

Installation Instructions

Notice

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

These instructions cover the installation of the D9109A Enclosure and the installation of the D9024 or D10024 system components within it. See the Fire Alarm Control Panel Operator's Manual for instructions on powering up and operating the system.

Warnings and Cautions

Warning is used in these instructions to indicate procedures to follow to avoid injury.

Caution is used in these instructions to indicate procedures to follow to avoid damage to equipment.

FCC Notices

Part 15

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

UL/NFPA Notices

- UL listed for NFPA 72, Local

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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Installation Instructions

A. D9109A Enclosure Installation

Depending on the configuration and the battery selection, the Fire Alarm Control Panel (FACP) can weigh more than 75 pounds. When attaching the enclosure to a surface, use mounting hardware capable of supporting this weight, and reinforce the wall as necessary.

The enclosure can be ordered separately to conform with construction schedules. The enclosure door, with its integral Front Panel Display, and the system components are packaged separately and can be ordered and shipped at a later date.

Caution: Route 120V AC wiring into the enclosure at the upper left corner only. Keep AC wiring away from the circuit boards.

Caution: For Power Limited Circuits use types FPL, FPR, or FPLP cable as applicable per NEC, Article 760.

A.1 Semi-flush Mounting

1. Prepare an opening in the wall 20" x 20" x 5-1/2".
2. Remove the knockouts as necessary for wiring conduit fittings.
3. Mount the enclosure in the wall
4. Run the necessary wiring throughout the premises and pull the wires into the enclosure. Knockouts are provided at the top of the enclosure. If other holes are necessary, avoid interfering with the component mounting locations.
5. Mount the D9080 Flush Mount Trim Ring to the enclosure.

A.2. Surface Mounting

1. Remove the necessary knockouts and install conduit fittings
2. Mount the enclosure in the desired location. Use all four mounting holes.
3. Run the necessary wiring throughout the premises and pull the wires into the enclosure. Knockouts are provided at the top of the enclosure. If you punch other holes, be sure not to let them interfere with the component mounting locations. See the Caution above.

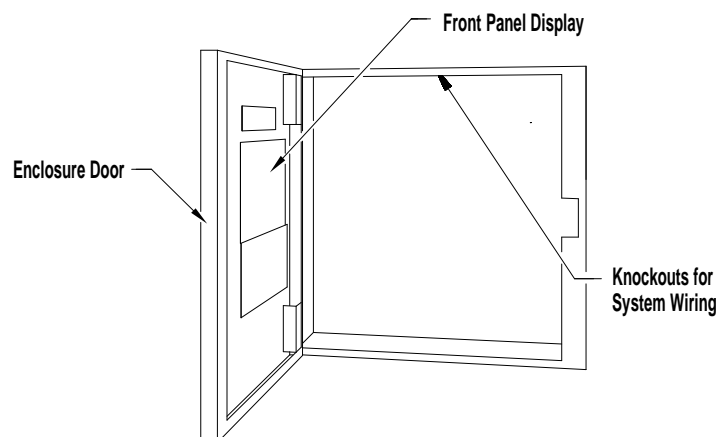


Figure 1: D9109A Enclosure and Removable Door

B. Circuit Connections

The D9024 and D10024 Fire Alarm Control Panels (FACP) are analog systems. They exchange data and may provide power to devices over two-wire circuits. Radionics recommends shielded single pair twisted cable wiring with a drain wire such as Atlas #218 or West Penn Wire/CDT #D293.

West Penn Wire/CDT #D293 has a nominal capacitance of 28 pF/ft between conductors.

Data Circuit Length is the distance over the circuit wire from the connection at the Control Module to the most distant device and back to the Control Module. Data Circuit Length must include the distance to any device connected to the circuit in a "T" tap.

B.1. Polling Circuit (D9067)

Detection devices in the analog system receive power and communicate with the control panel over a two-wire circuit. The Digital Communications Protocol (DCP) resists interference from most types of EMI and RF generated noise, and there are no special wiring requirements other than attention to the wire gauge. Under extremely noisy conditions, twisted pair wire is recommended to reduce interference. If EMI is a problem, use shielded cable, being careful to ground the drain wire to the "E" terminal on the D10024M board. See Figure 2.

| Polling Circuit Length | Wire Gauge |
|------------------------|------------|
| Up to 4,000 ft. | 18 |
| 4,000 - 7000 ft. | 16 |

Table 1: Polling Circuit Length/wire Gauge

Note: The screw terminals will accept 14 AWG, but this will reduce the allowable length of the circuit.

Any devices in the system that are not analog and are connected to the Digital Communications Protocol (DCP) bus must be powered from a separate pair of conductors.

Each analog device is assigned a specific address by setting dip switches on that device. Each D9067 polling circuit can support up to 126 addresses. It is not necessary to wire devices in any particular order in a circuit.

The systems are expanded by adding D9067 Polling Circuit Modules to the Control Module. The D10024 has five expansion slots for polling circuits. The D9024 has three.

