

FIRE

4100U-S1 Fire Indicator Panel Installation & Maintenance



**Australian
Installation &
Maintenance
Manual**

LT0394

Simplex

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Approvals

Australian Standard AS4428.1

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Manufacture

The 4100U-S1 is a Fire Alarm manufactured by Tyco Safety Products for:

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The Company, therefore cannot accept any responsibility as to the suitability of the functions generated by the user using this programming facility.

Model Number & Firmware Revision

This manual applies to product with the following:

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5 July 2006 Issue 1.0 Original based on LT0350 1.0.7

Cautions, Warnings, and Regulatory Information

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 depends upon proper installation.



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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 your Simplex product supplier.

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SYSTEM REACCEPTANCE TEST AFTER SOFTWARE CHANGES - To ensure proper system operation, this product must be tested in accordance with AS1670 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.

IMPORTANT: Verify 4100U System Programmer, Executive, and Slave Software compatibility when installing or replacing system components. Refer to the relevant Product Bulletins from Simplex Fire Products Australia (www.simplexfire.com.au) for compatibility information.

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Chapter 1

Introduction to the 4100U-S1 Fire Alarm System

Introduction

The 4100U-S1 is a compact version of the 4100U fire alarm, which is intended for use in applications requiring only one or two loops of addressable devices.

This chapter is an overview of basic system concepts.

In this Chapter

Refer to the page number listed in this table for information on a specific topic.

Topic	See Page #
Basic Configuration	1-2
4100U-S1 Part Codes	1-3
4100 Part Codes (Non-4100U)	1-4

Basic Configuration

Overview

The basic version of the 4100U-S1 is used for smaller or single-building applications. It is ideally placed in a small building that requires a limited number of notification appliances and initiating devices.

If a small building is being expanded, or if other buildings are being constructed in the same general area (as in a campus application), the basic 4100U-S1 can be expanded via networking into one of the larger systems described in Chapter 3.

System Design

The basic 4100U-S1 is a single cabinet containing these items: CPU, System Power Supply, and optional slave cards.

As standard, the 4100U-S1 has one IDNet addressable loop that can support up to 250 devices. A second IDNet addressable loop can be added by fitting a 4100-3101AU IDNet module to the expansion bay in the cabinet (see Chapter 6).

The basic 4100U-S1 can be expanded with a limited number of 4100-type legacy card/modules or newer 4" x 5" 4100U modules.

All appliances and devices are connected to this one cabinet, as shown in Figure 1-1.

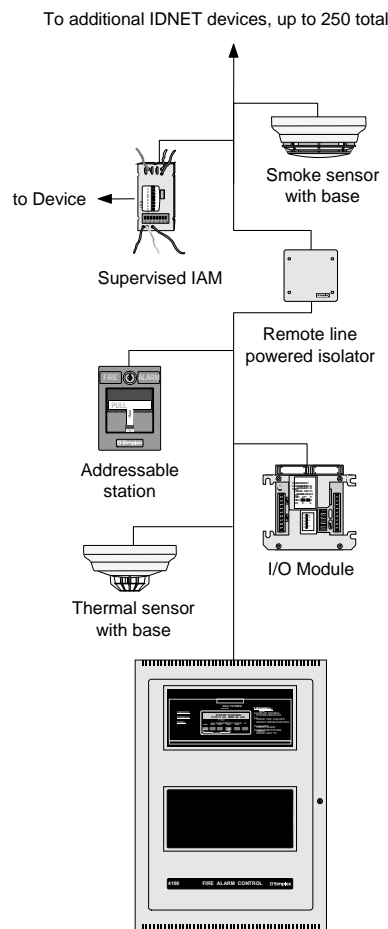


Figure 1-1. Basic 4100U-S1 System

4100U-S1 Part Codes

Overview

This section lists the parts that are supported by the 4100U-S1 Fire Alarm System.

Assemblies, Cards & Modules

The following is a list of assemblies, cards and modules used in 4100U-S1:

These parts are included in the base 4100U-S1:

- 742-516 CPU Motherboard (566-227)
- 4100-7151 CPU Card (566-149)
- 4100-9848AU System Power Supply, Australian version
- 4100-6033 Alarm Relay Card (566-058) plugged onto the SPS and used to supply the Brigade I/F relays.
- PA0915 Fuse Distribution Board, connected to the Auxiliary Power terminals of the System Power Supply
- 4100-2300 Expansion Bay Assembly (includes the metalwork with the PDI back-plane)
- 4100-1288 64 LED/64 Switch Controller module with mounting plate
- 4100-1282 8 SW/16 LED red/yellow module (2 off)

These parts may be used to expand a 4100U-S1:

- 4100-1282 8 SW/16 LED red/yellow module
- 4100-3101AU IDNET Module – 250 point capacity
- 4100-1289 64 LED/64 Switch Controller module
- 4100-1287 24 Switch/24 red LED module
- 4100-1284 8 Switch 16 red/green LED module
- 4100-1281 8 Switch 8 yellow LED module
- 4100-0160 Internet Interface Module (566-355).
- ME0456 Fan Control Module

Kits

The following kits are available to install in a base 4100U-S1:

Brigade Interfaces

- FP0935 ASE Door Kit (ASE not included)
- FP0937 PPU/AIU Door Kit (PPU/AIU not included)

Other

- 4100-KT0448 Fused DC Distribution Bd, XSPS AU Mounting
- 4100-KT0468 4100 Motherboard to 4100U Bay, Mounting Kit
- 4100-0766K T-Gen 50 and 4100U Mounting Bracket Kit
- ME0460 T-Gen 50 Evacuation Control Switch and Label
- ME0490 T-Gen 50/4100U Dynamic Microphone and lead

Continued on next page

4100U-S1 Part Codes, *Continued*

Labels (expansion/spares)	• LB0602	Operator I/F ISO/Test Card
	• LB0605	Fan Control Zone Insert Card
	• 526-873	Slide In Label, LED Switch Module, 1 Sheet of 6
	• 4100-1294	LED Module Slide In Labels, Panel Set
Looms (expansion/spares)	• LM0309	4100U Mains Lead With Filter
	• LM0310	4100U Battery Lead Set, 18U-21U
	• 734-008	Harness, Power Comms, 4 Way, 2ft Length
	• 734-075	Harness, Power Comms, 4 Way, 8ft Length
	• 116-226	Sw/LED Module Ribbon Cable, 26 Way, 2in
	• 116-227	Sw/LED Module Ribbon Cable, 26 Way, 6in

4100 Part Codes (Non-4100U)

The following is a list of existing 4100+/A cards and modules that may be used with 4100U-S1.

- 4100-5004 8 AZF Monitor Zone
 - 4100-0113 Dual RS232 Modem Interface
 - 4100-3003 8 Relay Module
 - 4100-4321 6 Supervised Relays
 - 4100-3024 24 Relay Module
 - 4100-0302 24 I/O Module
 - 4100-0111 Quad Isolator Module
 - 4100-6014 Modular Network Card (requires 2 media cards)
 - 4100-6056 Wired Media Card RS485
 - 4100-6057 Fibre Optic Media Card
 - 4100-0154 VESDA High Level Interface
-

Chapter 2

Installing 4100U-S1 Components

Introduction

This chapter describes how to mount the 4100U-S1 cabinet to a wall, and how to mount system card bays into the cabinets, modules to bays, etc.

Most of a 4100U-S1 is already assembled within the factory. Steps 2 to 6 below are therefore not typically required in the field, but are included for reference.

The assembly drawings are included in the appendix of this manual for reference.

In this Chapter

Refer to the page number listed in this table for information on a specific topic.

Topic	See Page #
Introduction to 4100U-S1 Cabinet	2-2
Step 1. Mounting Cabinets	2-9
Step 2. Mounting Card Bays to Cabinets	2-9
Step 3. Configuring Cards	2-9
Step 4. Interconnecting Modules and Bays	2-11
Step 5. Installing Modules into Expansion Bays	2-13
Step 6. Installing LED/Switch Modules into Expansion Bays	2-17
4100U Fan Control Module	2-22

Introduction to 4100U-S1 Cabinet

Overview

The 4100U-S1 cabinet contains the CPU, operator interface, system power supply (SPS), backup batteries, and any additional modules that the panel requires.

Bays

These items are organized into sub-assemblies called bays or card frames, each with a swing-down front door. The 4100U-S1 has two bays: the CPU bay and one expansion bay.

In the standard 4100U-S1, the CPU bay contains the SPS and the CPU Motherboard with CPU Daughter card. The front of the bay holds the Operator Interface, consisting of the LCD, keyboard, and fault sounder. Older 4100-style motherboards can be mounted in the CPU bay.

The expansion bay has a PDI (Power Distribution Interface) backplane into which can be plugged a number of 4" x 5" 4100U modules. Older 4100-style motherboards can also be mounted in the expansion bay.

Continued on next page

Introduction to 4100U-S1 Cabinet, *Continued*

CPU Motherboard

The 4100U CPU motherboard holds the CPU card, which is central to the 4100U-S1 system. It is mounted in the CPU bay, occupying two slots of space immediately beside the power supply. These boards do not have a card address DIP switch (the CPU is always address 0).

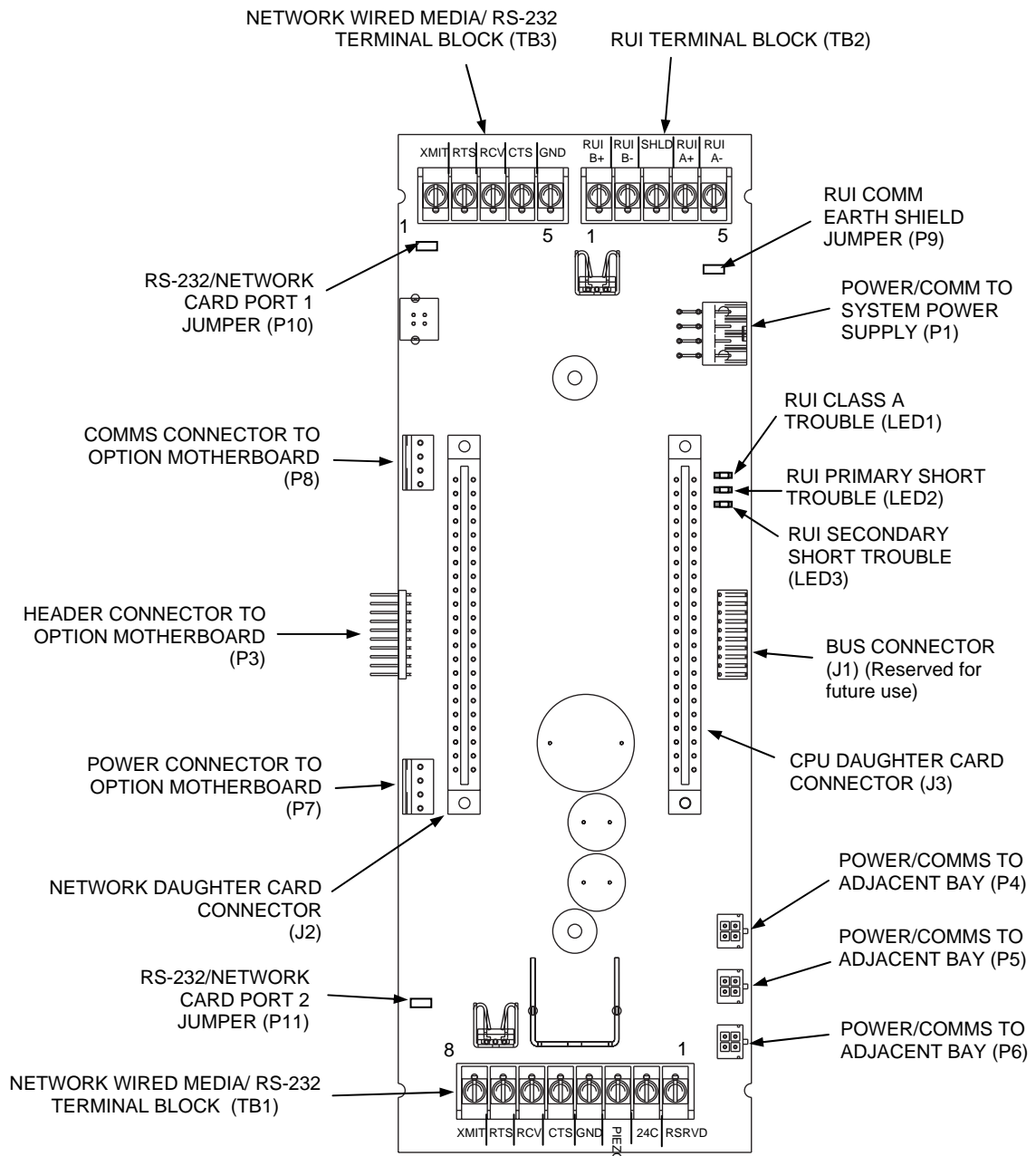


Figure 2-1. CPU Motherboard (566-227)

Continued on next page

Introduction to 4100U-S1 Cabinet, *Continued*

CPU Card

The CPU card mounts onto the CPU motherboard. The CPU card contains a service port, a direct drive user interface connection, and a port for a service modem.

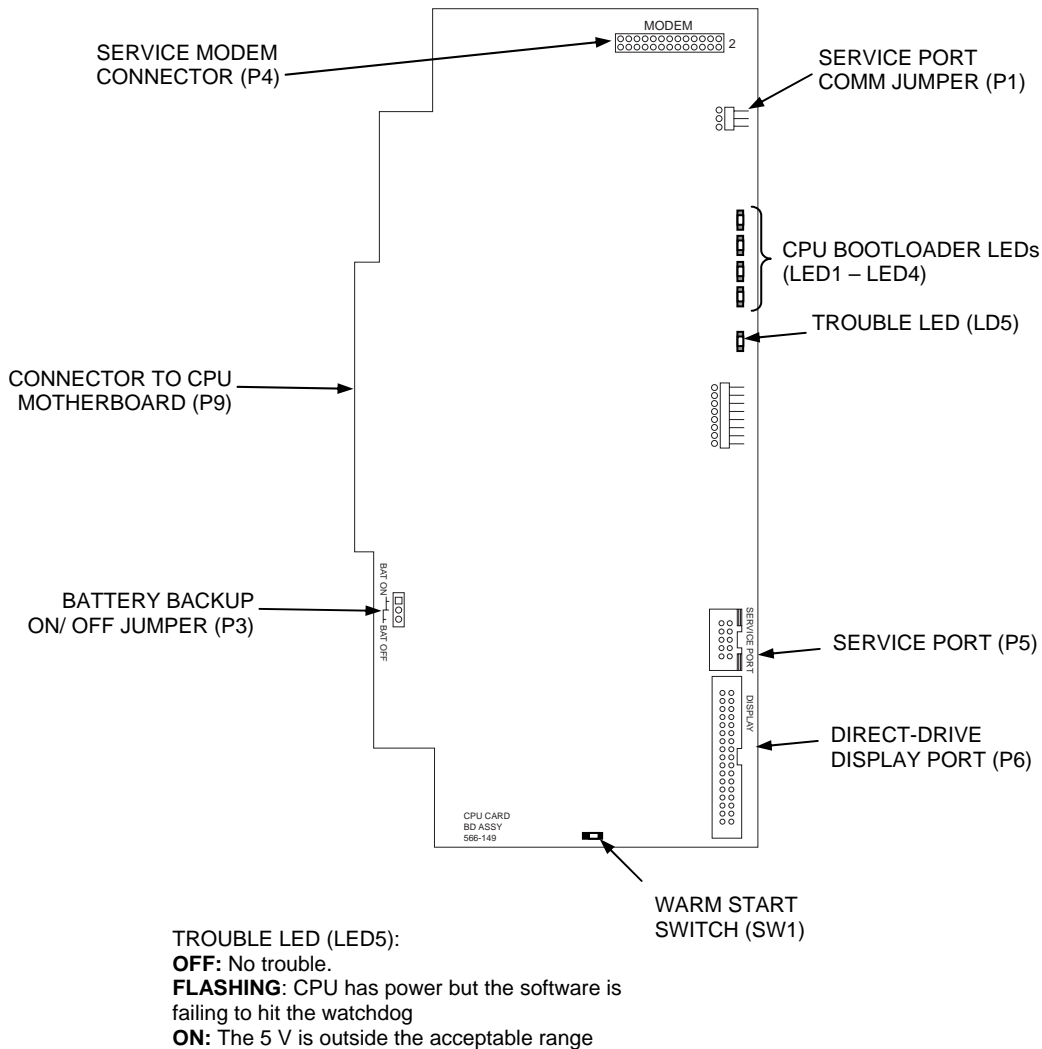


Figure 2-2. CPU Card (566-149)

Continued on next page

Introduction to 4100U-S1 Cabinet, *Continued*

CPU Card LEDs

The CPU card LEDs indicate Bootloader status as shown in the table below.

Table 2-1. CPU Card LEDs 1 through 4

Status Condition	LED4	LED3	LED2	LED1
Bootloader Initialization	On (0.25s), Off (0.25s)	On (0.25s), Off (0.25s)	On (0.25s), Off (0.25s)	On (0.25s), Off (0.25s)
Bad Master CRC or No Master Present	On	Off	Off	Off
Diagnostic Fail – RAM	On	Off	Off	On
Diagnostic Fail – Bootloader CRC	On	Off	On	Off
Downloading Master	On	Off	On	On
Downloading CFG	On	On	Off	Off
Downloading MsgLib	On	On	Off	On
Downloading BootLoader	On	On	On	Off
Download Successful	On	On	On	On

Continued on next page

Introduction to 4100U-S1 Cabinet, *Continued*

Operator Interface

The operator interface lets a user operate the panel. It provides alarm, fault, and isolate status alerts, and lets the user review historical logs and perform diagnostics.



Figure 2-3. Operator Interface

Additional CPU Motherboard Modules

4100-6014 Modular Network Interface Card (NIC). A daughter card that mounts to the CPU motherboard. Performs 4100 networking operations. May be installed with 4100-6056 Wired Media Cards and/or the 4100-6057 Fiber Media Cards.

System Power Supply (SPS)

The 4100U-S1 is powered by the SPS (System Power Supply), which gets its primary power from the AC mains and its secondary power from the backup batteries.

The SPS in the 4100U-S1 has hardware and software that are specific to Australian requirements.

The system power supply is mains powered and has backup batteries that get switched in on mains failure. It is the initial power source for the CPU and the host cabinet. The SPS provides 24V card power to the CPU motherboard and the other cards. It also supplies 24V power on a separate bus to the outputs, e.g. Notification Appliance Circuits (NACs).

The SPS also has three on-board NACs that support reverse polarity supervision. It provides an IDNet channel, auxiliary power, an auxiliary relay, and it mounts and drives the Alarm Relay Card.

The SPS performs functions such as brownout detection, battery transfer, battery recharge, earth fault detection, and power limiting of outputs. It provides voltage and current information to the CPU card, which can then be displayed at the user interface.

The 24VDC bulk power on the SPS is unregulated, and is divided into three feeds: 24V Card, 24V Signal, and 24V Aux Power. 24V Card, which supplies the cards, and Aux Power, which is accessible on screw terminals, are each rated at 2A and protected by a PTC. The 27.3V regulated battery charger is powered from the bulk supply and is switched off during alarm. The charger has two programmable options of rating: 1.4A for 6-18Ahr batteries, and 3.3A for batteries above 18Ahr.

The “heavy” 24V Signal feed is only accessible via the NACs on the SPS.

Continued on next page

Introduction to 4100U-S1 Cabinet, *Continued*

The basic 4100U-S1 has a Fuse Distribution Board mounted on the SPS chassis and connected to the Auxiliary Power terminals. This provides four sets of supply terminals, each individually fused at 1A, but the collective capacity is still limited to 2A from the Auxiliary Power supply. The fuses are not directly supervised.

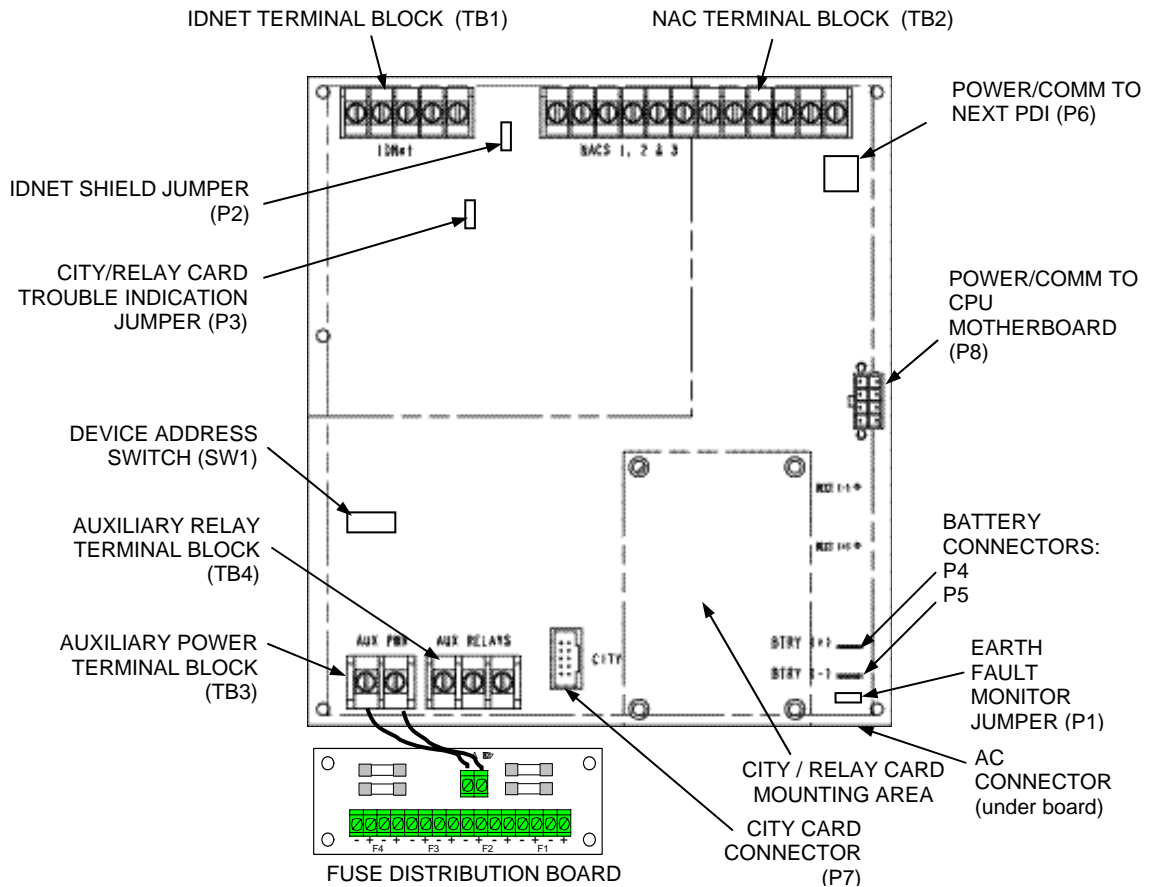


Figure 2-4. System Power Supply

Continued on next page

Introduction to 4100U-S1 Cabinet, *Continued*

The Power Distribution Interface (PDI)

In the expansion bay, power and data are distributed via the power distribution interface (PDI). The PDI is a wiring board with eight card slots, each of which can accommodate a 4-inch (102 mm) x 5-inch (127 mm) slave card. If 4100-style motherboards are used, they must be mounted over the PDI using a kit of metal standoffs (part number 4100-KT0468).

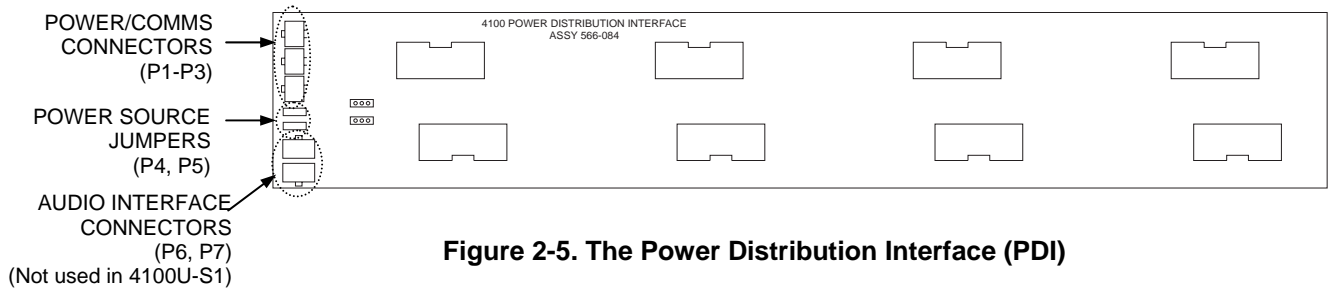


Figure 2-5. The Power Distribution Interface (PDI)

Mains Outlet

The rightmost 2" slot in the expansion bay is occupied by a mounting bracket holding a single switched General Power Outlet. The fixed AC power wiring must be installed to this GPO by a suitably qualified electrician.

IMPORTANT: AC power must be provided to the 4100U-S1 from a dedicated branch circuit.

The SPS plugs into this GPO, and can be switched off or unplugged for servicing.

Step 1. Mounting Cabinets

Overview

The important aspects of mounting the cabinet are:

- Access for the operator;
- Height of displays and controls;
- Free space for door opening;
- Cable entry for field wiring.

Refer to AS1670.1 for the height requirement and minimum access requirements.

In general, 4100U-S1 cabinets will be wall mounted. There are four dimpled mounting holes in the rear of the cabinet. These are accessible from the inside of the cabinet with the equipment bays still fitted, but it may be more convenient to remove the CPU bay. See the instruction in the next section about this procedure.

Mounting hole and cabinet dimensions are shown in drawing 1976-176, in the appendix to this manual.

Door opening is to the left as standard.

Step 2. Mounting Card Bays to Cabinets

Overview

The CPU Bay and the Expansion Bay are both attached to the rear of the cabinet by four 8/32" screws. The bays are prevented from movement during transit by locking screws fitted just below the upper mounting screws.

To remove a bay, remove the locking screws, loosen the mounting screws, then lift the bay up and out. Disconnect any wiring from the bay before lifting it free. Assembly is the reverse of this procedure. The transit locking screws do not have to be re-fitted to an installed cabinet.

Step 3. Configuring Cards

Overview

The CPU, SPS, and all other modules to be mounted in the 4100U-S1 cabinet must be configured to operate correctly in the system via their DIP switch and jumper ports. This section describes the hardware configuration for the CPU and SPS, since they will always be used in the CPU bay.

CPU Motherboard Configuration

The CPU motherboard must be jumpered as follows:

- P9** determines whether the RUI SHIELD signal is connected to 24 C or Earth.
- Position 1 – 2: SHIELD to 24 C (default). Set to this position **unless** the system uses a TrueAlert Power Supply. Use this setting for 4100U-S1.
 - Position 2 – 3: SHIELD to Earth. Set to this position **only if** the system uses a TrueAlert Power Supply.
-

Continued on next page

Step 3. Configuring Cards, *Continued*

Note: Some devices that connect to RUI have inherently grounded shield terminals, in which case 24 C cannot be used. If 24 C is used, a Negative Ground Fault will occur.

P10/P11: P10 is associated with Port 1 and P11 is associated with Port 2. P10 and P11 are used to set the CPU motherboard up to be attached to either a network card or a RS-232/2120 card.

- Position 1 – 2: Network card (NIC) plugged into CPU motherboard (default).
 - Position 2 – 3: RS-232/2120 card plugged into CPU motherboard.
-

CPU Daughter Card Configuration

The CPU daughter card must be jumpered as follows:

P1 is used for engineering diagnostics (COMLAB). Normally has no link fitted.

- Position 1 – 2 : Download or no connection.
- Position 2 – 3 : Diagnostic mode.

P3 configures the RAM battery as ON or OFF.

- Position 1 – 2 : ON – move to this position for normal operation.
 - Position 2 – 3 : OFF – factory setting.
-

SPS Configuration

The SPS must be configured as follows:

SW1: Using DIP switch SW1, set the SPS card address to 1. Use the address table in Appendix A for the switch settings.

P2: P2 configures the IDNet shield connection.

- Position 1 – 2 (bottom) : Connects the shield to 0 V (default). Use this setting for 4100U-S1.
- Position 2 – 3 (top) : Connects the shield to earth ground.

P3 configures relay 3 on the 4100-6033 Alarm Relay Card.

- Position 1 – 2 (top) : Removes fault monitoring on Relay 3 (default). Use this setting for 4100U-S1.
- Position 2 – 3 (bottom) : Makes Relay 3 activate when there is a fault.

P1: Earth connect jumper.

- Position 1 – 2 (rhs): Enables Earth fault monitoring. Set to this position **unless** the system uses a TrueAlert Power Supply under common 0 V. Use this setting for 4100U-S1.
 - Position 2 – 3 (lhs): Disables Earth fault monitoring. Set to this position **only if** the system uses a TrueAlert Power Supply under common 0 V.
-

PDI Configuration

P4/P5: The PDI can be configured to draw its power from different sources via P4 and P5. For 4100U-S1 both links should be in position 1-2.

Configuring Other Cards

Refer to the appropriate installation instructions to configure other cards that are located in the CPU and expansion bays. The common 4100U cards and modules are included in this manual. Refer to Appendix D for a list of publications.

Step 4. Interconnecting Modules and Bays

Overview

Each card has to be interconnected with every other card in its bay. At the same time, bays in the 4100U-S1 also have to be connected together. Read this section to ensure that cards and bays are interconnected correctly. Refer also to drawings 1976-136 and 1976-137.

