



**COMSPHERE
-48 Vdc CENTRAL OFFICE
POWER UNIT**

INSTALLATION GUIDE

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COMSPHERE –48 Vdc Central Office Power Unit

Installation Guide
3000-A2-GB41-40

5th Edition (May 1998)

Changes and enhancements to the product and to the information herein will be documented and issued as a new release.

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Important Safety Instructions

1. Read and follow all warning notices and instructions marked on the product or included in the manual.
2. This product is intended to be used with a three-wire grounding type plug — a plug which has a grounding pin. This is a safety feature. Equipment grounding is vital to ensure safe operation. Do not defeat the purpose of the grounding type plug by modifying the plug or using an adaptor.

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3. Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these slots and openings must not be blocked or covered.
4. Do not allow anything to rest on the power cord and do not locate the product where persons will walk on the power cord.
5. Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous high voltage points or other risks. Refer all servicing to qualified service personnel.
6. General purpose cables are provided with this product. Special cables, which may be required by the regulatory inspection authority for the installation site, are the responsibility of the customer.
7. When installed in the final configuration, the product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. If necessary, consult with the appropriate regulatory agencies and inspection authorities to ensure compliance.
8. A rare phenomenon can create a voltage potential between the earth grounds of two or more buildings. If products installed in separate buildings are **interconnected**, the voltage potential may cause a hazardous condition. Consult a qualified electrical consultant to determine whether or not this phenomenon exists and, if necessary, implement corrective action prior to interconnecting the products.
9. In addition, if the equipment is to be used with telecommunications circuits, take the following precautions:
 - Never install telephone wiring during a lightning storm.
 - Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
 - Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface
 - Use caution when installing or modifying telephone lines.
 - Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
 - Do not use the telephone to report a gas leak in the vicinity of the leak.

Notices

⚠ WARNING:

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

The authority to operate this equipment is conditioned by the requirements that no modifications will be made to the equipment unless the changes or modifications are expressly approved by Paradyne Corporation.

⚠ WARNING:

To Users of Digital Apparatus in Canada:

This Class A digital apparatus meets all requirements of the Canadian interference-causing equipment regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du règlement sur le matériel brouilleur du Canada.

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Preface

Objectives and Reader Assumptions

This guide contains installation information for the COMSPHERE® –48 Vdc Central Office (CO) Power Unit which is designed to be used with COMSPHERE 3000 Series Carriers.

It is assumed that you are familiar with the functional operation of data equipment, digital network services, data service units (DSUs), dial/lease modems, T1 channel service units (CSUs) and T1 data service units/channel service units (DSU/CSUs).

Abstract

Chapter 1 provides descriptive information about the –48 Vdc CO Power Unit.

Chapter 2 provides installation consideration information and procedures for installing an optional second power module, setting the option straps, installing the –48 Vdc CO Power Unit, providing power to the power unit, installing a Shared Diagnostic Control Panel (SDCP), connecting to a CO Alarm System or a COMSPHERE 6800 Series Network Management System (NMS), and installing an optional air filter and brackets.

Chapter 3 describes the status indicators on the faceplate of the power module. It also provides troubleshooting guidelines and replacement instructions for the power module, and a preventive maintenance schedule for the optional air filter.

Appendix A contains interface connector pin assignment information.

The **Glossary** provides definitions for acronyms and product-specific terms used in this guide.

The **Index** lists key terms, acronyms, concepts, and sections in alphaorder.

Related Documents

3000-A2-GA31 *COMSPHERE 3000 Series Carrier Installation Manual*

Contact your sales or service representative to order additional product documentation.

Paradyne documents are also available on the World Wide Web at:

<http://www.paradyne.com>

Select *Service & Support* → *Technical Manuals*

Introduction 1

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Overview

The COMSPHERE –48 Vdc Central Office (CO) Power Unit is designed to provide low voltage dc power to any data communication equipment (DCE) operating in a COMSPHERE 3000 Series Carrier.

The –48 Vdc CO Power Unit (hereafter referred to as the CO Power Unit) consists of the following components:

- One CO power tray with mounted backplane
- One power module
- Two backplane connector cable assemblies
- Two air filter brackets
- One installation kit which includes the following:
 - Two dc input connector housings and six contacts for the customer-supplied dc input cable
 - Four air filter bracket screws
 - Two nylon cable ties

You must supply the following related components:

- A second power module, if desired.
- One or two –48V power input cables. The required number of input cables depends upon your configuration.
- One air filter, if needed.

- Alarm cables and NMS adapter cable, if needed. These components are used to connect the CO Power Unit to a CO alarm system and/or a COMSPHERE 6800 Series Network Management System (NMS) through a Modular 3611 Data Service Unit (DSU).

(A Modular 3611 DSU has a row of contacts on the rear edge of the circuit card and is shipped with a rear connector plate. The rear connector plate allows the removal of a Modular 3611 DSU from the front of the carrier without first disconnecting the DTE cables at the rear of the carrier. The NMS adapter cable is only compatible with the Modular 3611 DSU. For more information on the Modular 3611 DSU, see the COMSPHERE 3600 Series Data Service Units, Models 3610 and 3611, Operator's Guide.)

The total number of components required depends upon your configuration. The ACCULINK 3151 CSUs and 3161 DSU/CSUs do not support forwarding of CO Power Unit alarms to a 6800 Series NMS.