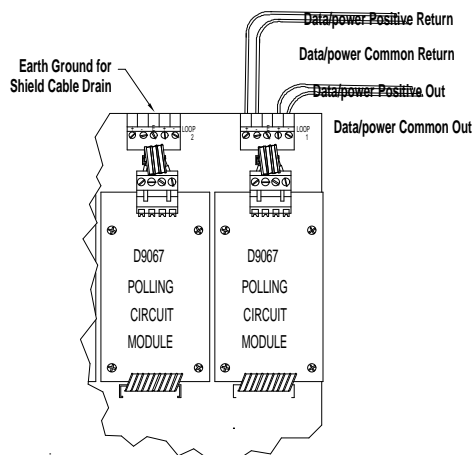


Figure 2: Ground Location on Control Module

Polling circuits can be connected to the FACP as either a Class "A" or a Class "B" circuit. "T" tapping is acceptable in Class "B" circuits. For specific Class "A" and "B" circuit installation requirements, see NFPA 72.

B.2 Peripheral Circuits

The RS 485 Bus Circuit provides an optically isolated data interface between the Control Module and Command Centers and Annunciators, networked panels, serial peripherals, and computer graphics systems. A shielded twisted pair wiring circuit connects to the D9051 RS 485 Bus Module. The three ports on the left side of the control module are mounting points, depending on the application, for the D9051 Modules.

The D9052 RS 232 Module provides an isolated interface between the Control Module and dial-up or dedicated modems. Modems allow communication over telephone lines between networked panels, system controllers, computer graphics packages, and other serial peripherals when the circuit distance is greater than 3,250 feet.

| RS 485 Peripheral Circuit Length | Wire Gauge |
|----------------------------------|------------|
| Up to 4,920 ft. | 18 |

Table 2: RS 485 Peripheral Circuit Length/wire Gauge

B.3 Notification Appliance (Indicating Device) and Output Circuit Connections

The D9024 and D10024 each has four power-limited and supervised Class "B," Style "W" indicating circuits. The terminal blocks for these circuits are at the lower edge of the Control Module. (See Figure 3.) Each indicating circuit must be terminated with a 2k End Of Line (EOL) resistor (Part No. 25899C, manufactured by Detection Systems). Four resistors for the indicating circuits are included in the Literature Pack. Each circuit has a maximum rating of one Amp.

See Compatible Device List Devices Compatible with the D10024 Analog Fire Alarm Control Panel Part No. 73-07674-000-A, for devices acceptable for use in the indicating circuit.

The D9024 and D10024 each has terminals for a power-limited auxiliary 24 V circuit at the lower left of the Control Module. This circuit is rated at one Amp maximum. If the system requires more than four circuits use the D327 Indicating Circuit Module to add circuits as required.

The total current of the five circuits (four "SOUNDER OUTPUTS" PLUS "24V AUX.") must not exceed two Amps.

The D9024 and D10024 each has two programmable relay contacts rated 24 V DC, 1 Amp.

Caution: Do not connect any wiring that is not power-limited to the relay contacts.

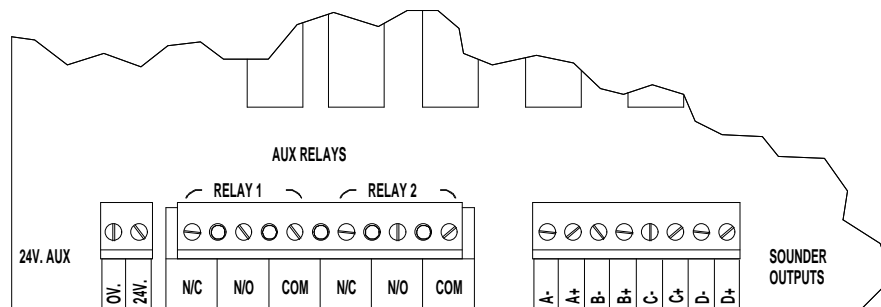


Figure 3: Output Connection Points on the D9024 and D10024M Control Module

C. Control Panel Components

Caution: Disconnect all main circuit breakers and battery connections before connecting any circuit cards.

C.1. Control Module

Conventional reporting devices initiate alarm conditions through the Fire Alarm Control Panel (FACP). The analog FACP interacts with its reporting devices in a system that is constantly measuring not only its environment, but also its own ability to report on that environment. The FACP analyzes the measurements, compares them with other measurements, thresholds, the reported contamination of the devices, the time of day, and other programmed standards. Depending on the results of these comparisons, the Analog FACP may initiate an alarm, service, or a trouble condition. The FACP supervises and responds individually to each analog device in the circuit.

When the analog system configures the polling circuits, the control panel down-loads a number of parameters, which have been programmed into the panel and are stored in the Central Processing Unit (CPU), to each analog device. These levels can be altered through the front panel or PC programming. Each device is programmed for:

- Alarm Level, High Sensitivity
- Alarm Level, Low Sensitivity
- Service Level

The D10024M or D9024M Control Module is the Input/output Printed Circuit Board, beneath which is the Central Processing Unit (CPU), and the Backplane Board. The Control Module, the On Board Power Supply, the Transformer, and the input wiring connections are all mounted on a skirt. The hardware needed to mount the board in the enclosure is attached to the skirt.