The basic 4100U-S1 will have all necessary interconnection wiring already fitted, but additional wiring may be necessary if expansion modules are fitted.

Guidelines

Review the following guidelines before interconnecting modules and bays.

- The SPS provides 24 V power to the CPU motherboard.
 - The CPU motherboard provides 8 V (3 A capacity) for use by legacy 4100 slave cards. 24 V Card power is routed through the motherboard for slave card use.
 - 4100 internal comms and power are harnessed to other bays. Do not connect the 8 V at P7 to an 8 V converter on a Goldwing or remote interface card.
 - 24 V Card power from the SPS is rated at 2 A maximum.
 - The 4-wire comms and power harness carries only the 24 V Card supply to a PDI, and not the 24V Signal supply.
 - Some of the wire harnesses supplied with add-on cards may not be required. These spare harnesses should be stored in case of future requirements.
-

Card Interconnections in the CPU Bay

Connect P8 on the SPS to P1 on the CPU motherboard using the 8 wire harness with eight-position Molex minifit connector (provided).

Card Interconnections Within Expansion Bay

The power distribution interface (PDI) mounted to the back of the expansion cabinet carries 24V Card power and data to each 4"x 5" card.

Refer to "Step 5: Installing Modules into Expansion Bays for instructions on mounting 4"x 5" cards to the PDI. Also bear in mind that legacy 4100 motherboards require non-PDI interconnections to each other and to the CPU Motherboard.

Basic Bay-To-Bay Interconnections

The 4 wire harness 734-008 is used to carry 24V Card power and coms from the CPU bay to the expansion bay. Connector P1 on the PDI receives power from P6 on the SPS or P7 or P8 on the CPU Motherboard. P2 on the PDI is used to connect power and comms to a 64/64 Controller. In a larger system, P3 on the PDI is used to carry power and comms to the next PDI, but is not used in 4100U-S1.

Continued on next page

Step 4. Interconnecting Modules and Bays, *Continued*

Connecting to Motherboards

Panels with legacy motherboards in the expansion bay require some non-PDI connections. If you need to connect a harness to a motherboard, refer to Figure 2-6 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 733-525 Harness to a motherboard in the CPU bay.
 - If the CPU bay has no additional motherboards (the usual case), 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.
2. Connect the other end of the harness to the leftmost motherboard in the next bay, as described below.
 - 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 pin, not in the middle.

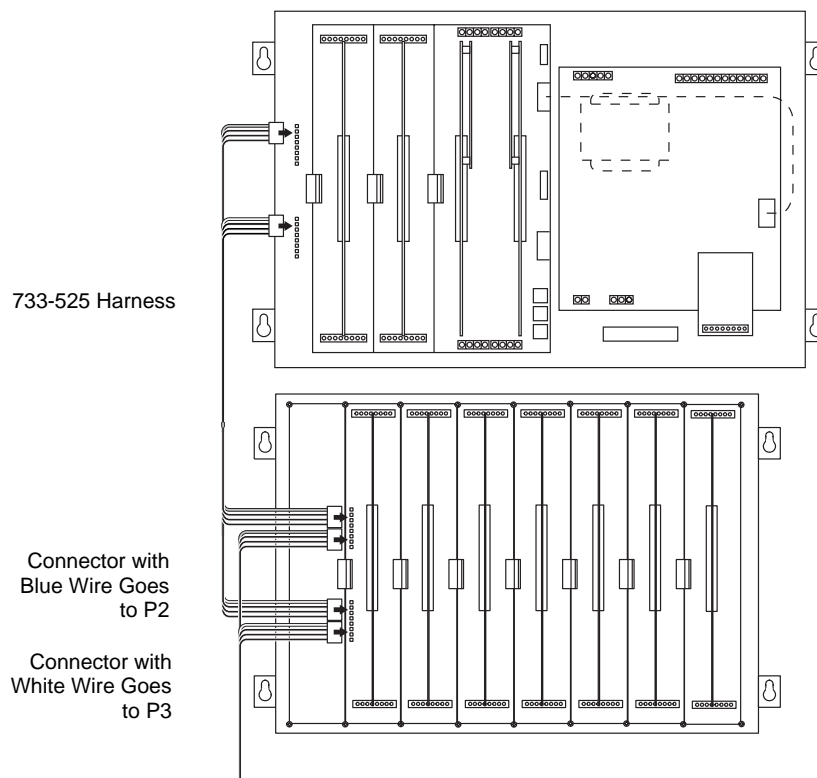


Figure 2-6. Power and Communication Wiring for Motherboards (note that there are limitations of where motherboards can be placed – see next section)

Step 5. Installing Modules into Expansion Bays

Overview

This section contains guidelines and instructions on installing 4" x 5" cards and traditional motherboards into the 4100U-S1 expansion bay.

IMPORTANT: This section applies to aftermarket modules for expansion bays only. If you do not need to install any aftermarket modules at all, you have completed the panel installation and can apply AC power.

Placement Guidelines

Refer to the following guidelines before mounting 4" x 5" cards and/or motherboards to the expansion bay.

- The 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 four 4" x 5" modules if a T-Gen 50 is fitted, or up to six modules if not.

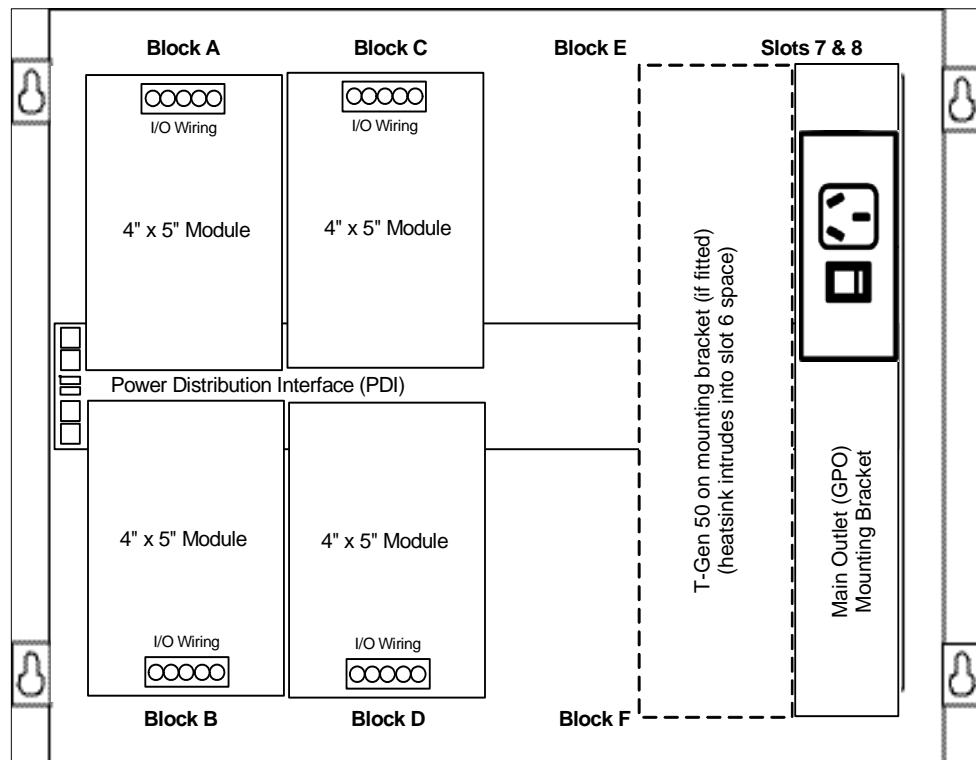


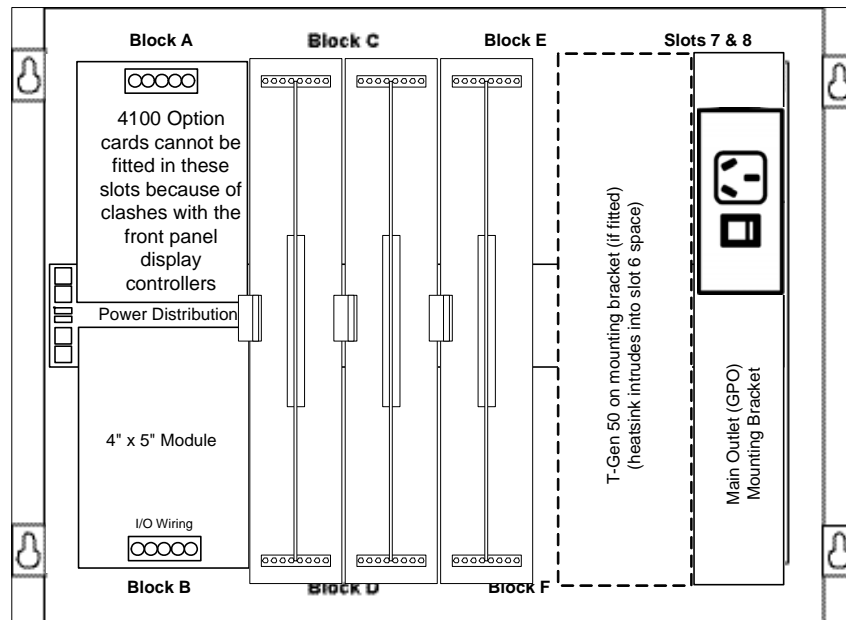
Figure 2-7. Expansion Bay 4" x 5" Card Placement

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Step 5. Installing Modules into Expansion Bays, *Continued*

Placement Guidelines (*continued*)

- Motherboards can be installed on top of the PDI in expansion bays. The data and power that would normally be bussed via the PDI are routed across the motherboards via their left and right connectors (J1 and P1).
- Up to four 2" (51 mm) x 11 1/2" (292 mm) motherboards can be installed in an expansion bay **if the pins on the left connector (usually P1) on the leftmost motherboard are removed.**
- Motherboards should be added from left to right, starting in slot 3.
- Relay motherboards must be the rightmost motherboards.
- The CPU motherboard generates the 8V supply required for 4100A motherboards. It also has the 4100A style Molex connectors to which a harness can be fitted as in Figure 2-6.



Up to four 2" x 11 1/2" motherboards can be mounted in the expansion bay. Three motherboards fit into Slots 3 through 5; the fourth can be added in Slot 6 if a T-Gen 50 is not fitted.

Figure 2-8. Expansion Bay Motherboard Placement

Continued on next page

Step 5. Installing Modules into Expansion Bays, *Continued*

Installing 4" X 5" Cards

The power distribution interface (PDI) is mounted to the back of the expansion bay. The PDI contains slots for up to eight 4"x 5" slave cards. Since the PDI carries power and data across the entire bay, it solves most interconnection issues, especially between 4"x 5" cards.

Use the following instructions and the figure below to mount 4"x 5" slave cards to the expansion cabinet.

1. Screw two standoffs and washers to the appropriate holes in the back of the cabinet. These holes must line up with the screw holes in the 4"x 5" card. See Figure 2-9.
2. Plug the 4"x 5" card into the appropriate blind mating connector. Seat the card firmly onto the PDI when installing to ensure complete insertion of the power connector into the PDI.
3. Secure the other end of the card to the standoffs with two 6/32" x 1/4" torx screws and washers.

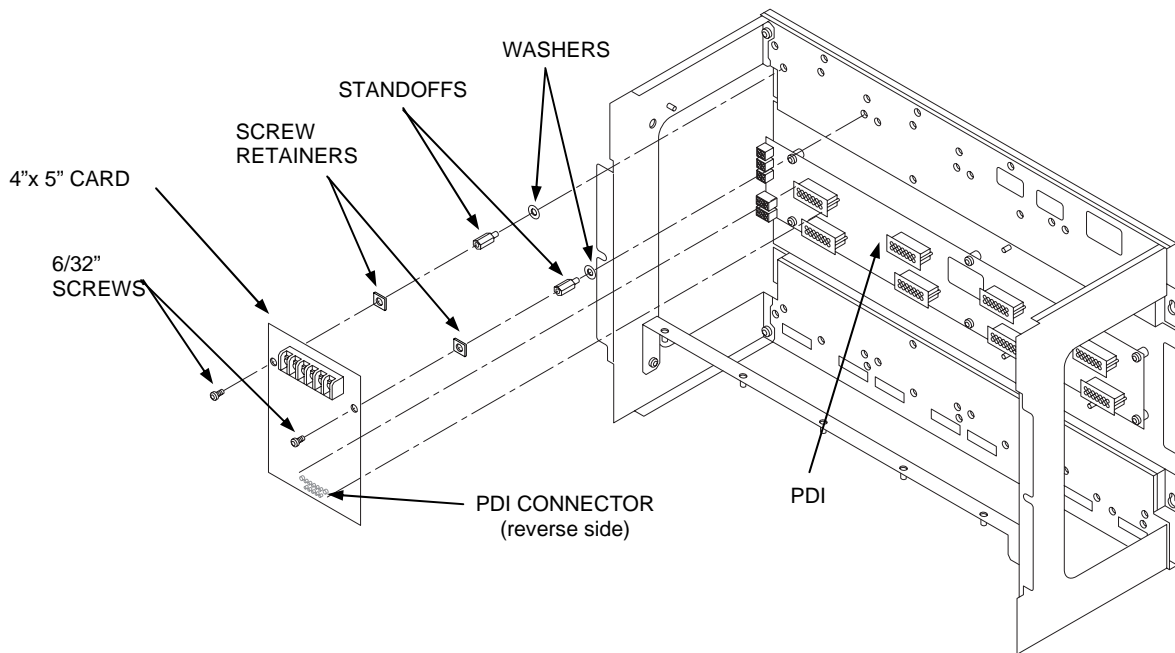


Figure 2-9. Slave Card/PDI Connection

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Step 5. Installing Modules into Expansion Bays, *Continued*

Installing Motherboards

Use the following procedure when installing motherboards in an expansion bay. Start with the third slot from the left and fill to the right. The mounting items are available as kit 4100-KT0468.

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 below.

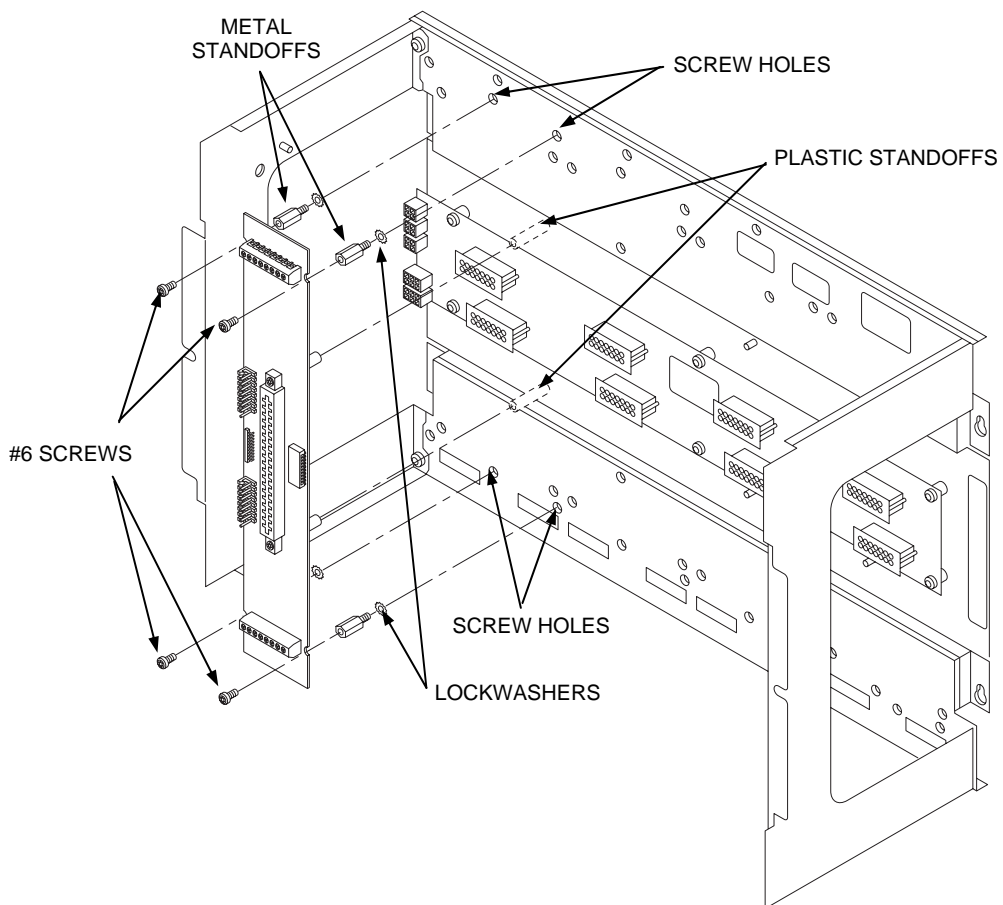


Figure 2-10. Installing the Motherboard in a 4100U-S1 Expansion Bay

This figure shows the motherboard being fitted to slot 2. In 4100U-S1, slots 1 and 2 can't be used for motherboards.

Step 6. Installing LED/Switch Modules into Expansion Bays

Overview

The LED/switch user interface consists of a variety of modules, mounted to the front of an expansion bay, which are configured via the 4100U Programmer. Each display module contains between 8 and 24 switches and LEDs, each one separately configurable.

User interface functionality is driven by the 64/64 LED/Switch Controller Card, which mounts behind two of the display modules (in positions 1 and 2). The types of modules typically used in 4100U-S1 are as follows:

- 4100-1288 LED/Switch Controller Card with mounting plate.
- 4100-1289 LED/Switch Controller Card (no mounting plate; it mounts on the expansion space of 4100-1288).
- 4100-1282 Display Card. With one red and one yellow LED per switch, this is used for Alarm Zone Facility displays.
- 4100-1294 Slide-In Label Kit - one per 4100U-S1 cabinet
- ME0456 Fan Control Module

Each 4100-1288 or 4100-1289 LED/switch controller supports up to 64 LED indicators and 64 switch controls. Using the 4100-1282 Display Card for zone displays, this corresponds to 32 zones per controller.

Other display cards are available for special display functions. Special configuration is required to use other display cards. Contact your Simplex dealer for guidance.

Continued on next page

Step 6. Installing LED/Switch Modules into Expansion Bays, *Continued*

The LED/Switch User Interface

Below is an illustration of a LED/switch bay from the user's perspective.

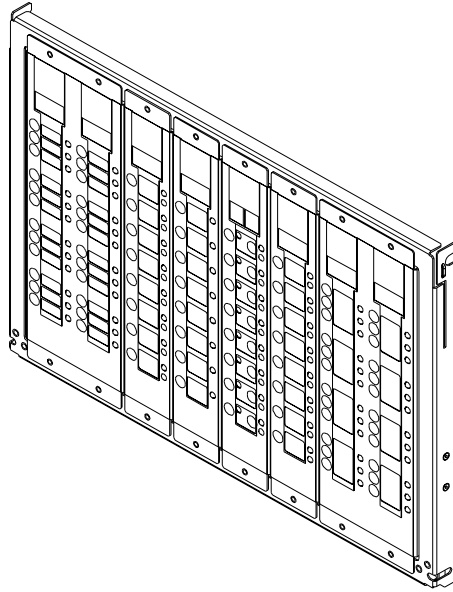


Figure 2-11. LED/Switch Modules

LED/Switch Controller Card

The LED/switch controller card is a 4100 slave that mounts behind two LED/switch modules. Each LED/switch controller handles up to 64 switches and 64 LEDs on the modules and communicates their status to the 4100U CPU. This is sufficient for 32 zones.

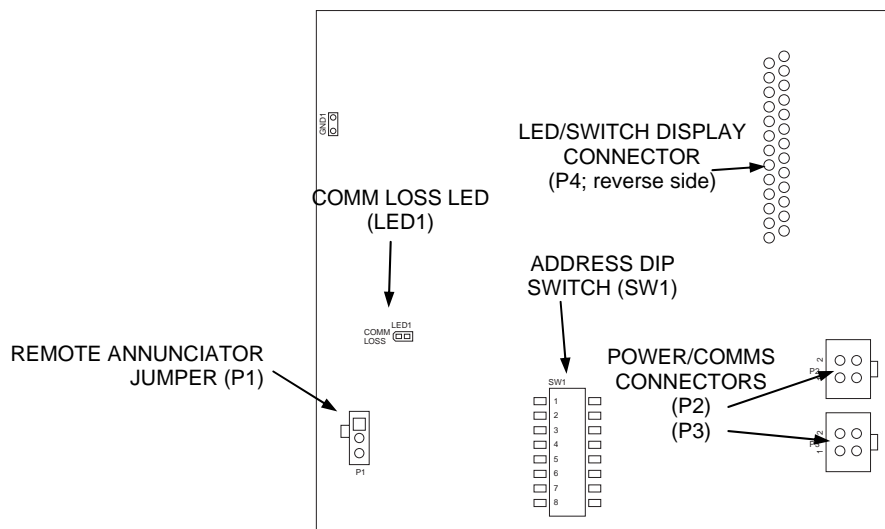


Figure 2-12. LED/Switch Controller

The standard configuration of 4100U-S1 uses 4100-1282 cards for zone displays, with programming so that pressing any switch toggles the Isolate state of the corresponding zone.

Continued on next page

Step 6. Installing LED/Switch Modules into Expansion Bays, *Continued*

LED/Switch Controller Card, *(continued)*

If more than 32 zones are required, a second controller (4100-1289) will be required.

Note that an ME0456 fan control module counts as 8 zones when adding up the controller requirements.

LED 1. This LED illuminates if communication loss between the controller and the CPU occurs. It is independent of jumper P1 (which configures different communication loss features).

Configuring the LED/Switch Controller Card

The 64/64 LED/switch controller requires physical configuration, but the LED/Switch modules do not. Switch controller configuration consists of setting jumper P1 and setting the card address. In the 4100U-S1, the first display controller is address 3 and the second has address 4. Card addressing is covered in Appendix A.

Mounting LED/Switch Modules to the Expansion Bay

Refer to the figure below to mount the display cards to the front of the expansion bay.

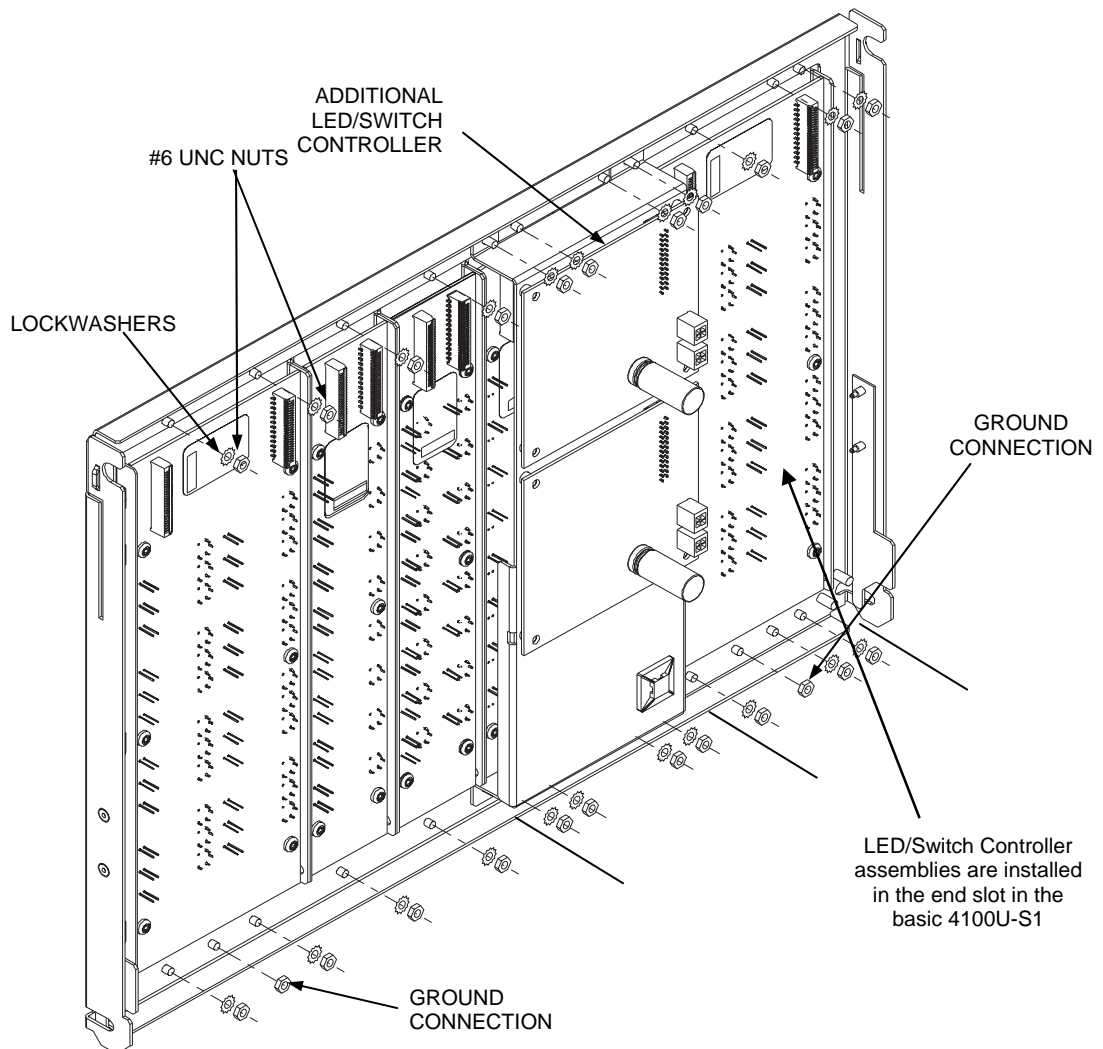


Figure 2-13. LED/Switch Card Mounting

Continued on next page

Step 6. Installing LED/Switch Modules into Expansion Bays, *Continued*

Mounting the Additional LED/Switch Controller Card

Refer to the figures and instructions below to mount the LED/switch controller card assembly to the back of one of the LED/switch cards.

1. Use four 322-123 Nuts and four 268-009 bay Washers to secure the 637-141 Bracket to the inside front of the expansion bay. Note that there is only one location where the bracket can be mounted, as shown in Figure 2-13.
2. Attach the header connector on the back side of the controller (P4) to the P1 (In) connector on the back side of the first LED/switch modules.
3. Secure the controller card to the board using four 6/32" x 1/4" Torx screws, as shown in Figure 2-14.

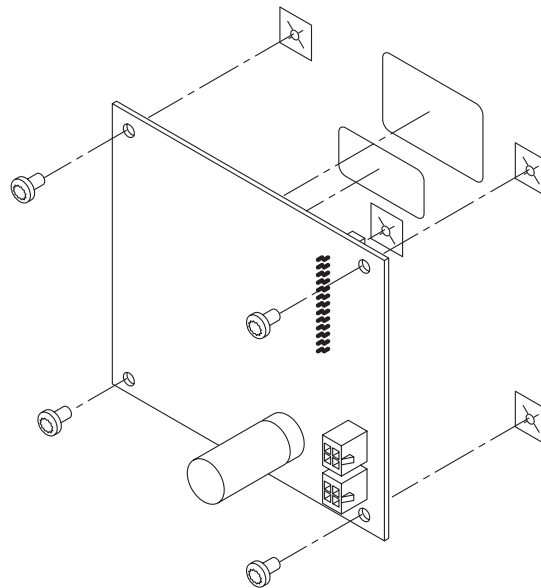


Figure 2-14. Controller Card Mounting

The second Controller Card (4100-1289) is mounted in the spare space on the same bracket.

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Step 6. Installing LED/Switch Modules into Expansion Bays, *Continued*

LED/Switch Modules

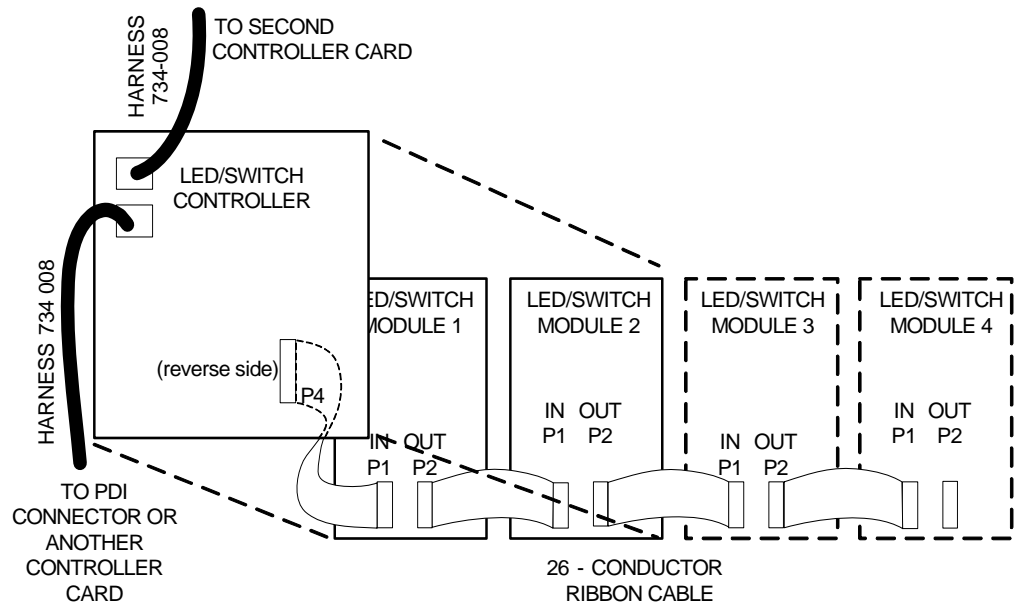
All types of modules are mounted to the front of a bay, and are connected to each other via a ribbon cable. Each module operates by the same rules: when a button is pressed, the controller card sends the CPU the information, and the action programmed for that button occurs.

