxiliary power (terminal 5), and the 24 VDC indicating circuits (terminals 7 and 9) must not exceed four Amps. Exceeding four Amps will overload the D9142 Power Supply. See *Calculations for 24 VDC Devices* to determine total output requirements.

## Operation

During normal operation, the indicating circuit is supervised for incorrectly installed devices, opens, shorts, and grounds. If any of these conditions are detected, the panel indicates a trouble condition at the command center. You can program the panel to report the condition to the central station.

When the panel detects an alarm, the alarm output circuit triggers the D192C to supply circuit power from the power supply.

To provide supervision, install the 560 $\Omega$ , 2 Watt EOL resistor (15-03130-005) beyond the last indicating device. Two resistors are supplied in the literature package.

## Silence Switch

The D192C has a toggle switch that is used to disable the fire alarm indicating devices while you test the panel (see *Figure 10*). When this switch is toggled up in the SILENCE (OFF) position, the D192C presents a short circuit to Point 7, causing a trouble response.

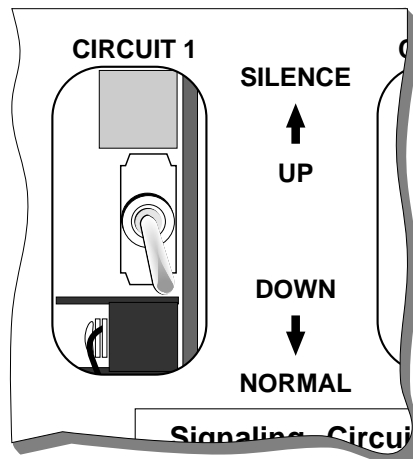


Figure 10: D192 Bell Silence Switch

# ZONEX, Addressable Points

## Description

You can use POPIT (**P**oint of **P**rotection Input Transponder) modules to provide up to 126 off-board points, bringing the total number of points the D9124 system can monitor to 134. Each off-board point requires a POPIT module.

POPITs connect to supervised two-wire data expansion loops run from POPIT to POPIT throughout the premises (see *Figure 14*). Data expansion loops connect to the motherboard. The motherboard connects to the POPEX module. POPEX modules connect to the point buss on the panel.

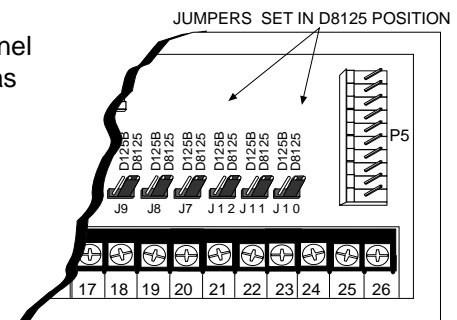
You can connect up to four data expansion loops to one D8125 input at the motherboard. Data Loops 1-4 connect to the D8125 POPEX 1 input on the motherboard (terminals 11 through 18). Data Loops 5-8 connect to the D8125 POPEX 2 input at the motherboard (terminals 19 through 26).

If a POPIT is disconnected from the expansion loop, a trouble message appears immediately. See the *D9112 Program Entry Guide* (74-06145-000) for programming options.

If you connect a POPIT that is programmed for a point number that does not appear in the program for the D9124 to the expansion loop, it appears as an extra point at the command centers when the point is faulted, and during the service walk test.

Placing a short on the data expansion loop generates a PT BUS TROUBLE report. The panel sees all points on the shorted expansion loop as shorted, and responds according to point programming.

POPIT modules monitor their sensor loops for three conditions, loop normal, loop open, and loop shorted. They report these three conditions to the D9124. A ground on a POPIT sensor loop reports as an open.



**Figure 11: Jumpers Set to D8125 Position**

The D9124 uses point programming to interpret the sensor loop information reported by the POPITs and make the appropriate system response. Detection devices connect to each POPIT. The POPIT sensor loop can supervise an unlimited number of detection devices, however, certain applications may limit the number of detection devices. Consult the appropriate NFPA standards.

The POPIT can come in a tampered enclosure, or an untampered enclosure.

**Verify the proper setting of motherboard jumpers:** Make sure the jumpers above terminals 18 to 24 on the motherboard are in the D8125 position (see *Figure 11*).

## POPEX/POPIT Configurations

### With the D8125 POPEX Module Supplied:

- You can use D8125 POPEX 1, data loops 1 to 4 (terminals 11 to 18) on the motherboard.
- You can install a maximum of 63 POPITs (points 9 to 71).
- Points 7 and 8 are used for power supply and initiation circuit supervision. POPITs are not required for these functions.

**With an Additional D8125 POPEX Module:**

- You can use D8125 POPEX 2, data loops 5 to 8 (terminals 19 to 26) on the motherboard.
- You can install an additional 63 POPITs (points 73 to 135) for a maximum of 126 POPITs in the system.

## Connecting the Additional D8125 Module

1. Mount the module to a D138 Mounting Bracket, only using the three screws provided.
2. Mount this assembly in the empty slot next to the other modules on the accessory module carrier. Use the orientation of the other modules as a guide. See *Figure 2* in the *Installation* section.
3. Connect the clip-on end of the extra wiring harness to the far right connector (J5) on the motherboard.
4. Connect the hanging wires to the D8125 module as shown in *Table 5*.

Color of Wire	Terminal on D8125	
Gray	–	TB2 - 2
Violet	+	TB2 - 3
Black	GND	TB1 - 1
Orange	OUT	TB1 - 2
Green	IN	TB1 - 3
Red	AUX	TB1 - 4

**Table 5: Wiring the D8125**

## Selecting POPIT Point Assignments

Off-board points are numbered 9 to 71 and 73 to 135. **The D9124 System reserves points 72 and 136 for internal use to supervise the data loops.** You must connect POPITs for points 73 to 135 to expansion loops connected to D8125 POPEX #2.

Addresses for each POPIT assign the module to a point number. POPIT address settings are found on the *POPIT Labels* and in the *Point Assignment* section of the *D9124 Program Record Training Sheet* (see *Figure 11*).

### POPIT Labels

Four sheets of peel-off POPIT labels are supplied with the D9124 System. Use the sheet marked *Vertical Grid for D8125 POPEX #1* for points 9 to 71. Use the sheet marked *Vertical Grid for D8125 POPEX #2* for points 73 to 135.

Each label has two parts. Place the smaller part, with just the point number on it, on the POPIT terminal block. Place the larger part with the address settings on the POPIT cover. Set the addresses and cover the POPIT.

Do not program two POPITs for the same point number. After you program all the points, perform a Fire Test or a Service Walk Test. See *Testing the System* for instructions. If a point does not test properly, check the programming for a duplicated address.

## D9112 Program Record Training Sheet for the D9124 System

The *D9112 Program Record Training Sheet for the D9124 (74-06802-000)* presents an example of a completed program record sheet for the D9124 System. The first column on the program record sheet contains the address settings for the POPITs. Addresses are numbered 1 to 6, left to right. Set addresses whose number appears in the ON position. Set addresses with a dash (-) in the OFF position (see *Figure 12*).

The second column contains the translation of the point number into the D8112 ZONEX format. See *Point User Flag* in the *Panel Wide Parameters* module of the *D9112 Program Entry Guide (74-06145-000)* for an explanation of this feature.

### Point Assignments

Popit Address Setting	Translation	Point #	Point Index	Area Assign	Debounce	BFSK/Relay	Point Text
	100	01	---	---	---	---	-----
	200	02	---	---	---	---	-----
	300	03	---	---	---	---	-----
	400	04	---	---	---	---	-----
	500	05	---	---	---	---	-----
	600	06	---	---	---	---	-----
	700	07	<u>1</u>	<u>1</u>	---	---	<u>I N D I C A T I N G C K T</u> ---
123456	101	08	<u>1</u>	<u>1</u>	---	---	<u>2 4 V P O W E R C K T</u> ---
1234 5-	102	09	---	---	---	---	-----
1234 -6	103	11	---	---	---	---	-----

Figure 12: Address Settings for POPITs

The third column contains the point number as it is displayed at command centers. The fourth column contains the point index. See the *Point Index Parameters* module in the *D9112 Program Entry Guide (74-06145-000)* for an explanation of the point index.

The fifth column of the record sheet shows the area the point is assigned to. The sixth column shows the Debounce Count for the point. See *Debounce Count* in the *Point Assignments* module in the *D9112 Program Entry Guide (74-06145-000)*.

The seventh column shows the BFSK report code. It is the point number reported for this point when the panel is using the BFSK format. The eighth column contains the text displayed at command centers for the point. The text is transmitted to the receiver when the panel is using the Modem II format.

## Installing POPITs

Each POPIT comes with an installation card (79-02474-068). You should be familiar with the POPIT Installation Card before attempting to install POPITs.

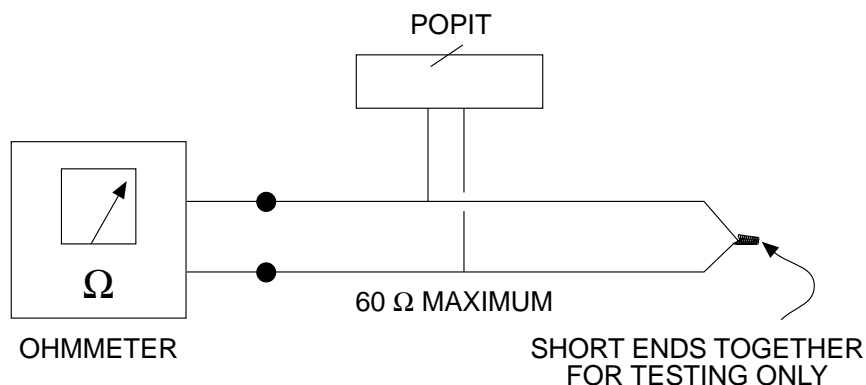
## Routing the Data Cable

The two-wire data expansion loop connects POPIT modules assigned to a single D8125 POPEX. You can connect up to four data loops to one D8125 at the motherboard. Data Loops 1-4 connect to D8125 POPEX #1. Data Loops 5-8 connect to D8125 POPEX #2 (see *Figure 8*).

Wire Gauge	Ohms per 1000 ft.
12	1.62
14	2.58
16	4.09
18	6.51
20	10.40
22	16.50

**Table 6: Resistance by Wire Gauge**

Regardless of wire gauge or distance used, **total resistance of the D8125 POPEX Data Loops cannot exceed 60  $\Omega$** . To determine total resistance, tie the ends of the D8125 POPEX Data Loops together to eliminate POPIT resistance (see *Figure 12*). After measuring resistance, untie the ends of the D8125 POPEX Data Loops.



**Figure 13: Checking Resistance of Data Loops**

**EMI (Electromagnetic Interference) may cause problems:** EMI may occur if you install a ZONEX system, or run wires near the following:

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

If you think EMI may be a problem, use shielded cable. The drain wire for the shielded cable must have continuity from terminal 4 on the D9112 board to the end of the wire run. If continuity is not maintained, the shielded cable may aggravate potential noise problems rather than eliminate them.

**Only connect the drain wire to terminal 10 on the D9112LTB:** Connecting the drain wire to a terminal other than terminal 10 may also produce problems. If you cut the drain wire to install POPITs, be sure to splice it together. Solder and tape all splices.



## Connect POPITs to the Data Cable

You do not need to wire POPIT modules in any order on the motherboard's D8125 POPEX Data Expansion Loop. An address setting on each POPIT (see *Selecting POPIT Point Assignments*) identifies the point of protection, regardless of its physical location on the data cable. POPIT modules must be mounted **at least three inches apart**. This prevents the tamper magnets from interfering with each other.

Connect POPIT modules to the data loop in parallel. Do not T-tap POPIT Data Loops together (see *Figure 13*).