The CO Power Unit can send alarms to a CO alarm system and a 6800 Series NMS simultaneously. To connect to a CO alarm system, you need one customer-supplied alarm cable for each power module. To forward alarms to a 6800 Series NMS, you need one Modular 3611 DSU (configured to forward alarms to a 6800 Series NMS) and one NMS adapter cable. You can also use a non-modular Model 3611 DSU, but you must build your own cable. This guide provides information on forwarding alarms to a 6800 Series NMS via a Modular 3611 DSU, but reminds you that a non-modular Model 3611 DSU can also be used.

NOTE

Customer-supplied cable assemblies must comply with items 5 and 6 of the *Important Safety Instructions* at the front of this guide.

For more information on the alarm cables and NMS adapter cable, see [Appendix A](#) of this guide.

Part numbers for the CO Power Unit and its related components are listed in [Appendix B](#) of this guide.

Features

The CO Power Unit provides the following features:

- Enables DCEs supported by the COMSPHERE 3000 Series Carrier to operate in a –48 Vdc central office environment.
- Provides the following three modes of operation:
 - **Basic mode** – the mode in which the single power module supplies power to the entire carrier. This mode of operation is the only mode available for the CO Power Unit with one power module.

- **Redundant mode** – the mode in which two power modules supply power to the entire carrier. If one power module fails, the remaining power module assumes the full load of the carrier. To operate in this mode of operation, you must install an optional second power module in the CO Power Unit.

- **Independent mode** – the mode in which each of the two power modules supplies power to one-half of the carrier. To operate in this mode of operation, you must install an optional second power module in the CO Power Unit.

- Provides forced air cooling for the carrier via a –48 Vdc fan in the power module.
- Provides an optional air filter which prevents dust from entering the CO Power Unit and the COMSPHERE 3000 Series Carrier.
- Detects power module and fan failures by monitoring the power output levels and the fan's low-speed sensor for proper operation of the power module. When a failure occurs, an alarm indication light appears on the power module's faceplate.
- Sends power failure and/or fan failure alarms to a CO alarm system and/or a 6800 Series NMS via a Modular 3611 DSU.

[Figure 1-1](#) illustrates the CO Power Unit with one power module in the left side of the CO power tray. In Basic mode, the single power module can be installed in either the left or right side of the CO power tray. [Figure 1-2](#) illustrates the CO Power Unit with two power modules.