Wiring Instructions

To interconnect display cards and connect the controller card to a power source:

1. Use harness 734-008 to connect P2 on the controller card to one of the 4-pin connectors on the PDI.
2. If there are two controller cards, use harness 734-036 to connect P3 on the first controller card to P2 on the second controller card. The order does not matter.

Connect P4 of the controller to P1 of the left-most display module, with the ribbon cable provided (the first two display modules are fitted in the factory). Connect P2 of this display module to P1 of the next module, up to a maximum of four modules. Repeat for the second controller, if fitted.



**Figure 2-15. LED/Switch Controller Wiring
(approximately as viewed on the rear of the open bay door)**

4100U Fan Control Module

Overview

The ME0456 is a 4100U style Switch/LED display module designed specifically for fan control. It complies with the requirements of AS 1668.1:1998. It has rotary switches and LEDs for 4 sets of fans. In order to accommodate the required rotary switches, the front plate is joggled forward so that it protrudes through the trim.

Labelling

The Fan Control switch positions of ON, AUTO and OFF, are permanently marked on the faceplate label, as required by AS 1668. The name area accommodates 3 rows of 6 letters at 5mm.

The labelling of the LEDs, ON, FLT, and OFF is marked on the removable fan name label card, LB0605, supplied with the module.

The card may be reversed and different LED labelling used, e.g. for damper controls.

A template version of this label is available as LB0605. This template allows entry of the fan name on a PC for local printing. LED names may also be revised.

Mounting & Connection

The Fan Control module mounts to the frame of the 4100U-S1 Expansion bay door from the front, in a similar fashion to display modules. Mounting nuts and washers are provided.

Connection from “Out” of the adjacent Switch/LED module (or 64/64 Controller if it is the first module on that Controller) to “In” on the module is by the flat flexible cable provided (166-226).

Programming

The module is programmed as a standard 8 Switch/16 LED module. Up to four modules can be driven by one 64/64 Switch/LED Controller.

Each fan control with one rotary switch uses two of the 8 “switches”, and 3 of the 16 LEDs of an 8 Switch/16 LED module as per Table 2-1. The other 4 LEDs are not fitted so must not be programmed, since it serves no purpose.

Table 2-1. Switch/LED Format

Fan Control	Switches	LEDs		
		ON	FLT	OFF
1	SW1, SW2	LD1	LD2	LD3
2	SW3, SW4	LD5	LD6	LD7
3	SW5, SW6	LD9	LD10	LD11
4	SW7, SW8	LD13	LD14	LD15

The switch functions for Fan Control 1 are shown in Table 2-2. The state of having both switches closed is not physically achievable.

Table 2-2. Switch Status

SW1	SW2	Fan Control Status
Closed (up)	Open (centre)	On
Open (centre)	Closed (up)	Off
Open (centre)	Open (centre)	Auto

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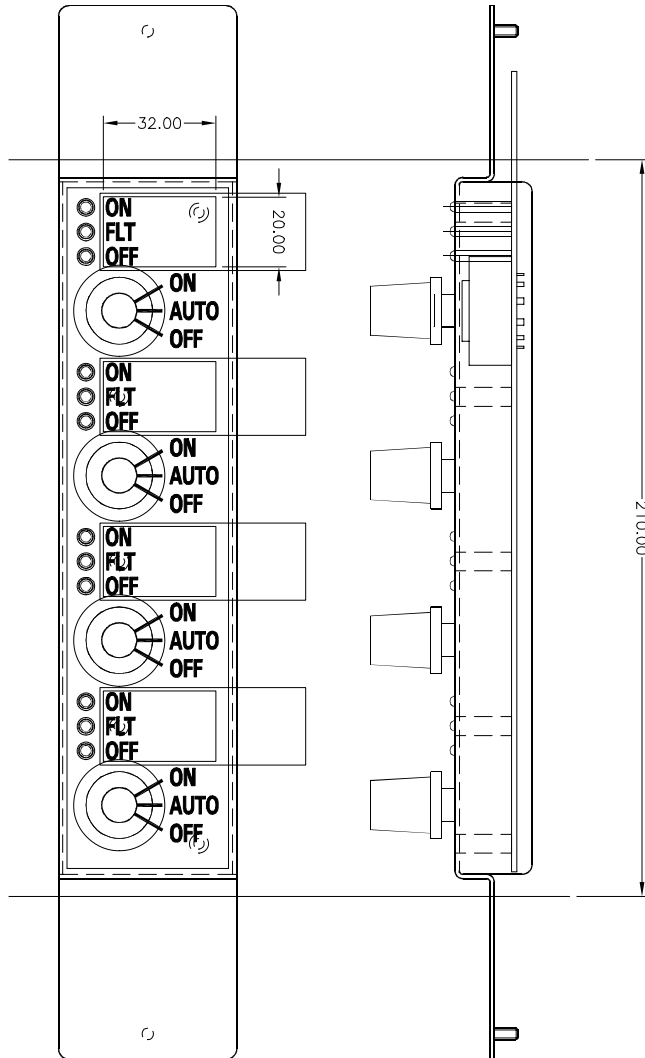


Figure 2-16. ME0456 Fan Control Module

Chapter 3

Networking

Introduction

A basic 4100U-S1 system becomes a network node when a Network Interface Card (NIC) or other compatible network card is installed and connected to another network node. How network cards connect to each other depends on the type of media cards being used.

In this Chapter

Refer to the page number listed in this table for information on a specific topic.

Topic	See Page #
Network Configuration	3-2
Introduction to the 4100 Network Interface Card (NIC)	3-4
Step 1. Configuring Network Cards	3-7
Step 2. Mounting Media Cards to the NIC	3-9
Step 3. Mounting Network Cards in the 4100U-S1	3-9
Step 4. Wiring Network Cards	3-10

Network Configuration

Overview

Multiple 4100U-S1 panels can be connected together into a network system by using network interface cards (NICs). When a NIC is installed into a 4100U-S1, it is used to connect to other network nodes. Nodes may consist of other 4100U-S1 or larger 4100U panels, or they may be other types of node such as Graphical Command Centers (GCCs), or Visual Command Centers (VCCs). A node is a self-sufficient CPU that controls appliances and devices, and which also has the capability of controlling and communicating with other nodes.

The network configuration supports two common architectures or wiring configurations: **ring** or **star**. A networked system can also use a combination of the two.

Ring and Star Configurations

The ring configuration consists of a number of nodes connected in a closed loop. The star configuration consists of several nodes connected directly to one common node. Physical bridge cards are used for the star configuration. Physical bridges reduce the amount of wire that would otherwise be needed to connect all nodes in a loop, and therefore cut down on system response time. However, the ring configuration is more secure against cabling faults. A combination of the two styles is illustrated in Figure 3-1.

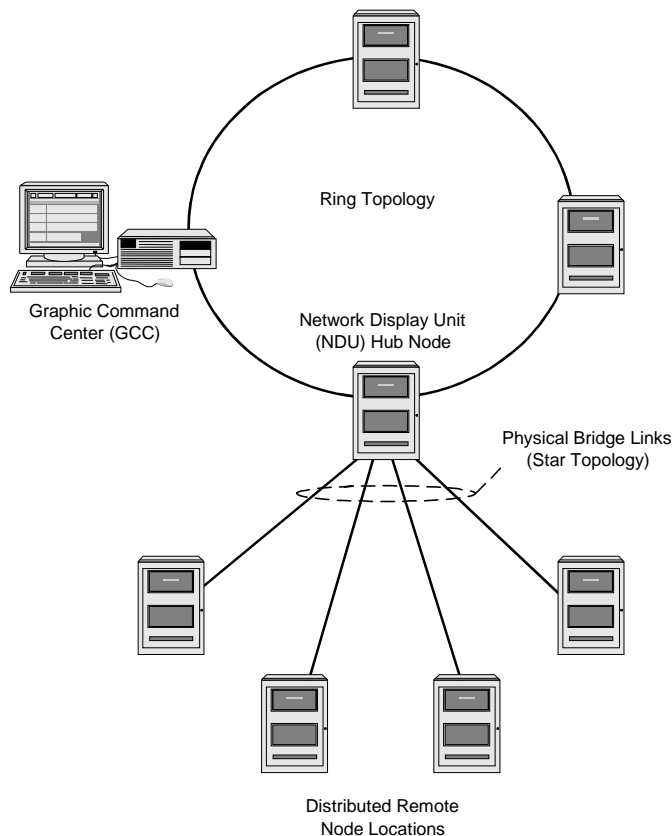


Figure 3-1. Ring/Star Configuration Example

Continued on next page

Network Configuration, *Continued*

Connecting Loops

Network rings or loops can be joined via physical bridge cards. There may be no more than two network loops connected in tandem. For every two loops that are interconnected (using one physical bridge), there can be a maximum of three other physical bridges used in a star configuration. See Figure 3-2.

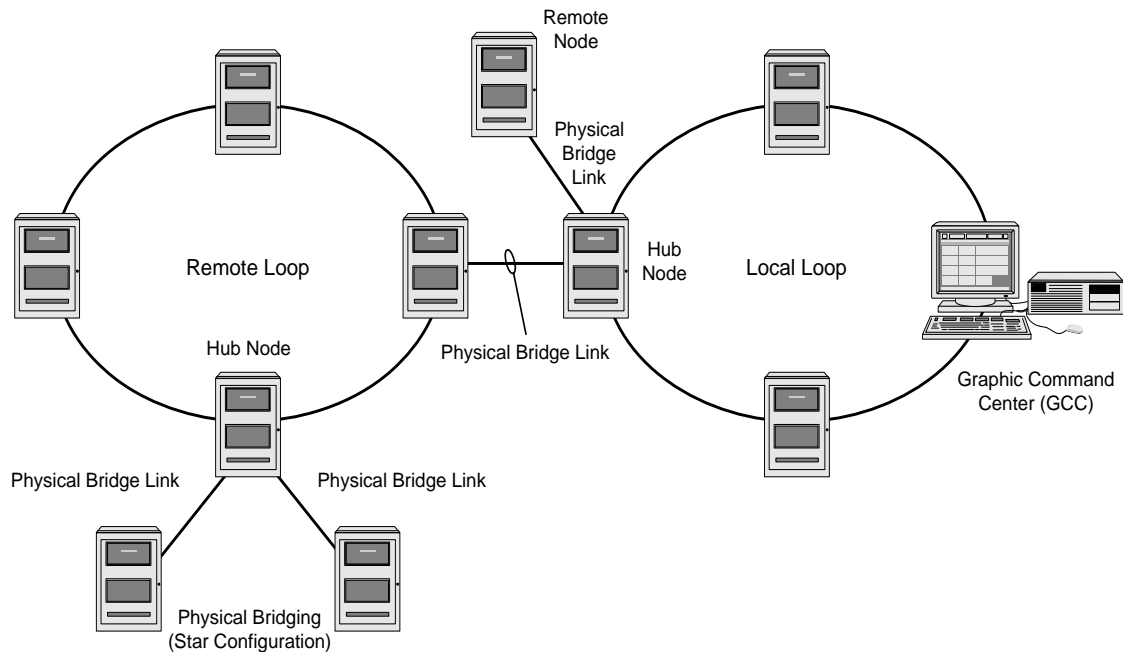


Figure 3-2. Interconnected Loop Configuration

System Design

To be used as a network node, a 4100U-S1 panel must contain the following:

- CPU
- System Power Supply
- 4100-6014 Network Interface Card plus two Media Cards

Getting Started

Overview

This chapter describes how to turn a basic 4100U-S1 into a network node. This process consists of the following:

Step 1. Mounting media cards to the network interface card (NIC)

Step 2. Mounting the network cards in the panel

Step 3. Wiring between panels

Each step is described in this chapter. Before beginning the installation, review the next few pages for a detailed description of network cards and the media cards that mount onto them.

Introduction to the 4100 Network Interface Card (NIC)

Overview

The Network Interface Card (NIC) is a slave card that uses the standard 4100 serial bus to communicate with the CPU. The NIC connects 4100U-S1 and other panels in a network, providing communication between each panel via fiber or shielded twisted pair cable.

The NIC is designed to be connected in a loop or ring arrangement, so that a single cable fault does not cause the entire system to fail. The ring arrangement provides the most secure and fault-tolerant wiring possible.

Two types of media boards can be used with the NIC card.

- The Fiber-Optic Media Card uses multimode optical fibres to connect network nodes. This can be used for electrically noisy environments or for connecting externally to other buildings.
- The Wired Media Card is used in all other types of applications. This uses ordinary screened paired cable to connect network nodes.

Up to two media boards can be plugged onto each NIC. The same NIC can use a combination of two types of media boards (for example, a NIC may have a wired media card connected to port 1 and a fiber-optic media card connected to port 2).

Continued on next page

Introduction to the 4100 Network Interface Card (NIC), *Continued*

Network Module Illustrations

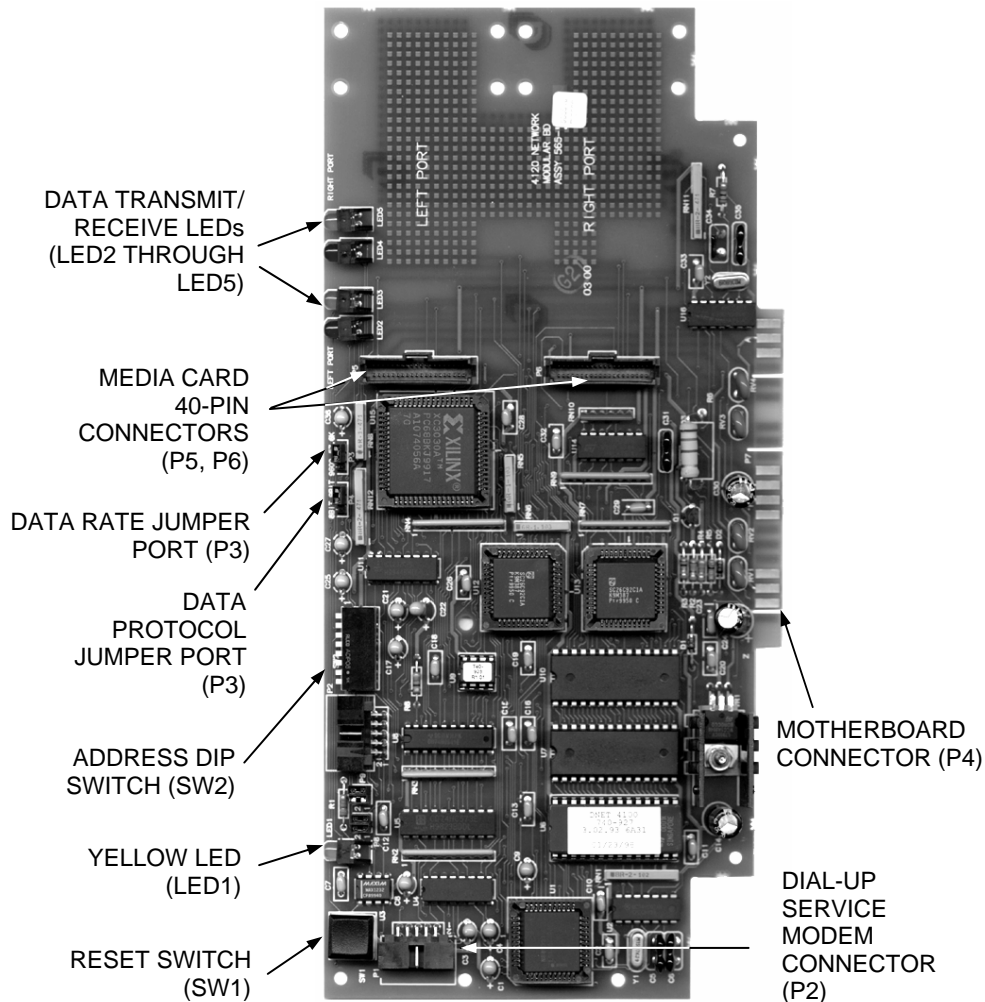


Figure 3-3. 4100-6014 Network Interface Card

NIC Card LED Indications

The 4100-6014 NIC has the following LEDs:

LED1 (yellow). Illuminates when

- The host CPU requests it to illuminate
- A transmission fails
- It is off-line with the host CPU
- It needs to be configured

LED2 (red). Illuminates when a data '0' is received at the right port.

LED3 (green). Illuminates when a data '0' is transmitted at the right port.

LED4 (red). Illuminates when a data '0' is received at the left port.

LED5 (green). Illuminates when a data '0' is transmitted at the left port.

Continued on next page

Introduction to the 4100 Network Interface Card (NIC), *Continued*

NIC Media Cards

There are two approved modules that can be plugged into the 4100-6014 NIC:

- 4100-6057 Fiber-Optic Media Card (565-261)
- 4100-6056 Wired Media Card (565-413)

Each module is shown below.

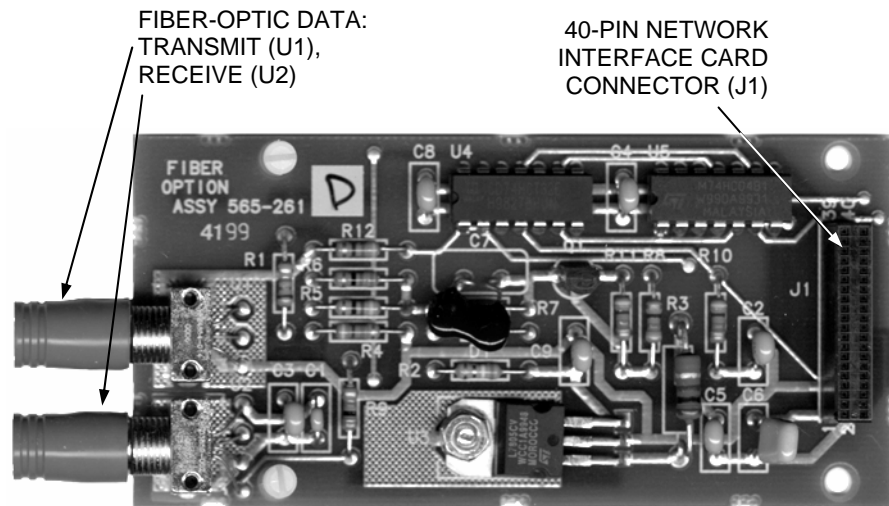


Figure 3-4. The 4100-6057 Fiber-Optic Media Card

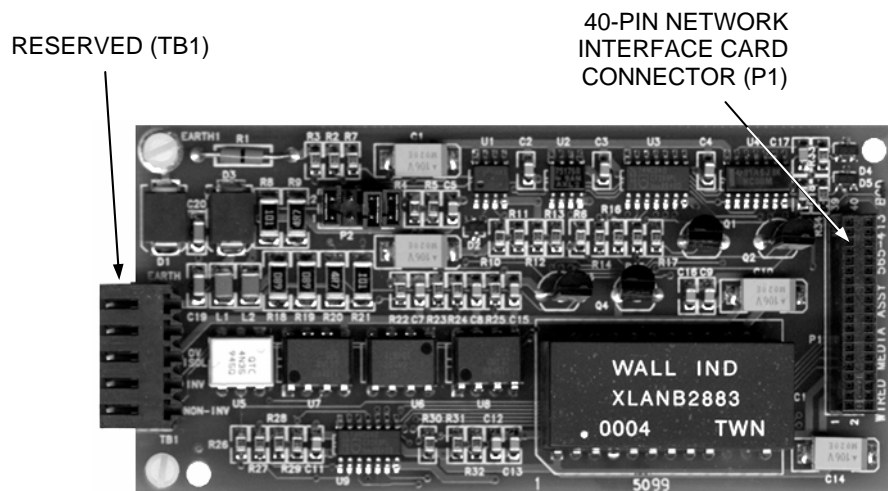


Figure 3-5. The 4100-6056 Wired Media Card

Continued on next page

Introduction to the 4100 Network Interface Card (NIC), *Continued*

Requirements and Limitations

Table 3-1. 4100 NIC & Media Cards - Electrical and Environmental Specifications

Electrical Specifications	
Network Interface Card	Startup, no media cards: 8 VDC @ 110 mA Nominal, no media cards: 20 to 32 VDC @ 0 mA
Fiber Media Card	Using 24 V power supply: 20 VDC @ 140 mA max. Using 5 V power supply (GCC/NPU): 5 VDC @ 130 mA max.
Wired Media Card	4.75 to 5.25 VDC @ 170 mA max.
Environmental Specifications (All Modules)	
Operating Temperature	32° to 120° F (0° to 50° C)
Humidity	10% to 93% relative humidity at 32°C

Step 1. Configuring Network Cards

Overview

The NIC card, along with each media card, all have jumpers that must be set as shown below.

CPU Motherboard Jumper Settings

NIC-compatible jumper settings on CPU motherboards depend on which motherboard is used.

Motherboard 566-227 (normally used in 4100U-S1):

P10: Port 1 settings.

P11: Port 2 settings.

- P10/P11 position 1 – 2: Network card (NIC) attached to CPU motherboard (default).
- P10/P11 position 2 – 3: RS-232/2120 card attached to CPU motherboard.

Motherboard 565-274:

- JW1 and JW2 must be installed.
- Jumper plugs P5-P8 must not be installed.

NIC Card Address Setting

Use **SW2** to set the NIC card address. Refer to Appendix A for the address table.

Continued on next page

Step 1. Configuring Network Cards, *Continued*

NIC Card Jumper Settings

There are two jumper settings on the NIC card: P3 and P4.

P3: Determines the NIC data transmission rate, 57.6 kbits/second or 9600 bits/second.

- Position 1 – 2 (the right two pins) *or* no pins jumpered: 57.6 kbits/second (default for 4100U-S1).
- Position 2 – 3 (the left two pins): 9600 bits/second.

P4: Determines the data protocol, 8-bit or 9-bit, that the NIC card is using.

- Position 1 – 2 (the right two pins) *or* no pins jumpered: 9-bit (default for 4100U-S1).
- Position 2 – 3 (the left two pins): 8-bit.

All settings are labelled on the card.

Wired Media Card Jumper Settings

P2: Tells the system which wire type is to be used.

- Positions 1 – 2, 5 – 6, and 7 – 8: 0.8mm shielded, twisted pair wiring.
- Remove all jumpers to specify 0.2mm unshielded twisted pair telephone cable wiring.

IMPORTANT: When using the wired media card, the Earth fault detection is performed on the left port only. Remove R1 (1 Ohm resistor) from the wired media card on the right port.

Step 2. Mounting Media Cards to the NIC

Overview

The 4100-6014 Network Interface Card (NIC) uses media cards to connect to other NICs. This section describes how the media cards are mounted onto NICs.

Media Card Mounting

NICs connect to each other via the two types of media cards. The types of media cards in the right and left ports are determined by the type of wiring that is being used between cards.

Connect P1 on the wired media card, *or* J1 on the fiber media cards, to P5 (the left port) on the NIC.

To connect a second media card to the same NIC, connect it as described above, but use P6 (the right port) on the NIC. Note that any two types of media cards can be connected to the same NIC.

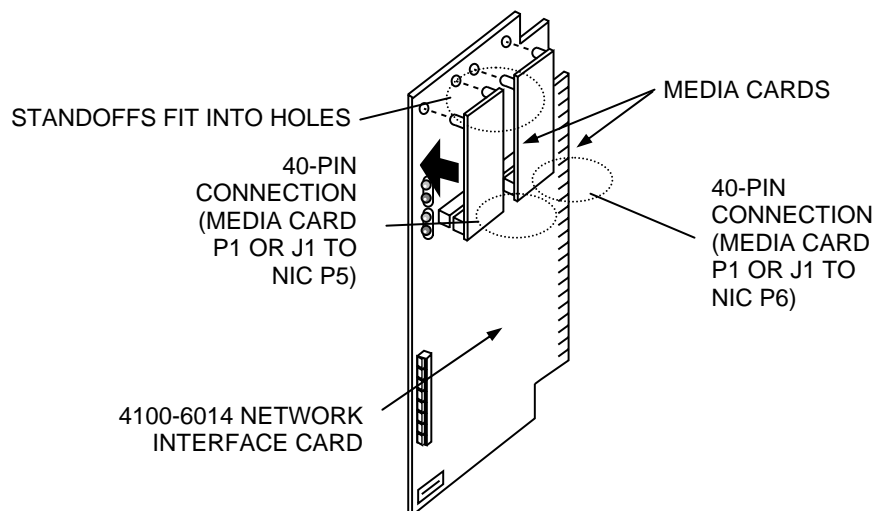


Figure 3-6. Media Card Mounting

Step 3. Mounting Network Cards in the 4100U-S1

The 4100 NIC daughter card inserts into motherboards as follows:

- If the 566-227 CPU Motherboard (default for 4100U-S1) or 565-275 CPU Motherboard is used, the NIC daughter card is inserted into connector J2.
 - If the 565-274 CPU Motherboard is being used, the NIC daughter card is inserted into connector J1.
-

Step 4. Wiring Network Cards

Overview

The nodes in the network now have to be wired together, so that the NIC in one host panel connects to the NIC in the next panel.

Wiring Guidelines

Refer to the following guidelines field wiring

General

- Network nodes must be wired from right port to left port, regardless of the media type selected.
- Best protection is achieved by wiring the nodes in a loop fashion. A single fault (except an Earth fault) will cause the network to reconfigure for degraded operation. A second fault (except an Earth fault) will result in the network dividing into two separate networks.
- It is permissible to use mixed media in a network. For example, some spans may be wired media while others are optical fiber.
- Each NIC has a jumper for selecting between network data rates of 57.6 kbps and 9.6 kbps. All cards in the network must be set for the same rate. When physical bridging is used, the data rate must be set to 9.6kbps.
- Each NIC has a jumper for selecting between 8- and 9-bit network protocols. All cards in the network must be set for the same network protocol. When physical bridging is used, the protocol must be set to 9-bit.

Wired Media

- Earth fault detection is performed on the left port only. When a network Earth fault occurs, the trouble is reported on the node whose left port is connected to the earthed section.
- All 0.8mm² wiring used Wired Media Cards must be shielded twisted-pair. All 0.2mm² (telephone cable) used must be twisted pair. When shielded cable is used, the shield must be terminated to chassis Earth on the left port only.
- All network wiring except the shield is supervised and power limited.
- When wiring leaves the building, 2081-9044 Overvoltage Protectors should be connected at the entry point. One overvoltage protector is installed where wiring leaves the building; another is installed where wiring enters the next building.

Fiberoptic

- All fibre cables must be multimode, graded index type. ST style connectors must be used. No physical strain should be put on the cables. There must be no cable bends of less than a 50mm radius.
- Two methods are available for joining fibre cable. Splices provide a permanent, very low loss, fibre-to-fibre connection. Couplers provide temporary connection between two ST style connectors with a loss of 1.2dB. Both methods are permitted on a fibre network.
- Maximum line lengths for 50/125 and 62.5/125 cable are shown in Table 3-2.

Step 4. Wiring Network Cards, *Continued*

Wiring Distances

Maximum wiring distances are shown in the table below.

Table 3-2. Wiring Distances

Media Type	Size	Data Rate	Max Distance
Wired	0.2 mm ² unscreened twisted pair	57.6 kbps	2,100m
		9.6 kbps	3,600m
	0.8 mm ² screened twisted pair	57.6 kbps	3,000m
		9.6 kbps	5,200m
Optical Fiber	50/125 um (4dB/km loss)	57.6 or 9.6 kbps	3,000m
	50/125 um (3dB/km loss)		4,500m
	62.5/125 um (4dB/km loss)	57.6 or 9.6 kbps	4,000m
	62.5/125 um (3.75dB/km loss)		4,600m

Notes:

- 0.8 mm² fire-rated screened twisted pair cable must not have more than 190nF/km capacitance or 21Ω/km resistance.
- 0.2 mm² unshielded twisted-pair telephone cable must not have more than 72nF/km capacitance or 84Ω/km resistance.
- Between any two connected network nodes, L+ of one node connects to R+ of the other, and L- connects to R-.

Continued on next page

Step 4. Wiring Network Cards, *Continued*

Fiber-Optic Wiring

Connectors U1 (transmitter) and U2 (receiver) on the 4100-6057 Fiber-Optic Media Card are used to connect 4100-6014 NICs across parts of a network.

Note: ST connectors with long strain relief boots must be used with the fiber optic cable.

Fiber Optic Connection Types

Dual Fiber Optic Cable Connections. The standard fiber optic connection between network nodes uses two fiberoptic cables, one for transmit and the other for receive. This connection allows for optimum communications distance.

The available communications distance is determined by the properties of the specific fiber cable used. Distances can be determined using the information and examples shown below in Table 3-3.

Between any two connected network nodes, U1 (transmit) on the Fiber Media card of one node is connected to U2 (receive) of the Fiber Media card of the other node, i.e., the fibers “cross over” between nodes.

Single Fiber Optic Cable Connections. For applications where a single fiber cable is available, or where use of a single cable is desired, using a model 4190-9010 Bi-Directional Coupler at each node combines the separate transmit and receive signals into a single path (refer to the requirements list).

This connection allows use of a single fiber cable, but it does reduce communications distance as indicated in the information and examples shown below in Table 3-4.

At each node, U1 (transmit) of the Fiber Media card must be connected to the transmit port of the coupler, and U2 (receive) to the receive port of the coupler.