1. Connect the positive (+) Data terminal from one POPIT to the positive (+) Data terminal on the next POPIT.
2. Connect the negative (-) Data terminal from one POPIT to the negative (-) Data terminal on the next POPIT.
3. Follow the steps above to connect all POPITs on the same D8125 POPEX Data Loop.

- ① = POPIT SENSOR LOOP (TYPICAL UP TO 63 PLACES)
- ② = 33K  $\Omega$  END-OF-LINE RESISTOR (TYPICAL UP TO 63 PLACES)
- ③ = POPIT SWITCH BLOCK (TYPICAL UP TO 63 PLACES)

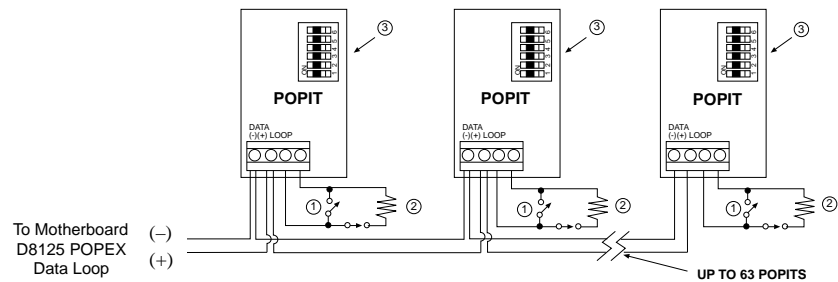


Figure 14: Connecting POPITs to the Data Cable

## Connecting the D290S and D290M Addressable Smoke Detector Bases

**To prevent damage to the POPEX module:** Wire smoke detector bases while the data cable is disconnected from the motherboard. Before connecting detector wiring to the panel, meter each wire to ground to check for continuity, and meter between each wire for continuity. You should have no grounds, or shorts between any of the wires. Put the detector heads on after you have metered all the wiring (see *Figure 14*). Refer to the Operation and Installation Manual for these detectors before beginning the installation.

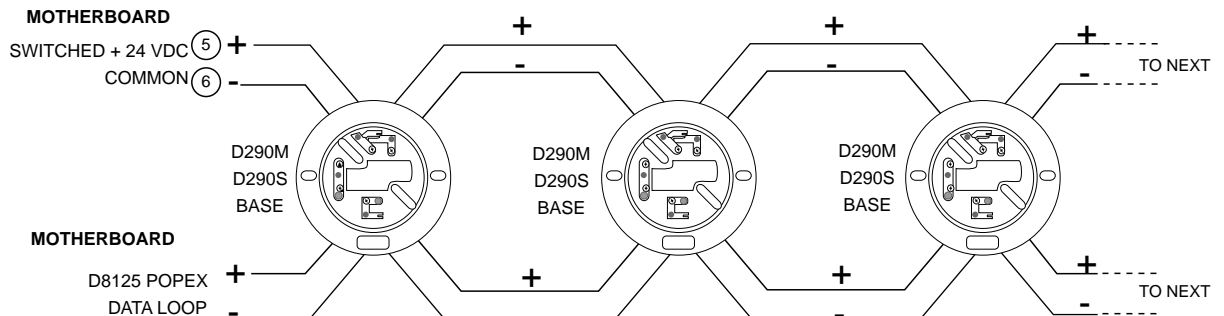


Figure 15: Connecting Devices to the Motherboard

## Connecting Data Loops to Terminals on the Motherboard

**D8125 POPEX modules must have their own data expansion loops:** The motherboard provides two sets of D8125 POPEX Data Loops. POPIT modules assigned to D8125 POPEX #1 cannot be placed on the D8125 POPEX #2 Data Loop. Limit the Data Loops coming back to the motherboard to a maximum of four data loop runs for each POPEX you install.

D8125 POPEX #1	D8125 POPEX #2
DATA LOOPS 1 TO 4	DATA LOOPS 5 TO 8
POINTS 9 - 71	POINTS 73 - 135

Table 7: Data Loops and POPITS

## Wiring the POPIT Sensor Loop

POPIT modules monitor their sensor loops for three conditions, loop normal, loop open, and loop shorted. They report these three conditions to the D9124 System.

The D9124 System uses point programming to interpret the sensor loop information reported by the POPITs and make the appropriate system response.

Terminate all POPIT sensor loops with a 33kΩ end-of-line resistor, Radionics Model D106F, supplied with each POPIT module.

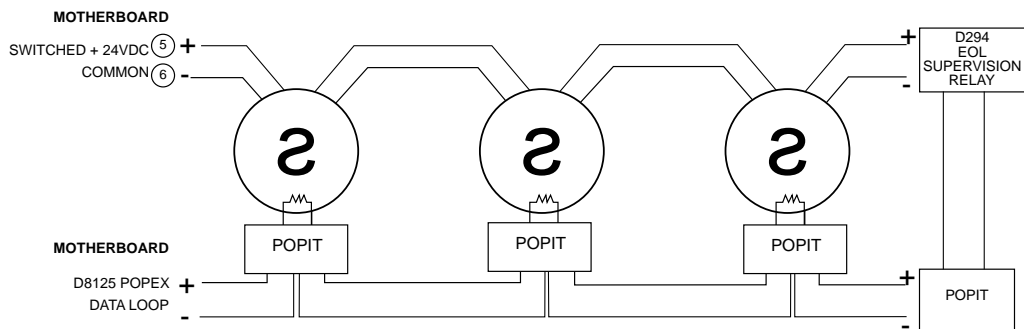


Figure 16A: Connecting Four-Wire Smoke Detectors

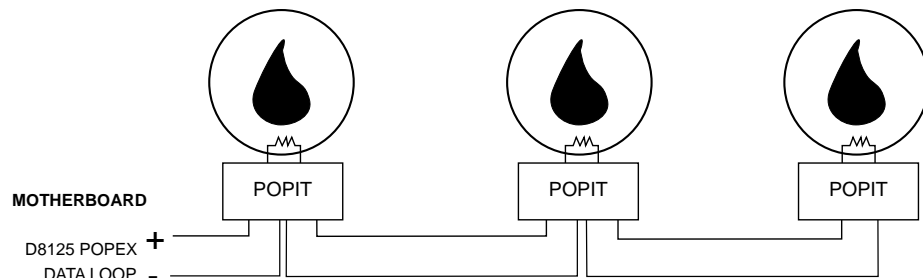


Figure 16B: Connecting Heat Detectors and Other Mechanical Devices

## POPIT Displays

For a list of D1255, D1256, and D1257 displays, refer to the user's guide provided with the command center or fire alarm annunciator.

## Central Station Reports

A complete list of reports received by the D6500 Receiver can be found in the *D6500 Security Receiver Computer Interface Installation Manual* (74-05313-000) and the *D6500 Report Directory* (74-04651-001). Reports from the D9124 System are the same as those generated by the D9112.

The D9124 System can transmit reports in either BFSK or Modem II formats. See the *Phone* and *Phone Routing* sections of the *D9112B Program Entry Guide* (74-06145-000) for important information about programming phone transmission formats and report routing.

If a POPIT is disconnected from the D8125 POPEX Data Loop, a trouble message appears immediately for points programmed for trouble reports. See the *D9112 Program Entry Guide* (74-06145-000) for programming options.

If you connect a POPIT that is programmed for a point number that does not appear in the program for the D9124 System to the D8125 POPEX Data Loop, it appears as an extra point at the command centers when the point is faulted, and during the service walk test.

Placing a short on the D8125 POPEX Data Loop generates a `PT BUS TROUBLE` report (in Modem II reporting format). The panel sees all points on the shorted D8125 POPEX Data Loop as shorted, and responds according to point programming.

## BFSK Reporting

The number that is transmitted when an event occurs on a point is programmed in *Point Assignments* `P### BFSK Rpt Code`. This format may be used to send summarized system information to the receiver.

## Modem II Reporting

The actual point number is sent when the panel is programmed to transmit reports using the Modem II format.

You can program the D9124 System to send an additional flag with point reports. This flag tells the D6500 receiver to translate point and user numbers to a Radionics D8112 style format. The ability to make use of this feature depends upon the type of automation system attached to the receiver. For details see *Point/User Flag* in the *D9112B Program Entry Guide*, *Phone* section.

# Power Supply

## Power for the D9112LTB, Command Center and Modules

### Primary Power

The D9112LTB receives 16.5 VAC 40 VA transformer power from connector J9 on the D9142 Power supply. For information about installing the D1601 Transformer, see *Installing the D1601 Transformer* in the *Installation* section.

### Secondary Power

One or two D126 12V, 7Ah or D1218 12V, 17.2Ah sealed lead-acid rechargeable batteries supply the power for the control/communicator, command centers, and the modules. The current draw on your system determines the ampere hour capacity of the batteries you need. See *Standby Battery and Current Rating*. The batteries also power these devices during interruptions in primary (AC) power.

Replace batteries every three to five years under normal use. Use only lead-acid batteries.

### Choosing the Right Batteries to Meet 12V Requirements

To determine the correct batteries to connect to the system, you must know the amount of current that 12V devices draw from the D9112LTB, and the number of hours that the batteries are supposed to last. *Table 8* gives some examples for the impact of adding 12V devices while meeting UL and NFPA requirements for fire detection systems.

The first column shows what's included in the system. The second and third columns show you totals from columns B and C in the *Auxiliary Current and Standby Battery Requirements* section, *Calculations for 12 VDC Devices*. The last two columns show what you need to meet the standby requirement.

*Table 8* is only for example purposes, you must perform actual calculations in *Calculations for 12 VDC Devices*.

System Includes	Column B TOTAL	Column C TOTAL	Battery or Power Supply Recommendations	
			24 Hour Standby Required	60 Hour Standby Required
D9124 Only	462mA	874mA	(2) D126	(2) D1218
D9124 + command center	568mA	1080mA	(1) D1218	Add power supply and batteries
D9124 + 63 POPITS	588mA	1063mA	(1) D1218	Add power supply and batteries
D9124 + 63 POPITS + command center	694mA	1269mA	(2) D1218	Add power supply and batteries
D9124 + 126 POPITS + additional D8125	762mA	1299mA	(2) D1218	Add power supply and batteries
D9124 + 126 POPITS + additional D8125 + command center	868mA	1505mA	(2) D1218	Add power supply and batteries

**Table 8: Standby Power Requirements for Additional 12V Devices**

## Installing the 12V Standby Source Batteries

Connect batteries in parallel. Two batteries are required. Before handling batteries, see the *Safety Section* for important information.

1. Place the batteries on the bottom shelf. The longer set of leads from the battery harness (see *Figure 16*) connects to the battery on the right side of the battery shelf.
2. Connect the black negative wires from the battery harness to the negative terminals on the batteries.
3. Connect the red wires from the battery harness to the positive terminals on the batteries.

### Power Supervision

When the battery float voltage drops to 13.8 VDC, the yellow charging status LED on the D9112LTB illuminates. When the battery drops to 12.1 VDC, the red low battery LED illuminates and the panel transmits a BATTERY LOW report in Modem II Format. In BFSK it transmits a TROUBLE ZN 9 to the receiver.

Investigate low battery reports immediately. During an AC outage, if the battery voltage drops below 10.0 VDC, the panel shuts down.

### AC Power Failure

The D9112LTB indicates an AC power failure when power is missing. This feature is programmable. The *AC Fail Time* program item sets the number of seconds that AC must be missing before the panel acknowledges the failure and the number of seconds after the power returns before the panel acknowledges the restoration of power.

You can program *AC Fail Time* from 1 to 90 seconds. The Radionics default sets *AC Fail Time* at 10 seconds.