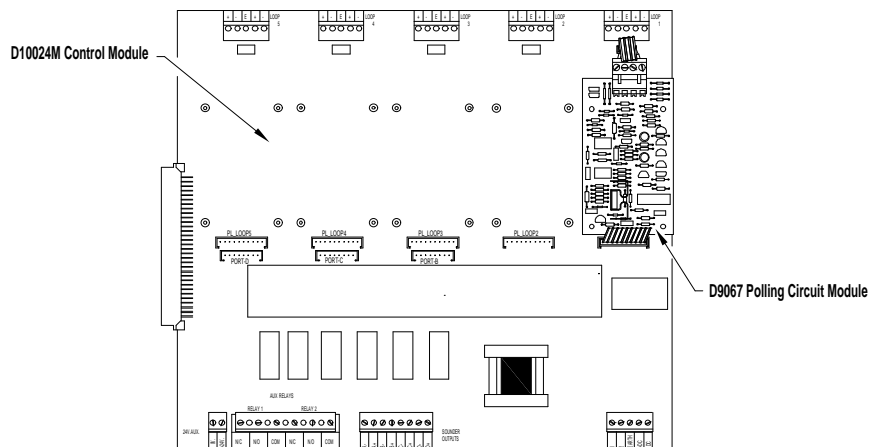


Figure 4: D10024M Control Module

C.1.a. Control Module Installation

Use the attached nuts to mount the skirt to the D9109A Enclosure as shown in Figure 5.

C.1.b. Front Panel Display Connection

Attach the Enclosure door and connect the 16-pin ribbon connector from the front panel display to the Control Module. Connect the Display Panel Ground Strap to the enclosure ground stud. See Figure 5.

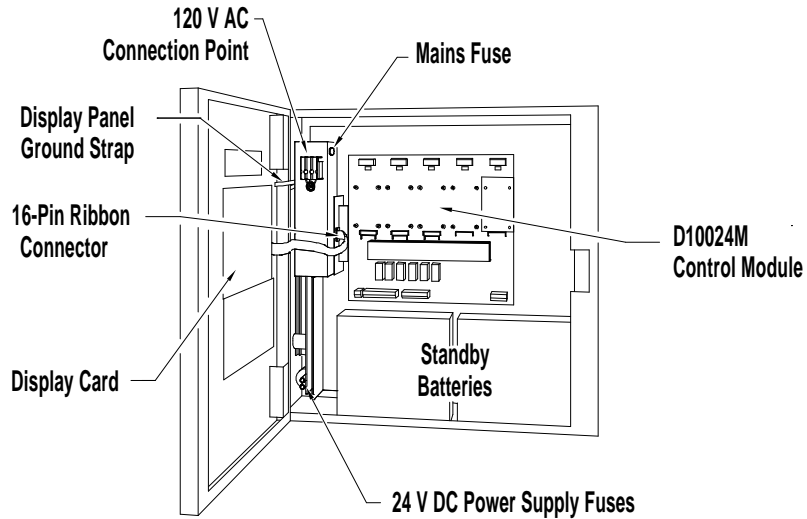


Figure 5: Enclosure Connections

C.2. D9067 Polling Circuit Module

Analog measuring devices report to the FACP over a polling circuit that connects to a D9067 Polling Circuit Module. The D10024 has five expansion slots for the D9067. The D9024 has three. (See Figure 6.)

C.2.a. D9067 Module Installation

Mount the D9067 Polling Circuit Module on the Control Module using the hardware provided with the modules. Begin on the right side of the board in the slot labeled PL_LOOP1, and continue across the board to the left as shown in Figure 6.

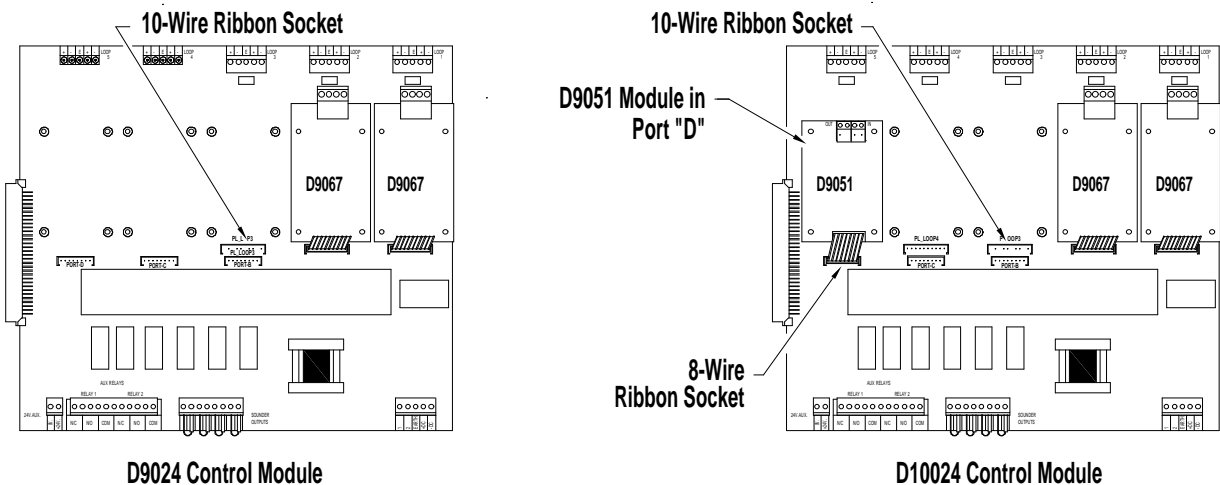


Figure 6: D9067 Polling Circuit Module Installation

In some configurations it may be necessary to mount the D9067 Module together with another module. On the D9024M this can occur above the socket labeled PL_LOOP3, which is above Port B. On the D10024M this can occur in the slots labeled PL_LOOP3, PL_LOOP4, and PL_LOOP5, which are above Ports B, C, and D. In this configuration, the D9067 Module mounts next to the Control Module, and the other module stacks over it on standoff pillars. See Figure 7.