Continued on next page

Step 4. Wiring Network Cards, *Continued*

4190-9010 Coupler Requirements

The 4190-9010 Coupler is used with the 4100-6057 Fiber Optic Media Board, revision "C" or higher. Two 4190-9010 Bi-Directional Couplers are required per connection, one at each node.

The 4190-9010 is equipped with type ST connectors. To make type ST to type ST connections, an ST to ST coupler, by others, is required. ST to ST Couplers are available from:

Black Box, part # FO200
 Fiber Instrument Sales, part # F1-8101
 Newark Electronics, part # 95F2097
 (or equivalent)

Table 3-3. Dual Fiber Optic Cable Communications Distance Examples

Fiber Type ^{1*}	MIFL ²	Power Margin	Distance ³	Budget ³
50/125 numerical aperture = 0.2	4 dB/km	4 dB	3 km	17 dB
	3 dB/km	3 dB	4.6 km	
62.5/125 numerical aperture = 0.275	4 dB/km	4 dB	4.0 km	21.4 dB
	3.75 dB/km	3 dB	4.6 km	

*See notes at bottom of page.

Table 3-4. Single Fiber Optic Cable Communications Distance Examples Using 4190-9010 Bi-Directional Couplers

Fiber Type ¹	MIFL ²	Power Margin	Distance ³	Budget ³	4190-9010 Coupler Loss	ST to ST Coupler Loss
50/125 numerical aperture = 0.2	3 dB/km	2 dB	2.33 km	21.4 dB	9.4 dB	3 dB
62.5/125 numerical aperture = 0.275	3.2 dB/km		2.5 km			2 dB

Notes for Tables Above:

- Cable specifications are for 50 or 62.5 um core with 125 um cladding, multi-mode graded index fiber. Wavelength = 850 nm.
- MIFL = Maximum Individual Fiber Loss. Numbers shown are for example reference only, refer to specific cable for exact specification.
- Maximum cable length is determined by distance listed or by reaching budget value, whichever is shorter. Maximum distances listed for dual fiber cable are shorter than would be calculated. Budget using 4190-9010 Bi-Directional Coupler is the same with either size cable because the coupler input cables are 62.5/125 um fiber allowing launch power to be the same.

Continued on next page

Step 4. Wiring Network Cards, *Continued*

4190-9010 Coupler Requirements (continued)

The illustration below shows coupler wiring.

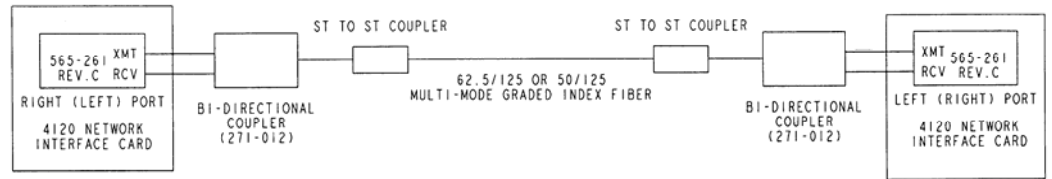


Figure 3-7. Coupler Wiring

Wiring with the Wired Media Card

Refer to the guidelines and figures in this topic to use wired media cards.

IMPORTANT: TB1 on the wired media card must not be used when it is connected to the 4100-6014 NIC.

- When the 4100-6056 (565-413) Interface Card is used with the 4100-6014 Network Card, TB1 on the Interface Card **cannot** be used. Network wiring must be connected to the motherboard as shown.
- The shield should only be connected at one end of the line. The shield is connected to the left port.
- Each cable requires two ferrite beads, one at each end. Refer to Figure 5-1 for bead wiring. Beads can be ordered as 4100-5129 (set of three).
- When wiring leaves the building, 2081-9044 Overvoltage Protectors are required. One overvoltage protector is installed where wiring leaves the building; another is installed where wiring enters the next building.

Table 3-5. 566-227 CPU Motherboard Wired Media Connections

CPU Motherboard Port for Media Card Connected to P5	Wired Media Card Connection (Left Port)
TB1-4	0 V
TB1-5	Earth ground
TB1-6	INV (-)
TB1-7	None
TB1-8	NONINV (+)
CPU Motherboard Port for Media Card Connected to P6	Wired Media Card Connection (Right Port)
TB3-1	NONINV (+)
TB3-2	Reserved
TB3-3	INV (-)
TB3-4	Earth ground
TB3-5	0 V

Continued on next page

Step 4. Wiring Network Cards, *Continued*

Wiring with the Wired Media Card (continued)

Figure 3-8, below, shows how CPU motherboards in two 4100U-S1s with wired media network cards connect to each other. The right port terminals (TB3) on one 4100U-S1 are connected to the left port terminals (TB1) of the other 4100U-S1.

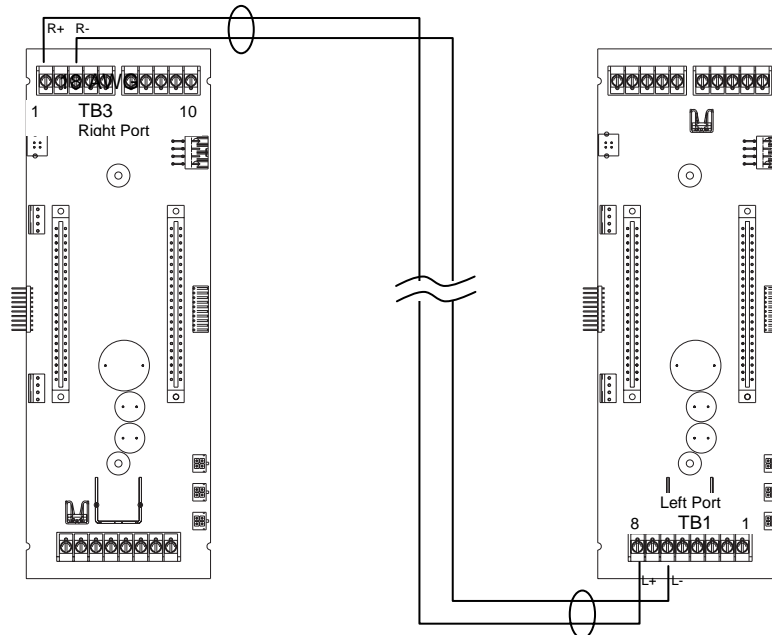


Figure 3-8. Wired Media Interconnection between CPU Motherboards in different panels

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Step 4. Wiring Network Cards, *Continued*

Loop Wiring, mixed Fiber and Cable

Figure 3-9 shows an example of loop network cabling using a mixture of fibreoptical cable and twisted pair. Note that the left port of any network card is connected to the right port of the next network card regardless of whether the connection is fiber or copper.

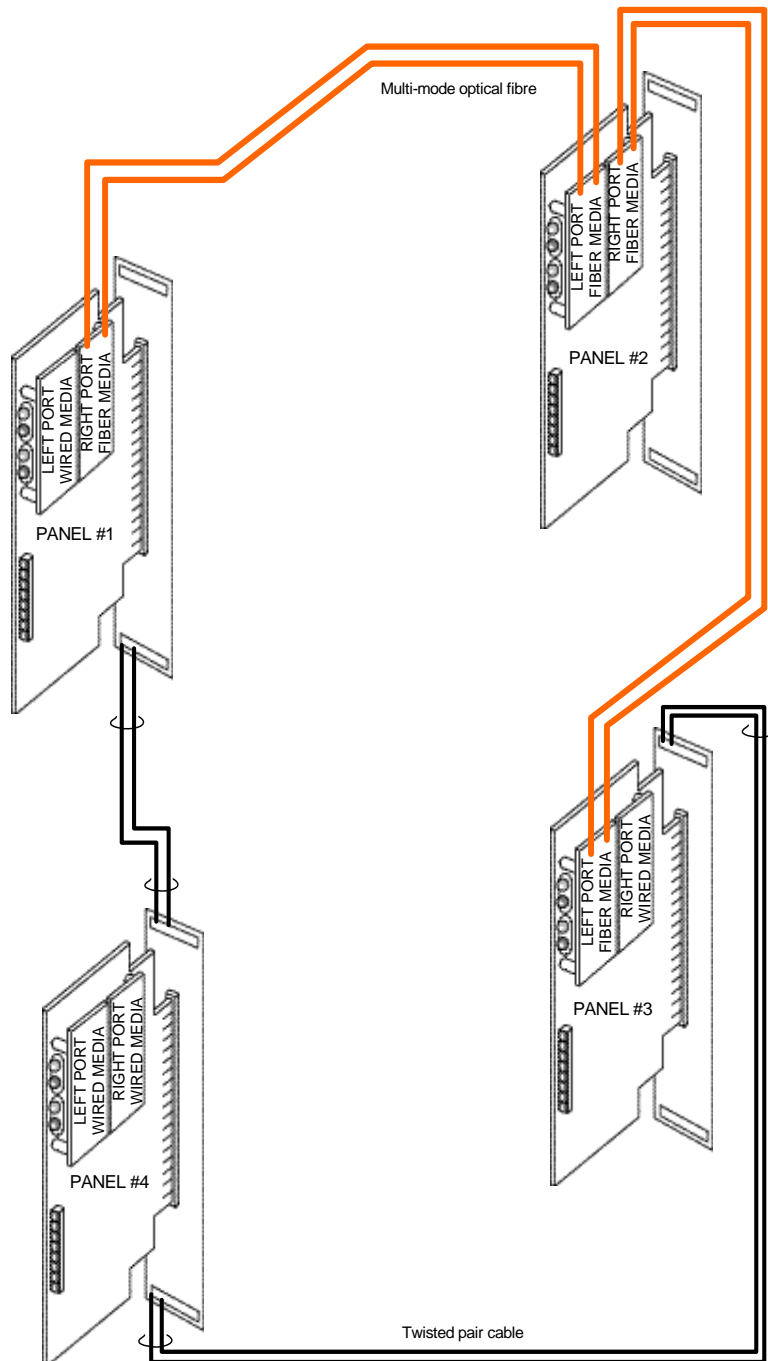


Figure 3-9. Example of Ring/Loop Network Wiring

Chapter 4

The System Power Supply & Alarm Relay Card

Introduction

The system power supply (SPS) is described in Chapter 2. A picture of it is shown in Figure 2-4.

This chapter has the current and voltage ratings of the SPS and describes how it is installed and configured by the factory. It also describes the Alarm Relay Card that mounts onto the SPS to provide three extra relays.

Field wiring of the SPS is covered in Section 5.

In this Chapter

Refer to the page number listed in this table for information on a specific topic.

Topic	See Page #
SPS Specifications	4-2
SPS Adjustments	4-4
SPS LED Indications	4-5
Troubleshooting an SPS	4-6
The Alarm Relay Card	4-7
Brigade Interfaces	4-9

SPS Specifications

Input/Output/Battery Specifications

The following table summarizes the specifications for the SPS.

Table 4-1. SPS Input and Output Specifications

AC Input Specifications	
SPS in Basic 4100U-S1 (4100-9848AU)	240 VAC + 6% -10% @ 50 Hz 2 A Maximum
DC Output Specifications	
Voltage	Nominal 28VDC Minimum: 19.5 VDC Maximum: 32 VDC Ripple: 2 VDC p-p @ full load (9A)
Total Current (max)	9A alarm load. Includes: NACs; +24V Card; +24V Aux; SPS card including on-board IDNet. 5A non-alarm load. Includes the above allowances, and allows for battery charging at high rate.
24V Card 24V Aux	2A max. See note. 2A max
Each NAC (total A+B)	3A max alarm load 2A max non-alarm load (when used as AUX 24V power).
SPS IDNet Output	30 V or 35 V (see note below)
Battery Charger Specifications	
Input Voltage Range	21-33 VDC
Output Float Voltage	27.3 VDC ±200 mV @ 20°C, temperature compensated at approximately -36mV/°C (0° C to 50° C)
Supervision Voltages (nominal at 20°C)	Charger High 28.4Vdc Charger Low 26.2Vdc Battery Low 24.3Vdc Battery Depleted 19.4Vdc
Output Current Limit	1.4 A (For 6.2 – 18 Ah battery) 3.3 A (Default; for 18-110 Ah battery)

Notes:

- AC power must be provided to the 4100U-S1 from a dedicated AC branch circuit. The AC input is supervised wiring.
- The AC branch is terminated in the cabinet in the general power output (GPO) mounted in the expansion bay. The SPS plugs into the GPO via a 3-pin plug and mains lead.
- A mains fail fault is generated when the DC voltage drops below 20.3V (nominally at mains voltage 204VAC).

Continued on next page

SPS Specifications, *Continued*

- The bulk supply (rated at 9A max) which feeds 24V Sig, 24V Card, 24V Aux also supplies the SPS Card including the on board IDNet, and the battery charger. The charger is disabled during alarms so as to make the 9A available on the other busses. (See the following table for the SPS current).
- +24V Sig is used to supply the NACs. It can be made accessible for other use by configuring a NAC as an auxiliary power output (normally energized).
- The battery circuit is checked every 29 seconds. The battery test is programmed via custom control for a 1 hour test once per week.
- The battery is connected to the charger but is normally disconnected from the bulk supply. During mains fail or the 1 hour battery test, the battery gets connected to the bulk supply.
- The IDNet output is 30V in the normal condition so as to prolong battery standby. When it is necessary to activate large numbers of output devices on IDNet peripherals (such as piezo sounders), the output voltage is increased to 35V to provide sufficient voltage at the end of line to activate piezo sounders. The higher voltage state is an alarm condition for the purpose of standby battery calculation.

SPS Current Consumption

The following table summarizes battery standby capabilities for the SPS. Voltage assumed is 24 V, which is the rated battery voltage for lead-acid type batteries.

Table 4-2. SPS Current Specifications

Standby Conditions	Current
<ul style="list-style-type: none"> • No alarms (NACs normal) • IDNet LED ON, no IDNet devices connected 	175 mA
Add to above for each additional set of 50 IDNet devices in standby, with IDNet at 30 V	40 mA
Total current for fully loaded IDNet channel (250 devices) in standby	375 mA
Alarm Conditions	Current
<ul style="list-style-type: none"> • 3 NACs ON • IDNet LED ON, no IDNet devices connected 	185 mA
Add to above for each set of 50 IDNet devices in alarm, 20 LEDs ON	80 mA
Add to above for each set of 50 IDNet devices in alarm, LEDs OFF	50 mA
Total current for a fully loaded IDNet channel (250 devices) in alarm, 20 LEDs ON	475 mA

Notes:

- *Additional standby conditions:* Trouble relay activated, power trouble LED on, IDNet LED on, battery charger off, auxiliary power load = 0 mA

Continued on next page

SPS Specifications, *Continued*

- **Additional *alarm* conditions:** Trouble relay activated, power trouble LED on, IDNet LED on, battery charger off, auxiliary power load = 0 mA, NAC alarm load = 0 mA, IDNet = 35 V
-

SPS Adjustments

Adjusting Voltages

There are two 4mm (i.e. small) potentiometers on the 4100-9848AU SPS, situated below the centre of the PCB. These are adjusted in the factory and typically will not need adjusting in the field.

If it is necessary to adjust them, turning the potentiometer clockwise increases the corresponding voltage.

R341 Battery Charger Voltage

Adjust this potentiometer to achieve a charger voltage of $27.3V \pm 0.1V$ at $20^{\circ}C$. (Allow $-36mV/^{\circ}C$ for temperatures different to $20^{\circ}C$).

R342 Voltage Measurement Calibration

Adjust this potentiometer to match the measurement of charger voltage on the panel LCD with that on a calibrated voltmeter measuring the charger output. Use the "Card Status" option of the menu. Match the two readings to within 0.1V.

Setting Jumpers and DIP Switches

See Chapter 2 "Step 3. Configuring Cards" for details of setting jumpers and DIP switches.

SPS LED Indications

Status LEDs

The SPS has the following LEDs:

LED1 (yellow). Illuminates when NAC 1 is ON or in Fault.

LED2 (yellow). Illuminates when NAC 2 is ON or in Fault.

LED3 (yellow). Illuminates when NAC 3 is ON or in Fault.

LED4 (yellow). Illuminates to indicate a communications loss with the system CPU; normally off.

LED5 (yellow). Indicates IDNet status. Normally off.

- Slow blink: Class A open circuit Fault.
- Fast blink: Short circuit Fault.
- On steady: No devices detected/ channel failure.

LED6 (yellow). Indicates power supply status. Normally off.

- Single blink: Positive earth fault.
- Double blink: Negative earth fault.
- Triple blink: Battery Fault.
- Quadruple blink: Charger Fault.
- On steady: Overcurrent fault.

LED7 (green). Illuminates when the power supply is powered from the AC line. Off when the power supply is de-energized, or when it is using battery backup power.

Troubleshooting an SPS

Overview	This section contains explanations of fault messages associated with the SPS that may appear on the 4100U-S1 display. Heading text in the left margin shows the error message, while the paragraph next to it describes the likely cause of the message.
“IDNet Power Monitor Trouble”	There is no output voltage from the power supply. Refer to Chapters 2 and 5 for information on power supplies.
“Extra Device”	One or more extra devices, i.e., devices that have not been configured on the IDNet channel, are on the system. Only one message appears, regardless of the number of extra devices found.
“Class A Trouble”	There is an open circuit on the IDNet channel. A hardware reset of the system is required to reset the fault.
“Earth Fault Search”	Comes up during the Earth Fault Search diagnostic function. Once the search is initiated, the front panel display indicates how far the search process has progressed (10%, 25%... 75%), and then shows the results of the search. The result either identifies the offending circuit or indicates that the earth fault could not be found. SPS circuits (IDNet, NAC, and aux power) are searched. System alarm and trouble processing is suspended during the search.
“Short Circuit”	Appears when a short circuit is detected on the IDNet channel. This status clears automatically when the short circuit is removed.
“Channel Fail”	Appears when at least one device on the IDNet channel has been configured, but no devices are communicating on the channel. This message does not appear if there are no configured devices on the IDNet channel.
“No Answer/ Bad Answer”	Occurs when the 4100U-S1 is put into a diagnostic mode and finds a device not responding, or responding unreliably.
“Output Abnormal”	Occurs when 24 V is not present on TrueAlarm devices or when TrueAlarm sensor bases with relay driver outputs are not properly supervised or when isolator devices are in isolation mode.

The Alarm Relay Card

Overview

The Alarm Relay Card mounts on, and is driven by, the SPS. It has 3 relays, each providing one set of voltage-free contacts. It is fitted to the basic 4100U-S1 as standard.

The relays are able to be configured under custom control, but the default operation is for system status, i.e. Fault (Trouble), Isolate (Supervisory), and Alarm, respectively. These are commonly used to drive the Brigade signalling device (ASE or PPU/AIU). See the next section for more details about Brigade Devices.

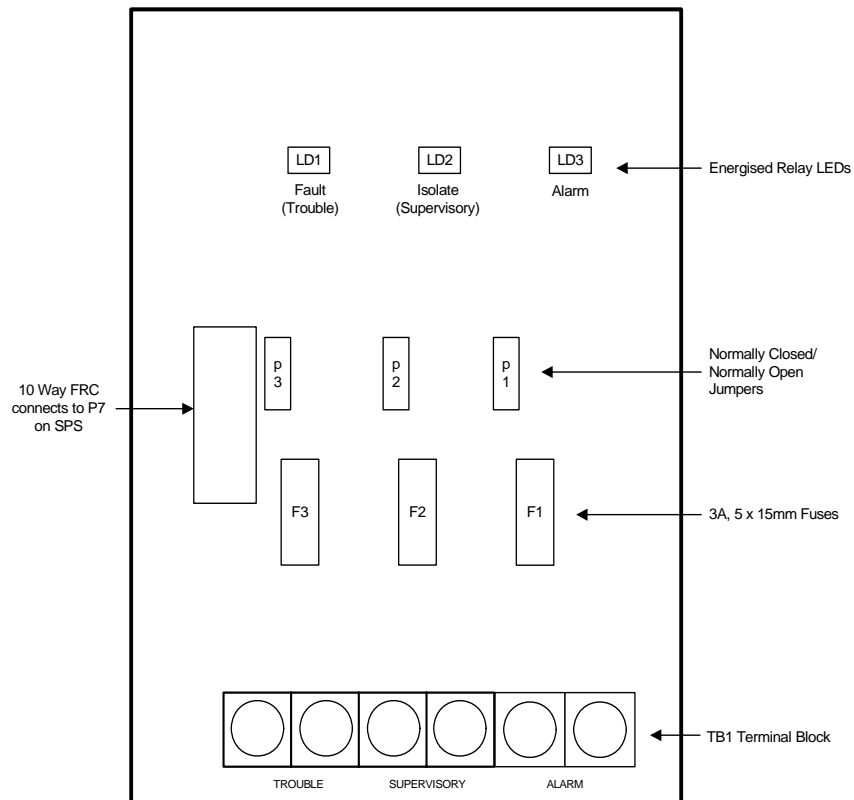


Figure 4-1. The Alarm Relay Card

Mounting (factory installed)

The Alarm Relay Card mounts on the SPS adjacent to the largest relay K3. With the power disconnected, fit the card using the three plastic stand-offs and one Torx screw with plastic sleeve.

Connect P4 on the relay card to P7 on the SPS with the 10 way FRC provided.

The Alarm Relay Card, *Continued*

Configuration

The relays have one set of voltage-free contacts (see note below) connected to one pair of terminals via a header. The two terminals are configured for normally closed or normally open by positioning a jumper on the relay card.

Table 6-3. Alarm Relay Card Jumper Positions

Relay	Header	Normally Closed	Normally Open
Alarm	P1	1-2 (top)	2-3 (bottom)
Isolate (Supervisory)	P2	1-2 (top)	2-3 (bottom)
Fault (Trouble)	P3	1-2 (top)	2-3 (bottom)

Notes

- The common contact of each relay has a transient suppressor to earth, and must not be used to switch voltages greater than its rating of 40V.
- The common contact is protected with a 3A fuse (5 x 15mm type).
- For the default configuration, the relays are normally de-energised and energise on Fault/Isolate/Alarm.
- The corresponding LED illuminates when the relay is energized.
- The relays may be configured under custom control to operate other than the default actions.

Warning

If relay RL3 is configured for operation other than Fault (Trouble), jumper P3 on the SPS must be shifted to positions 1-2 (top).

Specification

CARD	
Input Voltage	20-32Vdc
Input Current	15mA @ 24V, quiescent
(nominal)	37mA @ 24V, all relays on
RELAYS	
Form	Voltage-free changeover, suppressors to earth
Voltage	30Vac, 32Vdc
Current	2A, resistive load
FUSE	
F1, F2, F3	5 x 15mm, Glass Cartridge, 3A

Brigade Interfaces

Overview

The Alarm Relay Card is typically used to provide a Brigade Interface. The default configuration is for the three relays to operate on Fault (Trouble), Isolate (Supervisory) and Alarm, respectively.

Format

These relays are normally de-energised and energise on the respective status. They have voltage-free contacts that are connected to two terminals and can be configured as normally open or normally closed by the positioning of links. Refer to the previous section for details.

If a normally energized relay is required to provide activation on complete loss of system power (Standby), the Aux Relay on the SPS can be programmed as normally on and its contacts connected in series/parallel with the contacts of the Fault (Trouble) relay as is applicable, i.e., series for normally closed, parallel for normally open. Where the Brigade interface is powered from the 4100U-S1 and monitored by the central station, this is not typically required.

Note that if the Aux relay is programmed as normally energised, de-energising on Fault, it cannot be used to replace the Fault relay on the Alarm Relay Card as the latter is link connected to a hardware signal of “SPS CPU Fault”, and signals “Fault” when the SPS loses communications with the CPU.

Applications

The 4100U-S1 has specific mounting doors for several types of signaling device. These must be obtained separately.

Kit Contents

FP0935 FP,4100U-S1 1976-174,ASE DOOR KIT

- 1 x 4U hinged door, with ASE cover and barrel nuts already fitted
- 1 x 3 way connector and 1 x 2 way connector for connection to the ASE when it is fitted
- 1 x FP0740 FAS interface module with red, yellow, blue and white wires
- 1 x pair of red and black wires for connecting the ASE to the 4100U-S1 DC supply
- 4 x M6 screws, washers and cage nuts for mounting the door
- 5 x Cable ties and adhesive cable tie holders for fastening the ASE wiring
- 1 x green earth lead + nut and washers to earth the door to the expansion bay
- 2 x M4 x 16 screws and crinkle washers to mount the ASE to the door

FP0937 FP,4100U-S1 1976-174,PPU/AIU DOOR KIT

- 1 x 4U hinged door with spacer bracket, connector strip, label and wiring already fitted
 - 4 x M6 screws, washers and cage nuts for mounting the door
 - 5 x Cable ties and adhesive cable tie holders for fastening the PPU/AIU wiring
 - 1 x green earth lead + nut and washers to earth the door to the expansion bay
 - 4 x 1¼” PK screws and plastic spacers for mounting the PPU on the spacer bracket
-

Door Mounting

Both types of brigade doors mount in the 4 unit space at the bottom of the 4100U-S1 cabinet, using 4 x M6 screws, washers and cage nuts. Cage nuts should already be fitted to the 4100U-S1 and screws supplied with it, but there are spare screws, washers and cage nuts supplied with each kit in case the others have been lost.

General Wiring

The ASE or AIU/PPU should be powered from the fused DC distribution board on the power supply. It is recommended that the brigade device does not share its fuse protection with any other equipment, for reliability.

The wiring between the brigade device and the 4100U-S1 should be routed neatly as shown in the following drawings, and secured in place with the cable ties and adhesive tie holders supplied with the kits.

Fit the protective earth lead between the quick-connect tap on the brigade interface door and an unused stud in the lower right end of the expansion bay, using the nut and washers supplied with this kit.

AIU/PPU Mounting

The AIU or PPU must be obtained separately. The AIU is fastened directly to the spacer bracket on the brigade interface door by four screws supplied with the AIU. The PPU mounts on the spacer bracket using four screws and plastic standoffs supplied with this kit. See drawing 1901-267 sheet 2 for details.

AIU/PPU Wiring

The pre-fitted wiring must be connected to the 4100U-S1's Alarm Relay Card terminals as shown in 1901-267 sheet 2. Set the three links on the Alarm Relay card to the NO positions for an AIU and the NC positions for a PPU. Note: the red wire has some extra length, for use in linking the terminals together as shown. Both AIU and PPU require extra wire links on the Alarm Relay terminals, and the PPU requires extra wire links on the connector strip on the door.

ASE Mounting

The ASE must be obtained separately. If it is supplied complete with a body, this must be removed before fitting the ASE to the door. The ASE is fastened to the brigade interface door with the two M4 screws and crinkle washers in the kit. The antenna socket should be fitted to the tab on the door below the ASE position. See drawing 1976-174 sheet 1 on page 4 and the ASE installation instructions for details.

ASE Wiring

The FP0740 ASE FAS module must be connected to the 4100U-S1's Alarm Relay Card terminals and the 2 way ASE connector as shown in 1976-174 sheet 1. Set the three links on the Alarm Relay card to the NC positions.

Chapter 5

SPS Field Wiring (4100U-S1)

Introduction

This chapter shows how various devices are wired to an SPS. It includes connection to NACs, IDNet, relays, and power circuits.

In this Chapter

Refer to the page number listed in this table for information on a specific topic.

Topic	See Page #
General Field Wiring Guidelines	5-2
SPS NAC Field Wiring Guidelines	5-3
Power Supply Wiring Distances	5-6
Using T-Gen 50 with 4100U-S1	5-8
SPS Auxiliary Power Wiring	5-15
SPS Relay Wiring	5-17
SPS IDNet Wiring	5-18

General Field Wiring Guidelines

General Guidelines

- All field wires must be 0.75 mm² or greater cross section and comply with AS1670.1 and the wiring code.
- Conductors must test free of all earth leakage.
- 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.
- Wires that run in plenum should be in conduit.
- A system ground must be provided for earth detection and lightning protection devices. This connection must comply with approved earth detection.
- Only system wiring should be run together in the same conduit.
- Use supplied ferrite beads with all SPS field wiring including the Aux 24V. Loop wires twice through the supplied ferrite bead(s) as shown in Figure 5-1. (Extra can be ordered as 4100-5129 – 3 beads).

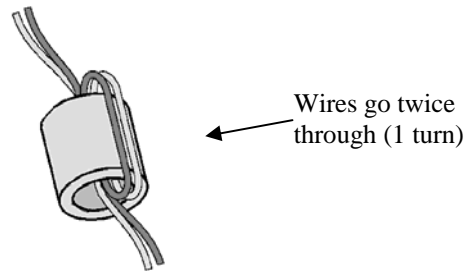


Figure 5-1. The Ferrite Bead

Continued on next page

SPS NAC Field Wiring Guidelines

Overview

Each of the three NACs on the SPS has two pairs of driven outputs (A+/A-, B+/B-) which operate together.

NAC B outputs have polarity reversal supervision and expect a 10k EOLR. Each connected device must have a suitably rated blocking diode. EOLRs are supplied fitted to the NAC terminals.

NAC A outputs have an integral 10k to accommodate Class A (loop) wiring. Class A wiring is not mandatory under AS1670.1.

Class B (string) wiring can only have one branch.

The 3A max rating applies to each NAC, B + A outputs combined under alarm conditions. NAC load current may be displayed on the LCD.

The Australian SPS has extra decoupling capacitors fitted to the NAC outputs, and cannot be used to drive the Simplex range of addressable appliances (Strobes).