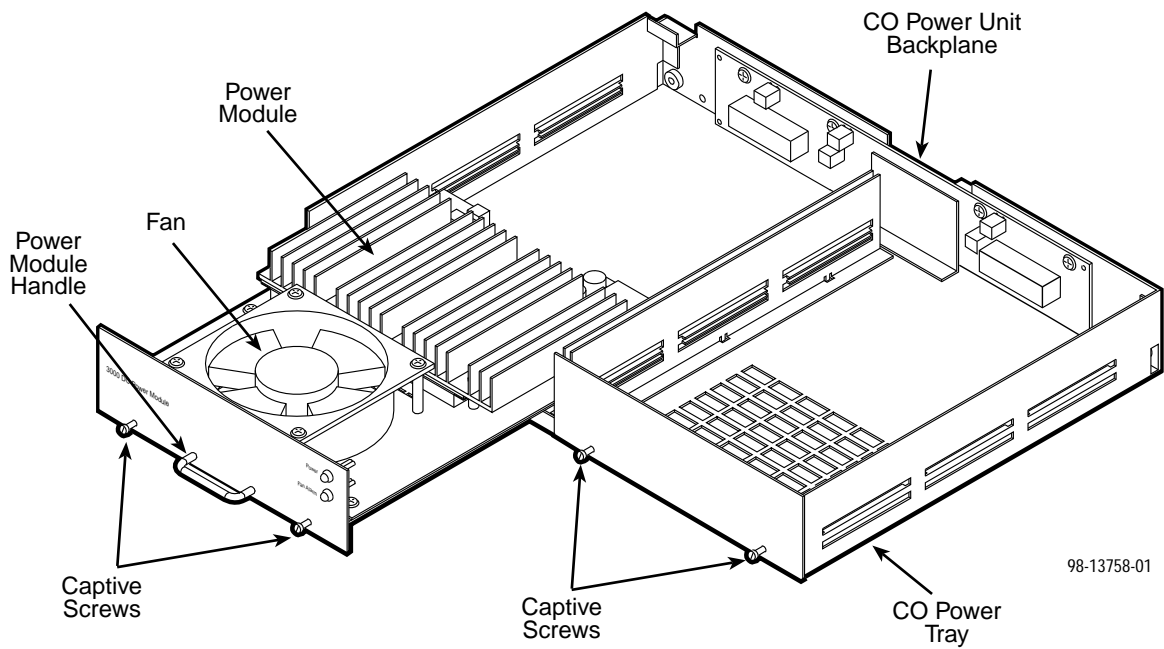


Figure 1-1. Central Office (CO) Power Unit with One Power Module

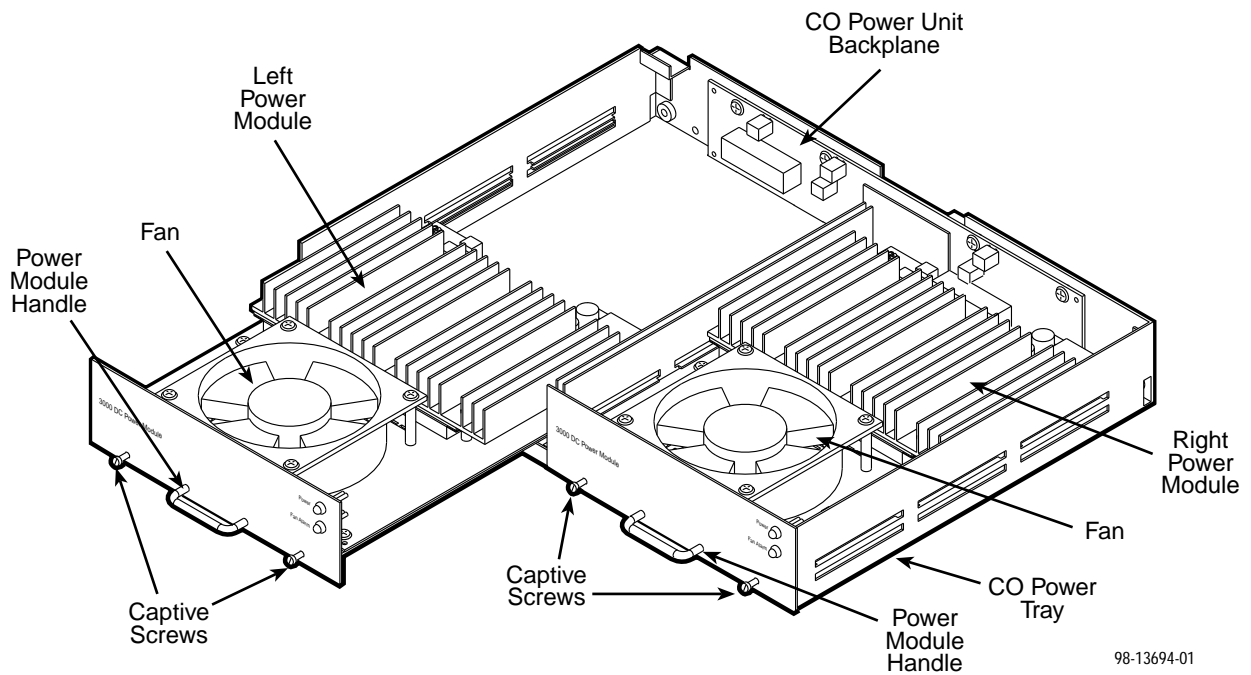


Figure 1-2. Central Office (CO) Power Unit with Two Power Modules

Technical Specifications

Technical specifications for the CO Power Unit (which includes one power module) are listed in [Table 1-1](#).

Table 1-1
(1 of 2)
Technical Specifications for Central Office (CO) Power Unit

Technical Specifications	Criteria
ENVIRONMENT	
Operating Temperature	32°F (0°C) to 122°F (50°C) (See the <i>Installation Considerations</i> section in Chapter 2 for additional operating temperature limits.)
Relative Humidity	5% to 95% (noncondensing)
Storage Temperature	–4°F (–20°C) to 158 5F (70°C)
Shock and Vibration	Withstands normal shipping and handling
POWER REQUIREMENTS	
CO Power Unit (with 16 fully equipped 3611 DSUs in the carrier)	–60 Vdc to –40 Vdc (4.5 amps maximum)
CO Power Unit (with 16 fully equipped 3151 CSUs in the carrier)	–60 Vdc to –40 Vdc (2.3 amps maximum)
CO Power Unit (with 16 fully equipped 3161 DSU/CSUs in the carrier)	–60 Vdc to –40 Vdc (4.8 amps maximum)
HEAT DISSIPATION (MAX.) AT –48 Vdc	
CO Power Unit (with 16 fully equipped cards in the carrier)	160 watts (CO Power Unit efficiency is approximately 76%)
PHYSICAL DIMENSIONS	
CO Power Unit	
Height	2.4 inches (6.2 cm)
Height (including air filter brackets)	3.0 inches (7.7 cm)
Width	16.9 inches (43.3 cm)
Depth	13.5 inches (34.6 cm)
Power Module	
Height	2.4 inches (6.2 cm)
Width	8.5 inches (21.8 cm)
Depth	11.7 inches (30.0 cm)
Air Filter	
Height	0.5 inches (1.3 cm)
Width	14.2 inches (36.4 cm)
Depth	5.5 inches (14.1 cm)

**Table 1-1
(2 of 2)
Technical Specifications for Central Office (CO) Power Unit**

Technical Specifications	Criteria
WEIGHT	
CO Power Unit (includes one power module)	10.6 pounds (4.8 kg)
CO Power Unit (includes two power modules)	15.8 pounds (7.2 kg)
Power Module	5.2 pounds (2.4 kg)
Air Filter	0.2 pounds (0.1 kg)
CENTRAL OFFICE (CO) ALARM RELAY CONTACTS	0.1 amp maximum at 70 Vdc maximum
APPROVALS	
Underwriters Laboratories, Inc. (UL) Recognized Component	Recognized component as part of 3000 Series Carrier, UL 1950
Canadian Standards Association (CSA) Certified Component	Certified Component as part of 3000 Series Carrier, CSA 22.2 No. 950

Equipment Warranty and Support

If you experience trouble with this equipment, please contact your sales or service representative (as appropriate) for repair or warranty information. If the product needs to be returned to the company service center for repair, contact them directly for return instructions using one of the following methods:

- **Via the Internet:** Visit the Paradyne World Wide Web site at <http://www.paradyne.com>
- **Via Telephone:** Call our automated call system to receive current information via fax or to speak with a company representative.
 - Within the U.S.A., call 1-800-870-2221
 - Outside the U.S.A., call 727-530-2340

If the trouble is causing harm to the telephone network, the telephone company may request that you remove the equipment from the network until the problem is resolved.