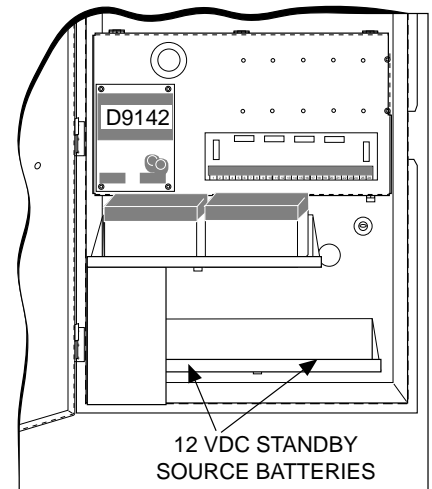
If the battery float voltage is less than 10.0 volts during an AC power loss, the panel shuts down. The display extinguishes at all command centers. When AC power returns, the panel begins operating. The panel retains the system status it was in at the time of the shut down.

### 12 VDC Battery Discharge/Recharge Schedule

These LEDs are on the upper left corner of the D9112LTB board.

Discharge Cycle		Recharge Cycle	
Float Voltage	Indication	Float Voltage	Indication
13.9 VDC	<ul style="list-style-type: none"> <li>Battery Fully Charged</li> <li>Charging status LED extinguished</li> </ul>	AC On	<ul style="list-style-type: none"> <li>Load Shed relay resets</li> <li>Battery charging begins</li> <li>Battery trouble and AC restoral reports sent</li> </ul>
13.8 VDC	<ul style="list-style-type: none"> <li>Charging status LED illuminated</li> </ul>	13.7 VDC	<ul style="list-style-type: none"> <li>Battery restoral reports sent</li> <li>Low Battery LED extinguished</li> </ul>
12.1 VDC	<ul style="list-style-type: none"> <li>Battery trouble &amp; AC Fail reports</li> <li>If programmed, Low Battery LED illuminated</li> </ul>	13.9 VDC	<ul style="list-style-type: none"> <li>Charging status LED extinguished</li> <li>Battery fully charged</li> </ul>
10.2 VDC	<ul style="list-style-type: none"> <li>Battery Load Shed (processing continues if AC present)</li> </ul>		

**Table 7: Battery Discharge/Recharge Schedule**



**Figure 17: 12V Standby Batteries**

## Battery Lead Supervision

The 12 V battery leads are supervised.

## Battery Charging Circuit

### Float Voltage

The float voltage for the 12 V battery charging circuit is 13.9 VDC at a maximum current of 1.4 Amps. Deduct any continuous load for 12 V devices connected to the panel from 1.4 Amps to find the actual current available for charging.

**Load Shed Relay protects battery:** During an AC power loss the battery supplies extended power to the security system. If the battery voltage falls below 10.2 volts during an extended AC power loss, a “load shed” relay disconnects the battery from the D9112LTB and disables the system. Load shed protects the battery from being damaged by deep discharge. When AC power restores, the load shed relay resets and battery is reconnected to the D9112LTB, enabling the system.

**Reset or power down required for shorted battery:** If the D9124 determines the battery is shorted, it uses the load shed relay to disconnect the battery. You must reset or power down the panel after correcting the problem to reset the load shed relay and reconnect the battery.

Reset the panel by momentarily placing the reset pin in the disable position. See *Figure 7*. The red Low Battery LED continues to flash until you reset the panel.

A shorted battery condition is created either by a shorted cell inside the battery, by a short between terminals 4 and 5, or a short between terminal 5 and earth ground. A shorted battery may generate WATCHDOG RESET reports and corrupt the panel program.

## Power for 24 VDC Initiating and Indicating Devices (D9142)

### Primary Power

The D1601 is a 120 VAC, 16.5V/24VAC dual secondary transformer that is the primary power supply for the control/communicator and initiating devices of the D9124. See *Installing the D1601 Transformer* in the *Installation* section of this manual for more information about installing the D1601.

### Secondary Power

Secondary power for the alarm indicating devices (bells, horns, and strobes) is supplied by two D126 12V, 7Ah, or external D1218 12V, 17.2Ah batteries, or larger, in a separate enclosure.

Radionics recommends battery replacement every three to five years under normal use. Use only lead acid batteries.

## Choosing the Right Batteries to Meet 24V Requirements

The correct size of batteries connected to the system depends on the amount of current that devices draw from the power supply and the standard that you are meeting. See the *Auxiliary Current and Standby Battery Requirements* section, *Calculations for 24 VDC Devices* for more information.

Table 10 shows the amount of current that 24 VDC devices can draw depending on the battery amp hours that you have installed, and the amount of standby time that you need. The calculations in Table 10 include current requirements for five minutes of bell time at the end of the standby period.

For example, if you have 7 amp hours of battery capacity (two D126 batteries installed), and you are required to provide 24 hours standby time, then 24VDC devices may draw no more than 0.135A. In addition to the 0.135A of continuous current drawn, you may also attach up to 3A of indicating devices (bells for up to 5 minutes) to the Bell Circuit terminals on the motherboard.

The maximum standby current cannot exceed 1.5 amps, the maximum bell current cannot exceed 3 Amps and the total current cannot exceed 4 amps. See page 38 for further discussions and examples.

Battery Amp. Hrs	24 Hour Standby		60 Hour Standby		72 Hour Standby	
	Current (Amps)	Recharge Time (Hrs)	Current (Amps)	Recharge Time (Hrs)	Current (Amps)	Recharge Time (Hrs)
7Ah	0.136	10	0.030	12	0.012	12
12Ah	0.322	10	0.105	12	0.075	12
14Ah	0.397	11	0.135	12	0.100	12
17.2Ah	0.517	13	0.183	14	0.140	14
24Ah	0.771	18	0.286	18	0.225	18
36Ah	1.219	34	0.467	27	0.376	26
38Ah	1.294	37	0.497	29	0.401	28

Table 10: Standby Power Requirements for 24V Devices

## Installing the 24 V Standby Source Batteries

See the *Safety Section* before installing batteries.

1. Place the batteries on the top battery shelf (see Figure 18).
2. Connect the black negative wires from battery harness P7 to the negative terminals on the batteries.
3. Connect the red wires from battery harness P7 to the positive terminals on the batteries.
4. Plug battery harness P7 into connector J7 on the D9142 Power Supply.

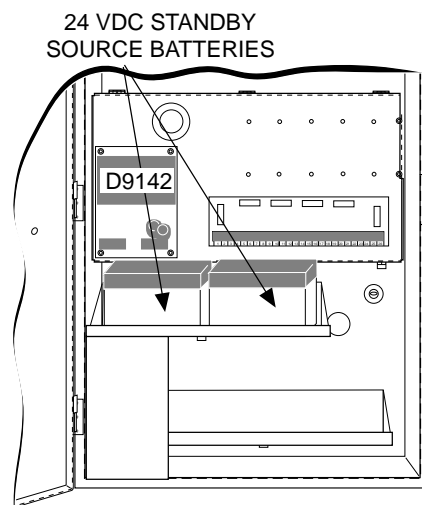


Figure 18: 24 VDC Standby Source Batteries

## **D9142 24 VDC Power Supervision**

When the float charge drops to a low battery condition, or when the batteries are removed, the red LED on the power supply illuminates. The D9142 sends a TBL POINT 8 report to the receiver, Point 8 displays a trouble at the command center. Investigate low battery reports immediately.

### **Battery Float Voltage**

The float charge voltage for the battery charging circuit is 27.6 VDC.

### **Circuit Protection**

The power supply limits current output to 4 Amps. It is protected against reversed battery polarity, thermal overload, and against current overload with a self-resetting current limited circuit.

### **Power Limited**

All 12V and 24V outputs are Power Limited.



# Power Output

## Auxiliary Power Outputs

*All external connections at the D9124 motherboard are Power Limited.*

### 12V Auxiliary Power from D9112LTB Terminal 1

The D9124 supplies 1.4 Amps at 10.2 to 14 VDC to power auxiliary devices. A self-resetting circuit breaker protects the circuit against shorts. Devices powered from this output must operate within a range of 10.2 to 14 VDC.

### 24 VDC Power from Motherboard Terminal 5

Use terminal 5 to power smoke detectors or other devices that are reset by interrupting power. Performing a **DETECTOR RESET** from the command center momentarily interrupts 24 VDC power to terminal 5 to reset the smoke detectors.

#### Power Output Depends on Standby Time Requirements

If your standby requirements call for 24 Hours standby time, the D9142 Power Supply provides up to .136 Amps at terminal 5 on the motherboard with 3 Amps of bell current available for five minutes of alarm after a 24 hour period of AC power loss. To increase this output, use larger capacity batteries in an additional enclosure (up to 38Ah, see *Table 10*).

If your application requirements call for 60 hours of standby time, the D9142 provides .030 Amps of standby current at terminal 5 on the motherboard with 3 Amps of bell current available for five minutes of alarm after a 60 hour period of AC power loss. To increase this output, use larger capacity batteries in an additional enclosure (up to 38Ah, see *Table 10*).

See the *Auxiliary Current and Standby Battery Requirements* section, *Calculations for 24 VDC Devices* for more information about standby time and available power output.

**Total output power for the D9124 must not exceed 4 Amps:** The total output power for auxiliary power (terminal 5), and the 24 VDC indicating circuits (terminals 7 and 9) must not exceed four Amps. Exceeding four Amps will overload the D9142 Power Supply. See the *Auxiliary Current and Standby Battery Requirements* section, *Calculations for 24 VDC Devices* for more information.

#### Verification/Sensor Reset Relay

Relay B is terminal 7 on the D9112 board. Terminal 7 on the D9112LTB controls the output at terminal 5 on the D9124 motherboard. When Relay B is energized for **DETECTOR RESET** or alarm verification, power to terminal 5 of the D9124 is interrupted. The D9112 default program sets Relay C for *A# Reset Sensors*. Reprogram *A# Reset Sensors* for Relay B.

See *Area Parameters A# Verify Time*, *Point Index Codes* Digits 3 and 6, and *Relay Parameters A# Reset Sensors* in the *D9112B Program Entry Guide* (74-06145-000) for instructions on programming verification/reset relays and points.

Pressing **DETECTOR RESET** activates verification/reset relays for five seconds. The panel ignores verification/reset points while the relay is activated.

## Alarm Power Output for Indicating Circuits

### 24 VDC Output

### Terminals 7 and 9

Each Alarm power output terminal (7 and 9) on the motherboard provides 24 VDC, 1.8 Amps maximum of alarm power output for bells, sirens, piezo fire sounders, and electronic horns and strobes. Current calculations in *Table 10* are based on a 3 Amp maximum.

**Total output power for the D9124 must not exceed 4 Amps:** The total output power for auxiliary power (terminal 5), and the 24 VDC indicating circuits (terminals 7 and 9) must not exceed four Amps. Exceeding four Amps will overload the D9142 Power Supply. See the *Auxiliary Current and Standby Battery Requirements* section, *Calculations for 24 VDC Devices* for more information.

### Alarm Power Output Responses

Programming in the *Bell Parameters*, *Point Index Codes*, *Point Assignments*, and *Relay Parameters* determine the response of terminals 7 and 9. See the *D9112 Control/Communicator Program Entry Guide* (74-06145-000) for programming instructions.

Relay A is terminal 6 on the D9112LTB. Terminal 6 on the D9112LTB controls the output at terminals 7 and 9 on the D9124 motherboard. Energizing Relay A provides power to terminals 7 and 9 on the motherboard. The D9112 default program sets Relay A for *A# Fire Bell*. There is no need to reprogram the relay.

# Auxiliary Current and Standby Battery Requirements

## Calculations for 12 VDC Devices

All currents are in milliamperes (1 ampere = 1000 milliamperes).