NACs may be programmed to be normally on to allow the terminals to be used as power supply outputs. See the SPS Auxiliary Power Wiring section following.

Guidelines

Review the following guidelines for NACs before you begin NAC field wiring.

- All wiring must be 0.75 mm² to 4 mm².
 - All wiring is supervised and power-limited.
 - The maximum alarm current is 3 A per circuit. The supervisory current is 2 mA at 24 VDC.
 - The nominal supply voltage rating is 24 VDC, 2 V p-p ripple (maximum).
 - The total available current from the SPS is 9A. Any current used for card power by modules plugged into the PDI, as well as any auxiliary 24 VDC current, must be deducted from the total 9A available current.
 - Terminal designations “+” and “-” are for the Alarm state (ON), not the supervision state.
-

Allocations

The configuration templates supplied for use with the 4100U-S1 all have these default assignments of the NAC outputs, with corresponding Custom Control equations.

- NAC1 : Ancillary Control Facility (ACF), to control ancillary devices during an Alarm. This output can be isolated using the ACF Isolate control on the keyboard.
 - NAC 2 : Fire Bell, to operate a bell as required by AS4428.1. This output can be isolated using the Bells Isolate control on the keyboard.
 - NAC 3 : Warning System, to operate devices such as T-Gen 50. This output can be isolated using the Warning System Isolate control on the keyboard.
-

Continued on next page

SPS NAC Field Wiring Guidelines, *Continued*

Some or all of these output functions could be implemented using addressable devices or other relay modules instead, in which case the corresponding NAC output could be reassigned to other uses. The new configuration would require full testing of these functions to ensure compliance with AS 4428.1.

Class A (loop) NAC Wiring

To connect the SPS to reverse-polarity, non-addressable notification appliances using Class A wiring, read the following instructions and refer to the figure below.

1. Route wire from the “B+”, “B-”, outputs on TB2 of the SPS to the appropriate inputs on a peripheral notification appliance. Use NAC1, NAC2, or NAC3 as required.
2. Route wire from the first appliance to the next one. Repeat for each appliance.
3. Route wire from the last appliance to the A+ and A- inputs on the same NAC circuit of TB1 of the SPS.
4. Repeat steps 1 through 3 for each NAC output you want to use.
5. Leave the 10 K, ½ W, brown/black/orange resistor (378-030) on each the “B+” to “B-” terminals of each unused NAC. No external end-of-line resistor is needed for circuits in use.
6. If the appliance/device to be used does not have an integral diode, a sufficiently rated blocking diode must be fitted between the incoming +ve wire and the +ve terminals of the device with cathode (stripe) to the device.

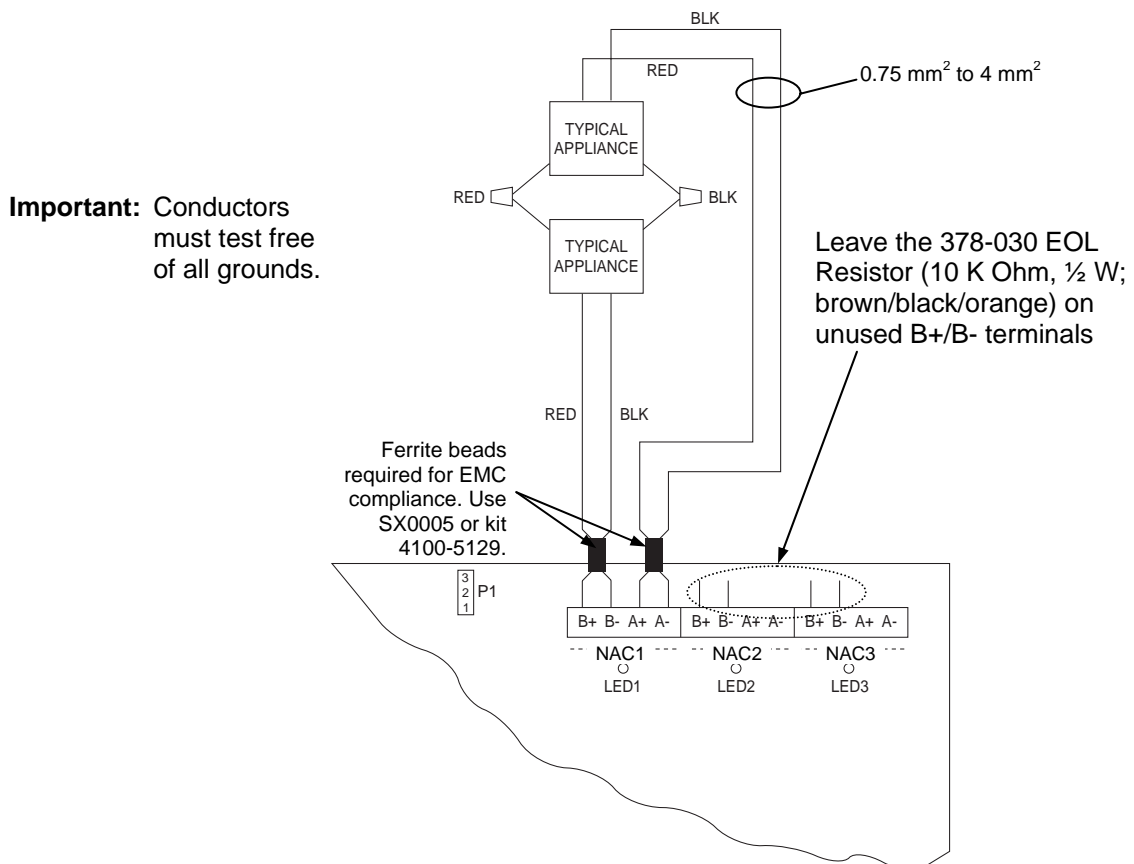


Figure 5-2. Class A (loop) NAC Wiring

Continued on next page

SPS NAC Field Wiring Guidelines, *Continued*

Class B (string) NAC Wiring

To connect the SPS to appliances using Class B wiring, read the following instructions and refer to the figure below.

1. Route wire from the B+, B- outputs on TB2 of the SPS to the appropriate inputs on a peripheral notification appliance. Use NAC1, NAC2, or NAC3, as required.
2. Route wire from the first appliance to the next one. **“T” tapping is not allowed since the spur will not be supervised.** Repeat for each appliance.
3. Route wire from the last appliance to the supplied EOLR or a 4081-9008 EOL Harness (10 K Ohm, ½ W; brown/black/orange).
4. Repeat steps 1 through 3 for each NAC output you want to use.
5. Leave the 378-030 EOL Resistor (10 K Ohm, ½ W; brown/black/orange) on each unused circuit. The circuit must connect “B+” to “B-” terminals.
6. If the appliance/device to be used does not have an integral diode, a blocking diode must be fitted between the incoming +ve wire and the +ve terminal of the device with the diode’s cathode (stripe) connected to the device.

The illustration below shows Class B wiring.

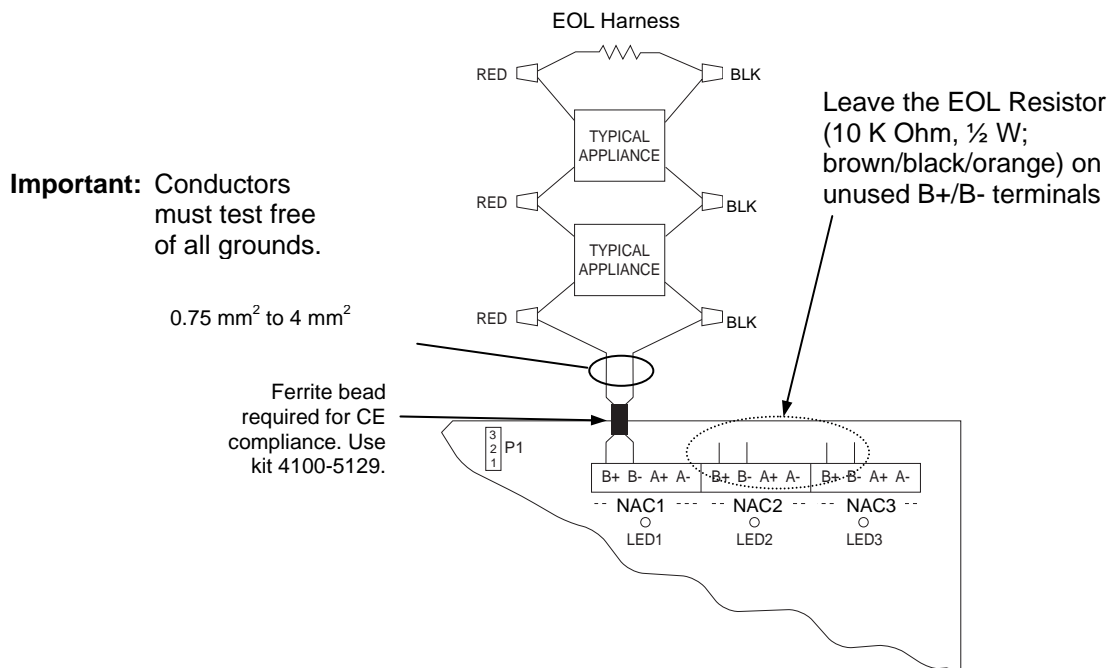


Figure 5-3. Class B (string) Wiring

Power Supply Wiring Distances

Overview

Before wiring from any type of power supply to notification appliances, check Tables 5-1 and 5-2 for wiring distances.

Class A NAC Wiring Table

Table 5-1 lists the maximum distances from the NAC terminal block to the last appliance in a Class A (loop) configuration, depending on wire gauge and current. Use Table 5-1 to calculate wire distances for your application if you are using Class A wiring.

Table 5-1. Class A (Loop) Wiring Distances

Alarm Current @ 24V	0.75 mm ²	1.00 mm ²	1.50 mm ²	2.50 mm ²	4.00 mm ²	DC Resistance
0.25A	120m	150m	230m	380m	620m	6.0 ohms
0.50A	58m	77m	120m	190m	310m	3.0 ohms
0.75A	38m	51m	77m	130m	210m	2.0 ohms
1.00A	29m	38m	58m	96m	150m	1.5 ohms
1.25A	23m	31m	46m	77m	120m	1.2 ohms
1.50A	19m	26m	38m	64m	100m	1.0 ohms
1.75A	16m	22m	33m	55m	88m	0.86 ohms
2.00A	14m	19m	29m	48m	77m	0.75 ohms
2.25A	13m	17m	26m	43m	68m	0.67 ohms
2.50A	12m	15m	23m	38m	62m	0.60 ohms
2.75A	10m	14m	21m	35m	56m	0.55 ohms
3.00A	10m	13m	19m	32m	51m	0.50 ohms

Notes:

- Max Distance = distance from SPS to last appliance.
- This table is calculated at 49 degrees Centigrade.
- Distances are based on a 3V drop, and take into account the worst-case panel output voltage. These distances are based on the worst case of having one single load at the furthest point.
- If circuit integrity wire is used instead of housing cable in a fire-rated enclosure, reduce wiring distances by 12 m for every 3 m of potential exposure.

Continued on next page

Power Supply Wiring Distances, *Continued*

Class B NAC Wiring Table

Table 5-2 lists the maximum distances from the NAC terminal block to the last appliance in a Class B (string) configuration, depending on wire gauge and current. Use Table 5-2 to calculate wire distances for your application if you are using Class B wiring.

Table 5-2. Class B (string) Wiring Distances

Alarm Current @ 24V	0.75 mm ²	1.00 mm ²	1.50 mm ²	2.50 mm ²	4.00 mm ²	DC Resistance
0.25A	230m	310m	460m	770m	1200m	12.0 ohms
0.50A	120m	150m	230m	380m	620m	6.0 ohms
0.75A	77m	100m	150m	260m	410m	4.0 ohms
1.00A	58m	77m	120m	190m	310m	3.0 ohms
1.25A	46m	62m	92m	150m	250m	2.4 ohms
1.50A	38m	51m	77m	130m	210m	2.0 ohms
1.75A	33m	44m	66m	110m	180m	1.7 ohms
2.00A	29m	38m	58m	96m	150m	1.5 ohms
2.25A	26m	34m	51m	85m	140m	1.3 ohms
2.50A	23m	31m	46m	77m	120m	1.2 ohms
2.75A	21m	28m	42m	70m	110m	1.1 ohms
3.00A	19m	26m	38m	64m	100m	1.0 ohms

Notes:

- Max Distance = distance from SPS to last appliance.
- This table is calculated at 49 degrees Centigrade.
- Distances are based on a 3V drop, and take into account the worst-case panel output voltage. These distances are based on the worst case of having one single load at the furthest point.
- If circuit integrity wire is used instead of housing cable in a fire rated enclosure, reduce wiring distances by 12 m for every 3 m of potential exposure.

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Using T-Gen 50 with 4100U-S1

Overview

AS 1670.1 requires fire alarm warning systems to produce sounds complying with AS 2220 or ISO 8201. One way of meeting this requirement in a 4100U system is to use a T-GEN 50 tone generator, which is capable of driving up to 50W of load on a 100V speaker line.

The recommended version of the T-Gen 50 for use in 4100U-S1 is available as part 4100-0766K (see PID information in Chapter 1). This consists of a T-Gen 50 mounted on a metal bracket which is mounted into the expansion bay in the same way as a legacy 4100 motherboard. This part code includes the necessary mounting hardware.

The best place to mount this bracket is in the right-most free slot in the expansion bay, next to the mains socket bracket. The bracket should be installed with the T-Gen 50 facing to the left - this is "upside down" compared to some other uses of this bracket. Note also that the heat sink of the T-Gen 50 intrudes slightly into the space above the next slot to the left. This will probably clash with other motherboards or modules and make this slot unusable.

Powering the T-Gen 50

The T-Gen 50 must be continuously powered from 24VDC, i.e. not just during Alarm conditions, so that it can supervise the 100V speaker line.

If the T-GEN 50 is powered from one of the outputs of the Fused Distribution Board PA0915, the maximum speaker load is reduced to 20W. More load than this will run the risk of blowing the 1A fuse on the Distribution Board. Do not fit a higher rated fuse to the Distribution Board, since this will not provide proper protection due to other protection devices in the power supply.

If more output is required, power the T-GEN 50 directly from the AUX POWER terminals of the SPS power supply. This output is rated at 2A, which is just sufficient to drive one fully loaded T-GEN 50. However, this leaves no reserve for any other equipment to be powered from these terminals, e.g., a brigade signalling device.

Using T-Gen 50 with 4100U-S1, *Continued*

Controlling a T-Gen 50 with a Relay Module

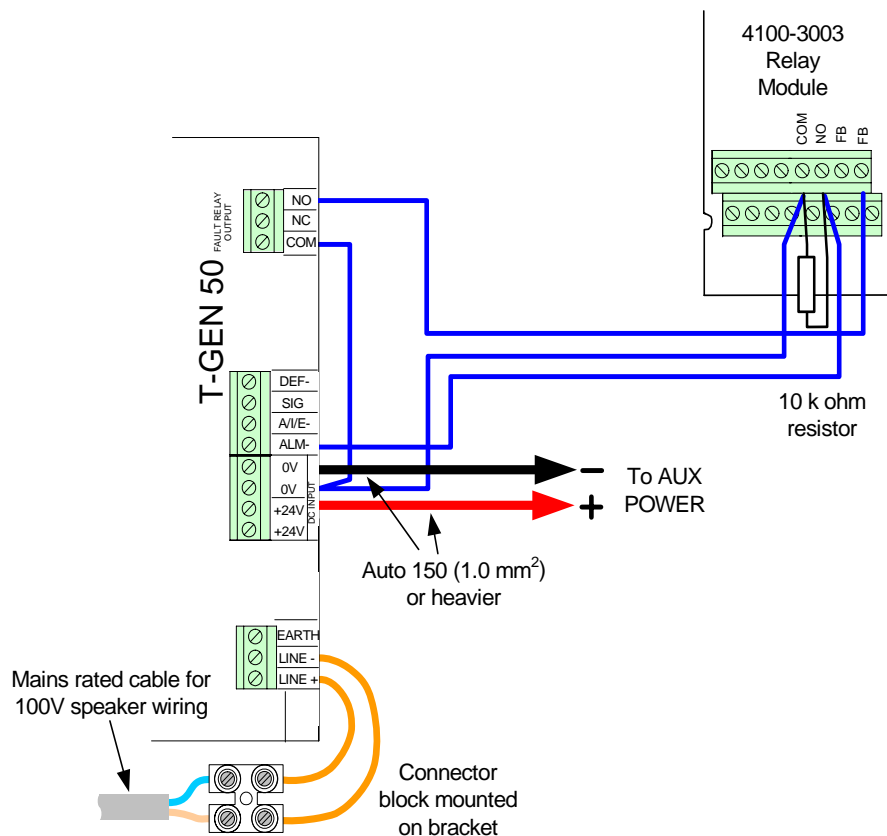


Figure 5-4. Relay Module Connection to a T-Gen 50

A T-GEN 50 can be operated and supervised using a 4100-3003 relay module. The relay module is used to control the ALM- input to the T-GEN 50 and to monitor the state of its Fault relay. The T-GEN 50 is configured to supervise the ALM- wiring from the relay module and the 100V wiring to the loudspeakers.

Figure 5.4 shows the wiring between the T-GEN 50 and the relay module. The detail of the 24V supply is not shown, but the T-GEN 50 0V MUST be common with the 4100U 0V (this will always be the case when using the AUX POWER supply, as described earlier).

Using T-Gen 50 with 4100U-S1, *Continued*

T-Gen 50 Setting for Relay Operation

These switch and link settings should be used. These apply to T-GEN 50 software version 1.7.

Alert to Evacuate Change-Over Time			
SW1 (T0)	SW2 (T1)	SW3 (T2)	Setting on T-GEN 50
OFF	OFF	OFF	0 sec
ON	OFF	OFF	30 sec
OFF	ON	OFF	1 min
ON	ON	OFF	1.5 min
OFF	OFF	ON	3 min
ON	OFF	ON	5 min
OFF	ON	ON	10 min
ON	ON	ON	Alert Only

SWITCH	Name	Setting on T-GEN 50
SW4	ALM I/P Supervision	ON (Supervision enabled)
SW5	ALM I/P	OFF (Non-latching)
SW6	Evac Tone	OFF
SW7		OFF for AS 2220 tone ON for ISO 8201 + Keywords
SW8	Evac Message	OFF for Evac Message 1 or Field Recorded message, ON for Evac Message 2 or Keywords only in ISO 8201

Link	Name	Setting on T-GEN 50
1	BIAS	FITTED if PA or Background Music not required.
2	MASTER	FITTED
3	REC EN	Fit to record message.
4	TEST	Fit for test tone during installation
5	SLAVE	NOT FITTED
6	SLAVE / MASTER	MASTER
7	FAULT= DEF-/RELAY	RELAY

Using T-Gen 50 with 4100U-S1, *Continued*

Controlling a T-Gen 50 from a NAC Output

A T-GEN 50 can be controlled and supervised using a NAC output. The NAC is used to control the ALM- input to the T-GEN 50 and to supervise its Fault relay output. The T-GEN 50 is configured to supervise the 100V wiring to the loudspeakers.

Figure 5-5 shows the wiring between the T-GEN 50 and the NAC terminals.

The detail of the 24V supply is not shown, but the T-GEN 50 0V MUST be common with the 4100U 0V (this will always be the case when using the AUX POWER supply as described earlier).

The NAC output must be programmed as a SIGNAL point type, so that it automatically operates on Alarm, and provides reverse polarity supervision to the 10kΩ EOLR.

The configuration templates already have NAC3 programmed as a suitable output to drive the T-Gen 50.

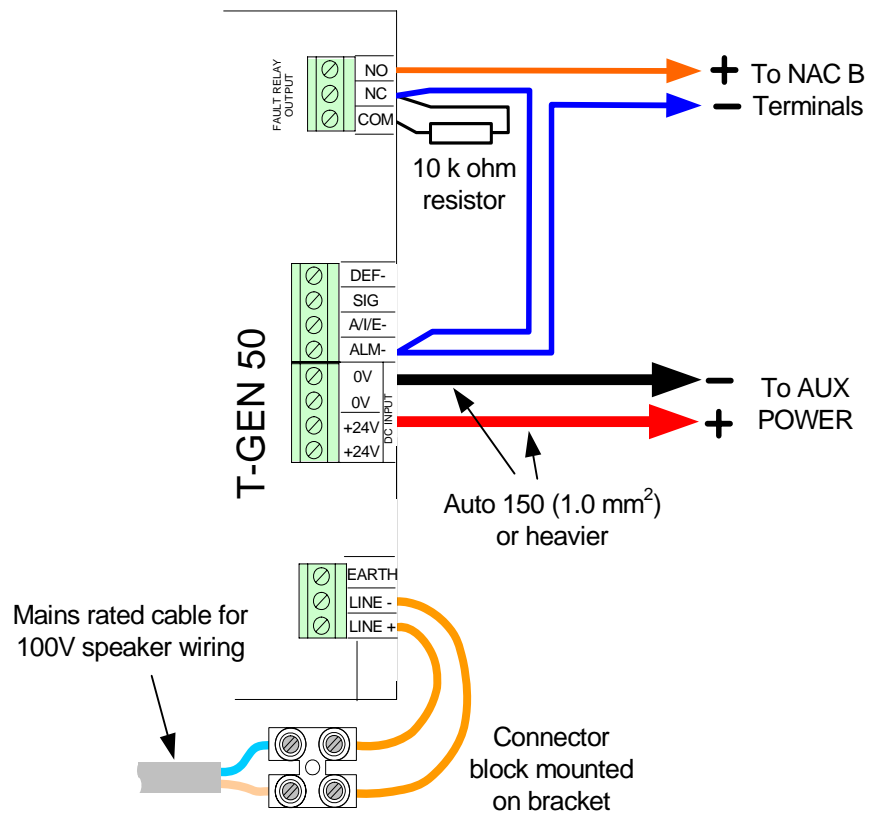


Figure 5-5. NAC Connection to a T-Gen 50

Using T-Gen 50 with 4100U-S1, *Continued*

T-Gen 50 Settings for NAC Operation

These switch and link settings should be used. These apply to T-GEN 50 software version 1.7.

Alert to Evacuate Change-Over Time			
SW1 (T0)	SW2 (T1)	SW3 (T2)	Setting on T-GEN 50
OFF	OFF	OFF	0 sec
ON	OFF	OFF	30 sec
OFF	ON	OFF	1 min
ON	ON	OFF	1.5 min
OFF	OFF	ON	3 min
ON	OFF	ON	5 min
OFF	ON	ON	10 min
ON	ON	ON	Alert Only

SW1 to SW3 settings have no effect on Slave T-GEN 50s.

SWITCH	Name	Setting on T-GEN 50
SW4	ALM I/P Supervision	OFF (Supervision disabled)
SW5	ALM I/P	OFF (Non-latching)
SW6	Evac Tone	OFF
SW7		OFF for AS 2220 tone ON for ISO 8201 + Keywords
SW8	Evac Message	OFF for Evac Message 1 or Field Recorded message, ON for Evac Message 2 or Keywords only in ISO 8201

Link	Name	Setting on T-GEN 50
1	BIAS	Can be FITTED if PA or Background Music not required
2	MASTER	FITTED
3	REC EN	Fit to record message.
4	TEST	Fit for test tone during installation
5	SLAVE	NOT FITTED
6	SLAVE / MASTER	MASTER
7	FAULT= DEF-/RELAY	RELAY

Using T-Gen 50 with 4100U-S1, *Continued*

Fitting an EvacuationControl

An optional three-position control ME0460 (see part numbers in Chapter 1) allows T-GEN 50s to be switched from the front panel between automatic operation, being Isolated, or producing Evacuation tone, regardless of the state of other control inputs.

With the control in the ISOLATE position, the T-GEN 50 will not respond to the ALM-input, or activate its FAULT output if a fault is present.

With the control in the EVAC position, the T-GEN 50 will immediately produce Evacuation tone.

Figure 5-6 shows how to connect an Evacuation Control to a T-GEN 50.

The control can be fitted to an FP0935 or FP0937 4U Brigade Interface door as used in 4100U-S1, or fitted to a 4100-1279 blank display module (requires a 9.5mm hole to be drilled in the display module – the ME0460 includes an installation guide with drilling details). See Figure 5-7 for examples.

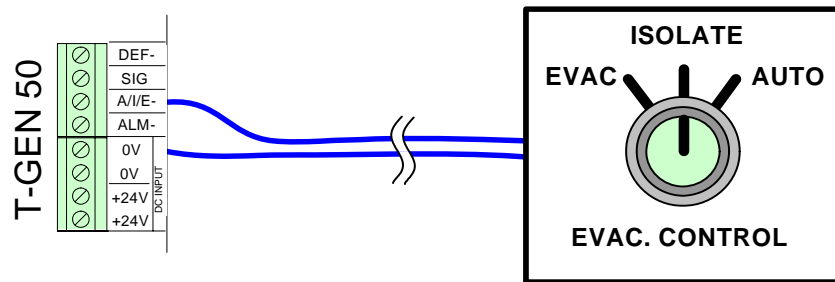


Figure 5-6. Wiring an Evacuation Controller to a T-Gen 50

Fitting a PA Microphone

The T-GEN 50 can be fitted with a compatible PA microphone, to allow voice announcements via the warning system. ME0490 is a suitable part for the 4100U-S1 (see part numbers in Chapter 1)

A suitable recess or cavity is required for storing the microphone while not in use. The FP0935 and FP0937 4U Brigade doors have a suitable recess. See Figure 5-7 to see how the microphone fits and how its lead is routed inside the cabinet.

Using T-Gen 50 with 4100U-S1, *Continued*

100V Speaker Wiring

Refer to the T-GEN 50 Installation and Operating Guide (LT0186) for details about the wiring of speakers and end-of-line resistor requirements for the T-GEN 50.

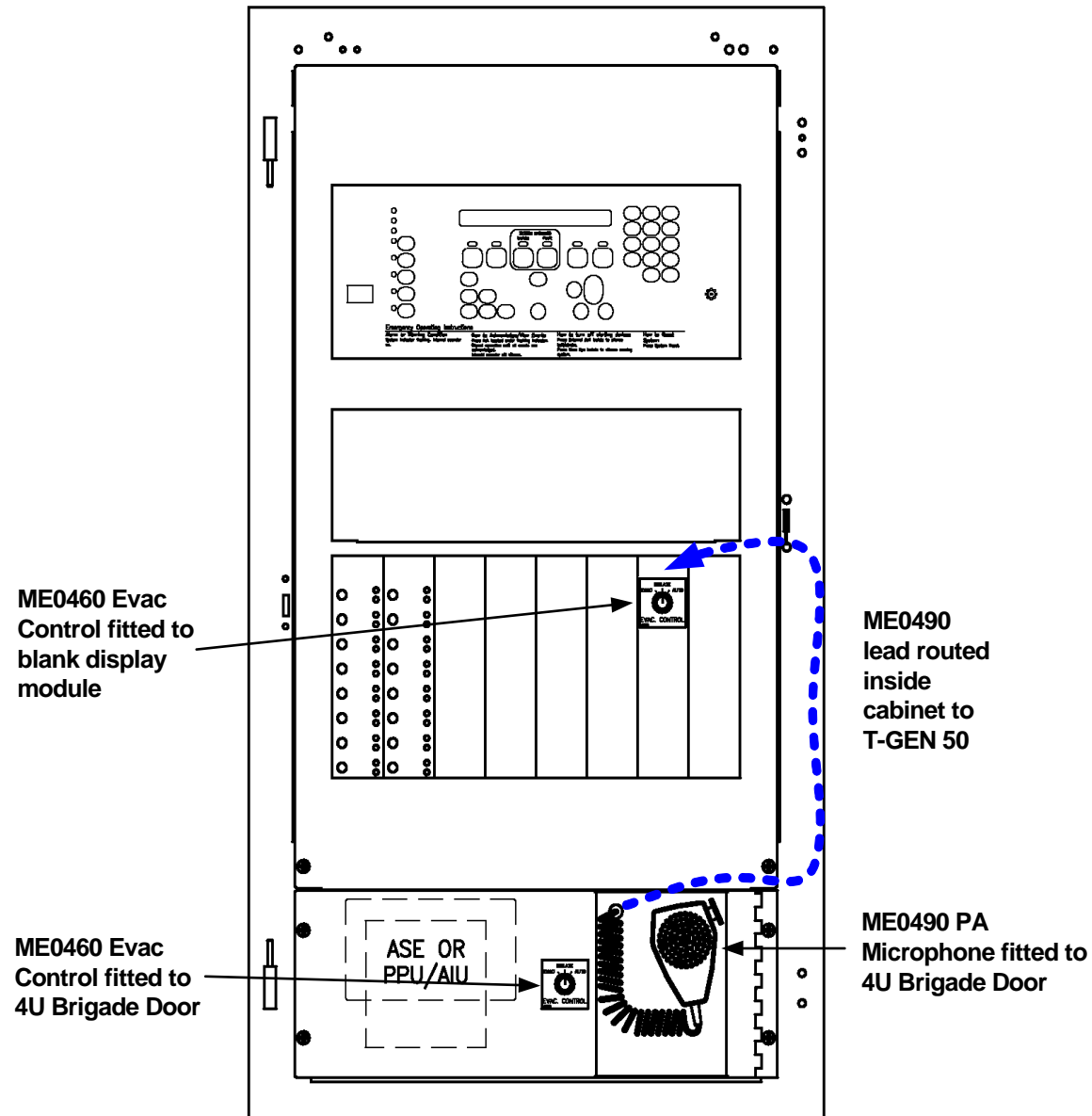


Figure 5-7. Examples of Evacuation Controls and PA Microphone

SPS Auxiliary Power Wiring

Overview

The panel, battery-backed, unregulated dc bulk power is available from the SPS via the NAC and the 24V Aux power terminals. NACs can be configured as auxiliary power point type in the 4100U Programmer. All of these are power-limited.