Installation 2

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Overview

The CO Power Unit consists of one power module in a CO power tray. When installed, the CO Power Unit provides low voltage dc power to the DCEs in the carrier. This chapter provides information on how to install the CO Power Unit into a COMSPHERE 3000 Series Carrier.

Installation Considerations

The CO Power Unit is shipped with one power module and operates in Basic mode. With an optional second power module the CO Power Unit can be configured to operate in either Independent mode or Redundant mode. If you order a second power module for your CO Power Unit, you must determine the mode in which you wish to operate *before* installing the CO Power Unit.

NOTE

The CO Power Unit installation procedure must be performed by a qualified service personnel.

In addition, if you want to forward alarms to a 6800 Series Network Management System (NMS), you must connect the CO Power Unit to the external leads of a Modular 3611 DSU. Model 3151 CSUs and Model 3161 DSU/CSUs do not support forwarding of CO Power Unit alarms to a 6800 Series NMS. To access these external leads, use an NMS adapter cable to connect the external leads of a Modular 3611 DSU to the CO Power Unit.

This section describes the three modes of operation and provides information you need to know in order to send alarms to a 6800 Series NMS.

Basic Mode of Operation

The CO Power Unit with one power module operates in Basic mode. In this mode of operation, the single power module supplies power to the entire carrier.

When stacking multiple carriers equipped with CO Power Units with single power modules, you must install the power module in each of the CO Power Units in alternating sequence (that is, left side, right side, left side, right side, etc.) for proper cooling. For example, if the CO Power Unit in the bottom carrier has its power module installed in the left side of the CO power tray, the carrier

directly above the bottom carrier should have its power module installed in the right side of its CO power tray. Then, the next carrier directly above should have its power module installed in the left side of its CO power tray, and so on for the remainder of the carriers in the cabinet. For information on removing and installing a power module, see the *Power Module Replacement Instructions* section in Chapter 3.

With the power modules placed in alternating sequence, the maximum operating ambient temperatures listed in **Table 2-1** are permitted.

Independent Mode of Operation

In the Independent mode of operation, the left power module (as viewed from the front of the carrier) powers Slots 1 through 8 of the carrier and the right power module powers Slots 9 through 16 of the carrier. The Shared Diagnostic Unit (SDU), contained in Slot 0, is powered by both power modules. If a power module fails, only the service to that side of the carrier is disrupted. The other side of the carrier is unaffected. Do *not* remove a

failed power module until a replacement is available. To replace a power module, see the *Power Module Replacement Instructions* section in Chapter 3 of this guide.

When the power modules are configured for Independent mode of operation, up to six carriers can be mounted in a cabinet. The maximum ambient temperature is 50°C.

The –48 Vdc input can be provided in one of two powering options:

- Using two separate –48 Vdc power sources and two input power cables.
- Using one –48 Vdc power source and two input power cables.

For maximum reliability, use the first option. For more information on these powering options, see the *Providing Power to a CO Power Unit* section.

To change the mode of operation, see the *Setting the Option Straps* section.

**Table 2-1
Maximum Ambient Temperatures Permitted**

Maximum Ambient Temperature	Allowable Number of Stacked COMSPHERE 3000 Series Carriers in a Cabinet		
	3551 and 3611 DSUs without DBMs, 3511 DSUs, 3151 and CSUs ²	3551, 3611, and 3616 DSUs with DBMs and 3811 Modems ²	3161 DSU/CSUs ¹
122°F (50°C)	4	2	See Note 4
113°F (45°C)	5	3	1 ³ , 2
104°F (40°C)	6	4	3
95°F (35°C)	6	5	4
86°F (30°C)	6	5	5
77°F (25°C)	6	6	6

NOTES:

- ¹ These operating ambient temperatures can be increased by 5°C by placing 3161 DSU/CSUs in cooler slots (2, 3, 4, 5, 10, 11, 12, 13), or by leaving a slot empty next to each 3161 DSU/CSU.
- ² Use the strictest cooling requirements when there is a mixture of units installed.
- ³ Requires a power module on each side, otherwise the ambient temperature must be restricted to 35°C.
- ⁴ A single carrier, equipped with two power modules, can operate at 50°C provided the cooler slots (2, 3, 4, 5, 10, 11, 12, 13) are used.

Redundant Mode of Operation

In the Redundant mode of operation, both power modules share the load (that is, both modules supply power to all slots in the carrier). If one power module fails, the remaining power module assumes the full load of the carrier. Operation of the CO Power Unit continues, but it is recommended that you replace the failed power module as soon as possible. Do not remove a failed power module until a replacement is available. For instructions on how to replace a power module, see the *Power Module Replacement Instructions* section in Chapter 3 of this guide.

When the power modules are configured for Redundant mode of operation, up to four carriers can be mounted in a cabinet and meet the stated maximum temperature operating limits of 50°C. The reduction of carriers per cabinet is necessary to compensate for the loss of cooling capability if one of the power modules fails. If the operating temperature limit in the room is less than 45°C, then up to five carriers can be mounted in a cabinet. If the operating temperature limit in the room is less than 40°C, then up to six carriers can be mounted in a cabinet.

The –48 Vdc input can be provided in one of three power options:

- Using one –48 Vdc power source and one fused input power cable.
- Using one –48 Vdc power source and two fused input power cables.
- Using two separate –48 Vdc power sources and two fused input power cables.

