4100/4120-Series Relay Modules Installation Instructions

Introduction

This publication describes the installation procedure for the relay cards listed in the following table.

Model Number	Description	Required Backbox
4120-3001	4 Relay/2 Amp	2975-91*xx* Back Box (4100)
4100-3204/ 4100-3201	4 Relay/2 Amp	2975-94*xx* Back Box (4100U/4100ES)
4120-3002	4 Relay/10 Amp	2975-91*xx* Back Box (4100)
4100-3202	4 Relay/10 Amp	2975-94*xx* Back Box (4100U/4100ES)
4120-3003	8 Relay/3 Amp	2975-91xx Back Box (4100)
4100-3206/ 4100-3203	8 Relay/3 Amp	2975-94*xx* Back Box (4100U/4100ES)

Related Documentation

- *Field Wiring Diagram for 4100 Power Limited* (841-731) or,
- *Field Wiring Diagram for 4100 Non Power Limited* (841-995)
- *4100ES Fire Alarm System Installation Guide* (574-848)

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Cautions and Warnings

Cautions and Warnings

READ AND SAVE THESE INSTRUCTIONS- Follow the instructions in this installation manual. These instructions must be followed to avoid damage to this product and associated equipment. Product operation and reliability depend upon proper installation.



DO NOT INSTALL ANY SIMPLEX® PRODUCT THAT APPEARS DAMAGED- Upon unpacking your Simplex product, inspect the contents of the carton for shipping damage. If damage is apparent, immediately file a claim with the carrier and notify an authorized Simplex product supplier.



ELECTRICAL HAZARD - Disconnect electrical field power when making any internal adjustments or repairs. All repairs should be performed by a representative or authorized agent of your local Simplex product supplier.



STATIC HAZARD - Static electricity can damage components. Handle as follows:

- Ground yourself before opening or installing components.
- Prior to installation, keep components wrapped in anti-static material at all times.



EYE SAFETY HAZARD - Under certain fiber optic application conditions, the optical output of this device may exceed eye safety limits. Do not use magnification (such as a microscope or other focusing equipment) when viewing the output of this device.

FCC RULES AND REGULATIONS – PART 15 - This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

SYSTEM REACCEPTANCE TEST AFTER SOFTWARE CHANGES To ensure proper system operation, this product must be tested in accordance with NFPA 72® after any programming operation or change in site-specific software. Reacceptance testing is required after any change, addition or deletion of system components, or after any modification, repair or adjustment to system hardware or wiring.

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

NFPA 72® is a registered trademark of the National Fire Protection Association.

Overview

General Information

Review the following items for general information about the relay modules.

- All relay module contacts are Form C, dry contacts, meaning the Common terminal is connected to the Normally Closed terminal when the relay's coil is in the de-energized state.
- Relay operation must be programmed, using the 4100 programmer. Programming a relay involves assigning a software point type to the relay. This point type determines the system list to which the relay point is assigned and consequently the operation of the relay when an alarm, trouble, and supervisory condition occurs.
- Feedback loop circuits function as inputs to the system. Feedback circuits are present on all 4100 relay cards, and on both the 4-relay/10 A and 4-relay/2 A upgrade cards. See below for programming details on the 4100-3206. Typically, feedback circuits connect to a set of NO or NC contacts on a motor or the sail switch on a damper, allowing the state of the device to be monitored. In some situations, the state of the feedback point is used as a trigger within a custom control equation, allowing the system to react in one way when the contact is in one position and another way when the contact is in the other position.
- Always disconnect power from the system before installing a relay module.

A Note on Panel Programming for the 4100-3206

From the panel's perspective, the 4100-3206 appears to be functionally the same as the 4120-3003. The 4100-3206, however, does not have the feedback function that is present in the other assemblies. In the programmer, the feedback points still appear, but are pre-assigned the point type "UNUSED" and have their custom label pre-assigned to read "FEEDBACK NOT AVAILABLE."

If the 4100-3206 is not available as a selection in the version of the Programmer being used, the 4120-3003 can be used to program this card. If the 4120-3003 card is programmed, the feedback points should be left with their default point type. The label should be manually changed to "FEEDBACK NOT AVAILABLE" to avoid confusion when viewing the points.

Environmental Requirements

Install the relay modules in an environment that is within the following:

Temperature: 0° to 120° F
Humidity: 93% Relative Humidity @ 90° F

Setting Switches

Switches

Switch SW1 is a bank of eight DIP switches. From left to right (see figure below) these switches are designated as SW1-1 through SW1-8. The function of these switches is as follows:

- **SW1-1**. This switch sets the baud rate for the serial communication line running between the Relay Daughter card and the 4100 CPU. Set this switch to ON.
- **SW1-2 through SW1-8**. These switches set the card's address within the 4100 FACP. (These switches must be set to the value assigned to the card by the 4100 Programmer.) Refer to Table 1 for a complete list of the switch settings for all of the possible card addresses.

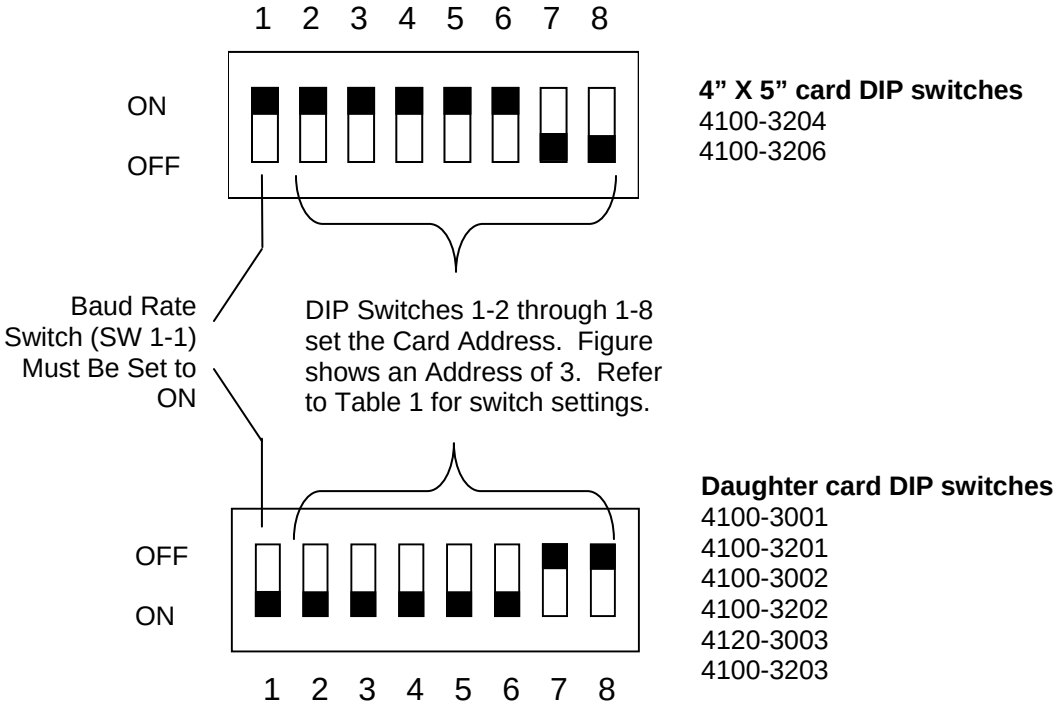


Figure 1. Address DIP Switch

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Setting Switches, *Continued*