Guidelines

Review the following guidelines before using the SPS for auxiliary power.

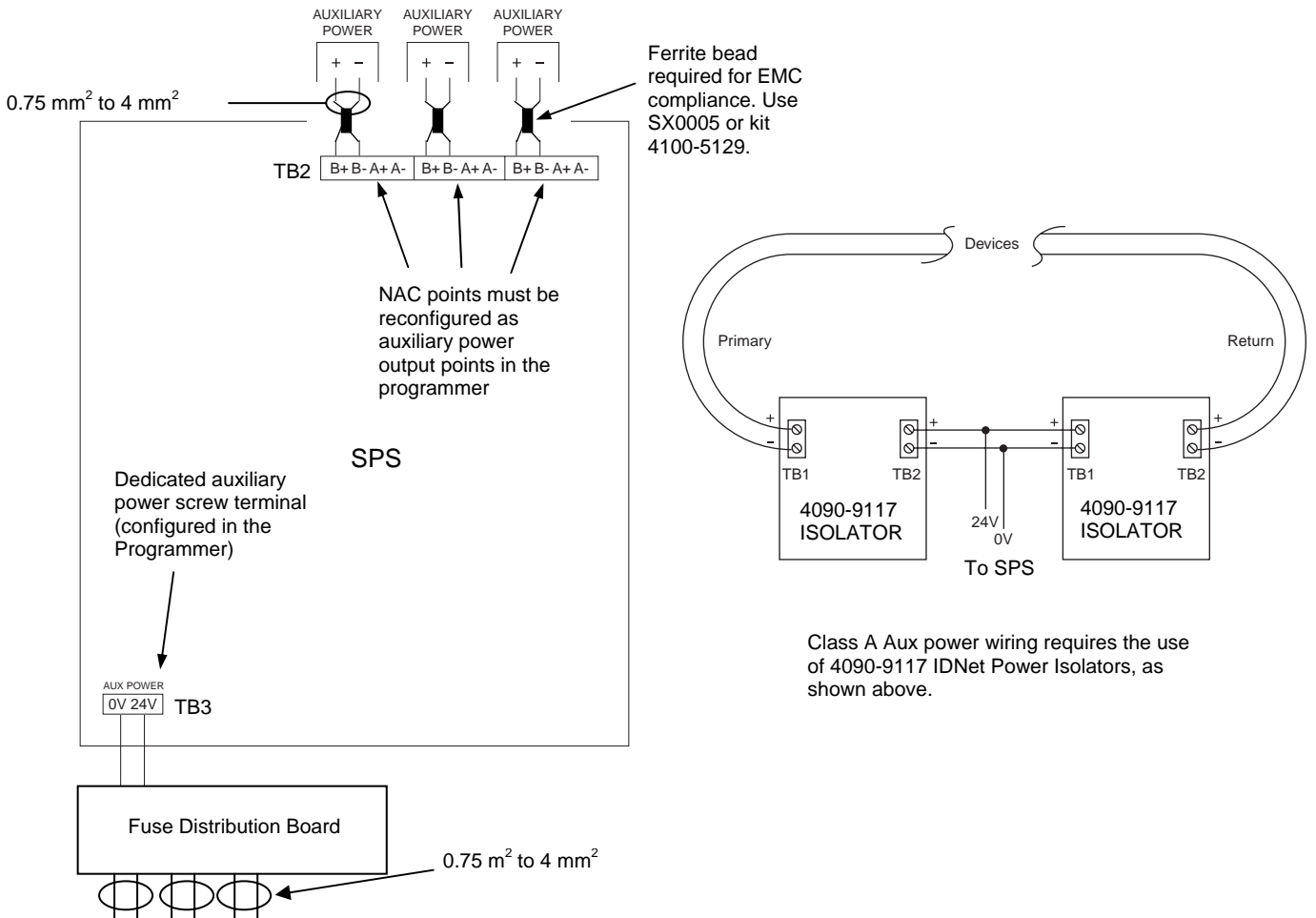
- Voltage rating: 24 VDC (nominal), 2 V P-P ripple (maximum).
- The total auxiliary current available for non-alarm loads is 5A. The total current available for the entire SPS is 9A, including NAC, auxiliary, and card power.
- The Auxiliary Power output is rated at 2A DC. Programming is required to activate this supply output.
- A Fuse Distribution board is fitted to the SPS bracket and wired to the Auxiliary Power output as standard. Each output from this board is protected by a 1A fuse. Do not fit heavier fuses than 1A since this may defeat the fuse protection. The combined output from the DC Distribution board is limited to 2A.
- All wiring is 0.75 mm² to 4 mm².
- All SPS powered field wiring requires a ferrite bead fitted (refer Figure 5.1).
- All wiring that leaves the building requires overvoltage protection. Install module 2081-9044 wherever wire enters or exits the building. A maximum of four 2081-9044 Modules may be connected to one channel.
- When a NAC is configured as an auxiliary power circuit, no end-of-line resistor is used.
- External power wiring is not supervised unless an end-of-line relay is wired, coil to auxiliary power, and Normally Open contacts are monitored by a system power point. Relay current must be considered as part of the load.

Continued on next page

SPS Auxiliary Power Wiring, *Continued*

Wiring

The SPS can connect to auxiliary power appliances via the dedicated auxiliary power tap (TB3). If more power is needed, any of the three NAC outputs can be used for auxiliary power.



- Maximum load per NAC: 3A alarm, 2A non-alarm load
- Maximum load per Fuse Distribution Board output: 1A, limited to 2A collectively.
- Class A wiring is possible only if 4090-9117 Power Isolators are used.
- Ferrite beads must be fitted on NAC wiring. Use kit 4100-5129 (3 beads).

Figure 5-8. Auxiliary Power Wiring

SPS Relay Wiring

Overview

The SPS has one programmable relay, Aux 1, with one set of voltage-free contacts (see below).

The Alarm Relay 4100-6033 is fitted as standard to 4100U-S1. This has 3 relays, each with one set of normally open (or normally closed) contacts available on a screw terminal block (see Chapter 4).

Aux 1 Relay

- The relay must be configured in the Programmer.
 - The relay circuit is rated to switch 2A resistive or 1A inductive at 30VAC or 32VDC.
 - Relay contacts are Form C voltage-free contacts (but with a 40V transorb from common to Earth). Do not switch voltages greater than this rating, or damage may result.
 - When power through the relay contacts is provided by the SPS Auxiliary Power output, wiring is power-limited.
 - The relay circuit is not supervised.
-

Alarm Relay Card

The three relays have default functions of Fault (trouble), Isolate (supervisory) and Alarm, and are typically used for Brigade Signalling (refer to Chapter 4 for jumper settings and other Brigade device information).

Continued on next page

SPS IDNet Wiring

Overview

This section describes how the IDNet Channel on the SPS connects to addressable devices/detectors.

The guidelines governing IDNet wiring guidelines are covered in Chapter 6, IDNet Installation.

IDNet Wiring

Up to 250 IDNet initiating devices are supported on the SPS IDNet channel. The SPS supports both Class A (loop) and Class B (string) wiring. Class A wiring is mandatory for connection to more than 40 devices.

Class A wiring allows IDNet appliances to continue to communicate with the SPS even in the event of an open circuit somewhere in the loop. Class A wiring requires that two wires are routed from the SPS to each IDNet appliance, and then back again to the SPS.

Class B wiring allows “T” tapping, and therefore requires less wiring distance per installation than Class A.

Note that IDNet wiring does not require end-of-line resistors, because each IDNet appliance communicates directly to the SPS.

Guidelines

Ferrite beads are required on the SPS IDNet cables (refer Figure 5.1). Refer to Chapter 6 IDNet Installation for the guidelines governing IDNet wiring.

Continued on next page

SPS IDNet Wiring, *Continued*

Class A (loop) Wiring

To connect addressable devices/detectors to the SPS IDNet using Class A wiring, read the following instructions.

1. Ferrite beads are required on the SPS IDNet cables (refer Figure 5.1).
2. Route wire from the B+, B- outputs on TB1 of the SPS to the appropriate inputs on a peripheral IDNet device.
3. Route wire from the first IDNet device to the next one. Repeat for each device.
4. Route wire from the last IDNet device to the A+ and A- inputs on TB1 of the SPS.

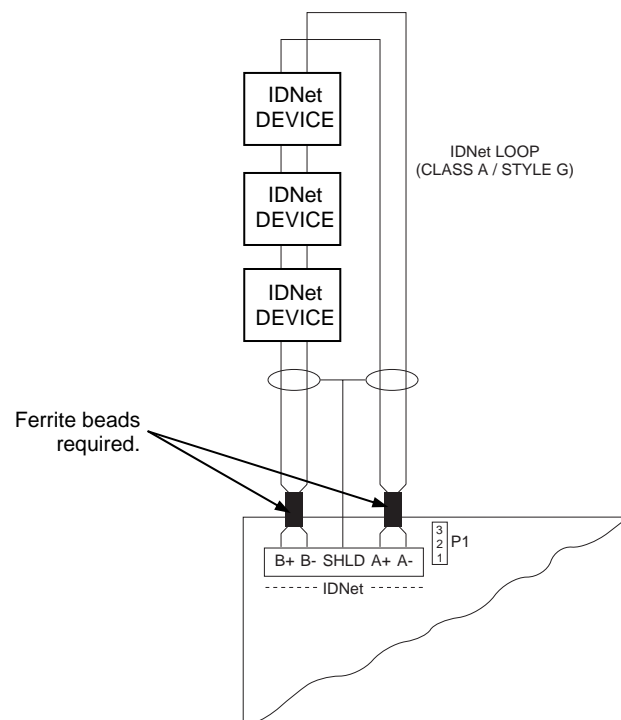


Figure 5-9. Class A (loop) Wiring

Continued on next page

SPS IDNet Wiring, *Continued*

Class B (string) Wiring

To connect addressable devices/detectors to the SPS IDNet using Class B wiring, read the following instructions.

1. Under AS1670.1 Class B wiring is allowed only for a maximum of 40 addressable devices.
2. A ferrite bead is required on the SPS IDNet cable.
3. On TB1, jumper B+ to A+, and jumper B- to A-.
4. Route wire from the B+, B- terminals to the devices.

The illustration below shows Class B wiring.

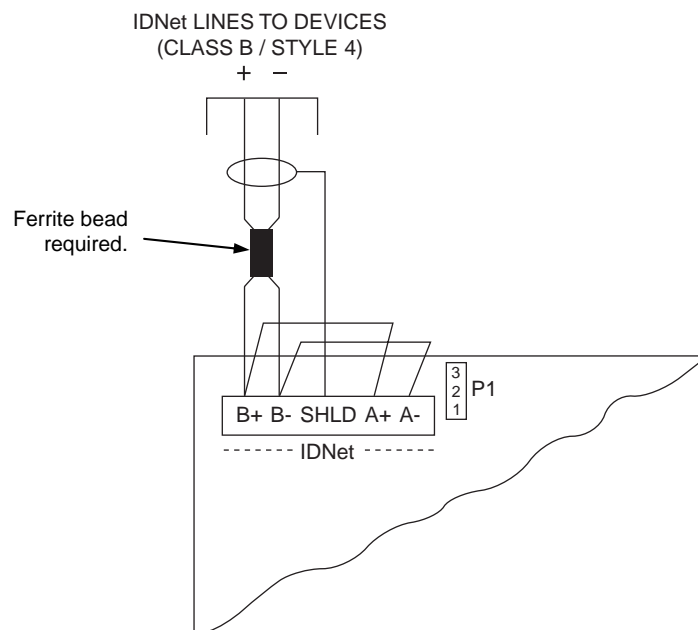


Figure 5-10. Class B (string) Wiring

Chapter 6

Installing a 4100U IDNet Card

Introduction

The 4100U-S1 can support one IDNet card in the expansion bay, to provide a second addressable loop.

The IDNet Card uses Mapnet Protocol and communicates with existing Mapnet detectors/devices plus the new IDNet devices.

In this Chapter

Refer to the page number listed in this table for information on a specific topic.

Topic	See Page #
The IDNet Card	6-2
Installing the IDNet Card onto the PDI	6-4
Configuring the Card	6-5
Wiring to IDNet Devices	6-6
Troubleshooting on IDNet	6-9

The IDNet Card

Overview

The 4100U IDNet card receives 24V power (+24V Card Supply bus) and communication with the CPU via the PDI. There are several versions of IDNet Card, configured by links soldered on the PCB. The 4100-3101AU used in Australia communicates with up to 250 devices.

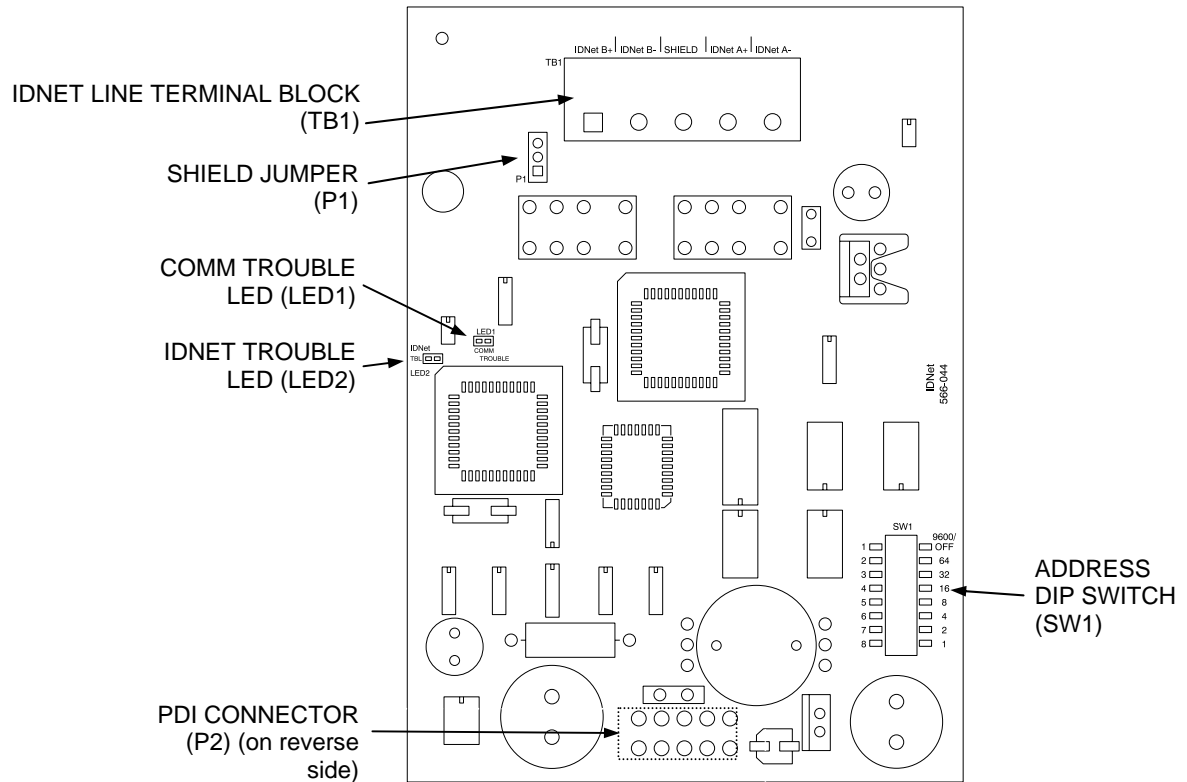


Figure 6-1. The IDNet Card

The IDNet Card, *Continued*

LEDs

The IDNet card has the following LEDs:

LED1. Normally off. Turns on steady if the IDNet card is not communicating with the 4100U CPU.

LED2. Normally off. Illuminates to indicate a problem with the IDNet lines.

- Steady on indicates channel failure, i.e. communication problems with configured devices.
- One repetitive blink indicates a line short.
- Two repetitive blinks indicate a Class A failure or an open line.

Specifications

Table 6-1. IDNet Specifications

Electrical Specifications	
Input Voltage	24 VDC nominal (24V Card Supply from SPS)
Comms/Power Voltage to IDNet Slaves	30 VDC (nominal) or 35 VDC @ 250 mA 36.5V maximum (<i>See below</i>)
Comms/Power Current Limit	350mA average current @ 49° C
Comms/Power Wiring Distance	40 Ohms maximum loop resistance 0.58 μ F capacitance maximum (line to line and shield to line)
Environmental Specifications	
Operating Temperature	0° to 50° C

- Voltage output to IDNet is normally 30VDC. Output is increased to 35VDC when LEDs, piezos, or other outputs are activated, as in the alarm state.
- The 30/35V PSU on the IDNet is rated at greater than 350mA. The current limit is provided by a PTC.
- Up to 250 IDNet devices are supported by one IDNet channel.
- The IDNet card keeps track of which LEDs should be on at all times, and displays no more than 20 at any given time.
- Up to 43 coded piezo sounders are supported by one IDNet channel.

Installing the IDNet Card onto the PDI

Overview

Use connector P2, labelled on the back side of the IDNet card, to connect to any of the four left-most PDI connectors as shown in the figure below.

Note that the right-most two PDI connectors are obscured by the mains output bracket, and a T-Gen 50 bracket (if fitted).

Fitting the IDNet card to the left-most position is recommended, since this will use space that cannot be used by legacy 4100 motherboards and daughter cards because of mechanical clashes with the LED/Switch controller(s) on the front panel.

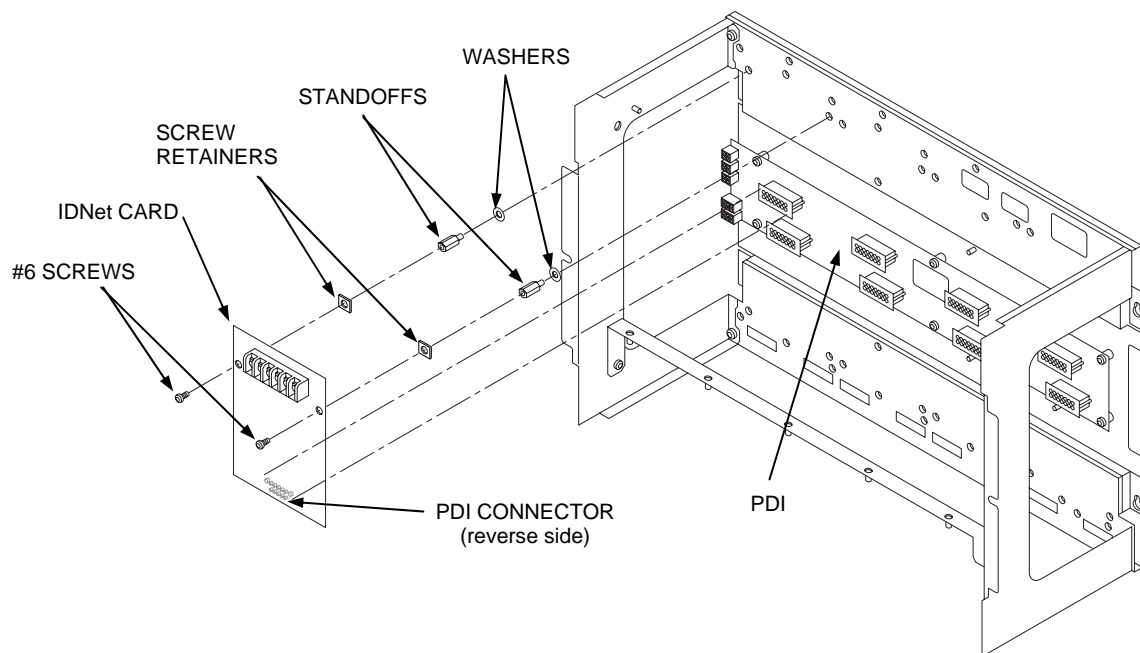


Figure 6-2. Mounting onto the Power Distribution Interface in the Expansion Bay

Configuring the Card

Overview

Configuring the card consists of selecting the shield tie point, and setting the card address.

Setting the Shield Tie Point

If a shielded cable is used, connect the cable shield to the dedicated terminal on TB1 and use jumper port (P1) to select where the shield will be tied.

- Position 1 - 2 connects the shield to 0 V.
 - Position 2 - 3 connects the shield to Earth.
-

Setting the Address

The card address is set on DIP switch SW1, which is a bank of eight switches (see figure below). From left to right, 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 internal communications line running between the card and the CPU. Set this switch to ON.
- **SW1-2 through SW1-8.** These switches set the card's address within the 4100U-S1. Refer to the table in Appendix A for a complete list of the switch settings for all of the possible card addresses.

Note: You must set these switches to the value that was assigned to the card by the 4100U Programmer.

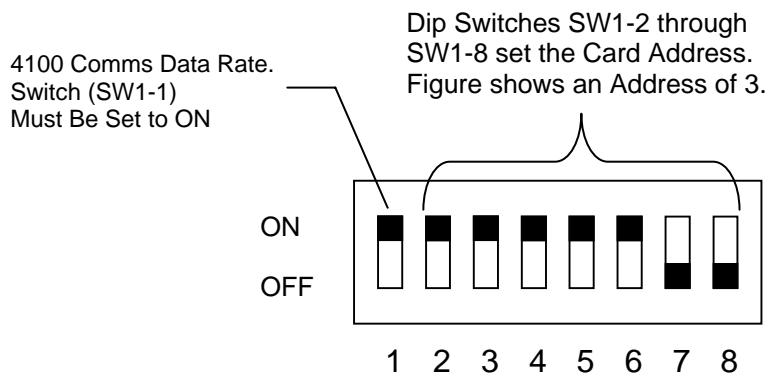


Figure 6-3. DIP Switch SW1

Wiring to IDNet Devices

Overview

Up to 250 IDNet slave devices, such as smoke detectors and manual call points, can be connected to the IDNet card using Class A (loop) or Class B (line) wiring, with the following restrictions.

Class A wiring allows the devices to communicate with the IDNet card even in the event of an open circuit somewhere in the loop. Class A wiring requires that two wires are routed from the IDNet card to each IDNet device, and then back again to the IDNet card. Under AS1670.1 every group of 40 devices (or less) must be separated by a Comms Isolator.

Class B wiring allows “T” tapping, and therefore requires less wiring distance per installation than Class A. IDNet wiring does not require end-of-line resistors, because each IDNet device communicates directly to the IDNet card. A maximum of 40 devices is allowed to be connected with Class B wiring.

See Appendix F for a list of compatible devices and their ratings.

Guidelines

- Use ferrite beads on wiring. See Figure 5.1.
 - Shielded cable is recommended in electrically noisy environments.
 - IDNet cabling should not be run adjacent to other cabling, especially non-fire system cabling, such as mains.
 - The limiting factors on the length of the twin core cable connecting the IDNet devices to the IDNet card are cable capacitance (attenuates the superimposed coms signal) and resistance (causes voltage drop of the supply voltage and comms signals).
 - The maximum capacitance of 0.58uF core to core must also include the mutual capacitance of core to earth. The latter is greatly increased when shielded cable is used.
 - Rather than do voltage drop calculations, the following simplified rules can be applied.
 - 125 devices or less: allow a maximum of 40Ω to any device (Class B), and in any loop (Class A).
 - 250 devices: allow a maximum of 20Ω in any loop.
 - 125 to 250 devices: linear de-rating between 40Ω and 20Ω can be applied. Calculate $R_L = 20\Omega \times (1 + (250-n)/125)$ where R_L is the allowable line resistance and n is the number of devices used.
Example: for 200 devices the maximum resistance allowed may be extended from 20Ω to: $20\Omega + 20\Omega \times (250 - 200) / 125 = 28\Omega$
 - Use the resistance specifications that apply to the cable being used. The values used in this manual allow 39Ω per km for 2 core of 1 mm² for copper wire at 49°C. (A commonly used value is 34Ω per km for 2 core of 1 mm² at 20°C). See Table 6.2. Note that this includes both cores.
 - Sounder bases and 6 point I/O modules do not draw the alarm load from the loop, but are powered from separate 24V terminals.
 - Where devices, e.g. sounder bases, are wired from a 24V source (e.g. supplied by 24V Aux Power or a NAC), and are in more than 1 zone, the power cable must also be isolated between zones by a 4090-9117AU Power Isolator Module.
-

Continued on next page

Wiring to IDNet Devices, *Continued*

Table 6-2 Cable Run Lengths

Notes

Wire Size	0.75 mm ²	1 mm ²	1.5 mm ²	2.5 mm ²	4 mm ²	Resistance
Distance	385 m	513 m	769 m	1,282 m	2,052 m	20Ω
Distance	769 m	1,026 m	1,538 m	2,565 m	4,104 m	40Ω

1. The current allowance per device on the loop is 0.5mA with the LED off, 2mA with the LED on. A maximum of 20 LEDs will be turned on at any time by the IDNet Card, e.g. in alarm.
2. The minimum voltage allowed at the furthest device to guarantee operation is 24.9Vdc. The IDNet boosts its output voltage from 30V to 35V during alarm.

Class A Wiring

To connect the IDNet card to devices using Class A wiring, read the following instructions and refer to the figure below.

1. Route wire from the IDNetB+, IDNetB- outputs on TB1 of the IDNet card to the appropriate inputs on a peripheral IDNet device.
2. Route wire from the first IDNet device to the next one. Repeat for each device.
3. Route wire from the last IDNet device to the IDNetA+ and IDNetA- inputs on TB1 of the IDNet card.
4. Separate every 40 devices (at most) with a communications isolator, e.g. 4090-9116.
5. Separate the power feed to sounder bases or 6 point I/O modules in different zones using the 4090-9117 Power Isolate module.

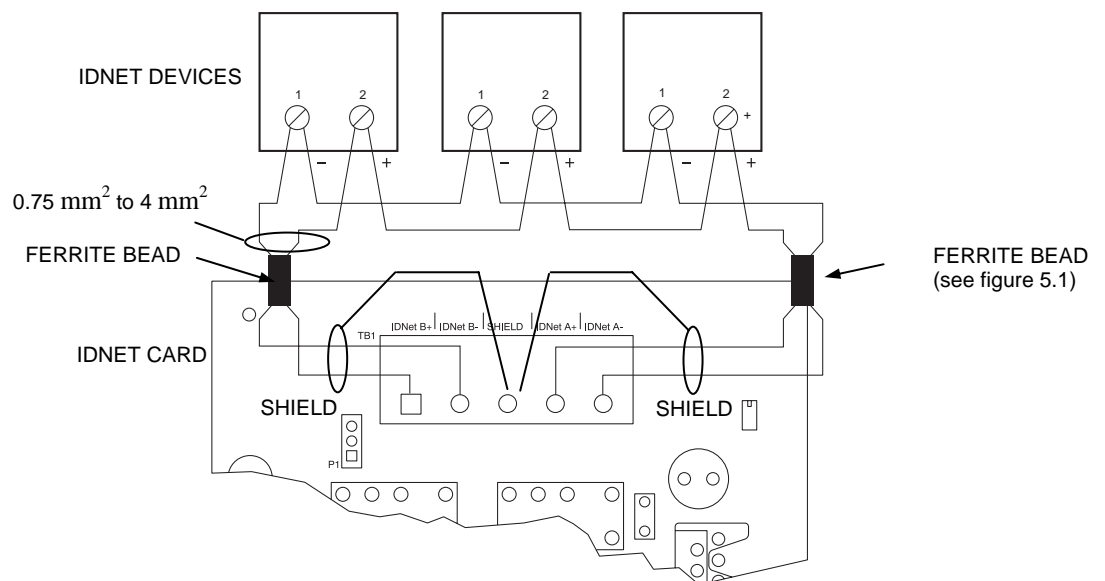


Figure 6-4. Class A (loop) Wiring

Continued on next page

Wiring to IDNet Devices, *Continued*

Class B Wiring

To connect the IDNet card to devices using Class B wiring, read the following instructions.

1. On TB1, jumper IDNetB+ to IDNet A+, and jumper IDNetB- to IDNetA-. If the jumper is absent, a Class A Trouble will be indicated on LED 2.
2. Route wire from the IDNetA+, IDNetA-, (or B+, B-) outputs on TB1 of the IDNet card to the first device, then on to the following devices.
3. Up to 40 devices maximum.
4. Sounder bases or 6 Point I/O modules in separate zones may not be wired in Class B (string).

The illustration below shows Class B wiring.