Caution: Disconnect all main circuit breakers and battery connections before connecting any circuit cards.

C.2.b. D9067 Module Connection to the Control Module

The D9067 10-wire ribbon connects to 10-pin plug immediately below it. The female four-wire plug at the top of the board plugs into the four-pin block below the dedicated screw terminal blocks. See Figures 6 and 7.

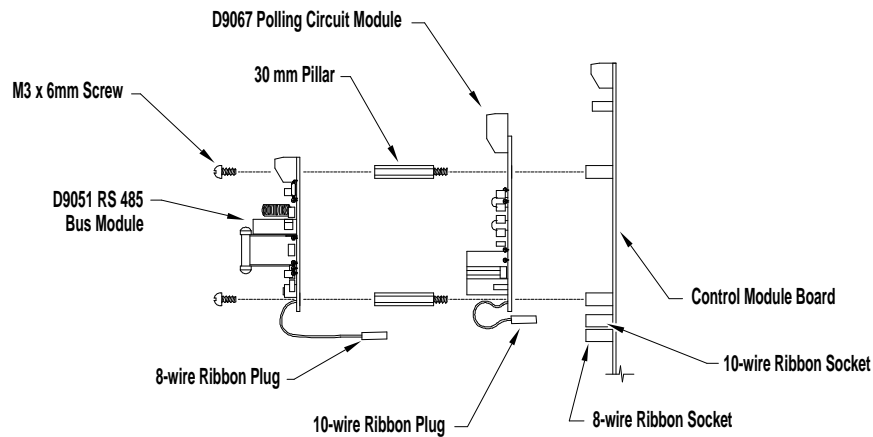


Figure 7: Stacked Modules

C.2.c. D9067 Module Connection to Class "B" (Style 4) Circuit

Connect the Data/Power Positive (+) wire of the polling circuit to the + terminal of the Data Terminal Block at the top of the Control Module. Connect the Data/Power Common (-) wire of the polling circuit to the - terminal of the Data Terminal Block. Connect the positive and negative terminals of the Data Terminal Block with jumper wires as shown in Figure 8: D9067 Class "B" (Style 4) Connection.

The Polling Circuit is power-limited.

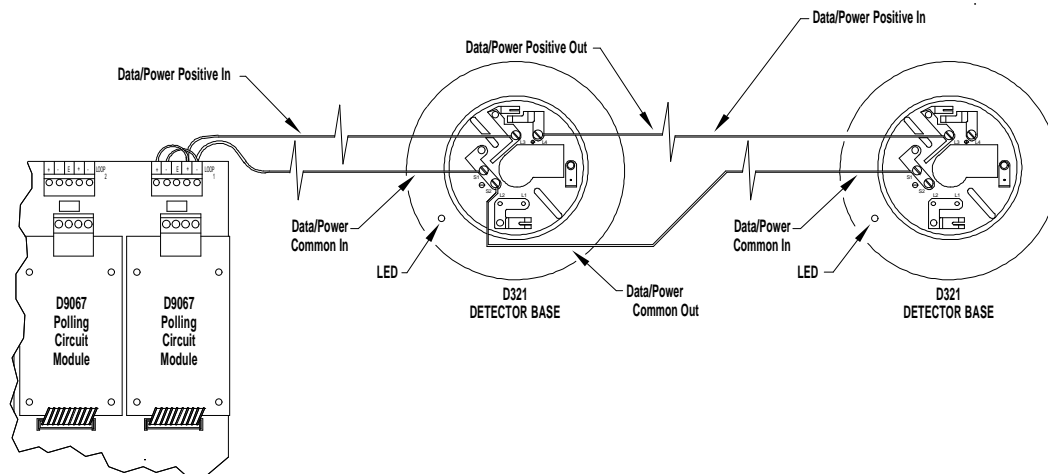


Figure 8: D9067 Class "B" (Style 4) Connection

C.2.d. D9067 Module Connection to Class “A” (Style 6) Circuit

Connect the Data/Power Positive (+) wire of the polling circuit to the + terminal of the Data Terminal Block at the top of the D10024M Control Communicator. Connect the Data/Power Common (-) wire of the polling circuit to the - terminal of the Data Terminal Block. Connect the returning Data/Power wires to the respective terminals as shown in figure 9.

Note: The Polling circuit is power-limited

C.2.e. Shielded Cable

Connect the drain wire for shielded cable to the E terminal of the Data Terminal Block.

Note: An improperly grounded shielded cable may aggravate rather than eliminate noise problems. Reconnect the shielded cable drain each time the cable is cut to install a device.

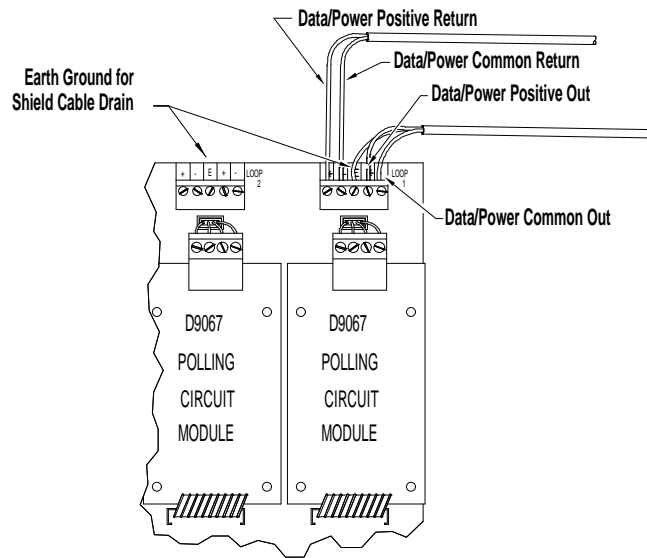


Figure 9: D9067 Class “A” (Style 6) Connection

C.3. D9051 RS 485 Bus Module

The D9051 module is an RS 485 Network Expander. It provides an isolated Class B, Style 4 or Class A, Style 6 data interface between the Control Module and Command Centers, Annunciators, networked panels, serial peripherals, and computer graphics systems.