Switches

Table 1. 4100 Daughter Card Addresses

Address	SW 1-2	SW 1-3	SW 1-4	SW 1-5	SW 1-6	SW 1-7	SW 1-8	Address	SW 1-2	SW 1-3	SW 1-4	SW 1-5	SW 1-6	SW 1-7	SW 1-8
1	ON	ON	ON	ON	ON	ON	OFF	61	ON	OFF	OFF	OFF	OFF	ON	OFF
2	ON	ON	ON	ON	ON	OFF	ON	62	ON	OFF	OFF	OFF	OFF	OFF	ON
3	ON	ON	ON	ON	ON	OFF	OFF	63	ON	OFF	OFF	OFF	OFF	OFF	OFF
4	ON	ON	ON	ON	OFF	ON	ON	64	OFF	ON	ON	ON	ON	ON	ON
5	ON	ON	ON	ON	OFF	ON	OFF	65	OFF	ON	ON	ON	ON	ON	OFF
6	ON	ON	ON	ON	OFF	OFF	ON	66	OFF	ON	ON	ON	ON	OFF	ON
7	ON	ON	ON	ON	OFF	OFF	OFF	67	OFF	ON	ON	ON	ON	OFF	OFF
8	ON	ON	ON	OFF	ON	ON	ON	68	OFF	ON	ON	ON	OFF	ON	ON
9	ON	ON	ON	OFF	ON	ON	OFF	69	OFF	ON	ON	ON	OFF	ON	OFF
10	ON	ON	ON	OFF	ON	OFF	ON	70	OFF	ON	ON	ON	OFF	OFF	ON
11	ON	ON	ON	OFF	ON	OFF	OFF	71	OFF	ON	ON	ON	OFF	OFF	OFF
12	ON	ON	ON	OFF	OFF	ON	ON	72	OFF	ON	ON	OFF	ON	ON	ON
13	ON	ON	ON	OFF	OFF	ON	OFF	73	OFF	ON	ON	OFF	ON	ON	OFF
14	ON	ON	ON	OFF	OFF	OFF	ON	74	OFF	ON	ON	OFF	ON	OFF	ON
15	ON	ON	ON	OFF	OFF	OFF	OFF	75	OFF	ON	ON	OFF	ON	OFF	OFF
16	ON	ON	OFF	ON	ON	ON	ON	76	OFF	ON	ON	OFF	OFF	ON	ON
17	ON	ON	OFF	ON	ON	ON	OFF	77	OFF	ON	ON	OFF	OFF	ON	OFF
18	ON	ON	OFF	ON	ON	OFF	ON	78	OFF	ON	ON	OFF	OFF	OFF	ON
19	ON	ON	OFF	ON	ON	OFF	OFF	79	OFF	ON	ON	OFF	OFF	OFF	OFF
20	ON	ON	OFF	ON	OFF	ON	ON	80	OFF	ON	OFF	ON	ON	ON	ON
21	ON	ON	OFF	ON	OFF	ON	OFF	81	OFF	ON	OFF	ON	ON	ON	OFF
22	ON	ON	OFF	ON	OFF	OFF	ON	82	OFF	ON	OFF	ON	ON	OFF	ON
23	ON	ON	OFF	ON	OFF	OFF	OFF	83	OFF	ON	OFF	ON	ON	OFF	OFF
24	ON	ON	OFF	OFF	ON	ON	ON	84	OFF	ON	OFF	ON	OFF	ON	ON
25	ON	ON	OFF	OFF	ON	ON	OFF	85	OFF	ON	OFF	ON	OFF	ON	OFF
26	ON	ON	OFF	OFF	ON	OFF	ON	86	OFF	ON	OFF	ON	OFF	OFF	ON
27	ON	ON	OFF	OFF	ON	OFF	OFF	87	OFF	ON	OFF	ON	OFF	OFF	OFF
28	ON	ON	OFF	OFF	OFF	ON	ON	88	OFF	ON	OFF	OFF	ON	ON	ON
29	ON	ON	OFF	OFF	OFF	ON	OFF	89	OFF	ON	OFF	OFF	ON	ON	OFF
30	ON	ON	OFF	OFF	OFF	OFF	ON	90	OFF	ON	OFF	OFF	ON	OFF	ON
31	ON	ON	OFF	OFF	OFF	OFF	OFF	91	OFF	ON	OFF	OFF	ON	OFF	OFF
32	ON	OFF	ON	ON	ON	ON	ON	92	OFF	ON	OFF	OFF	OFF	ON	ON
33	ON	OFF	ON	ON	ON	ON	OFF	93	OFF	ON	OFF	OFF	OFF	ON	OFF
34	ON	OFF	ON	ON	ON	OFF	ON	94	OFF	ON	OFF	OFF	OFF	OFF	ON
35	ON	OFF	ON	ON	ON	OFF	OFF	95	OFF	ON	OFF	OFF	OFF	OFF	OFF
36	ON	OFF	ON	ON	OFF	ON	ON	96	OFF	OFF	ON	ON	ON	ON	ON
37	ON	OFF	ON	ON	OFF	ON	OFF	97	OFF	OFF	ON	ON	ON	ON	OFF
38	ON	OFF	ON	ON	OFF	OFF	ON	98	OFF	OFF	ON	ON	ON	OFF	ON
39	ON	OFF	ON	ON	OFF	OFF	OFF	99	OFF	OFF	ON	ON	ON	OFF	OFF
40	ON	OFF	ON	OFF	ON	ON	ON	100	OFF	OFF	ON	ON	OFF	ON	ON
41	ON	OFF	ON	OFF	ON	ON	OFF	101	OFF	OFF	ON	ON	OFF	ON	OFF
42	ON	OFF	ON	OFF	ON	OFF	ON	102	OFF	OFF	ON	ON	OFF	OFF	ON
43	ON	OFF	ON	OFF	ON	OFF	OFF	103	OFF	OFF	ON	ON	OFF	OFF	OFF
44	ON	OFF	ON	OFF	OFF	ON	ON	104	OFF	OFF	ON	OFF	ON	ON	ON
45	ON	OFF	ON	OFF	OFF	ON	OFF	105	OFF	OFF	ON	OFF	ON	ON	OFF
46	ON	OFF	ON	OFF	OFF	OFF	ON	106	OFF	OFF	ON	OFF	ON	OFF	ON
47	ON	OFF	ON	OFF	OFF	OFF	OFF	107	OFF	OFF	ON	OFF	ON	OFF	OFF
48	ON	OFF	OFF	ON	ON	ON	ON	108	OFF	OFF	ON	OFF	OFF	ON	ON
49	ON	OFF	OFF	ON	ON	ON	OFF	109	OFF	OFF	ON	OFF	OFF	ON	OFF
50	ON	OFF	OFF	ON	ON	OFF	ON	110	OFF	OFF	ON	OFF	OFF	OFF	ON
51	ON	OFF	OFF	ON	ON	OFF	OFF	111	OFF	OFF	ON	OFF	OFF	OFF	OFF
52	ON	OFF	OFF	ON	OFF	ON	ON	112	OFF	OFF	OFF	ON	ON	ON	ON
53	ON	OFF	OFF	ON	OFF	ON	OFF	113	OFF	OFF	OFF	ON	ON	ON	OFF
54	ON	OFF	OFF	ON	OFF	OFF	ON	114	OFF	OFF	OFF	ON	ON	OFF	ON
55	ON	OFF	OFF	ON	OFF	OFF	OFF	115	OFF	OFF	OFF	ON	ON	OFF	OFF
56	ON	OFF	OFF	OFF	ON	ON	ON	116	OFF	OFF	OFF	ON	OFF	ON	ON
57	ON	OFF	OFF	OFF	ON	ON	OFF	117	OFF	OFF	OFF	ON	OFF	ON	OFF
58	ON	OFF	OFF	OFF	ON	OFF	ON	118	OFF	OFF	OFF	ON	OFF	OFF	ON
59	ON	OFF	OFF	OFF	ON	OFF	OFF	119	OFF	OFF	OFF	ON	OFF	OFF	OFF
60	ON	OFF	OFF	OFF	OFF	ON	ON								

Installing Motherboards into 2975-91*xx* Back Boxes (4100)

Overview

The relay modules can be mounted to either 4100 Back Boxes (PID series 2975-91*xx*) or 4100U/4100ES Back Boxes (PID series 2975-94*xx*) as follows:

- The 4120-3001, -3002, and -3003 are used for systems with 4100 Back Boxes.
- The 4100-3201 through -3204 and -3206 are used for systems with 4100U/4100ES Back Boxes.

This section describes mounting the 4120-3001 through -3003 into 4100 Back Boxes.

Installing into a 2975-91*xx* Master Controller Bay

Use the following guidelines and instruction when installing into a master controller bay.

- If the 575-274 Master Motherboard is used, it must be installed in the leftmost position of this bay. If the 575-274 Master Motherboard is not used, the master controller motherboard must be installed in the leftmost position of the bay.
- The power supply must be installed in the rightmost position of the bay.
- Relay cards must be installed in the slots immediately to the left of the power supply. This is necessary to allow for the proper routing of non-power limited wiring (120 VAC wiring connected to the relay card).
- If used, the Class B motherboard (575-275) must be installed to the left of the relay cards.

Install the motherboard as described below.

1. Orient the motherboard so that the connector labeled J1 is on the right and the header labeled P1 is on the left.
2. Slide the motherboard you are installing to the left until the pins are completely inserted in the connector of a previously installed motherboard.
3. Secure the motherboard to the chassis with four torx screws.

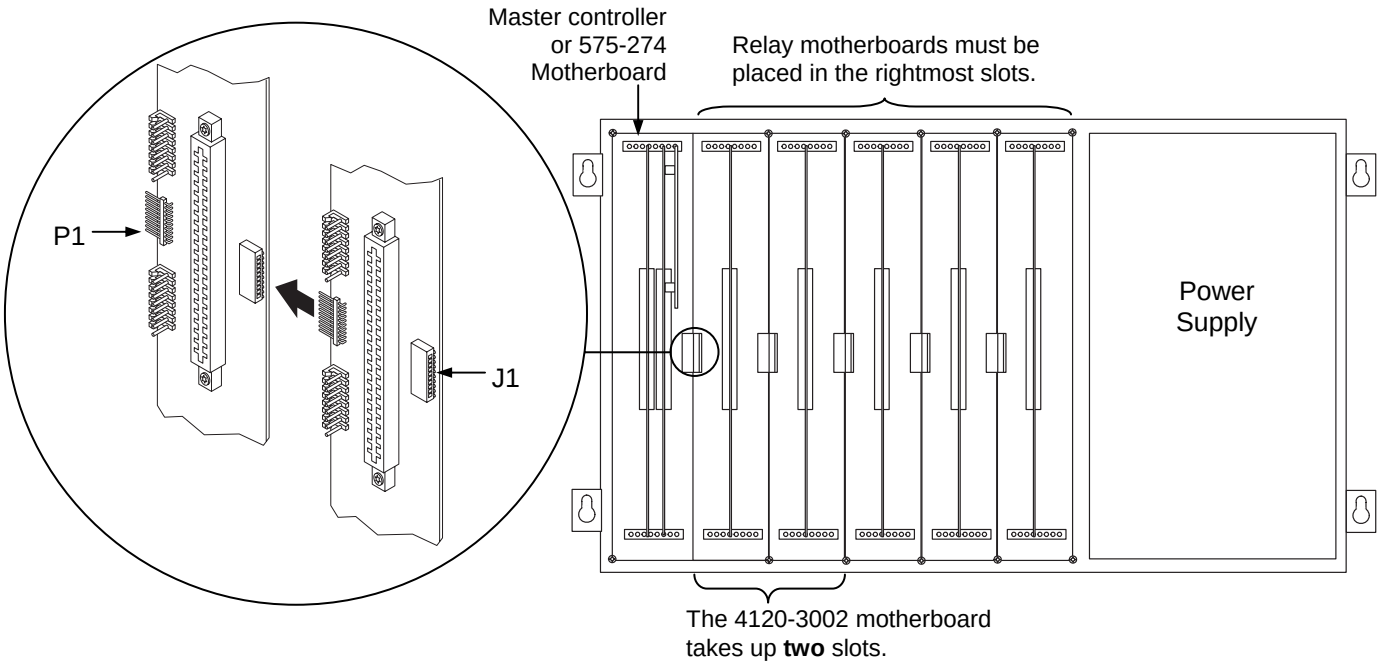


Figure 2. Installing the Motherboard into a 4100 Master Controller Bay

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Installing into a 2975-91*xx* Expansion Bay

Review the following guidelines before mounting the motherboard into a 2975-91*xx* Expansion Bay.