The second power option is more reliable than the first power option because it protects the CO Power Unit against a short circuit failure in the input circuit of one power module from interrupting the power source to the other power module. However, the third power option is the most reliable for the Redundant mode of operation because it protects against short circuit and input power failures. For more information on these powering options, see the *Providing Power to a CO Power Unit* section. To change the mode of operation, see the *Setting the Option Straps* section.

Alarm Forwarding to a 6800 Series NMS

In order to send power module failure and fan failure alarm signals to a 6800 Series NMS, you must have a Modular 3611 DSU (configured to forward alarms to a 6800 Series NMS) and an NMS adapter cable. (Model 3151 CSUs and Model 3161 DSU/CSUs do not support this feature.) When these components are properly configured and alarm conditions occur, alarm signals are sent to the 3611 DSU and then routed to the 6800 Series NMS where an alarm event is reported to the NMS operator. (Remember, you can also use a nonmodular Model 3611 DSU, but you must build your own adapter cable to connect Pin 9 of the EIA 25-pin male connector to Pin 6 of the modular plug for the +12 Vdc source, Pin 19 of the EIA 25-pin male connector to Pin 2 of the modular plug for the fan alarm, and Pin 23 of the EIA 25-pin male connector to Pin 1 of the modular plug for the power alarm).

For the Basic or Independent mode of operation, the Modular 3611 DSU (configured for alarm forwarding) must be installed in a different carrier in the cabinet (that is, a carrier in the cabinet other than the one you want to manage). This arrangement enables you to send alarms to the 6800 Series NMS even if one of the CO Power Unit's power modules fails. If the Modular 3611 DSU is installed in the same carrier, a power module failure will disrupt alarm forwarding to the 6800 Series NMS. In the Independent mode of operation, a power module failure disrupts service to one-half of the carrier. If that half of the carrier contains the Modular 3611 DSU (configured for alarm forwarding), then the DSU is inoperable and is unable to forward alarms.

NOTE

In the Redundant mode of operation, you may want to install the Modular 3611 DSU (configured for alarm forwarding) in a different carrier in the cabinet in the unlikely event of a double power module failure.

For information on connecting the CO Power Unit to a 6800 Series NMS, see the *Connecting the Alarm Contacts to a 6800 Series NMS* section.

CO Power Unit Installation

The CO Power Unit is installed at the bottom of the carrier. You will need a large, flat-blade screwdriver to install the CO Power Unit and a medium, flat-blade screwdriver to set the option straps.

NOTE

If you plan to use two power modules in your CO Power Unit, you must install the second power module before proceeding to Step 1. (See the *Installing the Optional Second Power Module* section.)

The following is an overview of the CO Power Unit installation procedure:

► Procedure

1. Set the option straps on the CO Power Unit's backplane to the desired mode of operation. (See the *Setting the Option Straps* section.)

If your CO Power Unit has a single power module, you do not need to set the option straps. The option straps are factory set for the Basic mode of operation. However, you should compare the option strap setting on backplane to the strap settings listed in *Table 2-2* in the *Setting the Option Straps* section to ensure correct settings.

2. Install the CO Power Unit into the carrier. (See the *Installing the CO Power Unit* section.)
3. Provide power to the CO Power Unit. (See the *Providing Power to a CO Power Unit* section.)

4. Install the Shared Diagnostic Control Panel (SDCP) on the carrier in which you installed the CO Power Unit, if desired. (See the *Installing an SDCP* section.)
5. Connect the alarm contacts for the CO Power Unit to a CO alarm system and/or a Modular 3611 DSU, if desired. (See the *Connecting the Alarm Contacts to a CO Alarm System* section or the *Connecting the Alarm Contacts to a 6800 Series NMS Via a Modular 3611 DSU* section.)

Steps 4 and 5 are optional.

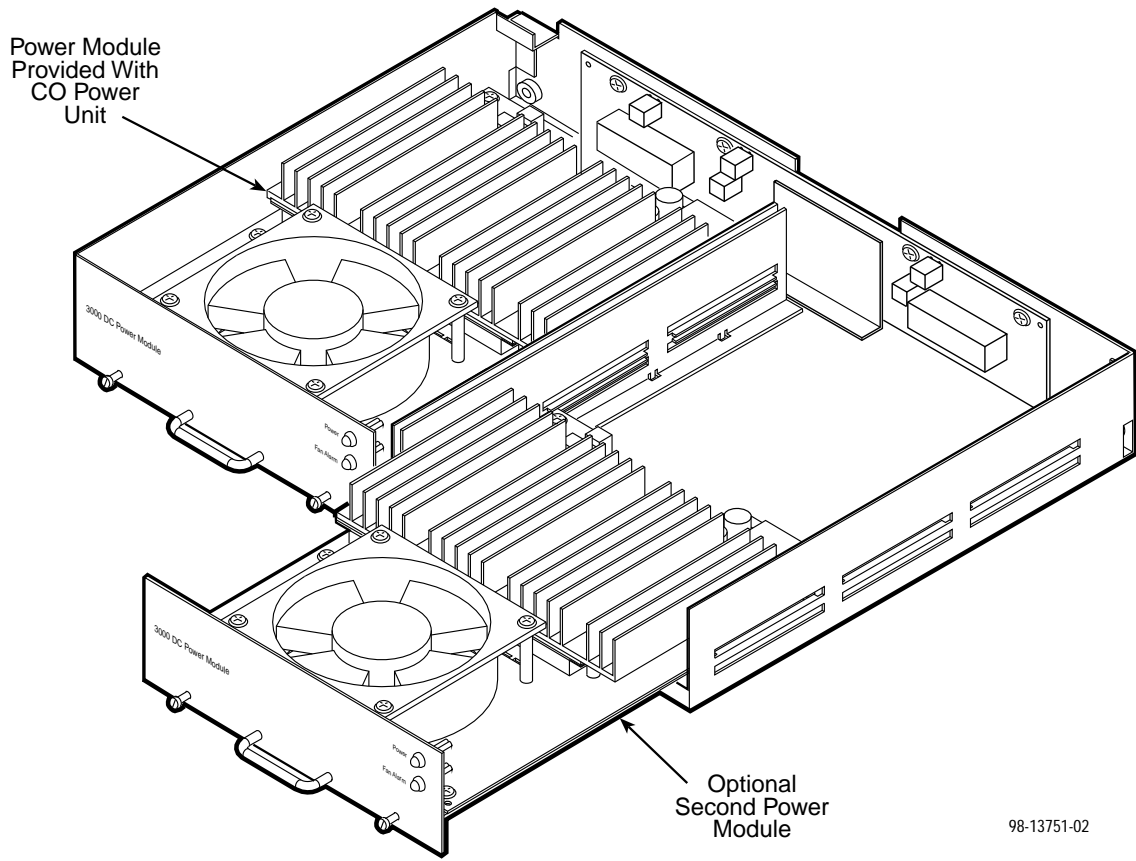
Installing the Optional Second Power Module