The D9024 and D10024 Fire Alarm Control Panels can support up to 31 peripheral communications devices on the RS485 bus. Each device must be assigned an individual binary address.

Port D supports a peripheral circuit for D9069 remote annunciators, D9070 controllers, 4-way notification appliances, synchronized notification appliances, and other serial peripherals.

Port C supports an RS 485 panel-to-master data link, or panel-to-graphics data link.

Port B supports an RS 485 output to network panels.

Remove AC power from the system at the dedicated 120V AC breaker, “lock out” the breaker, and remove the standby battery power before making or breaking any connections to the FACP.

Caution: Inform the operator and the local authority before installing this module in an existing system. Disconnect all power to the Fire Alarm Control Panel before installing this module.

C.3.a. D9051 Module Installation

The D9051 plugs into Ports B, C, or D on the D9024M or D10024M Control Module. These are the three ports on the left side of the Control Module. Depending on the circuit configuration and the panel, both the D9051 and the D9067 Circuit Modules may be mounted to the same four attachment points above a 10-pin ribbon socket. Where both are mounted at the same point, the D9067 attaches next to the Control Module and the D9051 mounts above it on 30 mm pillars. See Figure 7.

C.3.b. D10024 Attachment Points

On the D10024 Ports B, C, and D are below the 10-wire ribbon sockets labeled PL_LOOP3, PL_LOOP4, AND PL_LOOP5, which are connecting points for the D9067 Polling Circuit Modules. On the D10024M the D9051 and D9067 modules can mount together above Ports B, C, and D. See Figure 10.

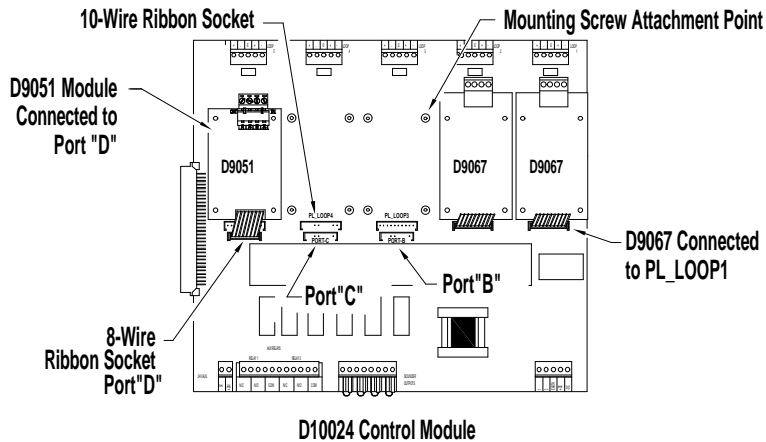


Figure 10: D10024 Control Module Configuration

C.3.c. D9024 Attachment Ports

On the D9024 Ports B, C, and D are the three ports on the left side of the board. Port B is below the 10-wire ribbon socket labeled PL_LOOP3 and Ports C and D are reserved for peripheral devices only. On the D9024 the D9051 and the D9067 modules may mount together above Port B. See Figure 11.

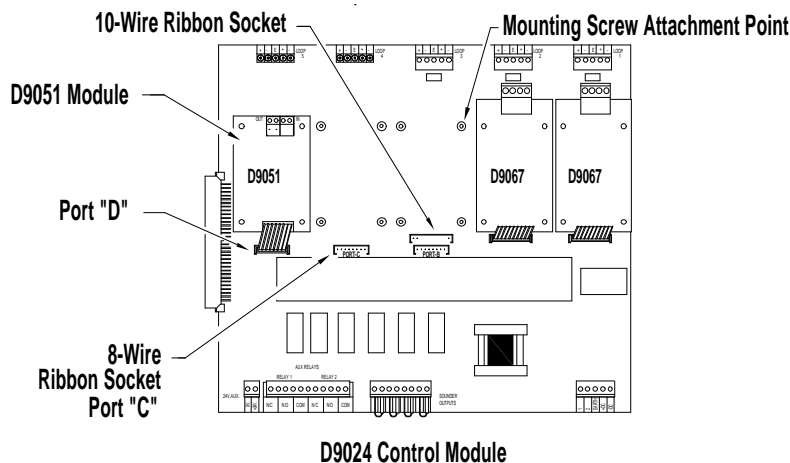


Figure 11: D9024 Control Module Configuration

C.3.d. D9051 Module Connection to the Control Module

The 10-wire ribbon connector from the D9067 Polling Circuit Module plugs into the 10-pin socket immediately below it. The D9051 8-wire ribbon connector plugs into the lower socket. See Figures 10 and 11.

Caution: Do not try to plug the 8-wire ribbon connector into the upper (10-pin) socket.