Model Number	Quan. Used	AC Power ON Normal Current Each Unit	A Total	AC Power OFF Minimum Current Each Unit	B Total	In Alarm Maximum Current Each Unit	C Total
All D9124 Devices <sup>1</sup>	<u>1</u>	460 x 1 =	<u>460</u>	462 x 1 =	<u>462</u>	874 x 1 =	<u>874</u>
D125B	_____	20 x Quan.=	_____	19 x Quan.=	_____	123 x Quan.=	_____
D129	_____	25 x Quan.=	_____	25 x Quan.=	_____	26 x Quan.=	_____
D192C	_____	20 x Quan.=	_____	20 x Quan.=	_____	10 x Quan.=	_____
D1255	_____	104 x Quan.=	_____	106 x Quan.=	_____	206 x Quan.=	_____
D1256	_____	104 x Quan.=	_____	106 x Quan.=	_____	206 x Quan.=	_____
D1257	_____	104 x Quan.=	_____	106 x Quan.=	_____	206 x Quan.=	_____
D8125	_____	48 x Quan.=	_____	47 x Quan.=	_____	48 x Quan.=	_____
D8127	_____	3 x Quan.=	_____	3 x Quan.=	_____	4 x Quan.=	_____
D8130	_____	5 x Quan.=	_____	5 x Quan.=	_____	54 x Quan.=	_____
D9131	_____	24 x Quan.=	_____	22 x Quan.=	_____	36 x Quan.=	_____
D8129	_____	20 x Quan.=	_____	20 x Quan.=	_____	20 x Quan. + 25 x # relays =	_____

Ratings of other **12 Volt** devices (bells, horns, strobes, smoke detectors, and heat detectors) in the system that are not shown above:

_____	x Quan.=	_____	x Quan.=	_____	x Quan.=	_____	
_____	x Quan.=	_____	x Quan.=	_____	x Quan. =	_____	
_____	x Quan.=	_____	x Quan.=	_____	x Quan.=	_____	
_____	x Quan.=	_____	x Quan.=	_____	x Quan.=	_____	
<b>TOTAL A=</b>		_____	<b>TOTAL B=</b>		_____	<b>TOTAL C <sup>2</sup>=</b>	

- <sup>1</sup> D9124 current draw includes:
- (1) D9112LTB Control/Communicator
  - (1) D1256 Fire Command Center
  - (1) D928 Dual Phone Line Switcher
  - (1) D8125 POPEX Module
  - (2) D192C Bell Circuit Supervision Modules

Currents shown in milliamperes (1 ampere=1000 milliamperes).

<sup>2</sup> If **Total C** exceeds 1900 mA, a D8132 is required to provide an additional 1400 mA. You may also use a UL listed external power supply for this purpose.

# Calculations for 24 VDC Devices

All calculations are in milliamperes (1 ampere = 1000 milliamperes).

Model Number	Quan. Used	AC Power ON		AC Power OFF		In Alarm			
		Normal Current Each Unit	A Total	Minimum Current Each Unit	B Total	Maximum Current Each Unit	C Total		
_____	_____	(mA) x Quan:	_____	(mA) x Quan:	_____	(mA) x Quan:	_____		
_____	_____	x Quan.=	_____	x Quan.=	_____	x Quan.=	_____		
_____	_____	x Quan.=	_____	x Quan.=	_____	x Quan.=	_____		
_____	_____	x Quan.=	_____	x Quan.=	_____	x Quan.=	_____		
_____	_____	x Quan.=	_____	x Quan.=	_____	x Quan.=	_____		
_____	_____	x Quan.=	_____	x Quan.=	_____	x Quan.=	_____		
_____	_____	x Quan.=	_____	x Quan.=	_____	x Quan.=	_____		
<b>TOTAL A=</b>			_____	<b>TOTAL B=</b>			_____	<b>TOTAL C*=</b>	

\* Total C must not be greater than 4 Amps (4000 mA).

# Standby Battery Calculations For Fire Alarm Applications

**Standby Battery and Current Rating Chart first:** You must calculate totals for columns B and C in the *Auxiliary Current and Standby Battery Requirements* section, *Calculations for 12 VDC Devices* before you can complete the calculations below.

## Calculations for D9112LTB and 12 VDC Initiating and Indicating Devices

### Central Station or Local Systems (24 Hour Standby)

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

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

Use totals from *Calculations for 12 VDC Devices*

$$\left( \frac{\text{Total B}}{\text{Hours}} \times 24 \right) + \left( \frac{\text{Total C}}{\text{Hours}} \times .083 \right) + 10\% \text{ Contingency} = \text{Total Ah}$$

Total Ah requirements must not exceed Ah capacity of batteries:

Two D126 Batteries = 14 Ah

Two D1218 Batteries = 34.4Ah

### Remote Station or Auxiliary Systems (60 Hour Standby)

Remote Station or Auxiliary Systems require 60 hours of standby plus five minutes of alarm operation at the end of the 60 hour period. A UL Listed power supply with additional batteries installed in a separate D9109 or D9109G enclosure may be required in the D9124 system to meet the basic standby requirements for a Remote Station or Auxiliary System installation. You must use battery ampere hour (Ah) calculations to verify compliance. The following formula includes the calculation for five minutes of alarm operation at the end of the 60 hour period, as well as a 10% contingency factor which allows for depletion of battery capacity with age.

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

Use totals from *Calculations for 12 VDC Devices*

$$\left( \frac{\text{Total B}}{\text{Hours}} \times 60 \right) + \left( \frac{\text{Total C}}{\text{Hours}} \times .083 \right) + 10\% \text{ Contingency} = \text{Total Ah}$$

Total Ah requirements must not exceed Ah capacity of batteries:

Two D126 Batteries = 14 Ah

Two D1218 Batteries = 34.4Ah

**Standby Battery and Current Rating Chart first:** You must calculate totals for columns B and C in the *Auxiliary Current and Standby Battery Requirements* section, *Calculations for 24VDC Devices* before you can complete the calculations below.

## Calculating D9142 24VDC Battery Capacity Requirements for Initiating and Indicating Devices

### Central Stations or Local Systems Require 24 Hours Standby

For 24 hour standby battery capacity determination use the first three columns of Table 10. First determine your calculated total 24VDC current required, per page 36, Column B, (AC power off). Next, from Table 10 in the 24 Hour Standby section, column labeled Current (Amps), select the row where the current is equal to or larger than your calculated total from page 36, Column B. To the left of this current value is the Battery Amp Hour rating you need. This value already has factored in a five minute bell current of 3 Amps at the end of the 24 hour standby period. If your standby current is greater than 1 Amp, subtract the current greater than 1 Amp from the bell current. For example, if you require 1.294 Amps of standby current you need a 38 AH battery. It will recharge in 17.1 hours and the maximum bell current is (4 Amps - 1.294 Amps) = 2.716 Amps of bell current.

### Remote Stations or Auxiliary Systems Require 60 Hours Standby

For 60 hour standby battery capacity determination use the first column and Columns 5 and 6 of Table 10. First determine your calculated total 24VDC current required per page 36, Column B (AC Power off). Next, from Table 10 in the 60 Hour Standby section, column labeled Current (Amps), select the row where the current is equal to or larger than your calculated total from page 36, Column B. To the left of this current value is the Battery Amp rating you need. This value already has factored in a five minute bell current of 3 Amps at the end of the 24 hours standby period. If your standby current is greater than 1 Amp subtract the current greater than 1 Amp from the bell current. for the 60 and 71 hour standby required can always use 3 Amps for the battery capacities and currents in the table.

# Telephone Connections

## D928 Dual Phone Line Switcher

**You must use two phone lines for a reporting fire system to meet UL and NFPA standards.**

### Description

The D9124 uses the D928 to transmit reports over a second phone line. The D928 allows the D9124 to monitor both the primary and secondary phone lines. For information about connecting the D928 to the D9124, see *Connecting Cables Between D9124 System Components* in the *Installation* section of this manual.

### Operation

The D9124 always uses the primary phone line to initiate phone calls, unless it has been detected as faulty.

#### Phone Line Monitor

The D9112LTB panel has a built-in phone line monitor that tests the phone line for voltage and current. The panel monitors the primary and secondary phone lines as the D928 regularly routes each line to the D9112LTB. The normal voltage on a telephone line is approximately 48 VDC (24 VDC for some phone systems). The phone line monitor senses trouble when the voltage on the line falls below 4.5 to 7.5 VDC, without a corresponding current increase of 8 to 13mA.

If the monitor senses trouble, it starts a programmable phone line trouble timer. The timer continues to run as long as the monitor senses trouble. It resets to zero when the panel senses a normal line. If the timer reaches the delay time in the *Phone Supervision* program item, it begins a phone line trouble response. Programming determines what the response is. See *Phone Parameters* in the *D9112B Program Entry Guide* (74-06145-000).

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

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

See the *Phone* section of the *Panel Wide Parameter* module of the *D9112B Program Entry Guide* (74-06145-000) for phone supervision and reporting options. You must set the *Two Phone Lines* prompt to **YES** to use the D928.

### Primary Phone Lines, Primary Phone Numbers

**Don't confuse primary phone lines with primary phone numbers:** With the D928 Dual Phone Line Switcher installed, the D9124 uses two phone lines, primary and secondary, to dial up to four phone numbers.

These four phone numbers are designated as primary, backup, or duplicate. See *Phone Routing* in the *Panel Wide Parameter* module of the *D9112B Program Entry Guide* (74-06145-000) for a description of these designations.

The D928 uses the primary phone line to dial a primary, backup, or duplicate phone number. The D9124 switches to the secondary line only when the D9124 senses trouble on the primary telephone line. During primary telephone line failure, the D9124 transmits all messages on the secondary line.

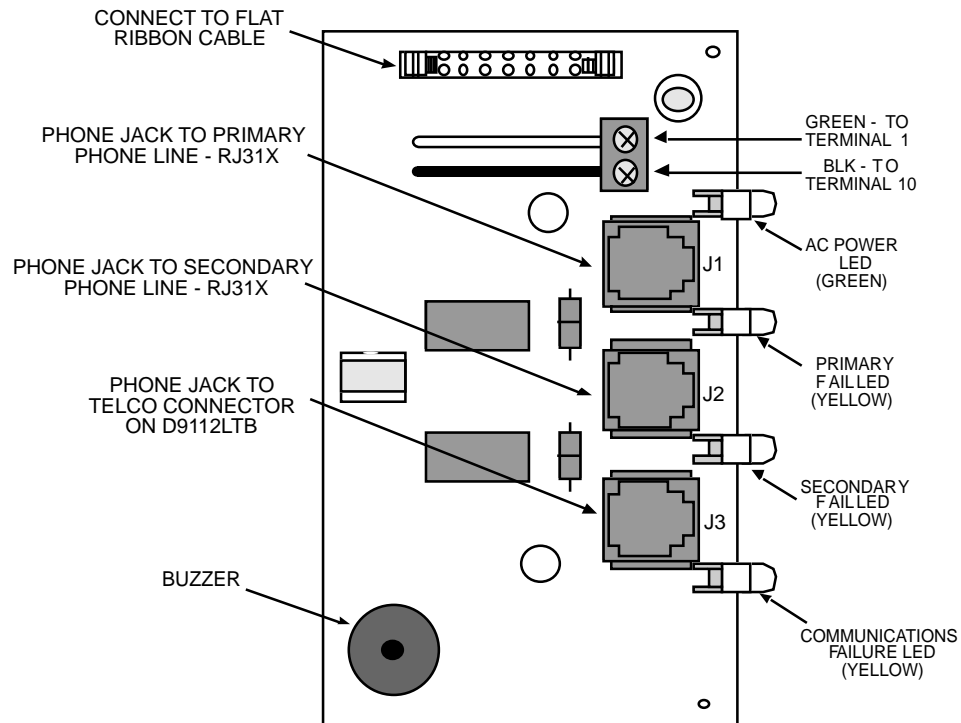
When the primary telephone line trouble clears, the D9124 sends the restoral message to the receiver on the primary telephone line. All messages are again sent on the primary line.

### Watchdog Feature

The Watchdog circuit monitors the panel's CPU (**C**entral **P**rocessing **U**nit) for proper operation. If the CPU fails, the buzzers on the D9112LTB and the D928 sound. The buzzers stops sounding when the CPU begins operating normally.