You can order a second power module for your CO Power Unit. This additional power module allows you to choose between two modes of operation: Redundant or Independent. You must install the optional second power module into the CO power tray before installing the CO Power Unit into the carrier.

To install the optional second power module:

► Procedure

1. Remove the coverplate by loosening the two captive screws on the bottom of the coverplate.
2. Place the second power module in the card guides on the right side of the CO power tray (as viewed from the front of the tray) and then slide power module to the rear of tray. See *Figure 2-1*.
3. Tighten the two captive screws on the bottom of the power module's faceplate.



98-13751-02

Figure 2-1. Installing the Optional Second Power Module

Setting the Option Straps

The option straps are screw switches that are set by raising (loosening) or lowering (tightening) the screw to break or make the contact. There are five option straps, S1 through S5, on the CO Power Unit’s backplane (see Figure 2-2).

NOTE

Older power modules have straps labeled S1 and S2. These should always be in the raised position.

**Table 2-2
Settings for Basic Mode**

S1 Lowered
S2 Lowered
S3 Lowered
S4 Lowered
S5 Lowered

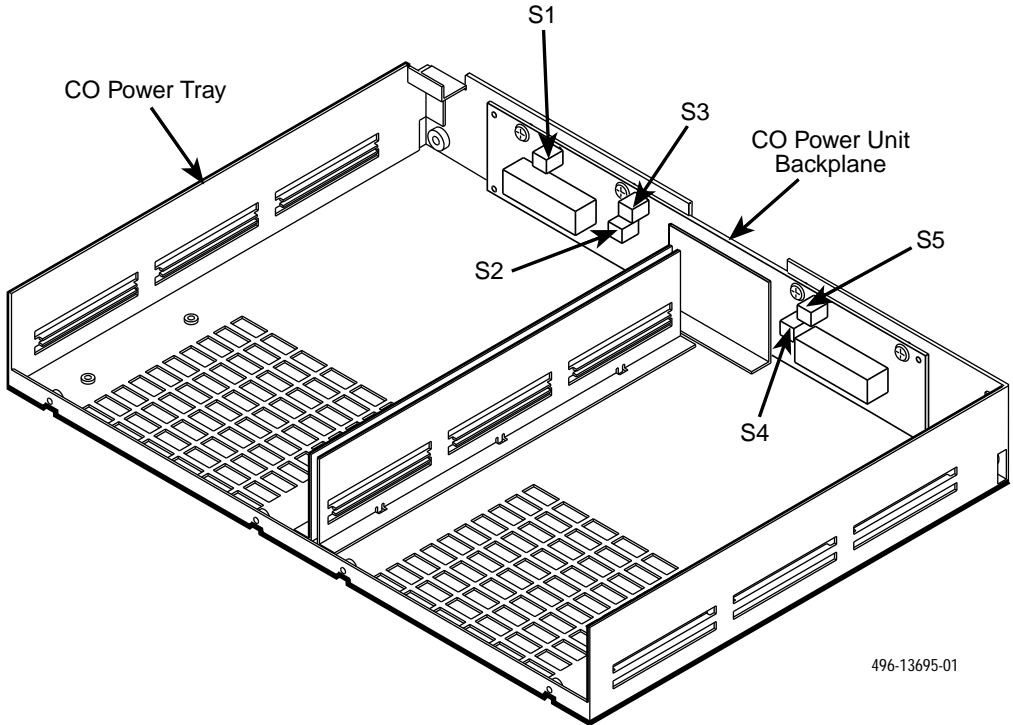
To set the option straps for Basic mode of operation:

► **Procedure**

1. Tighten the screws on all five straps (S1 through S5) on the CO Power Unit’s backplane. Make sure that the screws are securely touching the contacts, but do not screw the straps too tight because doing so can damage the equipment.

Basic Mode

If you want to operate in the Basic mode, you must use one –48 Vdc power source and configure the option straps as shown in Table 2-2.



496-13695-01

Figure 2-2. Option Straps (S1 through S5) on the CO Power Unit’s Backplane

Independent Mode

If you want to operate in Independent mode and you plan to use either one or two –48 Vdc power sources, configure the option straps as shown in [Table 2-3](#).