- If a power supply is installed in the bay, it must be installed on the far right of the bay and any relay modules must be installed in the slots immediately to its left.
- Relay cards must be installed in the rightmost possible slots. This is necessary to allow for the proper routing of non-power limited wiring (typically 120 VAC wiring), which could be connected to a relay module.
- If a 4100/4120-0155 SDACT, 4100-6052 Event Reporting DACT, 4100-6053 Point Reporting DACT, or a 4100/4120-0153 CCDACT is installed in the bay, it must be installed in the far left or far right slot. Neither of these modules contains the J1 or P1 connectors, which are used to distribute power and communications to adjacent modules.

Use the following directions and Figure 3 to install a motherboard into an expansion bay.

1. Orient the motherboard with the connector labeled J1 on the right and the header labeled P1 on the left.
2. Match the connector on the previously installed motherboard with the pins on the motherboard you are installing. Slide the motherboard to the left until the pins are completely inserted in the connector of the previously installed motherboard. If you are installing the leftmost board, the pins will remain unconnected.
3. Secure the motherboard to the chassis with four torx screws.

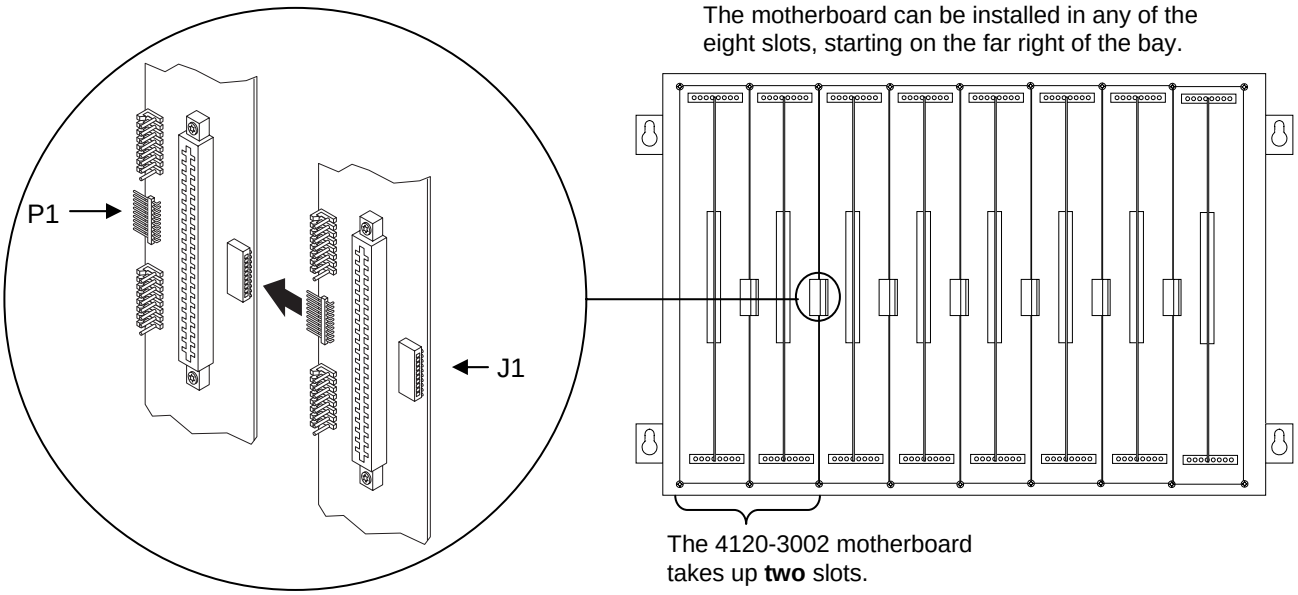


Figure 3. Installing the Motherboard into a 4100 Expansion Bay

4. If you are installing the leftmost motherboard, connect a 733-525 Power and Communication Harness. Continue to the next topic to connect the harness.

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Connecting the 733-525 Harness

If you need to connect a 733-525 Harness to a motherboard, refer to Figure 6 and follow these steps. Make sure to route the power and communication wiring on the left side of the bay.

1. Connect one end of the harness to a motherboard in an adjacent bay.

   If the adjacent bay is a master controller bay, connect the harness to the P2 and P3 connectors of the master controller motherboard and continue to step 2.

   If the adjacent bay is an expansion bay, connect the harness to the P2 and P3 connectors of the motherboard installed in the leftmost slot. (If a 4100/4120-0155 SDACT, 4100-6052 Event Reporting DACT, 4100-6053 Point Reporting DACT, or a 4100/4120-0153 CCDACT occupies the leftmost slot, connect the harness to the motherboard in the second slot from the left.) Connect the harness as follows:

   a. Insert the harness connector with the blue wire into the P2 connector. Note that the P2 connector has eight pins. Insert the harness connector on either the top four pins or the bottom four pins, not in the middle.

   b. Insert the harness connector with the white wire into the P3 connector. Note that the P3 connector has eight pins. Insert the harness connector on either the top four pins or the bottom four pins, not in the middle.

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Connecting the 733-525 Harness

2. Connect the other end of the harness to the leftmost motherboard in the next bay, as described below. Make sure to route the wiring on the left side of the bay.

   a. Insert the harness connector with the blue wire into the P2 connector. Note that the P2 connector has eight pins. Insert the harness connector on either the top four pins or the bottom four pins, not in the middle.

   b. Insert the harness connector with the white wire into the P3 connector. Note that the P3 connector has eight pins. Insert the harness connector on either the top four pins or the bottom four pins, not in the middle.

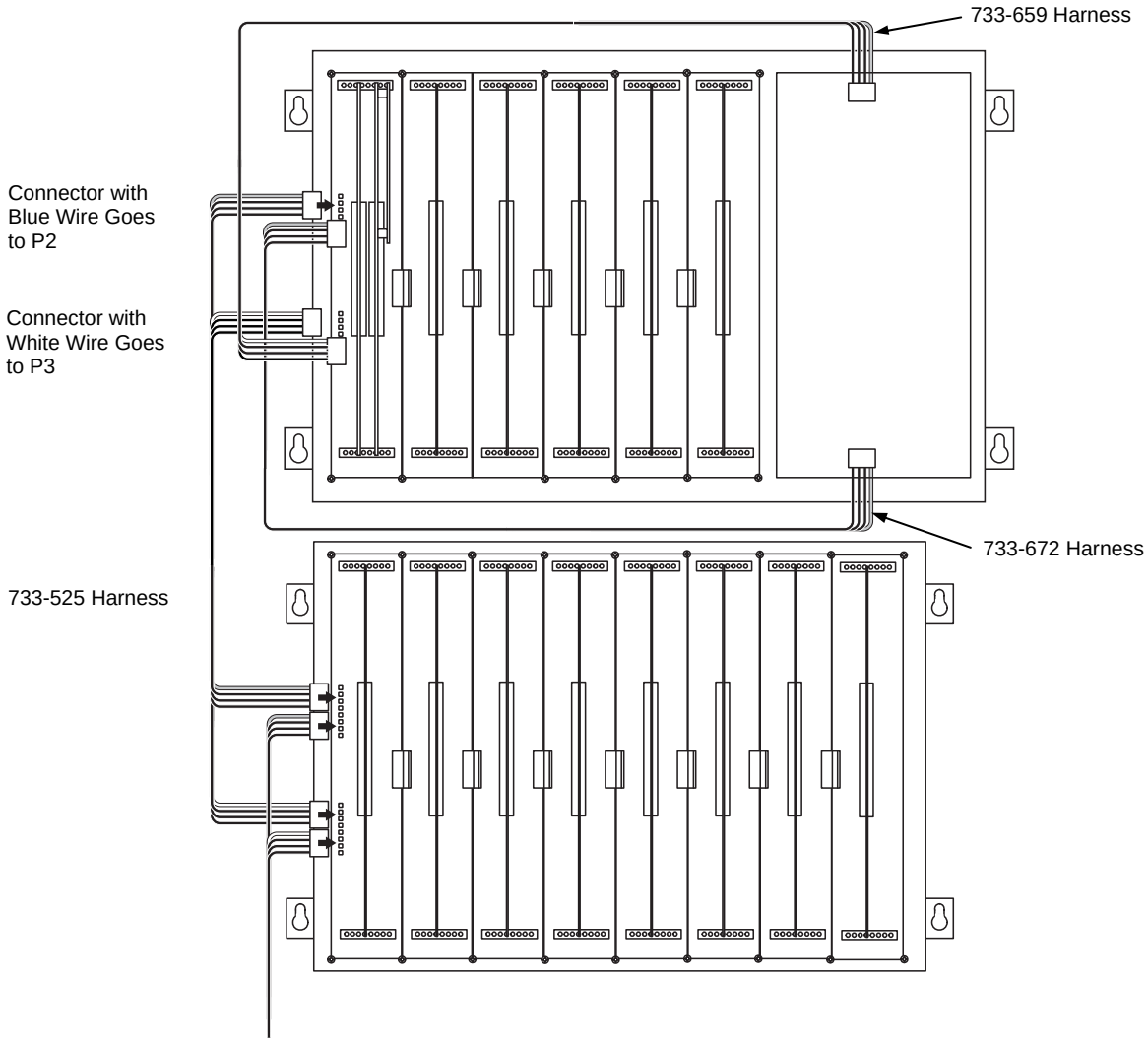


Figure 4. Power and Communication Wiring for Motherboards (4100)

Installing Boards into 2975-94*xx* Back Boxes (4100U/4100ES)

Overview

The relay modules can be mounted to either 4100 Back Boxes (PID series 2975-91*xx*) or 4100U/4100ES Back Boxes (PID series 2975-94*xx*) as follows:

- The 4120-3001, -3002, and -3003 are used for systems with 4100 Back Boxes.
- The 4100-3201 through -3204 and -3206 are used for systems with 4100U/4100ES Back Boxes.