### D928 Status LEDs

Four LEDs mounted on the front edge of the D928 module indicate primary phone line failure, secondary phone line failure, failure to communicate, and AC power status. When programmed and operating normally, only the green AC power status LED should be illuminated. See *Figure 19*.



**Figure 19: D928 Dual Phone Line Switcher Module**



## Phone Line Failure LEDs

Two yellow phone line status LEDs (one for the primary line, one for the secondary line) illuminate when phone line voltage drops below 4.5 -7.5 VDC without a corresponding 8-13mA increase in current. The panel monitors both phone lines. The D928 switches phone lines to the panel at regular intervals so that the panel can test each phone line. If the D9112LTB senses a faulty phone line, it monitors the faulty telephone line for the programmed interval before indicating a trouble condition. For more information, see the description of *Phone Supv Time* in the *D9112B Program Entry Guide* (74-06145-000).

## Failure to Communicate LED

A yellow LED illuminates when the D9124 goes into communications failure. The LED extinguishes when communication restores.

## AC Power Status LED

The green AC power status LED illuminates when the panel is running on AC power. When AC power is not available, the LED extinguishes.

## Communication Failure

The D9124 makes five attempts on each line before going into communication failure. The panel clears any reports in its phone buffer. **SERV COMM FAIL** appears in the display at command centers.

Pressing **TROUBLE SILENCE** silences the tone. When communication restores (a report is acknowledged by the receiver), the display clears automatically. See *Phone Parameters* in the *D9112B Program Entry Guide* (74-06145-000) for reporting options.

## Registration

The D9124 is registered with the Federal Communication Commission under part 68, for connection to the public telephone system using a D166 RJ31X jack.

FCC Registration Number: AJ-9USA-18808-AL-E

Ringer Equivalence: 0.1A 0.2B

This telephone interface complies with UL 1459.

## 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 on which you are connecting the panel
- Make (Radionics), model (D9124), and serial number of the panel
- FCC registration number and ringer equivalence for the panel (see *Registration*)

## Location

To allow fire alarm communications to take priority over other telephone communication, wire the D166 RJ31X jack before the in-house phone system to support line seizure (see *Figure 20*). Wire the jack to the street side of the phone switch, ahead of any PBX equipment. Line seizure provides for a temporary interruption of normal phone usage while the communicator transmits data. After installation, confirm that the panel seizes the phone line, acquires dial tone, reports correctly to the receiver, and releases the phone line to the in-house phone system.

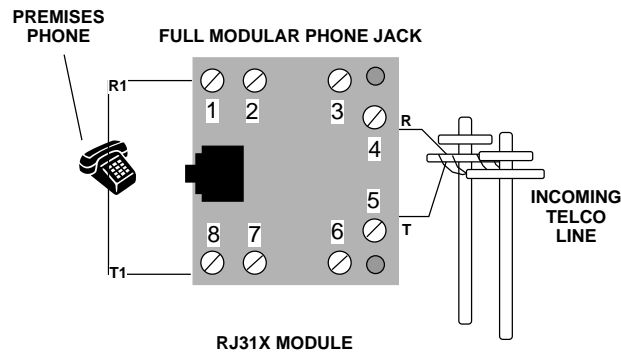


Fig. 20: D166 RJ31X Jack Wiring

## Phone Line Select Switch

Make sure the Phone Line Select switch on the left side of the D9112LTB is set in the loop start position.

***Ground start phone systems are not acceptable for fire systems.***

# Programming

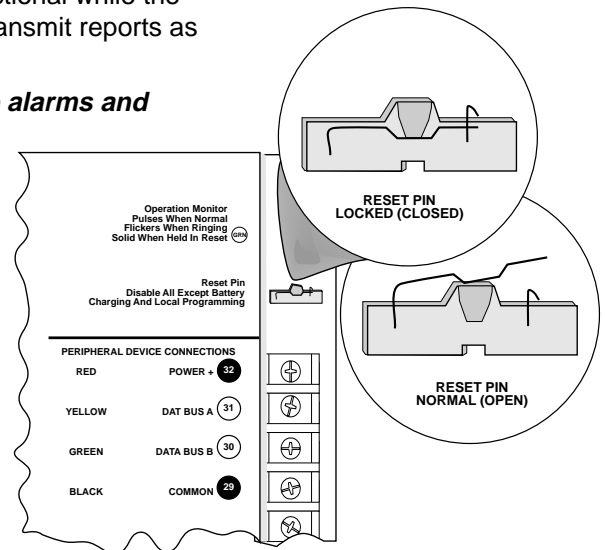
## Programming the Panel

The procedure below describes how to connect and disconnect the D5200 Programmer. Refer to *D5200 Programmer Operation Manual (74-06176-000)* for complete information on operating the D5200 programmer.

1. **Panel is fully operational during programming:** Except when the programmer is sending or receiving, the D9124 is functional while the programmer is connected to it. It will transmit reports as programmed.

**Locking the Reset Pin reduces false alarms and increases the speed of programming:** If you have supervised command centers or other supervised devices connected to the Data Bus (terminals 30 and 31), locking the Reset Pin will speed communication between the panel and the D5200.

**Radionics recommends that you lock the Reset Pin in the LOCKED position to prevent reports from being transmitted while you are programming.** See *Figure 21*.



**Figure 21: Reset Pin**

2. Plug the D5200 Data/Power cord into the programmer connector (J7) on the D9112LTB.
3. Advance the D5200 display to a *9112* program record. See *D5200 Programmer Operation Manual (74-06176-000)*.

**Troubles after 30 seconds if the Reset Pin is not locked:** If you don't enter the *9112* handler within 30 seconds of connecting the programmer, supervised SDI devices (command centers, printer interface, etc.) connected to the D9124 generate SDI trouble reports.

Once the panel generates the SDI trouble reports all command centers, both supervised and unsupervised, stop responding to key strokes. Entering the *D9112* handler or disconnecting the programmer returns the command centers to normal operation.

4. Perform the desired programming function (send or receive program).
5. Disconnect the programmer.
6. Changes to some program parameters require a reset before they become effective.

## Unlock the Reset Pin

**Reset Recommended:** Radionics recommends that you disable/restart the panel after changing program parameters with the D5200 programmer. If you locked down the reset pin in step 1, release it now to reset the panel. If you didn't lock the rest pin, momentarily close it now to reset the panel. See *Figure 21*.

Remember that the panel's on-board buzzer sounds for 10 seconds whenever you reset the panel.

## Sample Program

The *D9124 Program Record Training Sheet (74-06802-000)* shows the programming required to support the D1256 Fire Command Center and power indicating circuit supervision. The program entries shown on this sheet are those which are loaded into the D9124 before it's shipped from the factory.

**Further Programming Required:** These entries are necessary, but not sufficient by themselves to set up the panel. You must complete this program for the D9124 to function.

## Programmer Access Reports

If you send a program to the panel, the panel sends a `PROG ACCESS OK` report ten seconds after you exit the handler or when you disconnect the programmer. If you make three consecutive attempts to send or receive a program with an invalid DataLock code, the panel sends a `PROG ACCESS BAD` report. Successfully sending or receiving a program, or powering down the panel, resets the counter.

## Programmable Test Features

See *Testing the System* in this manual for information about how to operate these test features.

### Fire Test

The Fire Test provides a way for one person to carry out a fire test without assistance. It provides the following features:

- Reports to the receiver when you start the test, and when you end it.
- Annunciates local sounders without sending reports to the receiver.
- Automatically resets smoke detectors. You don't have to reset sensors with **DETECTOR RESET** after you test each device.
- With a local printer installed, you can print a record of each alarm test response.

#### Using Fire Test

**Fire Test suppresses alarms and troubles:** All alarm and trouble reports to the receiver are suppressed when fire test is in progress.

Make sure you have **DETECTOR RESET** enabled when you are using the Fire Test. The Fire Test is described in *Testing the System* and in the *User's Guide* provided with the D1255 and D1255R Command Centers.

### Walk Test

The Walk Test is carried out in the same manner as the Fire Test, but it tests points that turn on and off as part of an intrusion system.

### Service Walk Test

The Service Walk Test is carried out in the same manner as the Fire Test, but it tests all points.

## Automatic Test Reports

The D9124 can generate automatic test reports. Use this feature to test the phone lines. NFPA 72 Central Station and Remote Station standards require that you send a test report at least every 24 hours.

Test report schedules are programmed in the *Skeds* section of the D9112B Program. See *S## Function Code* selection number *9-Test Report* for programming requirements. You can defer the test report if the panel generates any report other than the automatic test report. Use the additional parameter *S## Defer Test* to defer the test until the next scheduled test report.

The test report can be programmed to send additional system event information. See *Expand Test Rpt* in the *Phone* section for more information.

The panel tries to send the report over the primary phone line first. If it fails, it switches to the secondary phone line. It sends a `PHONE LINE FAIL` (in Modem II) or a `TROUBLE ZONE E` (in BFSK) with the test report if it fails to reach the receiver the first time. A `PHONE RESTORAL` (in Modem II) or a `RESTORAL ZONE E` (in BFSK) is sent when the troubled line is used successfully.

**Setting test times:** A D1255 or D1255R Command Center is required in order to set the panel's clock and calendar. See the *Security System User's Guide "C-Time/Date"* (71-06141-000) for operating instructions.

# Testing The System

## Fire Test

Use this function to test fire points to be certain they function properly. You can review untested points at the command center to help pinpoint any problems.

Upon initiation, the fire test will test the fire alarm output and activate the command center fire sounder for two seconds. The AC will be disabled for four minutes in order to test the system's battery power. If the battery cannot maintain the system for the four minute period, the command center will appear to go dead. At the end of the four minute period, AC is returned to the system and the panel restores. A message will be sent to the receiver upon initiation and completion of the Fire Test. **During the Fire Test, no alarms will be sent to the receiver.**

If there is no activity on the system for 20 minutes, the system will automatically exit from the Fire Test and send a restoral message to the receiver.

### Using Fire Test:

1. Press the **ESC** key on the D1256 Command Center to enter the menu, then press **NEXT** repeatedly until you reach the **FIRE TEST ?** prompt. Press **ENT**.
2. The display shows **## PTS TO TEST**.
3. One-at-a-time, activate the detection devices to fault each point.
4. As you activate each point, your command center will display the point text for 60 seconds and ring the fire sounders for two seconds. This verifies that the detection device is working properly. The D9124 system automatically resets smoke detectors.

When a resetable point (such as a smoke detector) is faulted, the display shows **SENSOR RESETTING** for five seconds. During this time power is removed from smoke power relays.

Activating a point more than once does not increment the test count. However, the command center emits a brief tone and displays the point text each time you fault the point allowing you to test multiple devices assigned to one point.

5. When all 24-hour points have been tested, **0 PTS TO TEST** is displayed. Press **ESC**. The display momentarily shows **ALL PTS TESTED** before returning to idle text.
6. During the Fire Test you may want to see the points that remain untested. When point text is displayed, press **ESC**. The display shows **## PTS TO TEST**. Press the **ESC** key. **VIEW UNTESTED ?** is displayed. Press **ENT**. **## PTS UNTESTED** is displayed. Press **NEXT** to see a list of the points that have not yet been tested. Move through this list by pressing the **NEXT** key. To resume the Fire Test, press **ESC**. **## PTS UNTESTED** is displayed. Press **ESC**. **## PTS TO TEST** is displayed. Resume testing points.

To end the Fire Test, press **ESC** twice.

**Automatic time-out returns the system to idle text:** If there is no point or command center activity for 20 minutes, the fire test ends automatically, and the D9124 System sends a restoral message to the receiver. The command center returns to idle text.

## Service Walk Test

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

**Service Walk Test only available at command centers with panel wide scope:** See *Command Center* in the *D9112 Control/Communicator Program Entry Guide* (74-06145-000) for a description of command center scope.

**Warning, fire and other 24-hour points do not transmit reports to the receiver during Service Walk Test!**

The steps below outline a simple Service Walk Test procedure.