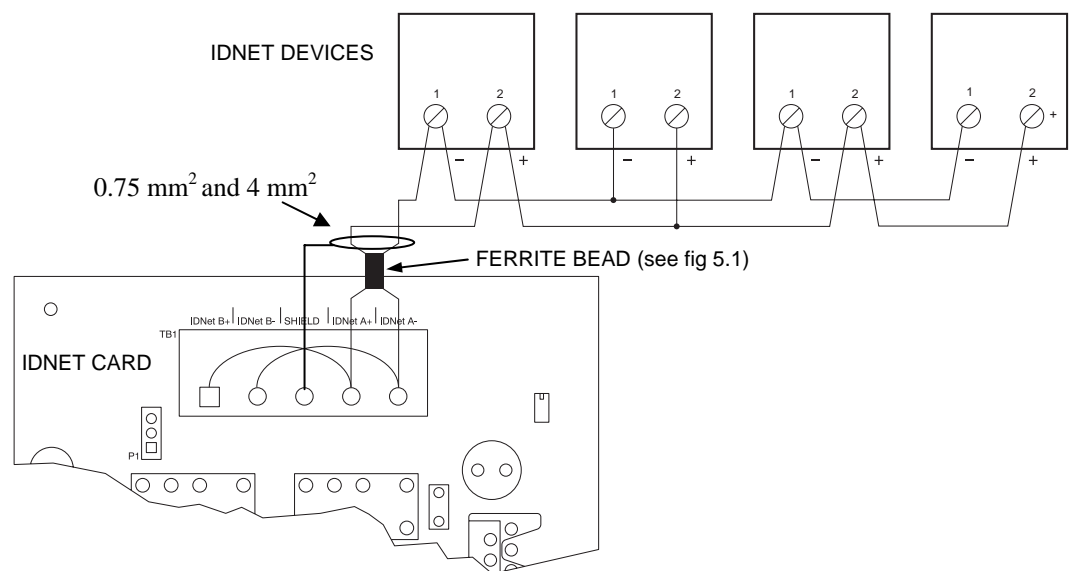


Figure 6-5. Class B (string) Wiring

Note: Maintain correct polarity on terminal connections. Do not loop wires under terminals.

Troubleshooting on IDNet

Overview

This section describes the messages that may appear on the 4100U-S1 display when using the IDNet card. Trouble messages appear on the left as titles, and possible causes are listed to the right in the text.

“IDNet Power Monitor Trouble”

There is no output voltage from the IDNet power supply. Replace the IDNet card.

“Extra Device”

Appears if one or more extra devices (i.e., devices that have not been configured for the IDNet channel) are found on the channel, or if a device is at an incorrect address. Only one message appears, regardless of the number of extra devices found. Viewing the trouble log will reveal the extra device address.

“Class A Trouble”

There is an open on the IDNet channel. After fixing the wiring fault, a hardware reset is required to reset the trouble.

“Earth Fault Search”

Appears while the IDNet card is searching for earth faults on the IDNet line. When this message is displayed, the IDNet card cannot show any alarms or other statuses.

Short Circuit

Appears when a short is detected on the IDNet channel. This status clears automatically when the short circuit is removed.

“Channel Fail”

Appears when devices have been configured, but none of the devices are communicating on the channel. This message does not appear if there are no configured devices on the IDNet channel.

“No Answer”

Appears when a device is missing.

“Bad Answer”

Appears when there is a faulty device or a noisy communications channel.

“Output Abnormal”

Occurs during any of these conditions:

- 24 V is not present on TrueAlarm devices.
 - TrueAlarm sensor bases with relay driver outputs are not properly supervised.
 - Isolator devices are in isolation mode.
-

Chapter 7

PC Software Connections

Introduction

The service port on the door with the Operator Interface enables the 4100U-S1 to connect to a PC running important utilities, such as diagnostics, programming, CPU firmware downloading, and channel monitoring.

In this Chapter

Refer to the page number listed in this table for information on a specific topic.

Topic	See Page #
Software Modes	7-2

Software Modes

Overview

The 4100U-S1 can connect to PC running important utilities, such as diagnostics, programming, CPU firmware downloading, and channel monitoring. It connects to the PC running all of these utilities via the service port on the CPU card.

Software Modes

There are three basic software modes that the service port or service modem can be used to connect to:

- Service and Diagnostics Mode
- Data Transfer Interface Mode
- Master Bootloader Interface Mode

Each mode is described below.

Service and Diagnostics Mode. This is the default functionality when a PC is connected to the 4100U-S1. On a PC, this mode provides application startup messages, an ASCII interface to a User Interface command set for diagnostics, and event reporting. The PC must be running suitable terminal emulation software (e.g., Hyperterm).

Important: When connecting via the service port, ensure your Flow Control is set to NONE in the Port Settings of your terminal emulator.

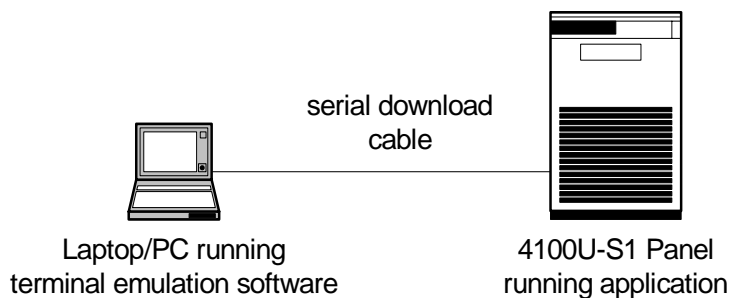


Figure 7-1. Service and Diagnostic Interface

Data Transfer Interface Mode. In this mode, the 4100U Programmer is used. This allows for slave downloading, as well as downloading a configuration and audio messages to the 4100U-S1, and uploading a configuration or history log. Connection to a PC is made via serial port or service modem.

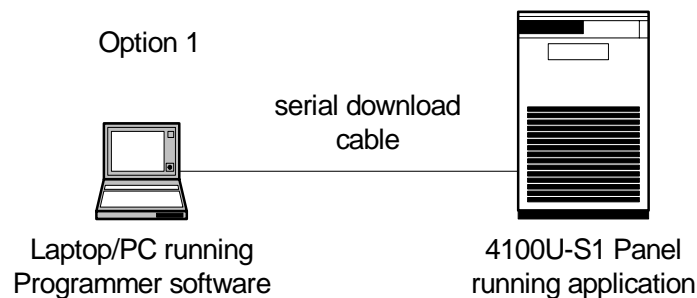


Figure 7-2. Data Transfer Interface

Software Modes, *Continued*

Continued on next page

Software Modes (*continued*)

Master Bootloader Interface Mode. This mode is used to download the Master CPU Exec firmware and the CFG.TXT file to the CPU via the serial port.

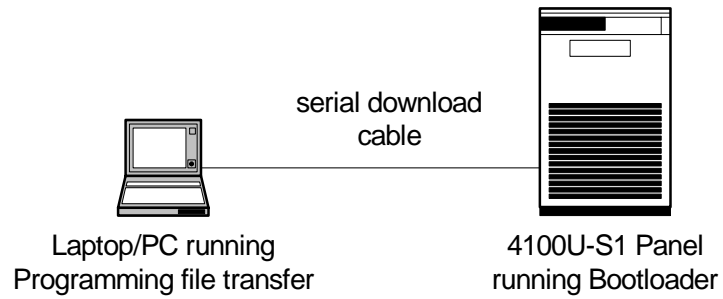


Figure 7-3. Bootloader Interface

Chapter 8

Installation Checklist, Commissioning & Maintenance

Introduction

The 4100U-S1 is tested in the factory and is loaded with a basic configuration.

When the panel arrives on site the installer must unpack and check the panel, mount the cabinet, any additional cards, and check the configuration before applying power.

A registered electrician must connect the mains. The panel should then be powered up and checked for correct operation.

With the mains turned off and the batteries disconnected, the field wiring is checked and connected to the field terminals on the various cards.

The panel should then be powered up and re-programmed to accommodate all the connected field devices. Faults in the field wiring, misaddressed detectors / devices and mismatched detectors / devices will be displayed on the LCD. These should be cleared one at a time and then the system (panel plus connected devices) should be commissioned.

In this Chapter

Refer to the page number listed in this table for information on a specific topic.

Topic	See Page #
Alignment & Adjustment	8-2
Power Up & Placing into Operation	8-3
Maintenance	8-4

Alignment & Adjustment

Overview

All the 4100U-S1 cards and modules in the base panel are tested and aligned in the factory before being supplied to the customer. The only field adjustment that may be necessary is to set the battery charger voltage. (Note this has been set and should not need re-adjusting).

R341 Battery Charger Voltage

Should the battery charger voltage need adjusting, the method is as follows:

1. Run the system with the batteries connected and the door closed for at least 30 minutes to allow components to "warm up" (the longer the better).
2. Calculate the required no-load battery charging voltage by taking 27.3V for 20°C and subtracting 0.1V for every 3°C above 20°C, or adding 0.1V for every 3°C below 20°C.
3. With the system not in Alarm, disconnect the batteries.
4. Measure the voltage at the battery terminals on the SPS and adjust this to the voltage calculated in Step 2 by turning pot R341 on the SPS.
5. Re-connect the batteries.

Power Up & Placing into Operation

To place the 4100U-S1 into operation, perform the following steps:

- STEP 1 Ensure that the Mains Switch is OFF.
- STEP 2 Ensure that 240 VAC is connected to the panel from the mains distribution switchboard.
- STEP 3 Ensure that the Lithium battery is fitted to battery holder on the CPU card, and link P3 is fitted to the BAT ON position.

 Turn the Mains Switch ON.
- STEP 4 Check that the green "MAINS ON" LED indicator is on.
 The Controller performs tests on its memory, electronics, and the LCD.
- STEP 5 Check that the buzzer sounds and the LCD display "CPU Serial Number".
- STEP 6 Check that the LCD has good visibility. Adjust the LCD Contrast control on the inside of the keyboard door, if necessary.
- STEP 7 Install and connect the batteries.
 Take care not to short the battery leads or connect in reverse polarity when connecting.
- STEP 8 Press the Lamp Test key on the control panel and check that all LEDs turn on, and the LCD shows all black squares.
- STEP 9 Clear any faults one at a time.

A full commissioning test must be carried out as per the requirements of AS 1670.1. Refer to the appendix in this manual for detail on checking wiring, and earth fault detection. Refer to the 4100U-S1 Operator's Manual LT0395 for detail of the walk test that may be used for verifying correct detector operation.

Maintenance

The 4100U-S1 system must be kept free from faults and tested on a weekly, monthly and annual basis to verify that it is operating correctly. The tests required by part 8 of the standard AS1851 Maintenance of Fire Protection Equipment are detailed in the 4100U-S1 Operator's Manual, LT0395.

The Operator's manual also provides detail of report printing and performing tests that are useful for checking the system.

Appendix A

Card Address DIP Switch

Overview

Addressable cards include a bank of eight DIP switches. From left to right (see Figure A-1, below) these switches are designated as SW_x-1 through SW_x-8. The function of these switches is as follows:

- **SW_x-1.** This switch sets the data rate for the internal 4100U communications line running between the card and the CPU. Set this switch to ON.
- **SW_x-2 through SW_x-8.** These switches set the card's address within the 4100U-S1. Refer to Table A-1 for a complete list of the switch settings for all of the possible card addresses.

Note: You must set these switches to the value assigned to the card by the 4100U Programmer.

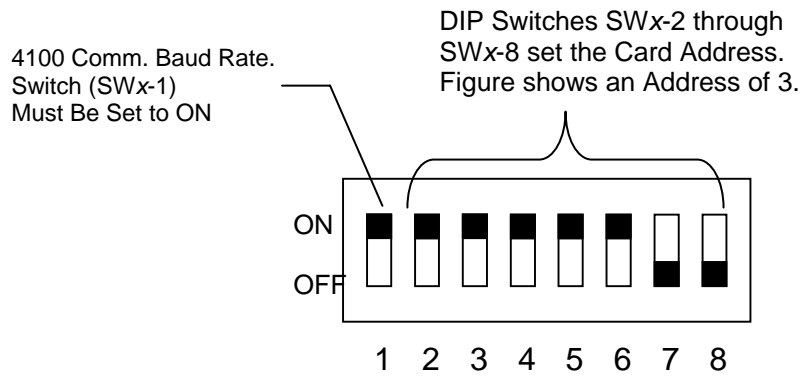


Figure A-1. DIP Switch SW_x

Continued on next page

Overview,
(continued)

Table A-1. 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	ON	OFF	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	ON	OFF	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								

Appendix B

Programming Requirements

Introduction

This appendix briefly summarises the programming that is required to comply with AS4428.1.

It does not provide equations or detail of programming. Refer to LT0400 4100U-S1 Programming & Configuration Reference for descriptions of the AS 4428.1 programming. The separate 4100U Programming Manual tells how to use the PC-based 4100U Programmer.

Required Features

The following is a list of functions that must be programmed under custom control. Functionality must comply with AS4428.1, and be as described in the Operator's Manual LT0395.

- Individual zone alarm indication, flashing until isolated, steady when isolated.
- Common Zone Alarm indication, flashing when any zone in alarm is un-isolated, steady when all zones in alarm are isolated.
- Individual zone isolate pushbutton and indication.
- Zone Alarm Test pushbutton and indication.
- Zone Fault Test pushbutton and indication.
- Warning System Isolate pushbutton and indication.
- External Bells Isolate pushbutton and indication.
- Ancillary Control Function and Isolate pushbutton and indication as required.
- Weekly 1 hour battery test.
- Fault indication after 8 hours of isolate.

The configuration templates for the 4100U-S1 all contain the necessary Custom Control equations for these functions. These settings should not be altered except under advice from Simplex.

Notes

- The US options for power supply and AVF are selected, not the Canadian ones.
 - Features that do not comply with AS4428.1 must not be enabled, e.g. Alarm cut-out times.
 - Features that are statutory in AS4428.1 must not be pass-code protected, e.g. zone isolate, zone test (Fault and Alarm).
-

Appendix C

Checking System Wiring

Overview

This appendix contains instructions on how to use a volt/ohm meter to check system wiring.

Using the Volt/Ohm Meter

When using the volt/ohm meter to check each circuit, make sure to adhere to the notes and instructions below.

Notes:

- Ensure that no power is applied to the 4100U-S1 fire alarm panel and that all wiring is properly connected (terminal blocks, LED/switch module ribbon cables, etc.).
- Use the earth stud in the control panel for all measurements to ground.
- Each circuit must test free of all grounds and extraneous voltages.

Use the volt/ohm meter as described in the steps below to check each circuit type.

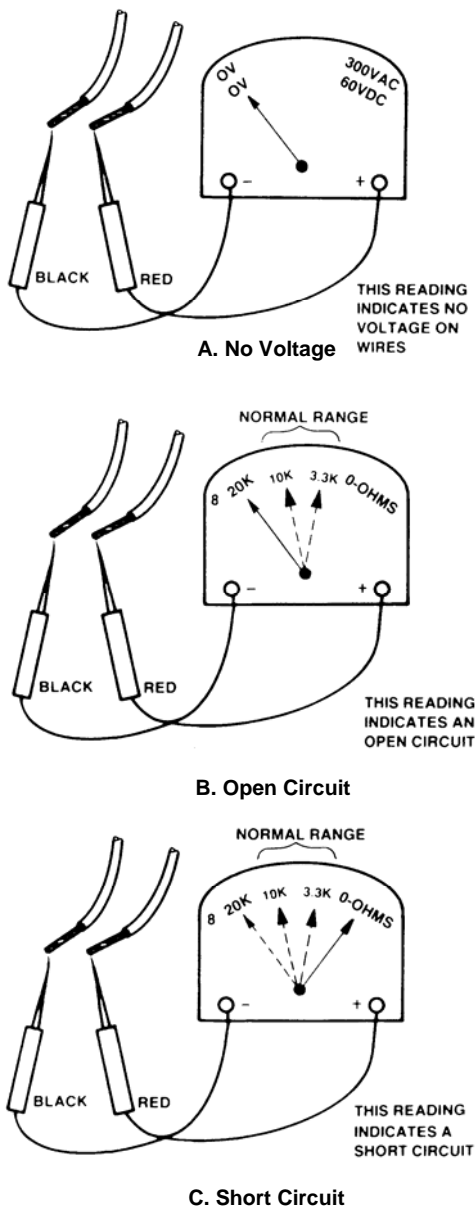


Figure C-1. Volt/Ohm Meter Readings

1. At the control panel, locate wires from each initiating device or indicating appliance circuit.
2. Check each circuit for extraneous voltage by setting the volt/ohm meter to 300VAC. Place the meter probes so that the black probe is on the “-” wire and the red probe is on the “+” wire. Meter readings must show 0 volts (see Figure C-1A).
3. Set the volt/ohm meter to 60 VDC and repeat step 2. The meter must read 0 volts (see Figure C-1A).
4. Set the volt/ohm meter to OHMS x 10 and place the meter probes as described in step 2. Check the circuits using the resistance measurements in Table C-1. Locate and correct any abnormal conditions at this time. **Note:** If the reading indicates an open circuit in an initiating circuit, make sure the smoke detector heads are properly mounted and seated. The circuit may be open if smoke detector power is not present, and if separately powered 4-wire devices are used.
5. Check all other system wiring to verify that each circuit is free of grounds and extraneous voltages.

Continued on next page

Appendix C: Checking System Wiring, *Continued*

Meter Readings

Table C-1 lists the correct meter readings for indicating appliances and initiating devices.

Table C-1. Acceptable Zone and Signal Circuit Meter Readings

Circuit Type	Meter Reading
Class B/Style B Initiating Device (Zone) Circuit	
From zone + to zone – (each zone)	3.3 K Ohms
From zone + to ground	Infinity
From zone - to ground	Infinity
Class A/Style D Initiating Device (Zone) Circuit	
From zone + to zone – (each zone)	Infinity
From zone + to ground	Infinity
From zone - to ground	Infinity
From zone + OUT to + IN	Less than 50 Ohms
From zone - OUT to - IN	Less than 50 Ohms
Class B/Style Y Notification Appliance Circuit (each signal circuit)	
From + to ground	Infinity
From - to ground	Infinity
Resistance across circuit: In one direction In opposite direction	10 K Ohms Less than 200 Ohms
Class A/Style Z Notification Appliance Circuit (each signal circuit)	
From + to ground	Infinity
From - to ground	Infinity
From zone + OUT to + IN	Less than 50 Ohms
From zone - OUT to - IN	Less than 50 Ohms
Resistance across circuit: In one direction In opposite direction	Infinity Less than 200 Ohms
Shielding	
Shield to ground	Infinity
Shield to -	Infinity
Shield to +	Infinity
MAPNET/IDNet II Loops (ZAMs and IAMs)	
From MAPNET/IDNet II + to ground	Infinity
From MAPNET/IDNet II - to ground	Infinity

Appendix D

Earth Fault Detection

Overview

This appendix contains instructions on how to use the Earth Fault Search feature of the 4100U-S1 diagnostics menus.

Earth Fault Search is a diagnostic search of external field wiring that assists in locating circuits with earth faults. An earth fault occurs when an electrical circuit is shorted to ground. Although most circuits operate with a single earth fault, multiple earth faults can disable communications. Because of this, earth faults must be located and repaired.

Earth Fault Search is conducted by the 4100U-S1. The diagnostic may be activated using either the front panel interface or the Computer Port Protocol via a service port.

The 4100U-S1 supports two types of Earth Fault Searches:

- **Location Search.** Searches all circuits at a location, such as the main panel.
 - **IDNet Channel Search.** Selectively enables channel isolators and repeaters to detect which segment of the channel wiring has a fault.
-

General Guidelines

Review the guidelines below before initiating an Earth Fault Search.

- The Detect Earth Fault jumper must be installed at the SPS for earth fault detection to occur.
- Only one power supply per location is configured to detect earth faults.
- For more reliable earth fault searching:
 - Use IDNet channel isolators to isolate channel faults to a specific segment of channel wiring.
 - Set IDNet channel isolator addresses to the lowest IDNet device addresses, increasing with communication distance from the IDNet card.
- If an earth fault is suspected on the IDNet channel with multiple isolators, start an IDNet Channel Search before doing a Location Search. If the Location Search is done first, it may not yield the correct location (this is a by-product of the extended amount of time required for the IDNet channel to initialize during a Location Search).
- Earth Fault Search detects only one fault at a time. Multiple faults require fixing the first fault and then repeating the search.
- The 4100U-S1 suspends normal operation for the duration of the Earth Fault Search.
- Location Earth Fault Searches optionally allow exclusion of auxiliary power circuits from the search, so that modules connected to the 24 V auxiliary outputs can remain in operation during the search.
- The option to exclude auxiliary power circuits does not apply to IDNet devices, because the entire IDNet communication channel is isolated during each search.
- During the search, all related troubles are suppressed and a single trouble pseudo-point is activated (P438).
- At the completion of the search, all slaves are restarted and normal panel operation resumes.
- Earth Fault Search is only supported by new 4100U modules. 4100 Legacy (slot format) modules are not supported, with the following exceptions:
 - IPS for earth fault detection (not recommended). The Earth Fault Search may fail because the isolation circuits of some 4100U slaves (such as the 4100U telephone slave) do not support IPS.

IMPORTANT: The fire panel cannot provide fire protection during an Earth Fault Search.

Earth Fault Searching from the Front Panel

Overview

This section describes how to conduct an Earth Fault Search, from selecting the appropriate access code to correcting the fault.

Access Level Selection

The panel must be at the appropriate access level (1, 2, 3, or 4) in order to run diagnostics. To get to the correct access level,

1. Press the Menu button. The following message comes up (press the Next or Previous buttons, if necessary, to display it):

```
Press <NEXT> or <PREVIOUS> to scroll  
Change Access Level?
```

5. Press the Enter button. Now you are prompted to log in or log out.

```
1=Login 2=Logout  
CURRENT ACCESS LEVEL = x
```

6. Press the "1" key on the numeric keypad to log in, so that the passcode prompt comes up.

```
Enter a Passcode followed by <ENTER>
```

7. Enter the passcode and press the Enter button. ACCESS GRANTED displays briefly on the LCD, and then the display goes back to:

```
1=Login 2=Logout  
CURRENT ACCESS LEVEL = y
```

You can now open the diagnostic menu as described in the next topic.

Starting the Earth Fault Search

To start an Earth Fault Search,

1. If necessary, press the Menu button to access the menus.
8. Press the Previous or Next buttons until the diagnostic functions option appears:

```
Press <NEXT> or <PREVIOUS> to scroll  
Diagnostic Functions?
```

9. Press the Enter button. Then press Next or Previous buttons until the Earth Fault Search option appears:

```
Press <NEXT> or <PREVIOUS> to scroll  
Earth Fault Search?
```

Continued on next page

Earth Fault Searching from the Front Panel, *Continued*

Starting the Earth Fault Search, Continued

10. Press the Enter button. The following options become available when you press the Next and Previous buttons:

Press <NEXT> or <PREVIOUS> to scroll Location Search
Press <NEXT> or <PREVIOUS> to scroll IDNet Channel Search
Press <NEXT> or <PREVIOUS> to scroll Last Search Result

The search types are described below. When you have determined what kind of search to initiate, display its option (one of the three shown above) and press the Enter button. Each option has its own topic, below.

Search Option A: Select Location

If you select the Location Search menu item, a list of cards to search becomes available. Use the Next and Previous buttons to scroll through the list.

If you find a card that you suspect is connected to a circuit with an earth ground, press the Enter button when that circuit is shown.

Before you can start the search, the Aux Power Select option comes up.

1=Exclude 2=Include Exclude AUXPWR circuits from search?
--

The number you select, 1 or 2, determines whether the auxiliary power circuit on the selected board is searched for earth grounds. If you exclude the auxiliary power circuit from the search, the circuit will continue to operate normally.

Press 1 (or just press the Enter button) to exclude the card's auxiliary power circuits from the search, or press 2 to remove auxiliary power circuits from normal operation and search them for earth grounds.

Now you are prompted to start the search. When the location you want to search is shown and "Press <ENTER> to start search" displays, the search is ready to start. A sample is shown below.

CARD 1, SYSTEM POWER SUPPLY Press <ENTER> to start search
--

NOTE: The 4100U-S1 suspends normal operation for the duration of the search.

Press the Enter button to start the search.

As the search progresses, watch the display for an indication of how much of the search has been completed. The search can be aborted at any time if you press the Clear button.

Earth Search In-Progress, Please Wait...
--

Earth Search In-Progress, Please Wait... 40%

Skip ahead to the "Completing the Search" topic.

Continued on next page

Earth Fault Searching from the Front Panel, *Continued*

Search Option B: Select Channel

If you select the IDNet Channel Search menu item, a list of IDNet channels to search becomes available. Use the Next and Previous buttons to scroll through the list. When the IDNet channel you want to search is shown and "Press <ENTER> to start search" displays, the search is ready to start. A sample screen is shown below.

```
IDNET CHANNEL M12
Press <ENTER> to select for search
```

NOTE: The 4100U-S1 suspends normal operation for the duration of the search.

Press the Enter button to start the search.

As the search progresses, watch the display for an indication of how much of the search has been completed. The search can be aborted at any time if you press the Clear button.

```
Earth Search In-Progress, Please Wait...
```

```
Earth Search In-Progress, Please Wait...
                               40%
```

Skip ahead to the "Completing the Search" topic.

Search Option C: Last Search Result

This option simply displays the last Earth Fault Search result. If there has been no search since the last system startup, or if the last search was aborted, the panel displays "RESULT NOT AVAILABLE."

Completing the Search

When a Location or IDNet Channel Search completes, all of the following occurs:

- All slaves automatically reset.
- The 4100U-S1 turns off the Earth Fault Search trouble pseudo-point.
- The panel displays the specific fault information.

The panel can return only one Earth Fault Search result at a time. If another fault exists, it can only be found using the diagnostics after the first fault is cleared. Faults will continue to appear, one by one, until each one has been found and corrected.

IMPORTANT: Once you have been directed to an earth fault and corrected it, it is recommended that you restart the system (warm- or cold-start).

Continue to the next topic for a list of search results and their required actions.

Search Results

Overview

There are several types of results that can display at the end of an Earth Fault Search. This section covers all types of results.

IMPORTANT: Once you have been directed to an earth fault and corrected it, it is recommended that you restart the system (warm- or cold-start).

Non-Point Faults

A non-point fault indicates a ground that cannot be traced to an addressable point (for example, a shield or an audio riser). The earth fault in this example is not occurring at the audio controller but somewhere in the riser:

```
CARD 17, ANALOG AUDIO CONTROLLER
AUDIO RISER 1                                EARTH FAULT
```

Non-point faults can be displayed for each of the following items:

- Channel Output (IDNet Card; MAPNET Interface Card)
 - RUI Channel (Master Controller Card). (Not used in 4100U-S1).
 - Channel 1 to 3 (TrueAlert Power Supply). (Not used in 4100U-S1).
-

Point Faults

A point fault indicates an earth fault at a specific addressable point. The example below is a location earth fault search result, where 3 is the card address, 10 is the point number, and 0 is the sub-point number (not used):

```
CARD 003, FLEX 50 AMPLIFIER
3-10-0                                EARTH FAULT
```

Point faults can be found at any point in the system that connects to field wiring.

Some IDNet channel point fault examples are illustrated below.

Fault not cleared. The message below shows that an IDNet channel that has been isolated for fault detection still has the earth fault:

```
CARD 2, IDNET CARD (250 POINTS)
M1, EARTH FAULT SEARCH FAULT CLEAR FAIL
```

Fault between channel output and first isolator. The message below shows a fault between the IDNet channel output and the first isolator on the line:

```
CARD 2, IDNET CARD (250 POINTS)
M1, CHANNEL OUTPUT                                EARTH FAULT
```

Continued on next page

Search Results, *Continued*

Point Faults, Continued

IDNet isolator fault. The message below shows a fault detected after the IDNet isolator was turned on:

CARD 2, IDNET CARD (250 POINTS)
M1-3, IDNET ISOLATOR EARTH FAULT

Fault Not Found

If the message in the lower right corner of the LCD reads **FAULT NOT FOUND** (for a Location Earth Fault Search) or **FAULT CLEAR FAIL** (for an IDNet Channel Earth Fault Search), it means the search could not locate the fault, but it acknowledges that a fault exists.

There are three main possibilities behind this message:

- There are one or more internal wiring earth(s) in the system.
- There are system defects (hardware or software, such as a failed isolation circuit).
- An intermittent earth exists in the system (it occurs inconsistently and is therefore difficult to track via diagnostics).
- The cable to the service port may be grounded due to the remote PC's 3-pin plug. Run the laptop on batteries only, or, use an isolating transformer to the PC to get rid of this earth.
- The fault is on an auxiliary output that was excluded from the search.

The problem may have to be found manually and then corrected in some of the above scenarios.

No Fault

If the message in the lower right corner of the LCD reads **NO FAULT**, it means the IDNet channel search could not locate any earth faults on that channel.

Result Not Available

If the message in the lower right corner of the LCD reads **RESULT NOT AVAILABLE**, it means there is no result to view. This message comes up only when you have selected "Last Search Result" on the menu.

Appendix E

Related Documentation

The following manuals are relevant. Other Australian 4100U manuals may be found on the TSP website.

Book Part Number	Title
LT0395	4100U-S1 AS4428 FIP OPERATOR'S MANUAL A5
LT0393	4100U-S1 ASE & AIU/PPU DOOR INSTALL INSTRUCTIONS
LT0400	4100U-S1 PROGRAMMING AND CONFIGURATION REFERENCE
LT0307	4100 Field Wiring Diagrams

The following is a listing of US 4100U documentation that may be relevant to 4100U-S1.