C.3.e. Connecting Circuit Wiring to the D9051

Circuit Length is the distance over the circuit wire from the connection at the D9051 Module to the most distant device and back to the D9051 Module. The maximum RS 485 circuit length is 4,920 ft. using shielded twisted pair wiring such as the Data Grade Cable D293, or non-shielded 18 gauge cable from Atlas, Guardian Sound & Security, or their equals.

| RS 485 Bus Circuit Length | Wire Gauge |
|---------------------------|------------|
| Up to 4,920 ft. | 18 |

Table 4: RS 485 Peripheral Circuit Length/wire Gauge

The two-wire RS 485 communication circuit may be connected to either or both sides (“IN” or “OUT”) of the D9051 terminal block.

Connect the “B” wire to the “B” terminal (the terminal on the left) of the terminal block at the top of the D9051 Module. Connect the “A” wire to the “A” terminal next to it.

If Shielded cable is used, connect the drain wire(s) to the “E” terminal of the terminal block at the top of the Control Module Board as shown in Figure 12

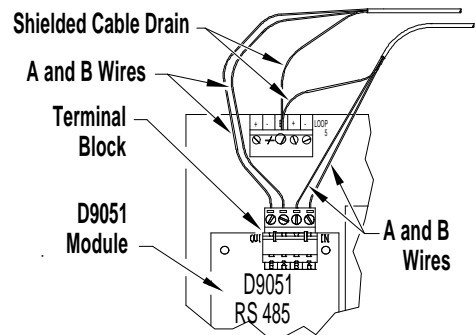


Figure 12: D9051 Wiring Connections

Note: An improperly grounded shielded cable may aggravate rather than eliminate noise problems. Reconnect the shielded cable drain each time the cable is cut to install a device.

D. Power

D.1. AC Power Connections

The D10024 receives power from a 120V, 60 Hz, AC power supply through a dedicated breaker. From the breaker, current flows through the input wiring terminals, through a 3 Amp fuse, through an EMI filter to the D1605 transformer, which converts 120V AC To 24 V AC. All of these components are mounted to the skirt at the factory, and the only field connection is the 120V input connection.

Radionics recommends that only a licensed electrician make 120V AC connections to the D10024 System. All connections are to conform to NFPA 70/NEC. Connect the D10024 system to a suitable ground.

Warning: Open and “lock out” the circuit breaker before connecting wiring. Do not power the system until the entire installation procedure is complete.

Caution: Disconnect all main circuit breakers and battery connections before connecting any circuit cards or wiring.

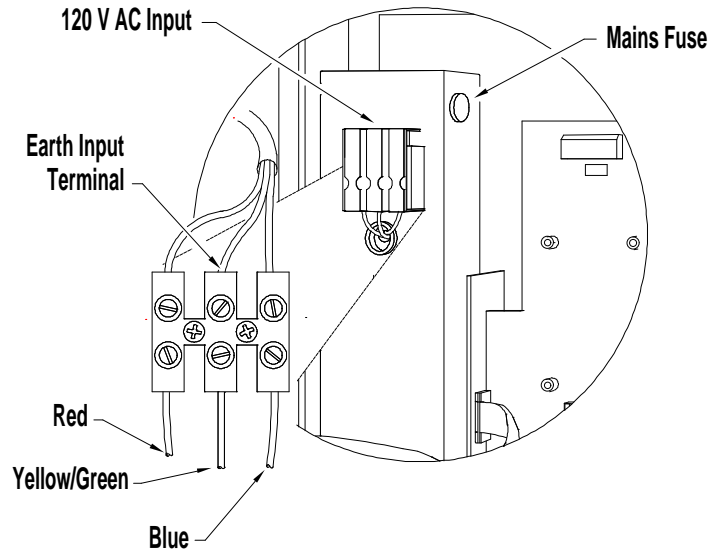


Figure 13: 120 V AC Input Connections

Caution: Maintain separation between 120V AC and low voltage wiring. Do not route them in the same conduit, and keep them apart inside the enclosure.

Connect the ground wire to the ground input (middle) terminal on 3 Amp fuse holder. (See Figure 13.) The 120 V neutral and line wires connect to either of the two outer terminals as shown in Figure 13.

D.2. D1605 Transformer

The D1605 receives current from the 120V AC breaker and delivers 24V AC current to the on-board power supply and the optional Front Panel Printer. The transformer, the 3 Amp fuse block, and the EMI Filter are mounted on the skirt behind the 120 V AC Input Connector.

D.3. Standby Batteries Installation

Caution: Battery lead connections are not power limited.

D.3.a. Standby Battery Selection

The D9024 and D10024 panels supervise and charge the two 12V sealed lead-acid batteries that are the standby power source. Several batteries are available from Radionics, and battery selection will depend on system design. Use the Current Rating Chart to select the correct batteries.