1. Choose a command center with panel wide scope to conduct the test. Be certain the display shows the idle disarmed text.
2. Press **9 9 ENT** to display the first item in the Service Menu.
3. Press **NEXT** to step through the menu items until **SERVICE WALK?** appears in the display.
4. Press **ENT**.
5. **ENTER PASSCODE** appears in the display if you programmed Service Walk Test access to be restricted by authority level.

Enter a passcode assigned an authority level with access to the Service Walk Test function. Press **ENT**.

6. The display shows **134 PTS TO TEST**. Test the first detection device.
7. As you fault the detection devices, the command center emits a brief tone, briefly displays the point text for the point tested, and returns to the points to test display.  
**Extra Points display default text:** If you incorrectly set the addresses on a POPIT to a point number that is not in your program for the panel, the default text for that point number (**POINT ###**) displays when you fault the point. The *D9112 Program Record Sheet* shows the default text for all points.  
Faulting the point a second time produces the tone and displays the point text, but does not reduce the **PTS TO TEST** count.
8. During the Service Walk Test you may want to see the points that remain untested. When the display shows **## PTS TO TEST**, press the **ESC** key. **VIEW UNTESTED ?** is displayed. Press **ENT**. The display shows **# PTS UNTESTED**. Press **NEXT** to see a list of the points that have not yet been tested. Move through this list by pressing the **NEXT** key. To resume the Service Walk Test, press **ESC**. **## PTS TO TEST** is displayed. Press **ESC** a second time to end the Service Walk Test.
9. After testing the last point, **0 PTS TO TEST** displays. Press **ESC**. The display momentarily shows **ALL PTS TESTED** before returning to idle text.

**Automatic time-out returns the system to idle text:** If there is no point or command center activity for 10 minutes, the walk test ends automatically and the D9124 System sends a restoral message to the receiver. The command center returns to idle text.

# Troubleshooting Guide

## Introduction

Radionics provides this guide to help you troubleshoot problems with the D9124. To prevent problems from occurring, read the preceding sections of this manual and the program entry guide to verify that the panel is correctly installed and programmed.

## Self Diagnostics

The D9124 performs a series of self diagnostic tests of its hardware, software, and program at start up and reset.

**Buzzer sounding is normal at start-up:** The on-board buzzer located on the lower right corner of the panel sounds as the D9124 performs its self diagnostic tests at start up and reset. The tests take approximately ten seconds. If all tests are completed successfully, the buzzer turns off.

The panel continues periodic internal testing during normal operation. If a fault is detected during this testing the buzzer begins sounding. One of the system messages listed below displays at the command centers.

### **CALL FOR SERVICE**    **Trouble at Command Center**

When a command center stops receiving data from the panel, CALL FOR SERVICE appears in the command center's display. No buzzer sounds at the command center.

### **PANEL BROKEN**    **Hardware, Software Failed**

If a hardware or software problem causes the buzzer to sound, the green operation monitor LED on the D9112LTB stops flickering or is extinguished. PANEL BROKEN appears in the displays of all command centers.

Pressing **TROUBLE SILENCE** does not silence the buzzer. You must return the panel to Radionics for repair. Attach a Radionics Return Tag or call Customer Service for a return authorization.

### **PARAM FAIL**    **Program Parameters Failed**

If a corrupted program causes the buzzer to sound, the green operation monitor LED continues to flicker. PARAM FAIL alternates with the idle text at the command centers. The panel sends a PARAM FAIL report to the receiver. Pressing **TROUBLE SILENCE** may silence the buzzer.

**Silencing the buzzer does not correct the problem:** You must replace the corrupted copy of the program in the panel. Load a new copy of the complete program. The displays clear when you reset the panel after loading a new program.

### **SERV AC FAIL**    **AC Power Failed**

An interruption of AC Power at terminals 1 and 2 causes SERV AC FAIL to appear in command center displays. You can program the panel to send an AC FAILED report to the receiver. Pressing **TROUBLE SILENCE** silences the buzzer. Restoring power clears the display.



### **SERV BATT LOW** Battery Voltage Low

If battery float voltage at terminals 4 and 5 falls below 12.1 VDC, a **SERV BATT LOW** appears in command center displays. See *Battery and Power Reports* in this section for probable causes and remedies.

Pressing **TROUBLE SILENCE** silences the buzzer. The display clears when battery voltage reaches 13.7 VDC.

### **SERV BATT MSING** Battery Missing, Shorted, or Reversed

If the panel can not detect a battery at terminals 4 and 5, a **SERV BATT MSING** appears in command center displays. You can program the panel to send a **BATTERY MISSING** report to the receiver.

Pressing **TROUBLE SILENCE** silences the buzzer. Restoring the battery clears the display.

### **SERV COMM FAIL** Communications Failure

**SERV COMM FAIL** appears in command center displays after the panel makes 10 unsuccessful attempts to report to the receiver.

Pressing **TROUBLE SILENCE** silences the buzzer. The display clears when communication restores (the receiver acknowledges a report). See *Communication Failure* in the *Telephone Connections* section for a complete description.

### **SERV KEYPAD** Supervised Command Center Missing

When the panel loses contact with a supervised command center, **SERV KEY PAD** appears at other command centers connected to the panel. The panel transmits an **SDI FAILURE** report to the receiver.

Pressing **TROUBLE SILENCE** silences the buzzer. The displays clear when contact with the missing command center restores.

### **SERV PH LINE #1 (or 2)** Phone Line Failure

**SERV PH LINE #1 (SERVC PH LINE #2)** appears in command center displays when the panel detects a phone line as faulted.

Pressing **TROUBLE SILENCE** silences the buzzer. The display clears when the panel detects a normal phone line. See *Phone Line Monitor* in the *Telephone Connections* section for a complete description.

### **SERV PRINTER** Supervised Printer Missing

When the panel loses contact with a supervised printer, **SERV PRINTER** appears in command center displays.

Pressing **TROUBLE SILENCE** silences the buzzer. The displays clear when contact with the missing printer restores.

## Phone Line Trouble

Phone line problems that are not corrected can result in the D9124 going into Communications Failure. You can program the D9124 to monitor one or two phone lines. See the *D9112B Program Entry Guide* (74-06145-000) for programming instructions.

If you enable the phone line monitor, SERVC PHONE LINE #1 (or 2 if two lines are used) appears in the command center's display when the D9124 detects a problem on the phone line.

Symptom	Diagnosis	Remedy
SERVC PH LINE #1 or 2 appears in control center display.	D9124's phone line monitor detects a phone line as faulted.	<ol style="list-style-type: none"> <li>1. Verify that the telephone cord is correctly connected to the RJ31X and the D9124.</li> <li>2. Verify the Ground Start Jumper is in the correct position.</li> <li>3. If using a ground start phone line, verify D136 relay is in socket K6/J5.</li> <li>4. Verify that the RJ31X jack is wired correctly. The incoming phone line must be wired to terminals 4 and 5. The in-house phone system must be wired to terminals 1 and 8.</li> <li>5. Verify that all telephones are on-hook. Leaving a telephone on hold after the other party hangs up creates an off-hook condition. Verify that no phones are on hold.</li> </ol> <p>If completing the steps above does not restore the phone line, meter the phone lines. You should meter 4.5 to 7.5 VDC when the line is idle (on-hook). You should meter 8 to 13 mA of current when the line is active (off-hook). If your readings are below the minimum values, contact your telephone company repair service.</p>

## Communications Failure

The D9124 goes into Communications Failure after ten unsuccessful attempts to reach the receiver. Follow the *Phone Line Trouble* procedure to verify that there is no problem with the phone lines at the D9124 installation. If the phone lines are good, monitor the lines (preferably at the receiver) for the symptoms listed below.

Symptom	Diagnosis	Remedy
<p>The line rings but the D6500 receiver does not pick up.</p> <p>Amber RING indicator on line card does not flash. Can not hear ring with headset at receiver location.</p>	Line is not ringing at the receiver.	<ol style="list-style-type: none"> <li>1. Verify that the lines are correctly connected to the receiver.</li> <li>2. Verify that correct prefixes and phone numbers for the receiver have been programmed into the D9124.</li> </ol> <p>If completing the steps above does not correct the problem, contact your telephone company repair service.</p>
<p>The line rings but the receiver does not pick up.</p> <p>Amber RING indicator on line card flashes. Can hear ring with test set at receiver location.</p>	Line card in receiver may be faulty.	Review receiver manuals for trouble shooting procedures.
<p>The D9124 receives a busy signal for all ten attempts to reach the receiver.</p>	<p>Calls are not reaching the receiver.</p>	<ol style="list-style-type: none"> <li>1. Verify that correct prefixes and phone numbers for the receiver have been programmed into the D9124.</li> <li>2. Verify that the phone lines are not shorted between the phone company's equipment and the receiver by placing a call to the number for the receiver. If you hear the line ring, but the ring detector doesn't light, or if you hear a busy signal and the green on line (OL) indicator is not lit, call the phone company for service.</li> </ol>
	<p>The receiver's call load is too great.</p>	<p>Additional line cards and phone lines may be needed for the receiver.</p>
<p>The receiver answers the call and provides an acknowledgment tone, but the communicator does not transmit reports.</p>	<p>The receiver is not producing the correct acknowledgement tone.</p>	<p>Verify that the receiver is producing a 1400 Hz, 2300 Hz, or Modem II acknowledgment tone.</p>

## Communications Failure (continued)

Symptom	Diagnosis	Remedy
The receiver answers the call and provides an initial "handshake" acknowledgment, but does not acknowledge the D9124's report transmission with a "kiss-off" acknowledgment .	The receiver is not compatible with the D9124's transmission format.	Verify that the receiver is compatible with the format the D9124 is using (either BFSK or Modem II). See <i>Phone</i> in the <i>D9112 Program Entry Guide</i> (74-06145-000).  Modem II requires D6500 MPU and Line Card EPROM revision 6.00 or higher.
	Noisy phone lines are interfering with report transmission.	Try making a voice call to the receiver on the line to verify the noisy condition. It may be necessary to have the phone company check the lines.

## Problems Programming the Panel

Before attempting to program the D9124, you should be familiar with the basic operation of the D5200 programmer. See the *D5200 Operation Manual* (74-06176-000). If you still experience problems, check for the symptoms below.

Symptom	Diagnosis	Remedy
The programmer displays PLUG IN 9124 when you press SEND or RECV.	The programmer is not correctly connected to the D9124.	<ol style="list-style-type: none"> <li>1. Verify that the data/power cord is plugged into the COMMUNICATOR port on the D5200.</li> <li>2. Verify that the data/power cord is plugged securely into the D5200 programmer.</li> <li>3. Check each conductor in the data/power cord for continuity.</li> </ol>
	AC induction through the on-board point sensor loops, the DATA BUS, or the ZONEX BUS.	<ol style="list-style-type: none"> <li>1. Verify a proper earth ground at terminal 10.</li> <li>2. Disconnect on-board point sensor loops, the DATA BUS (terminals 30, 31), and the ZONEX BUS (terminals 25, 26, 27, 28).</li> </ol>
After plugging in the programmer, the panel transmits SDI trouble reports for supervised SDI devices (command centers, printer interface modules, etc.). All SDI devices stop operating.	You haven't entered the D9124 handler within 30 seconds of plugging in the programmer.	Enter the D9124 handler within 30 seconds of plugging in the programmer.  Once the SDI reports are generated, entering the handler or disconnecting the programmer returns the SDI devices to normal operation.

## Problems with Points

If you incorrectly set the switches on a POPIT you may create both a missing and extra point. When you find a missing point, perform a Service Walk Test to search for extra points. See the *Security System Owner's Manual (71-06633-000)* for test instructions.