Table 2-3
Settings for Independent Mode

S1 Raised
S2 Raised
S3 Raised
S4 Raised
S5 Raised

To set the option straps for Independent mode of operation:

► Procedure

1. Loosen the screws on all five straps (S1 through S5) on the CO Power Unit's backplane so that the screws are not touching the contacts. (Two complete turns will suffice.)

Redundant Mode — One Source, One Cable

If you want to operate in Redundant mode and you plan to use a single –48 Vdc power source and a single input power cable, configure the option straps as shown in [Table 2-4](#).

Table 2-4
Settings for Redundant Mode Using a Single –48 Vdc Power Source and a Single Input Power Cable

S1 Lowered
S2 Lowered
S3 Lowered
S4 Lowered
S5 Lowered

To set the option straps for Redundant mode of operation using a single –48 Vdc power source and a single input power cable:

► Procedure

1. Tighten the screws on all five straps (S1 through S5) on the CO Power Unit's backplane. Make sure

that the screws are securely touching the contacts, but do not screw the straps too tight because doing so can damage the equipment.

Redundant Mode — Two Cables

If you want to operate in Redundant mode and you plan to use *either* a single –48 Vdc power source and two input power cables or two separate –48 Vdc power sources and two input power cables, configure the option straps as shown in [Table 2-5](#).

Table 2-5
Settings for Redundant Mode with Either a Single Power Source and Two Input Power Cables, or Two Separate Power Sources and Two Input Power Cables

S1 Lowered
S2 Lowered
S3 Lowered
S4 Raised
S5 Raised

To set the option straps for Redundant mode of operation with *either* a single power source and two input power cables, or two separate power sources and two input power cables:

► Procedure

1. Tighten the screws on the S1, S2, and S3 straps on the CO Power Unit's backplane. Do *not* screw the straps too tight because doing so can damage the equipment. Make sure that the screws are securely touching the contacts. Then loosen the screws on the S4 and S5 straps. (Two complete turns will suffice.)

NOTE

In *either* Independent or Redundant mode of operation, the S4 and S5 straps on the backplane must be raised (loosened) when two separate –48 Vdc power sources are used to prevent operational problems and voltage incompatibilities.

Installing the CO Power Unit

If installing an SDCP in the carrier in which you plan to install a CO Power Unit, be sure to install the SDCP ribbon cable that provides power to the SDCP before installing the CO Power Unit. (For instructions on how to install the SDCP ribbon cable, see the *SDCP Ribbon Cable Installation* section in the *COMSPHERE 3000 Series Carrier Installation Manual*.)

After installing the CO Power Unit, you can then install the SDCP. (For instructions on how to install the SDCP, see *Installing the SDCP* section later in this chapter.)

NOTE

Make a ground connection before installing the CO Power Unit. Locate the ground symbol label at the rear of the CO Power Unit. Remove the ground screw next to the label. Attach one end of a ground strap (minimum 18 AWG) and securely fasten the ground screw. Secure the other end of the ground strap to the nearest solid frame ground point (see [Step 2](#)).

To install the CO Power Unit:

► Procedure

1. If an air filter is desired, follow the procedure in the *Air Filter and Brackets Installation* section later in this chapter. Then, return to this procedure and proceed to the next step.
2. At the front of the carrier, place the CO Power Unit on the flanges at the bottom of the carrier (see [Figure 2-3](#)). Slide the CO Power Unit into place against the rear rail of the enclosure, guiding the ground strap through the opening in the carrier's backplane.

If an SDCP ribbon cable has been installed, hold the ribbon cable to the left of the CO Power Unit when sliding the power unit into place against the rear rail of the enclosure. Place the ribbon cable between the power module and the side of the CO power tray (see [Figure 2-3](#)). The SDCP ribbon cable is connected to the back of the SDCP after the CO Power Unit is installed.

Connect the ground strap to the nearest solid frame ground point (e.g., the rails on which the carrier is mounted). Do *not* connect the ground strap to the carrier.