This section describes mounting the 4100-3201 through -3204 and -3206 into 4100U/4100ES Back Boxes.

Installing 4100-3204 and -3206 Cards

The 4100-3204 and -3206 Relay Cards are designed to be mounted on the PDI in a 4100U/4100ES expansion cabinet. The card can be mounted on any of the PDI connectors.

Use connector P1, labeled on the back side of the card, to connect to any of the eight PDI connectors as shown in Figure 5, below.

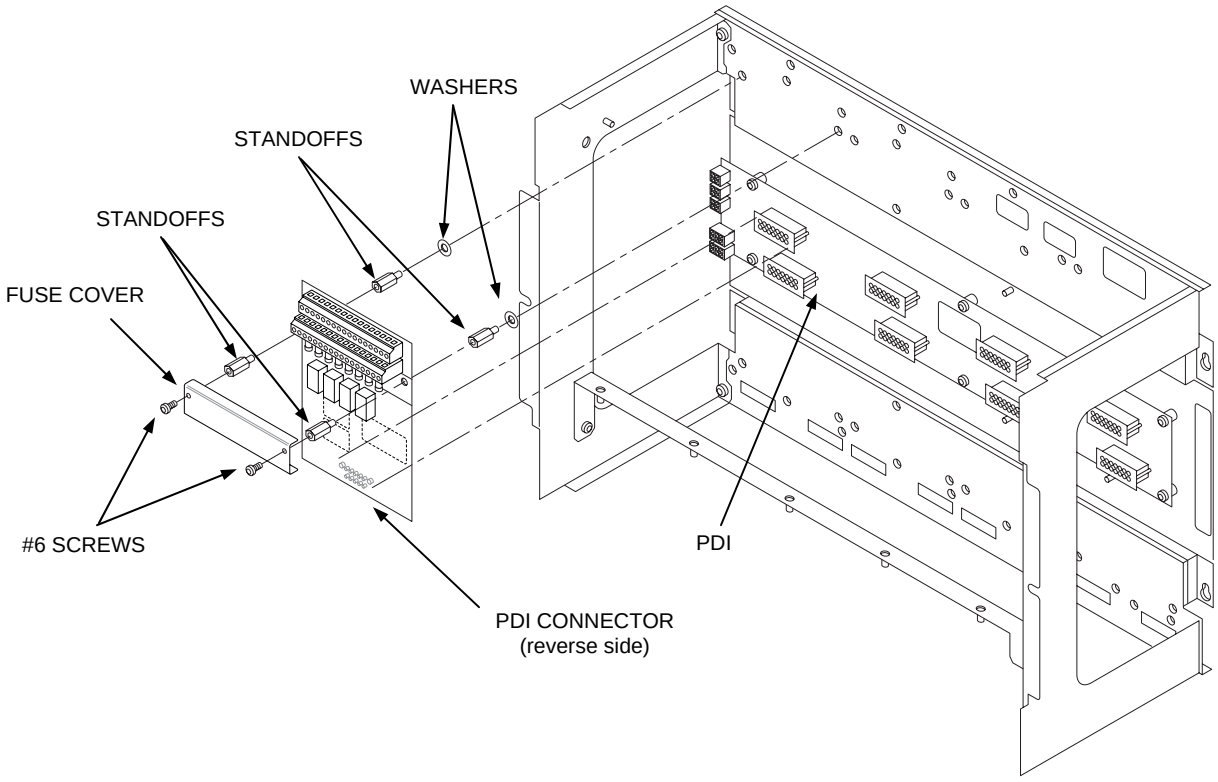


Figure 5. 4100-3204 and -3206 Mounting

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Installing 4100-3201 to -3203 Motherboards into a 2975-94*xx* Master Controller Bay

IMPORTANT: The 4100-3201, -3202, and -3203 Relay Modules are non-power limited modules that cannot be placed inside the master controller bay unless the proper wire separation can be achieved and maintained (per UL864).

Up to two 2" motherboards may be installed with the system CPU in the master controller bay. Note that only one 4100-3203 can fit in the master controller bay, because the 4100-3203 motherboard takes up 4".

Use the following directions to mount a motherboard into a CPU bay.

1. Orient the motherboard with the connector labeled J1 on the right and the header labeled P1 on the left.
2. Slide the motherboard to the right until the pins from P1 on the motherboard to the right are completely inserted in the motherboard's J1 connector.
3. Attach four lockwashers and metal standoffs to the chassis, and secure the motherboard to the chassis using four #6 screws.

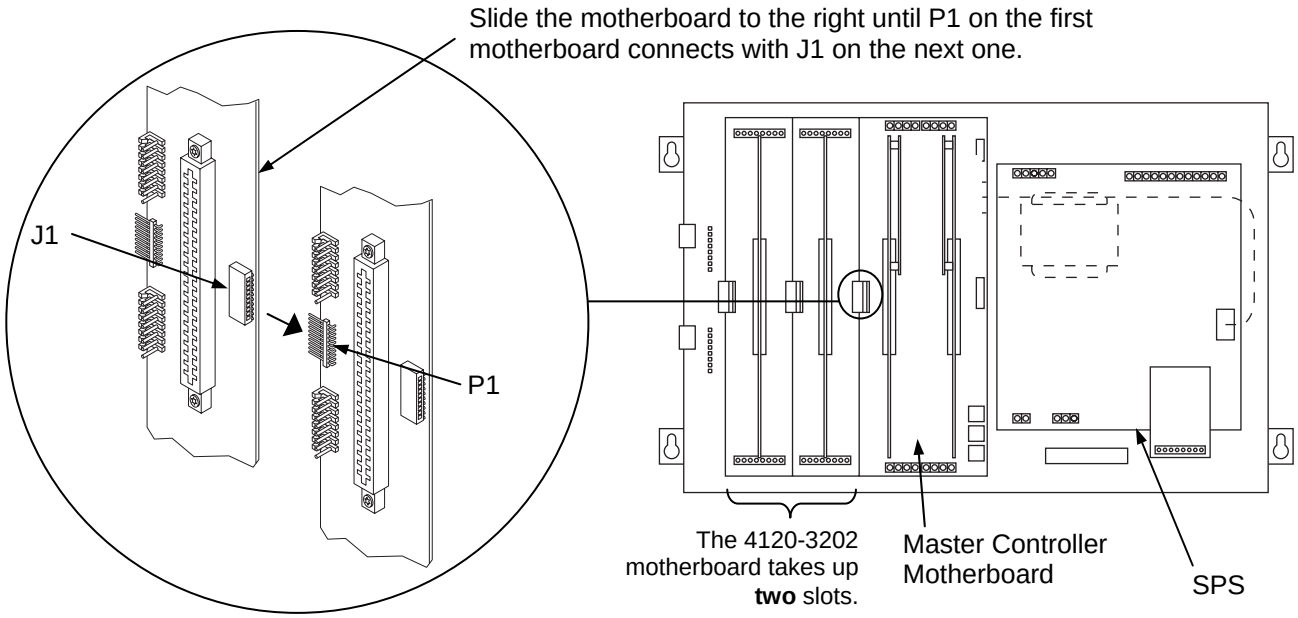


Figure 6. Installing the Motherboard into a 4100U/4100ES CPU Bay

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Installing 4100-3201 to -3203 Motherboards into a 2975-94*xx* Expansion Bay

When installing motherboards in a 4100U/4100ES expansion bay, adhere to the following guidelines:

- Each expansion bay assembly includes a chassis, two end supports, one LED/switch frame, and a power distribution interface (PDI) board.
- An expansion bay holds up to eight 4" x 5" modules. A double-size module, such as the expansion power supply (XPS), takes up two blocks of space as shown below.
- Up to seven 2" x 11 ½" motherboards *or* three 4" x 11 ½" motherboards can be installed in an expansion bay **if no 4" x 5" modules are installed in the bay**. Motherboards are mounted on top of the PDI in expansion bays. The data and power that would normally be bussed via the PDI is instead routed across the boards via ribbon cable from one board to the next.
- As shown in the figure below, motherboards can be installed alongside 4" x 5" cards, if necessary.
- The leftmost slot must not contain a motherboard.
- 4" x 5" cards must be added from right to left.
- Motherboards must be added from left to right.