Symptom	Diagnosis	Remedy
Point appears as missing at control centers and in reports to the receiver.	POPIT is not connected or incorrectly connected to the data expansion loop.	Verify the a POPIT module programmed for the missing point number is connected to the data expansion loop of the correct ZONEX module. Points 9 to 71 connect to ZONEX module 1. Points 73 to 135 connect to ZONEX module 2.  Meter each POPIT to verify the polarity of the data expansion loop. Voltage should be 9 to 13 VDC at each POPIT.
	Sensor loop switch (1 to 8) is turned off on OctoPOPIT.	If the sensor loop switch on an OctoPOPIT is turned off for a programmed point, the point reports as missing.
	Switch 12 ON for more than one OctoPOPIT connected to ZONEX 1 or ZONEX 2.  Switch 12 ON for OctoPOPIT connected to same ZONEX IN as a D8125.	Connect only one OctoPOPIT with switch 12 ON to ZONEX IN1 or ZONEX IN 2.  If ZONEX IN1 or ZONEX IN 2 is connected to a D8125, turn switch 12 OFF for all OctoPOPITs connected to that terminal.
	POPIT is not programmed correctly.	Verify that the address on the POPIT is set for the missing POPIT number. Addresses set incorrectly can cause both missing and extra POPITs.  Performing a Service Walk Test to search for extra points may help diagnose the problem.
Points intermittently appear as missing. Points are erratic.	Problem with data expansion loop.	See <i>Problems with Data Expansion Loop</i> .
	Debounce Count parameter set at 1. If an off-board point is in transition between normal and faulted conditions as the panel scans it, it appears as missing.	It is recommended that the Debounce Count be left at the default of 2.  Decreasing the Debounce Count to 1 may cause points to appear as missing. Increasing the Debounce may cause missed alarms.

## Problems with Points (continued)

Symptom	Diagnosis	Remedy
One or more points remain in trouble or alarm with all devices connected to the sensor loops normal.	<p>The sensor loop is open, shorted, or grounded.</p> <p>Opens, shorts, or grounds cause troubles or alarms depending on point programming.</p>	<p>Remove the sensor loop from the D9124 or POPIT and meter it for continuity. There should be no more than 100Ω resistance, plus the value of the end of line resistor on the wires. If you measure less resistance than the value of the end of line resistor, check the wiring for shorts.</p> <p>With the wires for the loop removed, measure them for leakage to ground. A ground before the end of line resistor on an on-board point's sensor loop is interpreted as a short. A ground on a sensor loop for a POPIT point is interpreted as an open.</p>
Faulted points do not generate alarms or troubles as programmed.	Sensor Reset pressed at the time the alarm or trouble was generated.	The D9124 ignores input from all points in the same area programmed for sensor reset during sensor reset.
	Two points are programmed with the same address.	Points programmed with the same address do not function correctly. Check to be certain that you have not duplicated point addresses.
Panel transmits PT BUS TROUBLE reports. Erroneous alarm and/or trouble reports may follow PT BUS TROUBLE report. Erroneous alarm and/or trouble events for off-board points appear at control centers.	Short on D8125 POPEX module's Data Expansion Loop or short on D9124's ZONEX data terminals (25 & 26, or 27 & 28).	<p>A short on either the Data Expansion Loop or the ZONEX data terminals generates a PT BUS TROUBLE report.</p> <p>While the short remains, the panel responds as though the sensor loop for each point connected to the POPEX module was shorted.</p> <p>Check wiring for shorts.</p>
	A POPIT has its address set incorrectly and it's sensor loop is shorted.	Check to be certain all POPIT addresses are set correctly.
	An OctoPOPIT assigned to points 65 to 71, or 129 to 135 has switch 8 turned on. Sensor loop is shorted	<p>Check to be certain that switch 8 is turned off for any OctoPOPIT assigned to points 65 to 71 or 129 to 135.</p> <p>The D9124 reserves points 72 and 136 for monitoring the ZONEX Point Bus (Data Expansion Loop).</p>

## Problems with Points (continued)

Symptom	Diagnosis	Remedy
All off-board points are MISSING.	Short on Aux Power, terminal 3 or ZONEX power, terminal 24.	Terminals 3 and 24 share a common circuit breaker. Check wiring and devices connected to these terminals for shorts or leakage to ground.
	If only one POPEX module is connected to the D9124, POPEX module may be incorrectly connected to the D9124 or Data Expansion Loop may be disconnected from POPEX module.	Check POPEX module for correct connections to the D9124 and the Data Expansion Loop.

## Problems with the D8125 POPEX Data Expansion Loops

EMI (Electro-Magnetic Interference), excessive resistance, or intermittent grounds, shorts, or opens on the data expansion loop can cause erratic or intermittent functioning of points. Follow the procedures below to find the source of problems on the data expansion loop.

### EMI

If you suspect EMI may be a problem, see *EMI on Long Wire Runs* in this section. AC induction on the data expansion loops must be less than 10 VAC.

### Measuring Resistance on the Loops

Before you follow the procedures below to measure resistance on the data expansion loops, check *Table 6* in the *Zonex* section to be sure you used the correct gauge wire for the length of the data expansion loops. Be sure not to connect your meter leads to power when measuring resistance. This may damage your meter.

When you measure the loop for resistance, monitor it long enough to observe an intermittent problem.

#### **To measure the resistance of the data expansion loop without POPITs connected to it:**

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



## Checking Shielded Cable

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

1. Remove the drain wire for the shield from terminal 10.
2. Measure the drain wire for resistance to terminal 10 (earth ground). If there is a short to ground, find and remove the foreign ground from the drain wire.
3. Reconnect the drain wire to terminal 10.
4. Measure the shield at the far end of the cable (last POPIT location on data expansion loops) for resistance to a ground reference. If there is an open circuit, find and repair the open in the shield. Solder and tape all connections.

## EMI on Long Wire Runs

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

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

There are many other possible sources of noise. If you suspect that noise may be a problem, the use of shielded wire is strongly recommended. Connect the drain wire from the shielded cable to terminal 10 on the D9124.

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

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

## Problems with Command Centers

Symptom	Diagnosis	Remedy
<p>Command centers show erratic behavior.</p> <p>For example, the pip that confirms you pressed a key "echoes" or the back lighting flashes off and on.</p>	<p>A supervised address has been entered in more than one command center.</p>	<p>Entering a supervised address in more than one command center causes erratic behavior.</p> <p>Use a supervised address in one command center only.</p>
	<p>One or more of the keys is stuck under the faceplate</p>	<p>Press each of the keys on the command center to be certain none of them is stuck.</p>
	<p>Data connections (yellow and green wires) on one or more command centers are reversed, or only one wire is connected.</p>	<p>Check to be sure that the yellow and green data wires are correctly connected at all command centers.</p>
<p>NO AUTHORITY displays at command center when you enter your passcode to perform a function.</p>	<p>Check the <i>User Interface</i> section of the program to be sure the function is enabled for Authority Level assigned to the passcode in the <i>Passcode Work sheet</i> section of the program.</p> <p>Check the <i>Passcode Worksheet</i> section of the program to be certain the passcode is assigned to the area where you are attempting to perform the function.</p> <p>Check the <i>Passcode Worksheet</i> section of the program to see if the passcode is restricted by a user window.</p> <p>Check the <i>Area Parameters</i> section of the program to be certain the area you are attempting to perform the function in is turned on.</p>	

## Watchdog Reset Reports

The D9124 sends a WATCHDOG RESET report whenever the panel's CPU (Central Processing Unit) is interrupted and has to start its normal operating sequence over. The on-board buzzer sounds briefly during the WATCHDOG reset. The panel returns to normal operation immediately after resetting.

The most common cause of CPU interruption and WATCHDOG RESET reports is static discharge to the panel. Static discharges may also corrupt the panel's program. The D9124 displays a PARAM FAIL message at the command centers and sends PARM CKSUM FAIL report if the program is corrupted.

Shorting D9112LTB terminal 3, 6, 7, 8, or 24, connector J2, or connector J4 to ground may also cause a WATCHDOG RESET. Remove the short to continue normal operation.

A single isolated WATCHDOG RESET report does not mean you have to replace the panel. If you experience frequent reports, contact Radionics Customer Service for help.

**Touch Terminal 10 first:** If the on-board buzzer sounds briefly when you first touch the panel, you're discharging any static charge you may be carrying to the panel. The panel may generate WATCHDOG RESET and/or PARAM FAIL events. Always touch terminal 10, the panel's earth ground connection, before beginning work on the panel.

## Runaway Reports to the Receiver

Using the D8128 in place of the D8128A OctoPOPIT Module may cause runaway reports to the receiver on AC failure. If you installed the D8128 be sure to replace it with the D8128A module.

## Battery and Power Reports

You can program the D9124 to transmit both battery and AC power status reports. See the *D9112B Program Entry Guide* (74-06145-000). If battery or AC power reports are a problem check the following.

**Blown Fuse F1 on the D9142 removes power from D9112LTB and D9142 Power Supply:** Fuse F1 is the D1601 Transformer's primary fuse. If Fuse F1 is bad, AC power is removed from all components in the system. See *120 VAC Fuse* for more information.

1. Check to be sure you are not overloading the D9142 Power Supply. Review the *Power Outputs* section and *Overloaded Power Supply* in this section.
2. Verify that there is at least 16.5 VAC on terminals 1 and 2.
3. The D1601 Transformer's input voltage should measure between 110 VAC and 120 VAC.
4. Verify that the output for the transformer connected to terminals 1 and 2 is rated for 16.5 VAC and at least 40 VA. (The D9142 Power Supply meets this requirement).
5. Disconnect the transformer from terminals 1 and 2 and measure the battery at terminals 3 and 4. A fully charged battery should show 13.8 volts.
6. Make sure the battery is a 12 V sealed lead acid type. It should be rated at 7 Ah or greater, depending on the NFPA classification of the installation.

## Overloaded 12 Volt Power Supply

If the load on the D9112LTB's 12 volt power supply exceeds its capacity, the panel follows a routine to protect itself and the battery. It sends reports to the receiver at several points during this routine. *Table 11* shows the D9112LTB LED indicators.

Keep in mind that AC power remains at terminals 1 and 2 as you read the overload scenario below.

- The panel is operating normally with a good battery, AC is present at terminals 1 and 2, and auxiliary power load is under 1.4A.
- Combined load on terminals 3, 6, 7, 8, 24, and 32, and connector J2 and J4 exceeds and remains above 1.4A. Device failure or premises wiring ground faults might cause the increased load.
- The panel begins drawing on the battery to support the increased load. The yellow charging status LED illuminates.
- The battery begins to drain. When voltage drops to 12.1 volts, the panel sends a LOW BATTERY report and illuminates the red Low Battery LED.
- When the battery drops to 10.2 volts the panel disconnects it to protect it from deep discharge.
- If AC is still present, the panel removes power to terminals 3, 6, 7, 8, 24, and 32, and connector J4 to protect its power supply. The green operation monitor LED extinguishes, but the panel is still operating.
- The panel sends BATTERY MISSING, PT BUS TROUBLE, and SDI FAILURE reports.
- If a D928 module is connected to J2, it begins sounding.
- After approximately 60 seconds the panel attempts to return to normal operation by returning power to terminals 3, 6, 7, 8, 24, and 32, and connector J4.
- If the overload condition is still present, the panel removes power.
- The panel attempts to return to normal operation approximately every 60 seconds.
- The cause of the overload is removed. Combined load on terminals 3, 6, 7, 8, 24, and 32, and connectors J2 and J4 remains below 1.4A.
- With the overload removed, the panel returns power to terminals 3, 6, 7, 8, 24, and 32, and connector J4. The panel sends PT BUS RESTORAL and SDI RESTORAL reports.
- If a D928 module is connected to J2, it stops sounding.
- If the battery voltage is below 8.4 volts, the panel does not reconnect it. You must replace the battery.
- When the battery reaches 13.7 volts the panel sends a BATTERY RESTORE report and extinguishes the red Low Battery LED.
- When the battery reaches 13.9 volts the panel extinguishes the yellow Charging Status LED.