Book Part Number	Title
574-197	4100U Fire Alarm Operator's Manual (US version)
574-674	4100/4120-Series MAPNET Isolator Modules Installation Instructions
574-772	4100U XPS and XNAC Installation Instructions
574-800	4100U IDNet Cards Installation Instructions
574-839	4100U City and Relay Cards Installation Instructions
574-848	4100U Fire Alarm System/ System Installation Guide (US version)
574-849	4100U PC Programmer Programming Manual
579-182	4100/4120-Series NIC and Media Modules Installation Instructions
579-184	4100/4120-Series Physical Bridges and 4100/4120-Series Media Modules Installation Instructions
579-205	4100/4120-Series Class A / Class B Zone Modules Installation Instructions
579-220	4100/4120-Series Relay Modules Installation Instructions
579-221	4100/4120-Series Dual RS-232/2120 Modules Installation Instructions

Continued on next page

Appendix E: Related Documentation, *Continued*

Book Part Number (cont.)	Title (cont.)
579-182	4100/4120-Series NIC and Media Modules Installation Instructions
579-184	4100/4120-Series Physical Bridges and 4100/4120-Series Media Modules Installation Instructions
579-205	4100/4120-Series Class A / Class B Zone Modules Installation Instructions
579-220	4100/4120-Series Relay Modules Installation Instructions
579-221	4100/4120-Series Dual RS-232/2120 Modules Installation Instructions
579-229	4100U Upgrade Kits Installation Instructions
579-246	4100U SPS/RPS Installation Instructions
579-248	4100-0632 Terminal Block Utility Module Installation Instructions

Appendix F

Compatible Actuating Devices

Introduction

This appendix describes the following:

- Devices that have been approved as compatible devices for use with the 4100U-S1.
- Devices approved for use with the IDNet and shows the number allowed per loop.

In this Chapter

Refer to the page number listed in this table for information on a specific topic.

Topic	See Page #
List of Approved Devices	F-1
Compatible Detectors, IDNET	F-4
Compatible Addressable Field Devices, IDNet	F-5

List of Approved Devices

Simplex Range - Conventional Detectors

4098-9413	Heat detector Type A
4098-9414	Heat detector Type B
4098-9415	Heat detector Type C
4098-9416	Heat detector Type D
2098-9201	Photoelectric smoke detector
2098-9576	Ionisation smoke detector
4098-9618EA	Heat detector Type A
4098-9619EA	Heat detector Type B
4098-9621EA	Heat detector Type D
4098-9621A	Heat detector Type C
4098-9601EA	Photoelectric smoke detector
4098-9603EA	Ionisation smoke detector

Tyco Range - Conventional Detectors

Detector Type	4090-9101 Monitor ZAM	4100-5001/2/4 8 Zone Module	2190-9156 Monitor ZAM
614CHCO/Heat Detector	25	37	25
614I Ionisation Detector	29	40	29
614P Photo-electric Detector	19	28	19
614T Heat Detectors - Type A, B, C, D	20	30	20
T614 Heat Detectors – Mk2 Type A, B, C, D	20	30	20

System Sensor Range - Conventional Detectors

Detector Type	4100-5001/2/4 8 Zone Module	2190-9156 Monitor ZAM	4090-9101 Monitor ZAM
885WP-B Weatherproof Heat Detector Type B @	40	40	40

@ Remote indicator output cannot be wired in common with Tyco 614 series or the Minerva M614 series (and most other Tyco/Olsen) detectors.

Continued on next page

List of Approved Devices, *Continued*

Hochiki Range - Conventional Detectors

DCA-B-60R MK V	Type A heat detector
DCC-A	Heat Type A
DCC-C	Heat Type C
DCD-A	Heat Type A
DCD-C	Heat Type C
DFE-60B	Type B heat detector
DCA-B-90R MK 1	Type C heat detector
DFE-90D	Type D heat detector
DFG-60BLKJ	Type B heat detector
DFJ-60B	Heat Type B
DFJ-90D	Heat Type D
SPA-AB	Beam type smoke detector
SIH-AM	Ionisation smoke detector
SIF-A MK 1	Smoke
SIJ-ASN	Smoke
SLK-A	Photoelectric smoke detector
SLG-A MK 1	Smoke
SLG-AM MK 1	Photoelectric smoke detector
SLR-AS	Smoke
HF-24A MK 1	Ultraviolet smoke detector
YBC-R/3A	Plain - non indicating base
YBF-RL/4AH4	LED Indicating base

Olsen Range - Conventional Detectors

B111B	Beam type smoke detector
C24B	Ionisation smoke detector
C29BEX	Ionisation smoke detector
FW81B	Heat detector cable, Type E
P24B	Photoelectric smoke detector
P29B	Photoelectric smoke detector
R23B	Infrared flame detector
R24BEX	Dual spectrum infrared flame detector
T54B	Probe type heat detector type E
T56B	Heat detector types A,B,C,D with Z55B base
T56B	Heat detector types A,B,C,D with Z54B base
V41B/V42B	Ultraviolet flame detector

Apollo Range - Conventional Detectors

Series 60 Heat detector Type A
Series 60 Heat detector Type B
Series 60 Heat detector Type C
Series 60 Heat detector Type D
Series 60 55000-310 Aus Photoelectric smoke detector
Series 60 55000-240 Aus Ionisation smoke detector

Continued on next page

List of Approved Devices, *Continued*

Brooks Range - Conventional Detectors

PFS-A	Heat detector Type A
PFS-B	Heat detector Type B
PFS-C	Heat detector Type C
PFS-D	Heat detector Type D
PFS-P	Photoelectric smoke detector
PFS-P MK II	Photoelectric smoke detector
PFS-I	Ionisation smoke detector
PFS-I MK II	Ionisation smoke detector

Cerberus Range - Conventional Detectors

D01191A	Beam
DL01191A	Beam

Simplex MAPNET 2 Range – Addressable Field Devices

2190-9156	Mapnet 2 Monitor ZAM
2190-9162	Mapnet 2 Signal ZAM
2190-9164	Mapnet 2 Control ZAM
2190-9169	Mapnet 2 Line Powered Short Circuit Isolator
2190-9172	Mapnet 2 Supervised IAM
2190-9173	Mapnet 2 Loop powered 2 Point Input / Output Module
4099-9032NL	Mapnet 2 Addressable Manual Call Point

Compatible Detectors, IDNET

The following lists the detectors approved for use with IDNet and shows current rating and numbers allowed per loop.

Device Type	Operating Current mA	Maximum Number Allowed Per Loop	Maximum Number Allowed Per Line
4098-9714E Analogue Photoelectric Smoke Detector	0.5 (2 with LED on)	250	40*
4098-9717E Analogue Ionisation Smoke Detector	0.5 (2 with LED on)	250	40*
4098-9733E Analogue Heat Type A & B Detector	0.5 (2 with LED on)	250	40*
4098-9754E Analogue Multi (Heat/Photo) Detector	0.5 (2 with LED on)	250	40*

* Maximum allowed by AS1670.1.

The 9714E, 9717E and 9733E detectors use a (4098-) 9789E addressable base or 9794E addressable sounder base, or 9793 addressable isolator base. The 9754E uses a 9796E addressable base or 9795E sounder base.

The maximum specified loop/line resistance is 40Ω.

The maximum number of LEDs switched on during Alarm on an IDNet loop is 20.

Compatible Addressable Field Devices, IDNet

The following lists the addressable devices approved for use with IDNet and shows current rating and numbers allowed per loop.

Device Type	Operating Current mA	Maximum Addressable Point On Analogue Loop	Maximum Addressable Points on Analogue Line
4090-9116 IDNet Comms Isolator	0.5 (2 with LED on)	250	40*
4090-9118 Relay IAM with T-sense	0.5 (2 with LED on)	250	40*
4090-9117 Addressable Power Isolator	0.5 (2 with LED on)	250	40*
4090-9119 Relay IAM with unsupervised Input	0.5 (2 with LED on)	250	40*
4090-9120 6 Point I/O	0.5	250	40*
4090-9001 Supervised IAM	0.65 (2.8 with LED on)	250	40*
4090-9101 Monitor ZAM	0.65 (2.8 with LED on)	250	40*
4099-9032 Manual Call Point	0.65 (2.8 with LED on)	250	40*

* Maximum allowed by AS1670.1.

The maximum specified loop/line resistance is 40Ω.

The maximum number of LEDs switched on by an IDNet in alarm is 20.

The 6 Point I/O LED is powered from the external 24V supply, not from the loop.

Note: The relays on the 6 Point I/O are not approved for switching field loads, i.e. the contacts may only be used to switch loads within an earthed cabinet.

Appendix G

4100U-S1 Specifications

General

System Capacity	500 points of addressable devices, plus 500 points of annunciation.
Expansion	up to 4 x 4100 legacy cards up to 4 x 4" x 5" PDI cards
Cabinet Size	1050H x 550W x 280D (mm)
Cabinet Material	1.2mm Zintec
Cabinet Finish	Powder coated
Cabinet Colour	Cream Wrinkle external, flat black internal trim
Mounting	Wall mount
Mains Input	240V AC, +6%, -10%, 50Hz
Internal Power Supply	24V DC @ 9A
Standby Battery	24V sealed lead acid type up 40Ah
Battery Charger	27.3V DC (nominal)
PSU Supervision	Charger high/low, Battery low/fail
Temperature	-5°C to 45°C
Humidity	10% to 90% RH non-condensing

Refer to Table 4-1 and 4-2 for full SPS specifications.

Fuses

Alarm Relay Card
F1 Alarm, 3A, 15 x 5mm, Glass Cartridge
F2 Supervisory, 3A, 15 x 5mm, Glass Cartridge
F3 Trouble, 3A, 15 x 5mm, Glass Cartridge

Fused Distribution Board
F1 24V Out, 1A 20 x 5mm Glass Cartridge
F2 24V Out, 1A 20 x 5mm Glass Cartridge
F3 24V Out, 1A 20 x 5mm Glass Cartridge
F4 24V Out, 1A 20 x 5mm Glass Cartridge

Firmware Features

- WALK TEST System Test
 - 4 Operator Access Levels
 - Event Historical Logging
 - Device selectable Alarm Verification
 - Individual Zone Isolate
 - Addressable device disable/enable
 - Non-volatile Flash EPROM for field editable program changes
 - Expansion cards firmware upgraded via download to flash EPROMs
-

Voltage & Current Ratings of Modules & Assemblies

The DC input voltage range of the following modules is 18-33Vdc. The current listed is nominal for 24Vdc, and may be used for battery capacity calculations.

Module	Name	Quiescent	Alarm
N/A	Master Controller Assembly (includes SPS, CPU, CPU Motherboard with RUI I/F, Operator Interface with LCD)	373mA	470mA
4100-6035	Alarm Relay Card	15mA	37mA
4100-3101	IDNet Module without Devices - per device add - with 250 devices add	75mA 0.8mA 200mA	115mA 1mA 250mA
4100-1288 4100-1289	64/64 Controller plus Switch LED Modules - no LED on - per LED on add - with 64 LEDs on add	20mA 3mA 210mA	3mA 210mA
4100-0620	Transponder Interface, Basic Unit	87mA	87mA
4100-0625	Transponder Interface, Local Mode	112mA	112mA
4100-6014	Network Interface Card	28mA	28mA
4100-6056	Wired Media Module	55mA	55mA
4100-6057	Fibre Optic Media Module	25mA	25mA
4100-6038	Dual RS232 Interface	132mA	132mA

Appendix H

Power Supply & Battery Capacity Calculations

Power Supply

Part of the system design includes calculating that the quiescent load and the alarm load are each less than the rating of the power supply.

Note that the quiescent load includes devices such as door holders that are normally energized, but get switched off during alarm.

The SPS rating is included in the specifications in Chapter 6.

Note that the system current for both the quiescent and the alarm state can be viewed on the front panel by use of the System Current status point under Card Status for the SPS.

Refer to AS1670.1 Section 8.2.3 for a definition of the loads to be calculated.

Battery Capacity

Battery capacity requirements are specified in AS1670.1, 2004, Section 3.16.4 with an example shown in Appendix C1.

To calculate the necessary capacity for the 4100U-S1 system:

- Fill out the table on the next page with the quantities of each type of module or device.
- For each device, calculate the standby current and alarm current.
- Sum the standby and alarm columns to get the total standby current (I(S)) and alarm current (I(A)).

Calculate the required battery capacity from this equation:

$$\text{Battery Capacity (Ahr)} = (I(S) \times 24 + 0.5 \times I(A)) \times 1.2$$

Note: I(A) allows for two zones in Alarm (including Ancillary loads).

The factor of 1.2 in Battery Capacity equation allows for battery efficiency reduction.

Take the calculated value of Battery Capacity and choose the next largest standard size of battery. The 4100U-S1 cabinet can accommodate 2 x 40Ahr batteries.

The following batteries are compatible with the 4100U-S1.

- Power Sonic PS12 Series
 - Century Power Sonic PS12 series
 - Sonnenschein A200 Series
 - Sonnenschein A300 Series
 - Century Yuasa NP Series
 - Auscell CJ12 series
 - Power Block PB12 series
-

Module	Description	Qty	Standby Current (A)		Alarm Current (A)	
			each	Subtotal	each	Subtotal
FP0934	4100U-S1 Basic Panel		0.373		0.47	
4100-1288	64/64 LED Switch Controller (1st controller per bay)		0.02		0.26	
4100-1289	64/64 LED Switch Controller (2nd controller per bay)		0.02		0.26	
4100-3101	IDNET module with 250 addressable devices		0.275		0.365	
4100-0113	RS232 Modem Interface		0.13		0.13	
4100-0154	VESDA HLI		0.13		0.13	
4100-3003	8XSPDT,3A,24VDC Relay module		0.03		0.28	
4100-3024	24 I/O Relay Motherboard + (4100-0302)		0.08		0.3	
4100-4321	6 Supervised Relays		0.02		0.07	
4100-5004	8 AZF Monitor Zone		0.08		0.2	
4100-6014	Modular Network Card (Requires 2 media cards)		0.028		0.028	
4100-6056	Wired Media Card RS485		0.055		0.055	
4100-6057	Fibre Optic Media Card		0.025		0.025	
4100-0160	Fire Panel Internet Interface Module		0.115		0.115	
4100-0766	T-GEN 50 on Amplifier Bracket Voice (2 Slots)		0.05		2.2	
4100-0895	MiniGen on Amplifier Bracket		0.00		0.9	
4100-2895	2nd MiniGen on same Amplifier Bracket		0.00		0.9	
2190-9156	ZAM Monitor - Mapnet 2		0.02		0.09	
2190-9162	ZAM Signal - Mapnet 2		0.015		0.065	
2190-9164	ZAM Control - Mapnet 2		0.01		0.04	
4090-9101	Mapnet / IDNet Monitor ZAM		0.016		0.072	
4090-917AU	Addressable IDNet Power Isolator		0.01		0.01	
4090-9120AU	IDNet 6 Point I/O Module (4 I/Ps + 2 relay O/Ps)		0.03		0.03	
4090-9050	ZAM 4-20mA Analog - Mapnet 2		0.03		0.03	
4098-9794E	Sounder Base - TrueAlarm				0.015	
4907-0012	Evac Tone Sounder - 24VDC				0.018	
Other Loads						
Other Loads						
Total Power Supply Capacity			I (S) =		I(A) =	

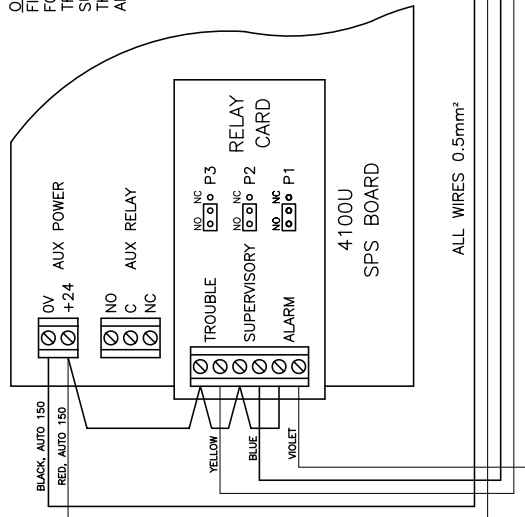
Appendix I

List of Drawings

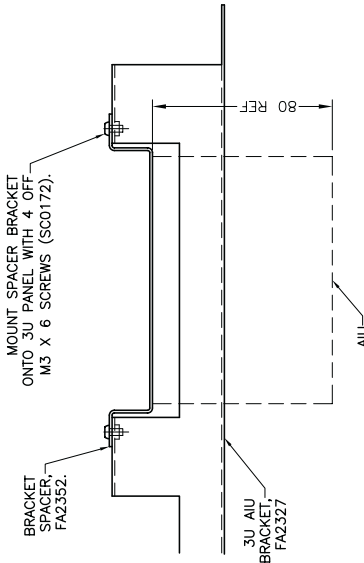
The following drawings are included since they are referred to in the manual or are relevant.

1901-267	Sheet 2, 4100U AIU/PSU Wiring Assembly Drawing
1976-176	4100U-S1 Presentation Drawing
1976-174	4100U-S1 Brigade Door Assembly Sheet 1 ASE, Sheet 3 PPU/AIU

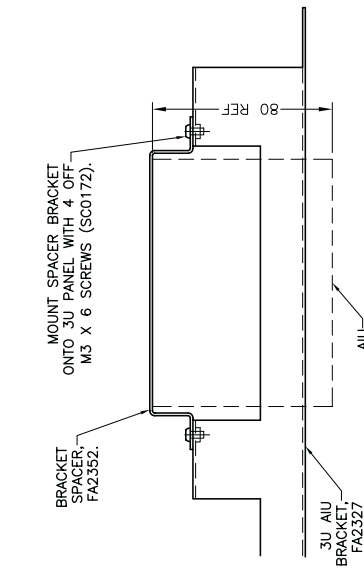
ON RELAY CARD FIT THE LINKS P1, P2, P3 TO THE NO POSITION FOR NORMALLY OPEN CONTACTS. TROUBLE = FAULT SUPERVISORY = ISOLATE THE RELAYS ARE NORMALLY DE-ENERGISED AND ENERGISE ON THE RESPECTIVE STATUS.



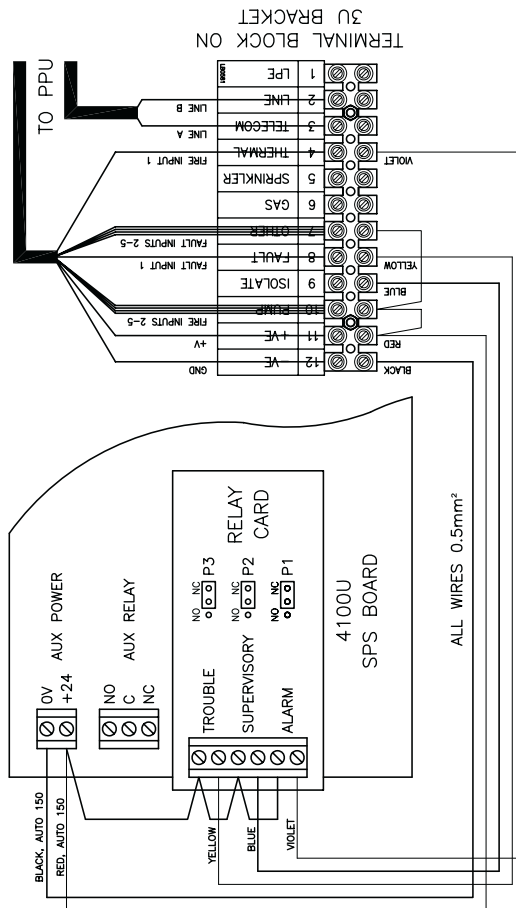
WESTERN AUSTRALIA AIU WIRING



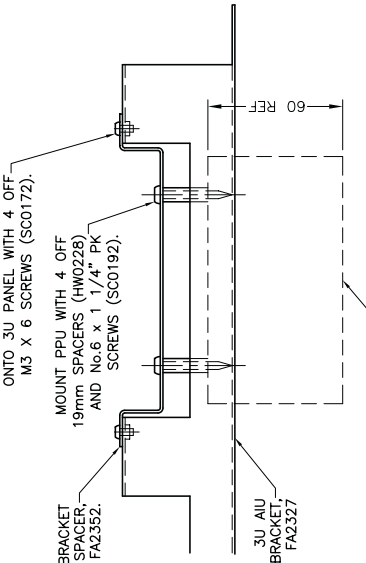
AIU BRACKET ASSEMBLY FOR 18U, 28U AND 40U RACK CABINETS



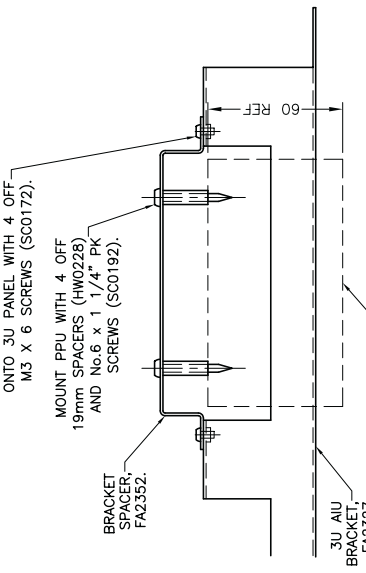
AIU BRACKET ASSEMBLY FOR 15U AND 21U RACK CABINETS



QUEENSLAND PPU WIRING



PPU BRACKET ASSEMBLY FOR 18U, 28U AND 40U RACK CABINETS



PPU BRACKET ASSEMBLY FOR 15U AND 21U RACK CABINETS

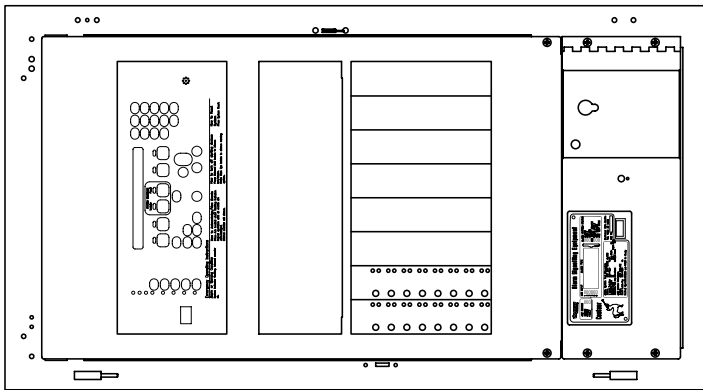
ON RELAY CARD FIT THE LINKS P1, P2, P3 TO THE NC POSITION FOR NORMALLY CLOSED CONTACTS. TROUBLE = FAULT SUPERVISORY = ISOLATE THE RELAYS ARE NORMALLY DE-ENERGISED AND ENERGISE ON THE RESPECTIVE STATUS.

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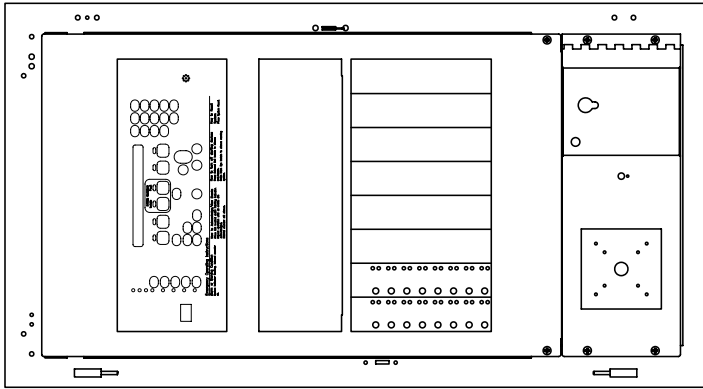
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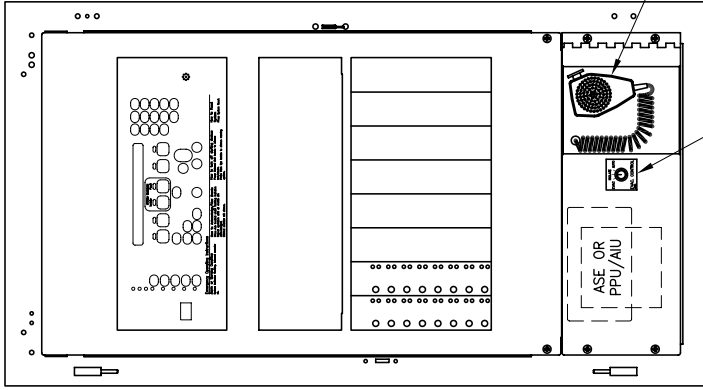
4100U
 AIU/PPU TO SPS WIRING
 LITERATURE MASTER
 DRAWING No: 1901-267 SHEET 2 of 2
 A2 ISS/REV A PART No: LT0316



ASE DOOR



PPU/AIU DOOR



T-GEN ACCESSORIES
(FIT EITHER DOOR TYPE)

NOTE: BRIGADE DOORS MUST BE ORDERED SEPARATELY.

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3rd ANGLE PROJECTION

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4100U SP1
21U X 240 DEEP CABINET
PRESENTATION DRAWING

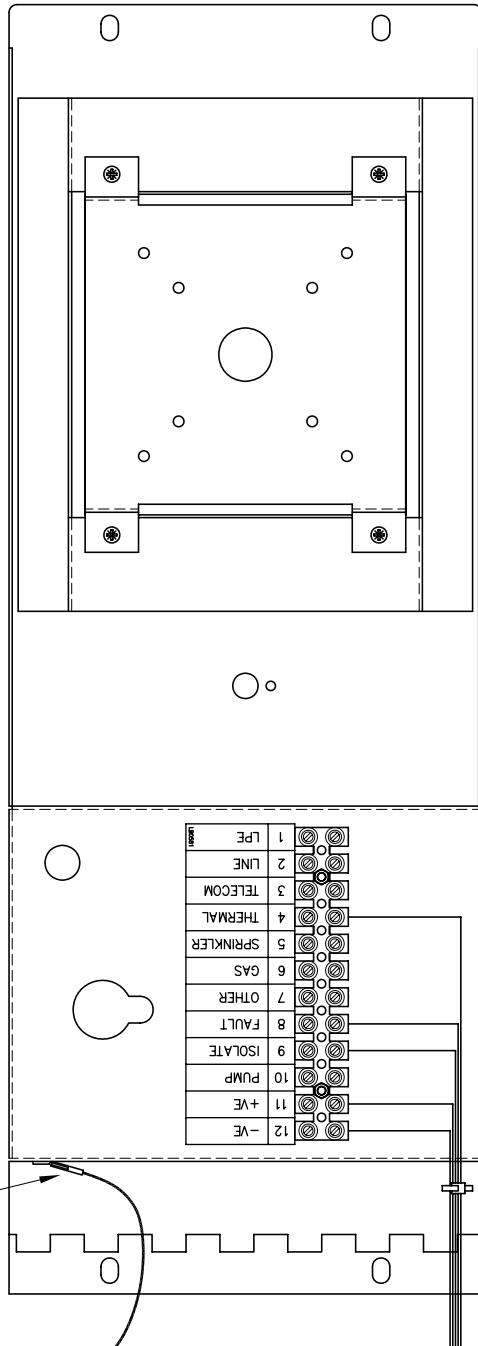
DRAWING No: 1976-176 SHEET 2 of 2

A3 ISS/REV A PART No: FP0934

FIX M4 LUG END OF THE DOOR EARTH LOOM TO BAY 6/32 UNC STUD WITH 6/32 NUT AND M4 SHAKEPROOF WASHERS SUPPLIED.

FIT THE EARTH LOOM ON THE DOOR 4.8mm SPADE TERMINAL.

WIRE 4U AIU/PPU DOOR TO SPS BRD AND RELAY BRD AS PER DRAWING 1901-267 SHEET 2.



INSTALLATION WIRING

FIT 4U DOOR EARTH LOOM TO BAY 6/32 UNC STUD.

NOTES:

- REFER TO LITERATURE LT0316 (DRAWING 1901-267 SHEET 2) FOR MORE WIRING DETAILS.

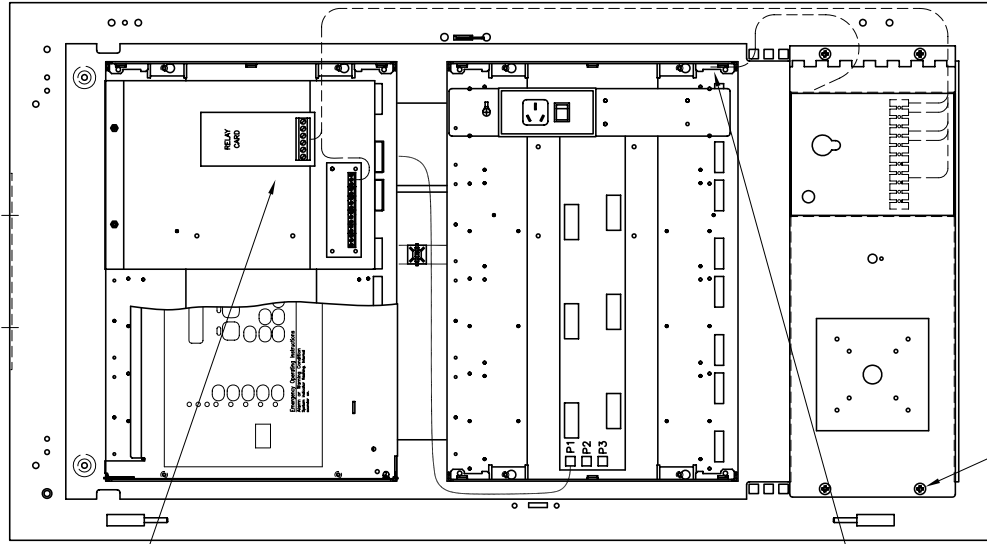
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3rd ANGLE PROJECTION

CABINET INSTALLATION

- MOUNT AIU/PPU DOOR WITH
- 4 OFF M6 X 12 SCREW, (SC0058)
 - 4 OFF FLAT M6 WASHER, (WA0008)
 - 4 OFF M6 CAGE NUT, (NT0030).



ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
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4100U-S1

AIU/PPU 4U DOOR
 WIRING DETAILS

DRAWING No: 1976-174 SHEET 3 of 4

A3 ISS/REV A PART No: FP0937



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