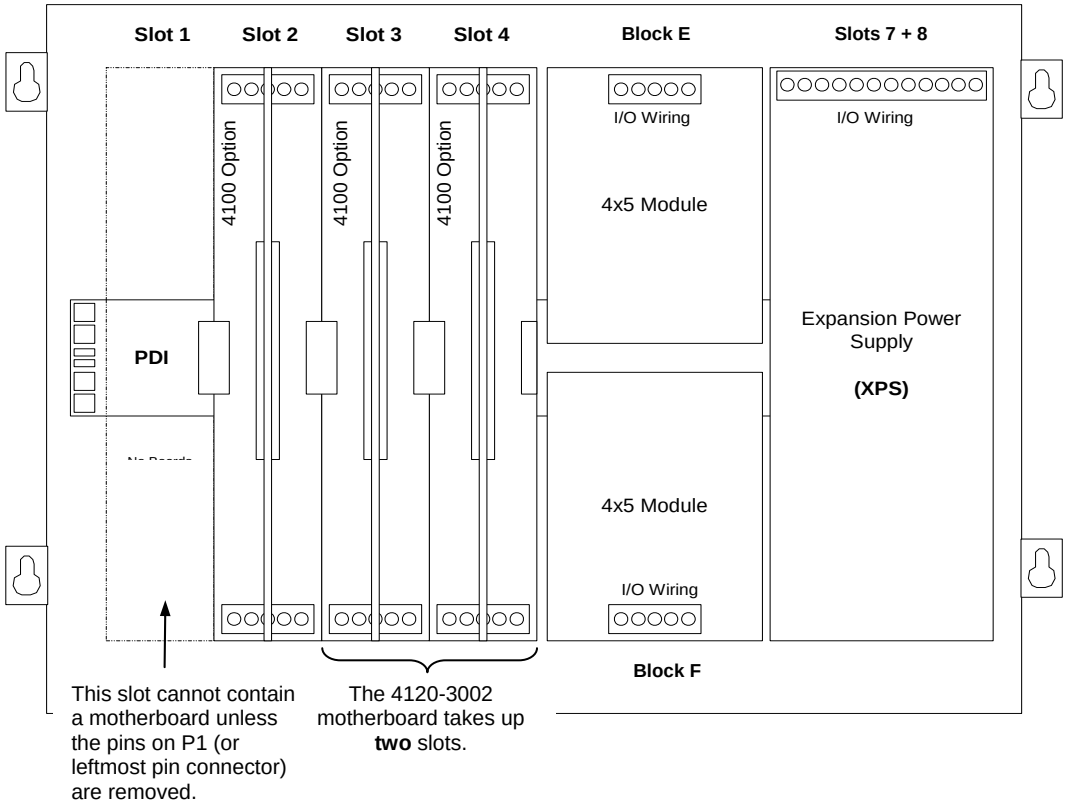


Figure 7. Installing the Motherboard in a 4100U/4100ES Expansion Bay

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Installing 4100-3201 to -3203 Motherboards into a 2975-94xx Expansion Bay

Use the following procedure when installing motherboards in an expansion bay. Start with the second slot from the left and fill to the right.

1. Orient the motherboard with the connector labeled J1 on the right and the header labeled P1 on the left.
2. Attach four metal threaded standoffs and lockwashers into the screw holes on the chassis.
3. Attach two grey plastic standoffs to the motherboard socket mounting screws.
4. Secure the motherboard to the standoffs using four #6 torx screws as shown in Figure 8.

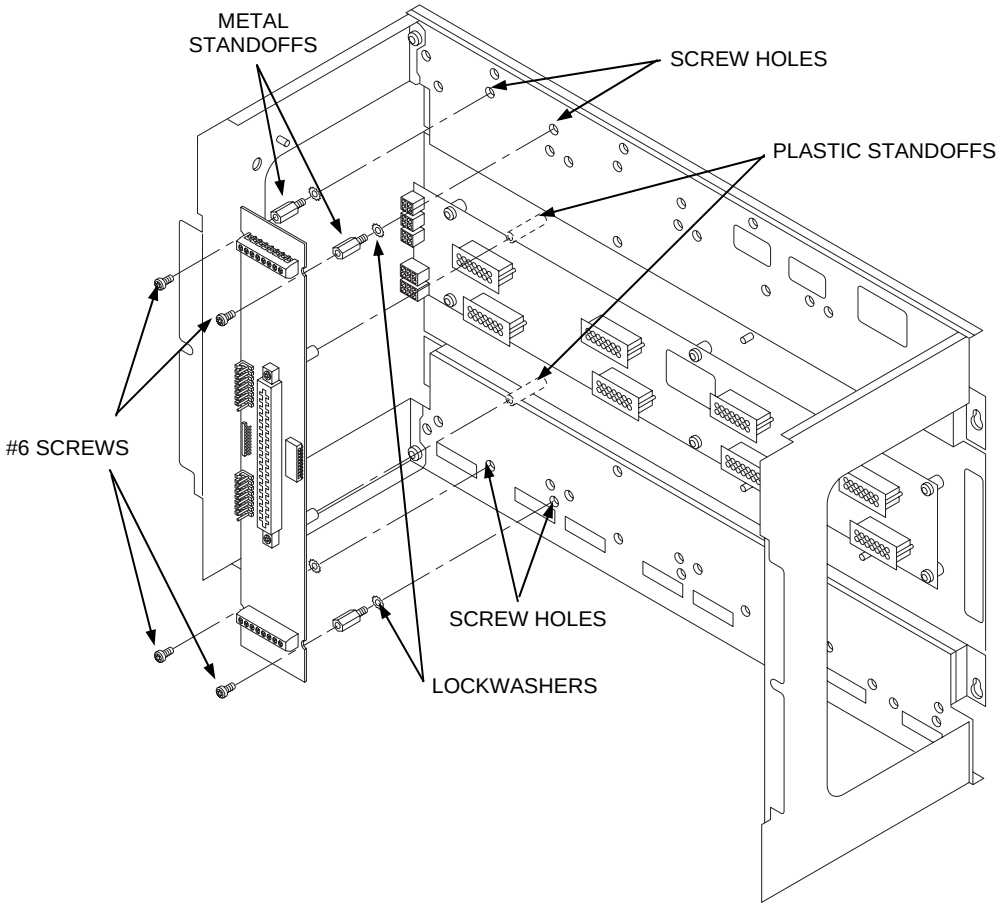


Figure 8. Installing the Motherboard in a 4100U/4100ES Expansion Bay

5. If you are installing the leftmost motherboard, connect a 733-525 Power and Communication Harness. Continue to the next topic to connect the harness.

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Connecting the 733-525 Harness

If you need to connect a 733-525 Harness to a motherboard, refer to Figure 9 and follow these steps. Make sure to route the power and communication wiring on the left side of the bay.

1. Connect one end of the harness to a motherboard in an adjacent bay.

   If the adjacent bay is a CPU bay with no additional motherboards, connect the harness to the P8 and P7 connectors of the CPU motherboard.

   - Insert the harness connector with the blue wire into the P8 connector. Note that the P8 connector has eight pins. Insert the harness connector on either the top four pins or the bottom four pins, not in the middle.
   - Insert the harness connector with the white wire into the P7 connector. Note that the P7 connector has eight pins. Insert the harness connector on either the top four pins or the bottom four pins, not in the middle.

   If the adjacent bay is an expansion bay or a CPU bay with additional motherboards, connect the harness to the P2 and P3 connectors of the motherboard installed in the leftmost slot. (If a 4100/4120-0155 SDACT, 4100-6052 Event Reporting DACT, 4100-6053 Point Reporting DACT, or a 4100/4120-0153 CCDACT occupies the leftmost slot, connect the harness to the motherboard in the second slot from the left.) Connect the harness as follows:

   - Insert the harness connector with the blue wire into the P2 connector. Note that the P2 connector has eight pins. Insert the harness connector on either the top four pins or the bottom four pins, not in the middle.
   - Insert the harness connector with the white wire into the P3 connector. Note that the P3 connector has eight pins. Insert the harness connector on either the top four pins or the bottom four pins, not in the middle.
2. Connect the other end of the harness to the leftmost motherboard in the next bay, as described below. Make sure to route the wiring on the left side of the bay.

   - Insert the harness connector with the blue wire into the P2 connector. Note that the P2 connector has eight pins. Insert the harness connector on either the top four pins or the bottom four pins, not in the middle.
   - Insert the harness connector with the white wire into the P3 connector. Note that the P3 connector has eight pins. Insert the harness connector on either the top four pins or the bottom four pins, not in the middle.

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Connecting the 733-525 Harness

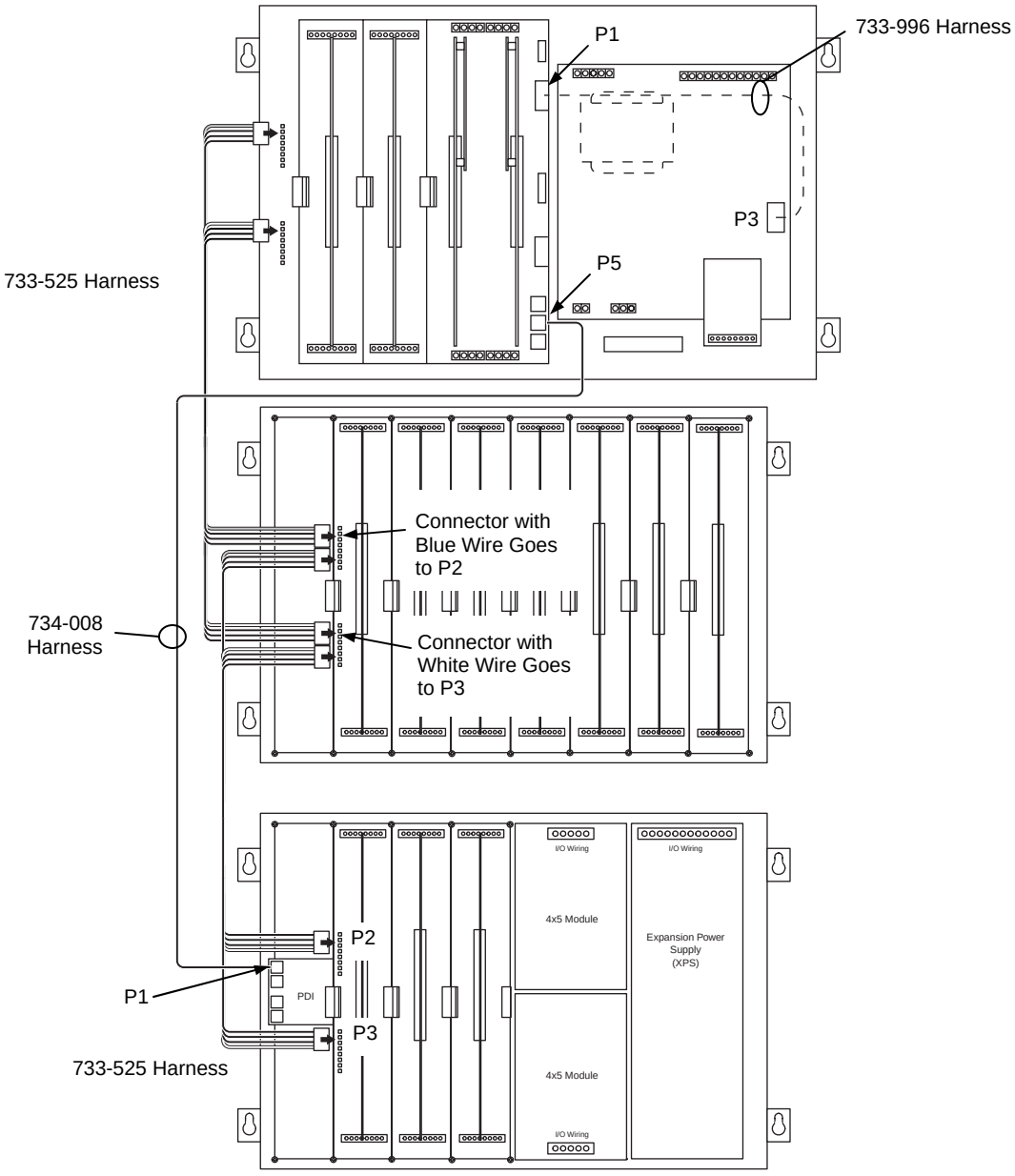


Figure 9. Power and Communication Wiring for Motherboard (4100U/4100ES)