## 120 VAC Fuse

Fuse F1 protects the D9142, D1601, and D9112LTB from damage due to power surges or over loads. If Fuse F1 is removed or is blown, AC Power is removed from both the D9112LTB and the D9142 Power Supply. Fuse F1 is a type 3 AG, 4 Amp, 250V slow blow fuse. Radionics part number 57-01338-004.

### Safety Precautions While Handling High Voltage

**Danger!** High voltage is present at the AC Power input terminals and at Fuse F1 near the lower right corner of the D9142 Power Supply. Always use the dedicated circuit breaker to remove 120 VAC before removing the covers to the fuse or terminals block. Always cover the terminals and Fuse F1 after making connections or testing these connections. All connections to the 120 VAC terminals should be performed as directed by NEC 70.

### Testing or Replacing Fuse F1

The 120 VAC fuse (F1) is located on the lower right-hand corner of the D9142, above the 120 VAC terminals (see Figure 22).

If the green AC power LED is extinguished, the 120 VAC circuit breaker is in the ON position, and the building lights and other electrical devices still operate, Fuse F1 may be open. To replace the fuse, follow these steps:

1. Turn OFF the 120 VAC facility circuit breaker.
2. Remove the protective cover from Fuse F1.
3. Pull the fuse from the socket.
4. Using a Volt/Ohm meter, test the resistance of the fuse. If the fuse measures open it is bad. Replace it with a new fuse matching Fuse F1's specification. If the fuse is measures shorted, it is good. The problem may be elsewhere. Call a licensed electrician to troubleshoot any electrical problem.
5. Insert the fuse into the F1 socket.
6. **ALWAYS REPLACE THE PROTECTIVE COVER.**
7. Turn the 120 VAC circuit breaker ON.
8. Observe the green AC power LED, it should be illuminated.

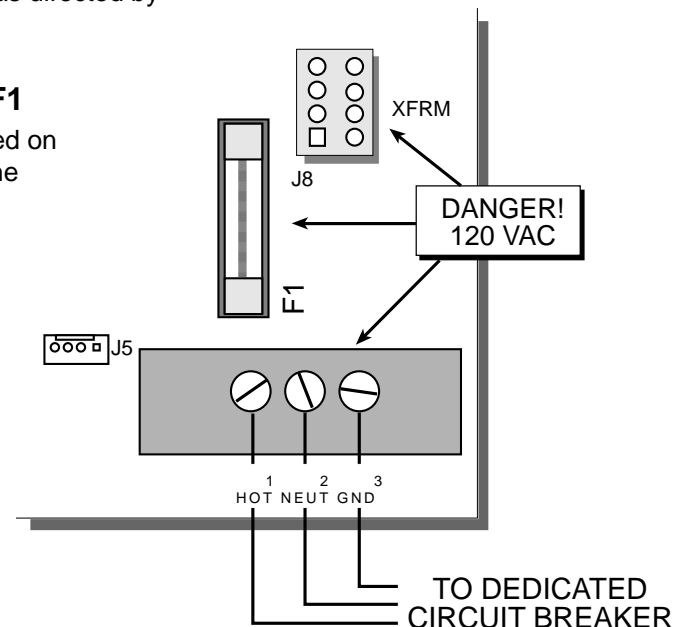
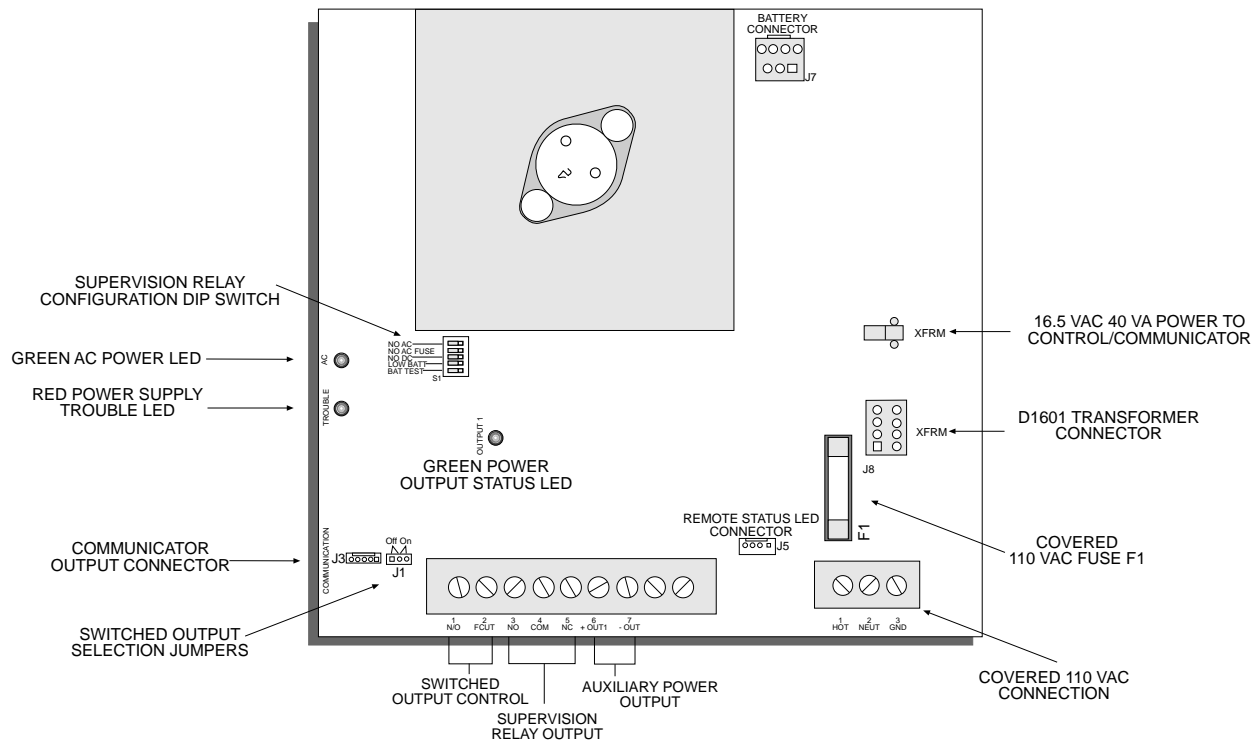


Figure 22: 120 VAC Power and Fuse

# D9142 24VDC Power Supply Features with D9124 Default Settings



**Figure 23: D9142 Power Supply**

## Description

The D9142 is a supervised, 4 Amp 24 volt power supply. The D9142 charges standby batteries and supplies power to auxiliary devices.

The D9142 connects to a dedicated circuit breaker. 120 VAC input terminals on the D9142 are covered for added safety. The D1601 transformer is fused with a thermal non resettable fuse. The transformer plugs into the D9142 using an input/output cable and provides AC power for the D9142 and a 16.5 VAC 40 VA output for powering the control/communicator.

The D9142 supervises all stages of power for detection in case of a fault.

You can select which trouble events activate a supervision relay output. The relay output allows for a remote indicator of general trouble with the D9142's AC power, battery, or power output.

## Battery Supervision

The D9142 offers low battery and missing battery supervision for both batteries.

When the battery drops to 22 - 24 VDC, or the battery is disconnected, the red Low Battery LED lights and the power supply triggers the Low Battery Trouble output.

When battery voltage returns to 24.2 - 26.5 VDC, the Low battery LED turns off. The D9142 resets the Low Battery Trouble output.

# LED Indicators

## D9142 Status LEDs

The LED's on the lower left side of the D9142 indicate the following:

- The green LED lights when AC Power is connected and applied to the D9142. Normally, this LED should be on.
- The red trouble LED lights when the D9142 senses trouble. Normally, this LED should be off.

(See Figure 23 for LED locations.)

## Power Output Status LEDs

The green power output status LED is located above the power output terminals toward the center of the D9142 board.

The LED lights when power output is powered on. The LED turns off when the output power is off.

## Default Trouble Output Settings

Choose from one to five trouble conditions to activate the relay. See the switch marked S1 on the D9142 (*Figure 23*).

**NO AC:** 120 VAC Power failure annunciation (Do not use for 24V fire applications. The D9124 Communicator provides this function.)

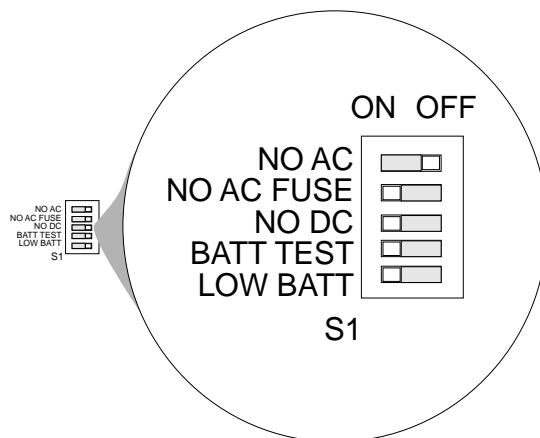
**NO AC FUSE:** Fuse F1 failure

**NO DC:** Power Output failure due to grounds or shorts on the output circuit

**BATT TEST:** Causes fault if battery test circuit fails.

**LOW BATTERY:** Battery voltage low or battery missing

*The factory settings are shown below.*



**Figure 24: D9142 Factory Switch Settings**

# Specifications

## D9142 24VDC Power Supply

### Power Input

120 VAC nominal, 60 Hz, 360 VA

### AC Line Fuse F1

Type 3 AG 4 Amp 250V Slow Blow.  
RPN: 57-01338-004

### Power Output

One output, 4 Amps

DC output voltage AC applied

22VDC minimum

28VDC maximum\*

DC output voltage, No AC

18.9VDC minimum\*

27VDC maximum

### Low Battery Voltage

Battery trouble threshold

22VDC minimum

24.1VDC maximum

Battery restoral threshold

24.2 VDC minimum

26.5VDC maximum

### Supervision Output Relay

Form C Rated for 2 A @ 12 or 24  
VDC

### Load Shed

Voltage trouble threshold

18.9VDC minimum

20.5VDC maximum

### Operating Temperature

32° - 122° F (0° - 50° C)

Voltage restoral threshold

23.1VDC minimum

### Humidity

5% to 85% @ 86° F (30° C)  
Non Condensing

24.7VDC maximum

### Batteries

The following 12V Sealed Lead Acid  
Batteries may be used: 7 Ah,  
12 Ah, 14 Ah, 17.2 Ah, 24 Ah, 36  
Ah, 38 Ah.

**\* Important: Connection of 24 volt indicating and initiating devices that have a minimum operating voltage greater than 18.9 VDC or a maximum operating voltage less than 28 volts DC may be damaged or fail to operate! See page 6, 24 Volt DC Output.**



# Specifications

## D9124 Control Communicator

### Voltage Input

#### Primary Power Supply

16.5/24 VAC

#### Secondary Power for Panel

Two 12VDC 7Ah, or 12VDC 17.2 Ah sealed lead acid rechargeable batteries.

#### Secondary Power for Devices

Two 12VDC 7Ah sealed lead acid rechargeable batteries.

### D9112LTB Current Requirements

Idle: 250 mA

Transmitting: 500 mA

### Power Output

#### 24 VDC Power Supply

Maximum of 4 Amps

#### 24 VDC Power Output (From D9142)

##### Terminals 5, 7 and 9 (motherboard)

1.8 Amps maximum at 24 VDC per terminal. Combined 24 VDC not to exceed four Amps total.

#### 12 VDC Power Output (From D9112LTB)

##### Terminal 1 (motherboard)

##### D9112LTB Terminal 3

1.4 Amps maximum at 12 VDC per terminal.

Combined 12 VDC outputs not to exceed 1.4 Amps total.

### Telephone Connections

#### Connection

RJ31X or RJ38X jacks can be used to connect telephone lines to the D9124.

### Operating Temperature

32 to 122 F @ 85% relative humidity Non Condensing



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