| | | AC Power On Normal Current | | AC Power Off Min. Current | | Alarm Max. Current | |
|-----------------|-----|-------------------------------|-------|------------------------------|----------|-----------------------|----------|
| | | A | | B | | C | |
| Model Number | Qty | Each Unit | Total | Each Unit | Total mA | Each Unit | Total mA |
| D9024 D10024 | 1 | 324 mA | 325mA | 325 mA | 325mA | 480mA | 480mA |
| D9067 | | 42 mA x Qty | | 42mA x Qty | 42mA | 42mA x Qty | |
| D9054 | 1 | 40 mA | 40mA | 40mA | 40mA | 40mA* | 41.5mA |
| D321/322 | | (360µA) .360mA x Qty | | (360µA) .360 mA x Qty | | (360µA) .360 mA x Qty | |
| D321/323 | | (290µA) .290mA x Qty | | (290µA) .290 mA x Qty | | (290µA) .290 mA x Qty | |
| D321/324 | | (280µA) .280mA x Qty | | (280µA) .280 mA x Qty | | (280µA) .280 mA x Qty | |
| D326 | | (300µA) .300mA x Qty | | (300µA) .300 mA x Qty | | (300µA) .300 mA x Qty | |
| D327 | | (320µA) .320mA x Qty | | (320µA) .320 mA x Qty | | (320µA) .320 mA x Qty | |
| D329 | | (280µA) .280mA x Qty | | (280µA) .280 mA x Qty | | (280µA) .280 mA x Qty | |

Other devices connected to the system not listed above

| | | | | | | | |
|--|--|------------|--|------------|--|-----------------------|--|
| | | x Qty | | x Qty | | x Qty | |
| | | x Qty | | x Qty | | x Qty | |
| | | x Qty | | x Qty | | x Qty | |
| | | x Qty | | x Qty | | x Qty | |
| | | x Qty | | x Qty | | x Qty | |
| | | x Qty | | x Qty | | x Qty | |
| | | x Qty | | x Qty | | x Qty | |
| | | x Qty | | x Qty | | x Qty | |
| | | | | | | Five in Alarm**23.6mA | |
| | | Total A mA | | Total B mA | | Total C mA | |

milliamps = mA
microamps = µA

* Add 1.5 mA per output when flashing

** The panel latches on to the first five devices in alarm and continues polling the balance of the devices. Five times 5 mA alarm current equals 25 mA. These five devices normally draw a minimum .280 mA each. 25 mA minus 1.40 mA (5 x .280) equals 23.6 mA added to the alarm total.

Table 5: Current Rating Chart for Standby Battery Calculations

Use battery ampere hour (Ah) calculations to verify compliance with standby requirements. Central Station or Local systems require 24 hours of standby plus five minutes of alarm operation at the end of that period. Local Systems require two batteries.

The following formula converts mA to Amperes, and includes factors for the five minute alarm period and the depletion of battery capacity with age.

Local Systems Ampere Hour Calculation Formula

$$\left[\frac{\text{Total B}}{1000} \times 24 \text{ (hours)} \right] + \left[\frac{\text{Total C}}{1000} \times .083 \text{ (hours)} \right] = \text{Total Ah}$$



Total Ah x 1.1 = Total Ah Requirements

Maximum battery size permitted to be connected to the D9024 or D10024 is 38 Ah.

Place the batteries in the enclosure as shown in Figure 14,

D.3.b. Battery Wiring Connections

The D10024 Literature Package contains a gray wire. Use this wire to connect the positive terminal of battery No. one to the negative terminal of battery No. two.

Connect the red wire lead from terminal (6) on the Power Supply to the positive terminal of battery No. two.

Connect the black wire lead from terminal (7) on the Power Supply to the negative terminal of battery No. one.

D.4. System Startup

Close the 120V AC dedicated breaker that controls the power input to the D10024. The green AC Power LED lights to show that the 120V AC power supply is on and the standby battery is connected.