Installing the Daughter Card

Installing the Daughter Card

The daughter card inserts into the connector located in the center of the motherboard. The connector is keyed so that the daughter card fits only one way. Before installing the card, examine the slot in the motherboard and the fingers on the daughter card and note where the key is located.

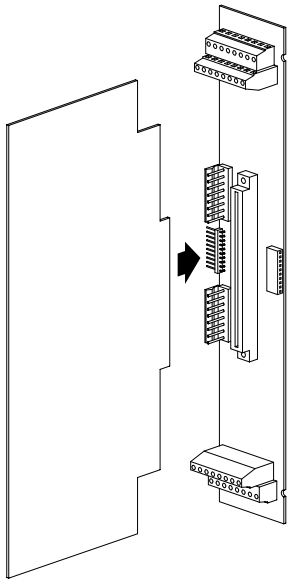


Figure 10. Installing the Daughter Card

Wiring

Introduction

This section contains guidelines and instructions for wiring the relay modules.

General Guidelines

Make sure these guidelines are accounted for before wiring:

- All wires must be 18 AWG, twisted/shielded pair.
- All wiring is supervised.
- Conductors must test free of all grounds.
- Power must come from a Simplex-approved power supply.
- All wiring must be done using copper conductors only, unless noted otherwise.
- If shielded wire is used,
  - the metallic continuity of the shield must be maintained throughout the entire cable length.
  - the entire length of the cable must have a resistance greater than 1 Megohm to earth ground.
- Underground wiring must be free of all water.
- In areas of high lightning activity, or in areas that have large power surges, the 2081-9027 Transient Suppressor should be used on monitor points.
- Wires must not be run through elevator shafts.
- Wires that run in plenum must be in conduit.
- Splicing is permitted. All spliced connections must either be soldered (resin-core solder), crimped in metal sleeves, or encapsulated with an epoxy resin. When soldering or crimped metal sleeves are used, the junction must be insulated with a high-grade electrical tape that is as sound as the original insulating jacket. Shield continuity must be maintained throughout.
- A system ground must be provided for earth detection and lightning protection devices. This connection must comply with approved earth detection per NFPA780.
- Only system wiring can be run together in the same conduit.
- Any wiring leaving the building requires overload protectors (2081-9044). Use one overvoltage protector where wiring leaves the building and another where the wiring enters the other building.

Continued on next page

Power-Limited Guidelines

Make sure these guidelines are accounted for before wiring for power-limited systems:

- Non-power limited field wiring (AC power, batteries, City connection) must be installed and routed in the shaded areas shown in Figure 11.
- Power-limited field wiring must be installed and routed in the non-shaded areas shown in Figure 11, with the exception of City wiring.
- Excess slack should be kept to a minimum inside the back box enclosure. The wiring should be neatly dressed and bundled together using the wire ties provided with the equipment. Anchor power-limited wiring to tie points, as shown in Figure 11.

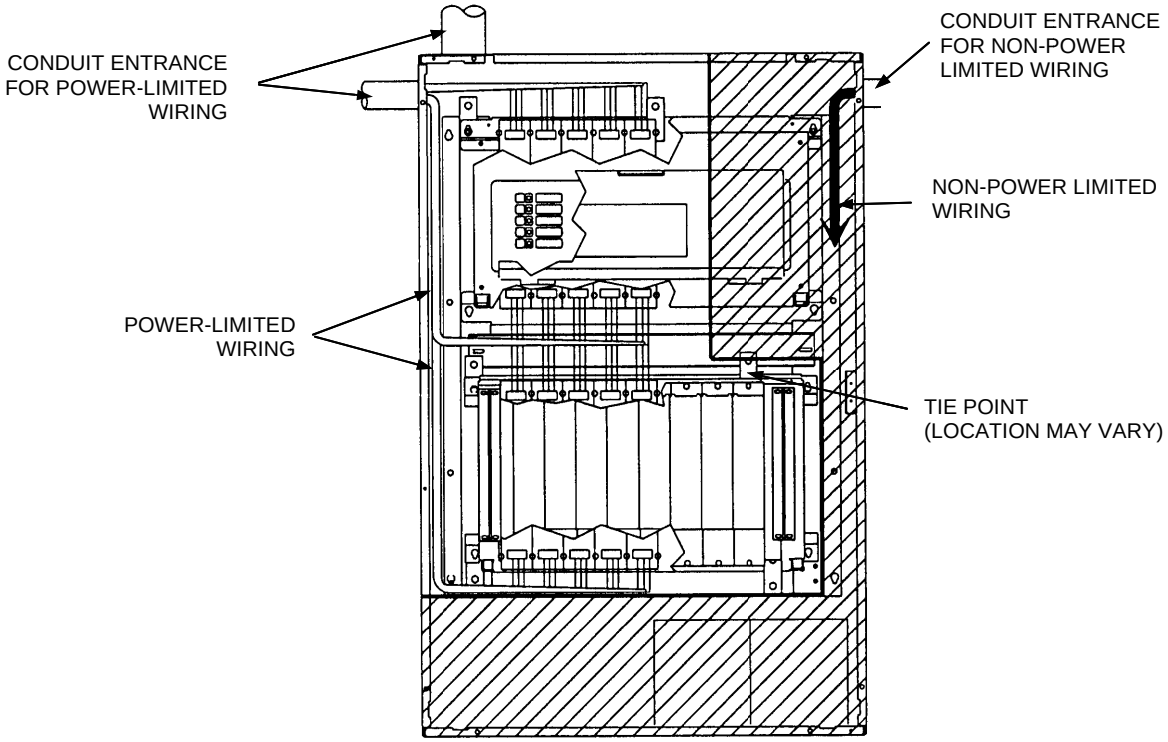


Figure 11. Power-Limited Wiring

- Tie the wiring located between bays to the internal wiring troughs, if applicable.
- When powering remote units or switching power through relay contacts, power for these circuits must be provided by one of the following in order to wire them as power-limited circuits.
  - UPS, XPS, or RPS-style power supply
  - The 4100-1108 Power Supply (8 A)
  - A power-limited power supply that is listed for fire-protective signaling use.

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Power-Limited Guidelines

- *Auxiliary power only:* In order to connect a circuit using power-limited wiring, the devices being powered must all be addressable, or a UL Listed EOL relay must be used to supervise the circuit. Refer to the figure below for wiring directions for the EOL relay.

Note: The 2098-9739 Relay is used as an example. Other UL Listed EOL relays can be used, depending on the application.