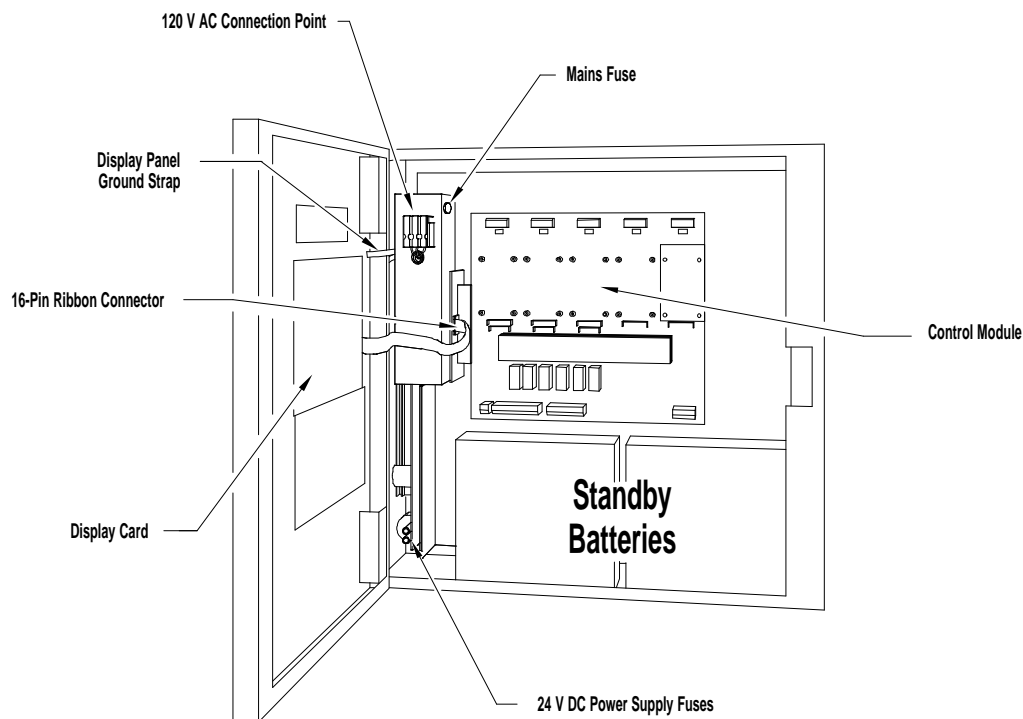


Figure 14: Standby Battery Installation

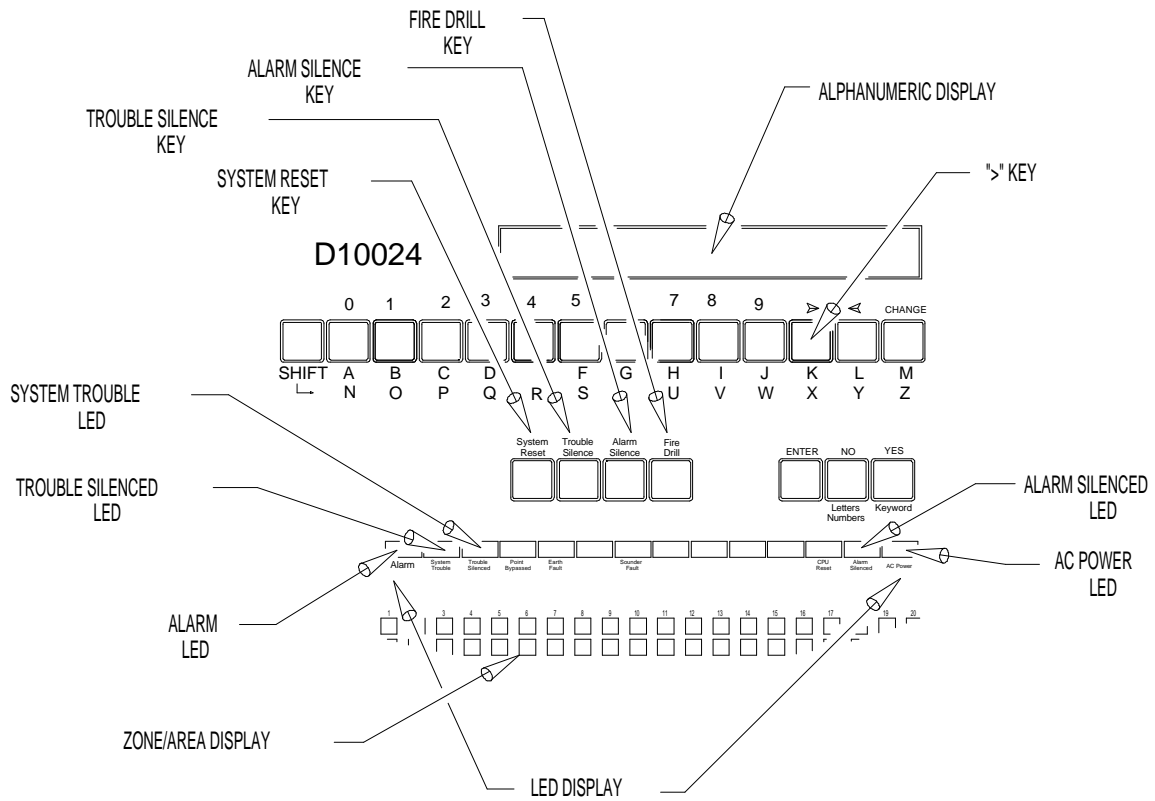


Figure 15: Front Panel Display

Operating Instructions

E. Normal Operation

In normal operation, the D9024 or D10024 indicates three conditions: normal power and polling, trouble, and alarm. If an alarm or fault condition is detected, the panel responds with a buzzer, an LED indication of the type of condition, an LED indication of the zone/area of the condition, and detailed information on the alphanumeric display. If more than one alarm or fault is detected, the alphanumeric display will automatically scroll through the first four.

E.1. Normal Power and Polling Activity

Under normal operation the green AC Power LED at the right of the indicator display is lit. If the 120 V AC power supply fails, it flashes. If the standby batteries fail, it goes out.

E.2. Trouble or Fault Conditions

If a device fails to respond, is disabled, the response is not within normal parameters, or the system detects a fault, the amber System Trouble or Fault LED lights. In addition, the amber TROUBLE LED in the ZONE/AREA section of the panel will light to indicate the location, the panel's internal buzzer will sound, and the alphanumeric display will provide detailed information.

E.3. Alarm Conditions

The red Alarm LED at the left of the indicator display flashes to indicate the system has detected a fire condition, or "Manual Alarm" has been pressed.

In a fire condition, the ZONE/AREA ALARM LED(s) will also light, indicating the alarm location(s), and the alphanumeric display will provide detailed information.

E.4. Resetting the System

If the keypad has been disabled, pressing the Silence or Reset keys will result in a message on the alphanumeric display asking for the level two passcode.

E.4.a. Trouble/Fault Reset

To acknowledge the event, press the Trouble Silence key to mute the internal buzzer. (Under certain circumstances, the system may override the mute.) The amber Trouble Silenced LED will light to indicate that condition. Press the System Reset key.

E.4.b. Alarm Reset

Note that the panel can only be reset from a fire condition if the alarms have been silenced.

To acknowledge an alarm, press the Alarm Silence key, which silences or resounds (toggles on and off) all alarm devices external to the FACP. The amber Alarm Silenced LED lights to indicate that condition. To resound the alarms, press the Alarm Silence key. Press the System Reset key.

For Assistance Contact:

A copy of these instructions shall be framed and placed adjacent to the D9024 or D10024 control unit.