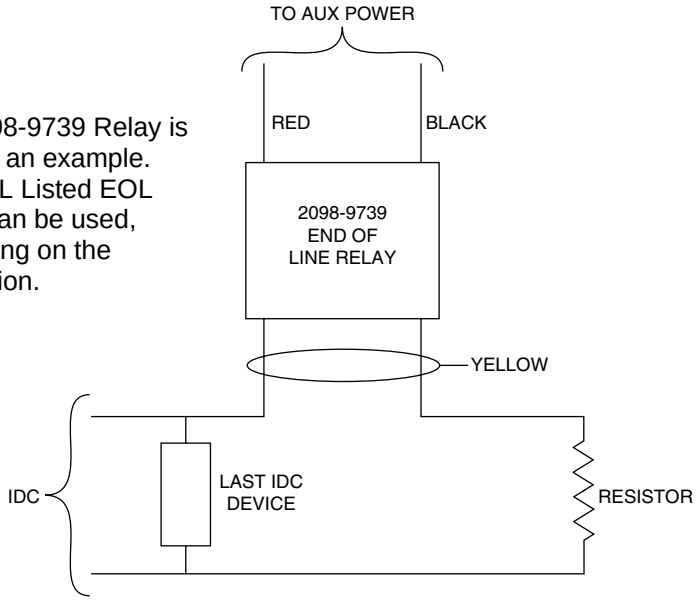


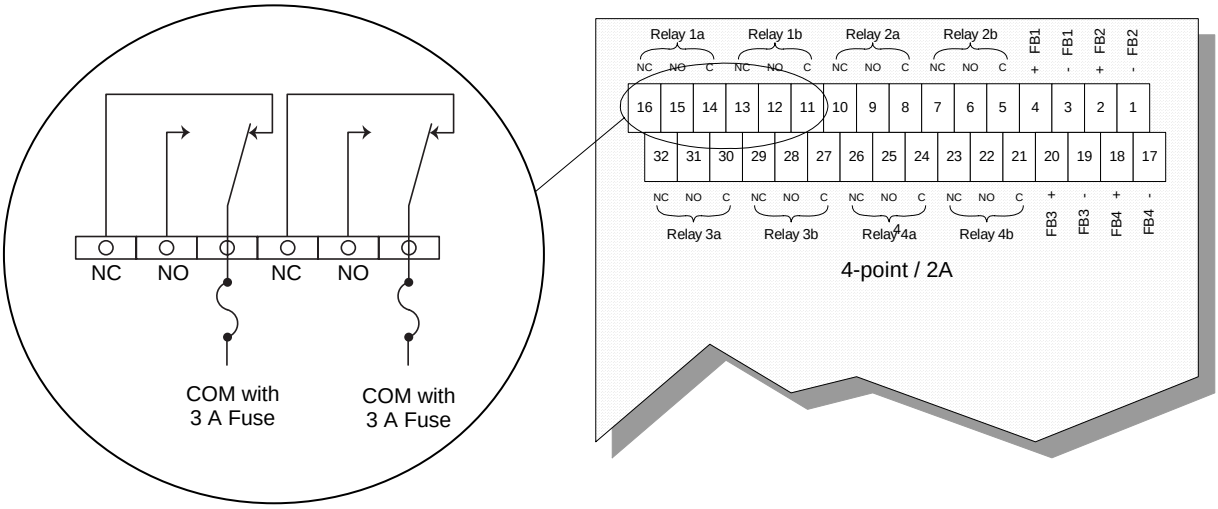
Figure 12. The EOL Relay

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4100-3204 Wiring

The 4100-3204 Relay Module includes 4 relays, each rated at 2 A. Each relay controls two sets of contacts and a separate 3 A fuse protects each set of contacts. Four unsupervised feedback circuits, which are typically used to determine the state of a separate set of contacts (such as the sail switch on a damper), are also provided. For battery calculation purposes, the module draws 18 mA in the normal supervisory condition and 70 mA with the relays activated.

All contacts are Form C, dry contacts, meaning the Common terminal is connected to the Normally Closed terminal when the relay's coil is in the de-energized state. The card's 30 VDC load capacity is 2 A* resistive/0.5 A inductive, and its 120 VAC load capacity is 0.5 A resistive/ 0.5 A inductive. The feedback circuits are rated at 24 VDC, 850 uA maximum short circuit current, with maximum line resistance of 100 Ohms. The feedback circuit is power-limited and intended for connection to contacts only. If the relay contacts are not switching power from the UPS, SPS, XPS, RPS, or 4100-1108 power supply, or a power-limited power supply that is UL-listed for fire protective signaling use, the feedback circuits are non-power-limited. Refer to Figure 13 for the designations of the contacts and feedback circuits.



Relay	Fuse	Contacts	
K1	F1	RELAY 1A	TB1-16 NC
			TB1-15 NO
			TB1-14 C
	F2	RELAY 1B	TB1-13 NC
			TB1-12 NO
			TB1-11 C
K2	F3	RELAY 2A	TB1-10 NC
			TB1-9 NO
			TB1-8 C
	F4	RELAY 2B	TB1-7 NC
			TB1-6 NO
			TB1-5 C
K3	F5	RELAY 3A	TB1-32 NC
			TB1-31 NO
			TB1-30 C
	F6	RELAY 3B	TB1-29 NC
			TB1-28 NO
			TB1-27 C
K4	F7	RELAY 4A	TB1-26 NC
			TB1-25 NO
			TB1-24 C
	F8	RELAY 4B	TB1-23 NC
			TB1-22 NO
			TB1-21 C

Figure 13. 4100-3204 Relay Module Wiring

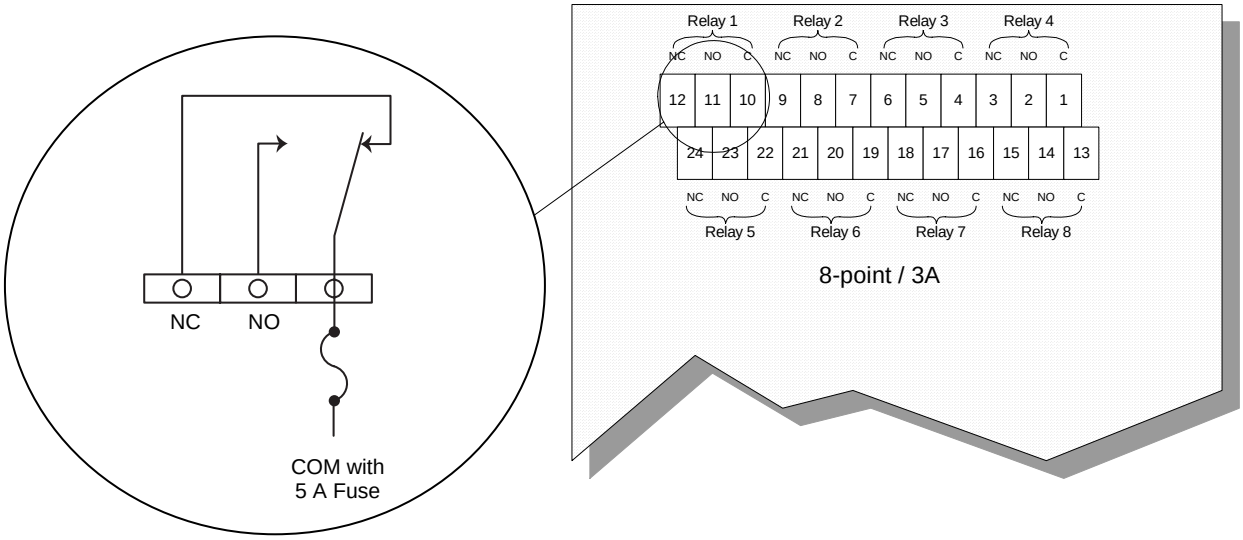
*Also 2 A at 30 VAC, non-inductive.

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4100-3206 Wiring

The 4100-3206 Relay Module includes 8 relays, each rated at 3 A. Each relay controls a set of contacts and a separate 5 A fuse protects each set of contacts. For battery calculation purposes, the module draws 16 mA in the normal supervisory condition and 200 mA with the relays activated.

All contacts are Form C, dry contacts, meaning the Common terminal is connected to the Normally Closed terminal when the relay's coil is in the de-energized state. The card's 30 VDC and 120 VAC load capacity is 3 A resistive/1.5 A inductive. Refer to Figure 14 for the designations of the contacts and feedback circuits.



Relay	Fuse	Contacts	
K1	F1	RELAY 1	TB1-12 NC
			TB1-11 NO
			TB1-10 C
K2	F2	RELAY 2	TB1-9 NC
			TB1-8 NO
			TB1-7 C
K3	F3	RELAY 3	TB1-6 NC
			TB1-5 NO
			TB1-4 C
K4	F4	RELAY 4	TB1-3 NC
			TB1-2 NO
			TB1-1 C
K5	F5	RELAY 5	TB1-24 NC
			TB1-23 NO
			TB1-22 C
K6	F6	RELAY 6	TB1-21 NC
			TB1-20 NO
			TB1-19 C
K7	F7	RELAY 7	TB1-18 NC
			TB1-17 NO
			TB1-16 C
K8	F8	RELAY 8	TB1-15 NC
			TB1-14 NO
			TB1-13 C

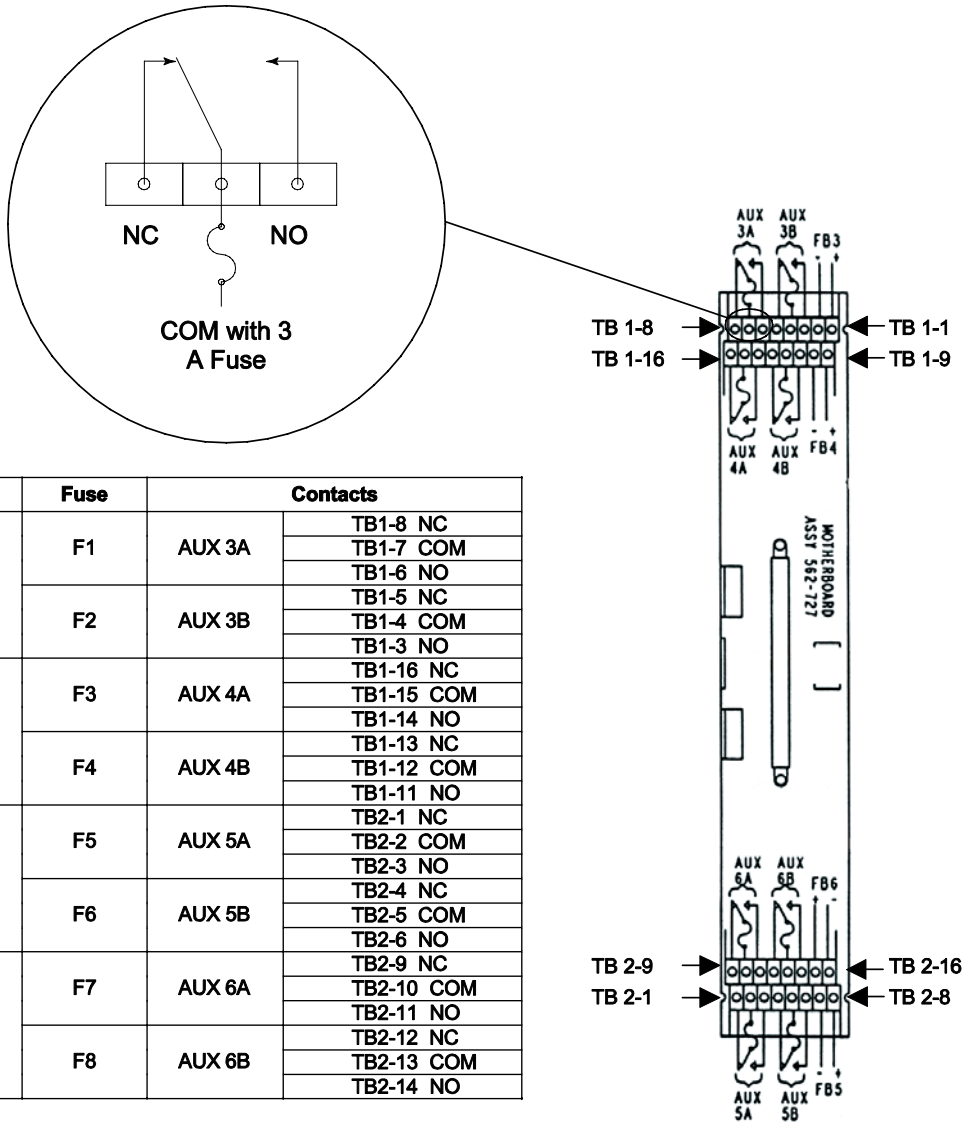
Figure 14. 4100-3206 Relay Module Wiring

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4 Relay / 2 Amp Module

The 4120-3001 and 4100-3201 Relay Modules — both of which consist of the 562-760 Daughter Card and the 562-727 Motherboard — include four relays, each rated at 2 amps. Each relay controls two sets of contacts and a separate 3 A fuse protects each set of contacts. Four feedback circuits, which are typically used to determine the state of a separate set of contacts (such as the sail switch on a damper), are also provided.

All contacts are Form C, dry contacts, meaning the Common terminal is connected to the Normally Closed terminal when the relay's coil is in the de-energized state. The maximum load that can be wired to the contacts is 2 A at 30 VDC. These relays are not rated for AC power. Refer to Figure 15 for the designations of the contacts and feedback circuits. All wiring connections are made to the 562-727 Motherboard.



Relay	Fuse	Contacts	
K1	F1	AUX 3A	TB1-8 NC
			TB1-7 COM
			TB1-6 NO
	F2	AUX 3B	TB1-5 NC
			TB1-4 COM
			TB1-3 NO
K2	F3	AUX 4A	TB1-16 NC
			TB1-15 COM
			TB1-14 NO
	F4	AUX 4B	TB1-13 NC
			TB1-12 COM
			TB1-11 NO
K3	F5	AUX 5A	TB2-1 NC
			TB2-2 COM
			TB2-3 NO
	F6	AUX 5B	TB2-4 NC
			TB2-5 COM
			TB2-6 NO
K4	F7	AUX 6A	TB2-9 NC
			TB2-10 COM
			TB2-11 NO
	F8	AUX 6B	TB2-12 NC
			TB2-13 COM
			TB2-14 NO

Figure 15. Wiring Connections for 4100/4120-3001 and 4100-3201 Relay Modules

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4 Relay / 10 Amp Module

The 4120-3002 and 4100-3202 Relay Modules — both of which consist of the 562-952 Daughter Card and the 562-951 Motherboard — include four relays, each rated at 10 A at 30 VDC or 10 A at 120/240 VAC. Each relay controls two sets of contacts and a separate 15 A fuse protects each set of contacts. Four feedback circuits, which are typically used to determine the state of a separate set of contacts (such as a set of contacts on a motor), are also provided.

All contacts are Form C, dry contacts, meaning the Common terminal is connected to the Normally Closed terminal when the relay's coil is in the de-energized state. The maximum load that can be wired to the contacts is 10 A. Refer to Figure 16 for the designations of the contacts and feedback circuits. All wiring connections are made to the 562-952 Motherboard. The NO, NC, and COM designations are silkscreened on the motherboard.

Relay	Fuse	Contacts	
K1	F1	AUX 1A	TB1-8 NO
			TB1-7 NC
			TB1-6 COM
	F2	AUX 1B	TB1-5 NC
			TB1-4 NO
			TB1-3 COM
K2	F3	AUX 2A	TB2-8 NO
			TB2-7 NC
			TB2-6 COM
	F4	AUX 2B	TB2-5 NC
			TB2-4 NO
			TB2-3 COM
K3	F5	AUX 3A	TB3-1 NO
			TB3-2 NC
			TB3-3 COM
	F6	AUX 3B	TB3-4 NC
			TB3-5 NO
			TB3-6 COM
K4	F7	AUX 4A	TB4-1 NO
			TB4-2 NC
			TB4-3 COM
	F8	AUX 4B	TB4-4 NC
			TB4-5 NO
			TB4-6 COM

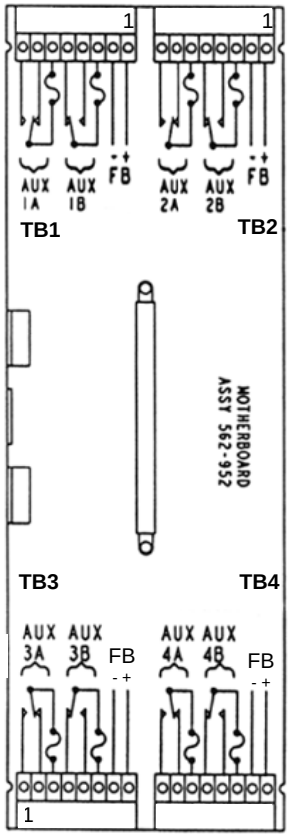


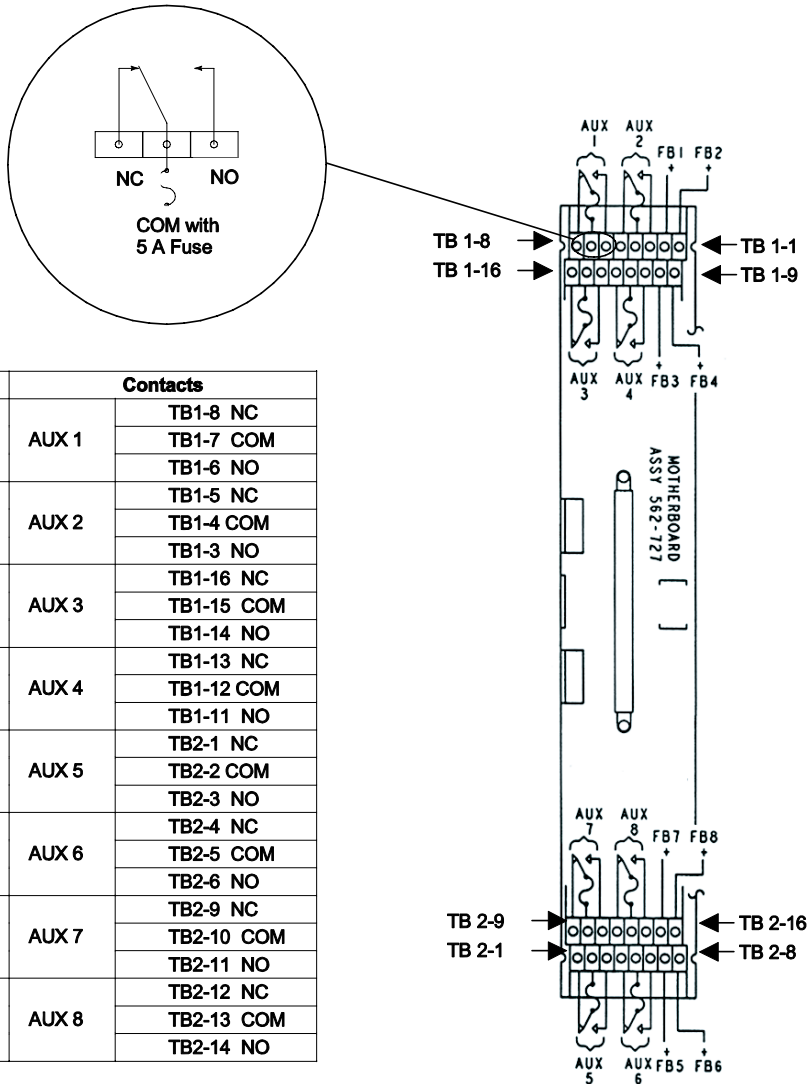
Figure 16. Wiring Connections for 4100/4120-3002 and 4100-3202 Relay Modules

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Relay / 3 Amp Module

The 4120-3003 and 4100-3203 Relay Modules — both of which consist of the 565-045 Daughter Card and the 562-727 Motherboard — include eight relays. Each relay controls one set of contacts and a separate 5 A fuse protects each contact. Eight feedback circuits, which are typically used to monitor the state of a separate set of contacts (such as the sail switch on a damper or the NO or NC contacts on a motor), are also provided.

All contacts are Form C, dry contacts, meaning the Common terminal is connected to the Normally Closed terminal when the relay's coil is in the de-energized state. The maximum load that can be wired to the contacts is 3 A at 30 VDC or 0.5 A at 120 VAC. Refer to Figure 17 for the designations of the contacts and feedback circuits. All wiring connections are made to the 562-727 Motherboard.



Relay	Fuse	Contacts	
K1	F6	AUX 1	TB1-8 NC
			TB1-7 COM
			TB1-6 NO
K2	F5	AUX 2	TB1-5 NC
			TB1-4 COM
			TB1-3 NO
K3	F8	AUX 3	TB1-16 NC
			TB1-15 COM
			TB1-14 NO
K4	F7	AUX 4	TB1-13 NC
			TB1-12 COM
			TB1-11 NO
K5	F1	AUX 5	TB2-1 NC
			TB2-2 COM
			TB2-3 NO
K6	F2	AUX 6	TB2-4 NC
			TB2-5 COM
			TB2-6 NO
K7	F4	AUX 7	TB2-9 NC
			TB2-10 COM
			TB2-11 NO
K8	F3	AUX 8	TB2-12 NC
			TB2-13 COM
			TB2-14 NO

Figure 17. Wiring Connections for 4100/4120-3003 and 4100-3203 Relay Modules