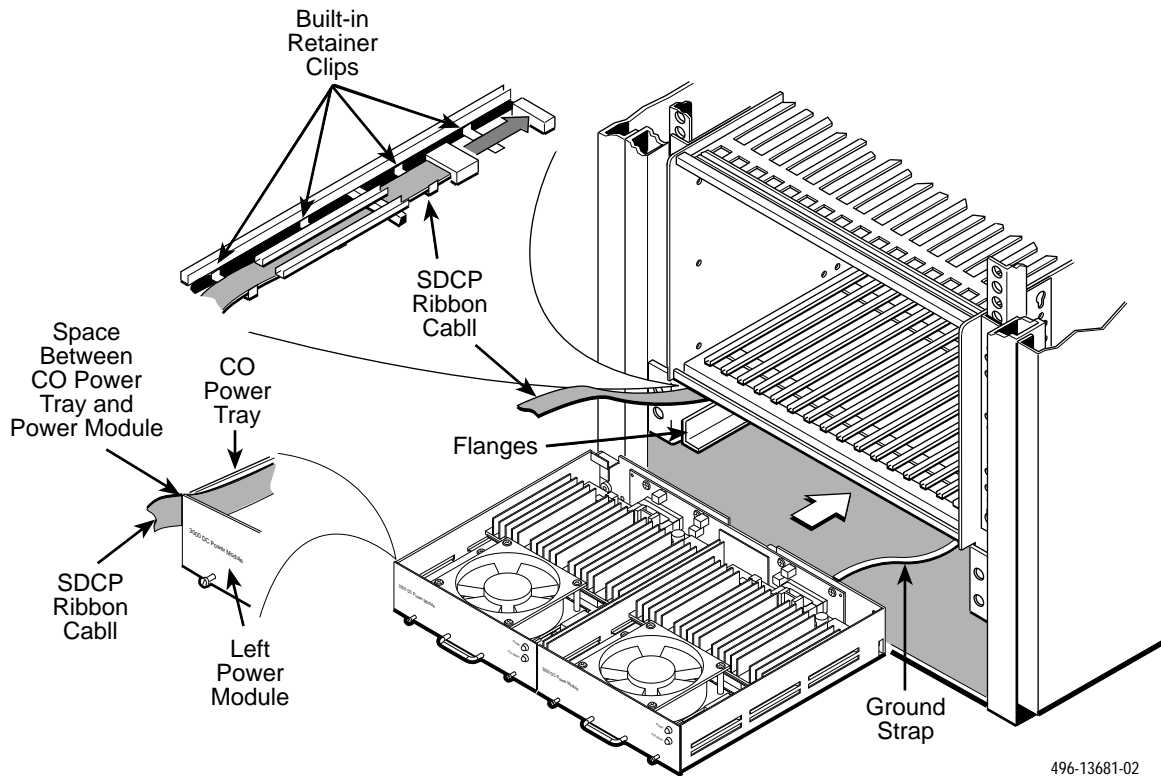


Figure 2-3. CO Power Unit Installation

3. At the rear of the carrier, use a large flat-blade screwdriver to engage and tighten the two captive screws that fasten the CO Power Unit to the carrier.
4. Plug one backplane connector cable assembly from the P20 connector on the carrier's backplane to the P6 connector on the CO Power Unit's backplane. Then, plug the second backplane connector cable assembly from the P19 connector on the carrier's backplane to the P3 connector on the CO Power Unit's backplane. The backplane connector cable assemblies enable a backplane-to-backplane connection which provides low voltage dc power to the carrier (see [Figure 2-4](#)).

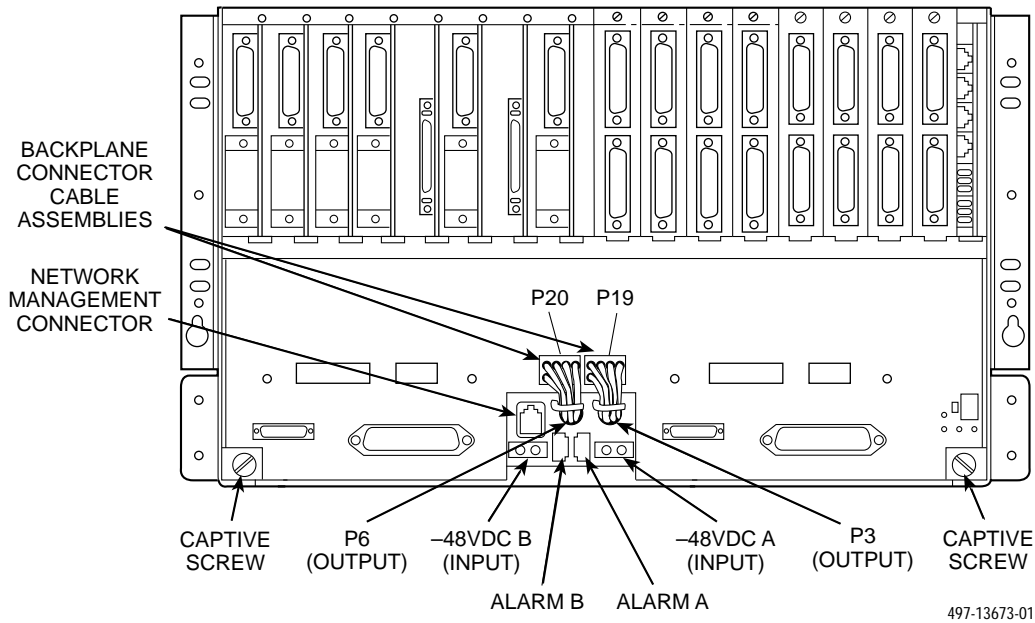


Figure 2-4. COMSPHERE 3000 Series Carrier (Rear)

Providing Power to a CO Power Unit

After the CO Power Unit installation procedure is completed, you must provide power to the unit. There are a number of powering options available depending upon your configuration.

NOTE

The option strap settings are factory set for the Basic mode of operation.

To provide power to the CO Power Unit operating in Basic mode:

► **Procedure**

1. Use one connector housing (AMP part number 1-480698-0) and two crimp-type contacts

(AMP part number 350550-1) to attach the connector to your –48 Vdc power input cable.

Note that you need a hand crimping tool (AMP part number 90296-2 or equivalent) to build the connector.

(The contacts are crimp type and are intended for use with 20 AWG through 14 AWG wire with a maximum insulation diameter of .130 inches. For additional information, see [Appendix A](#) of this guide.)

2. Provide external fusing, if desired. (The fuse shown in [Figure 2-5](#) is optional as per your requirements.) The optional fuse should have a rating of 6 amperes, 250 volts, and be a fast-acting type. Use a fuse similar to Littlefuse #312006.
3. Plug the input power cable to *either* the –48VDC A connector or the –48VDC B connector. See [Figure 2-5](#). (The option strap settings for this power option are listed in [Table 2-2](#).)

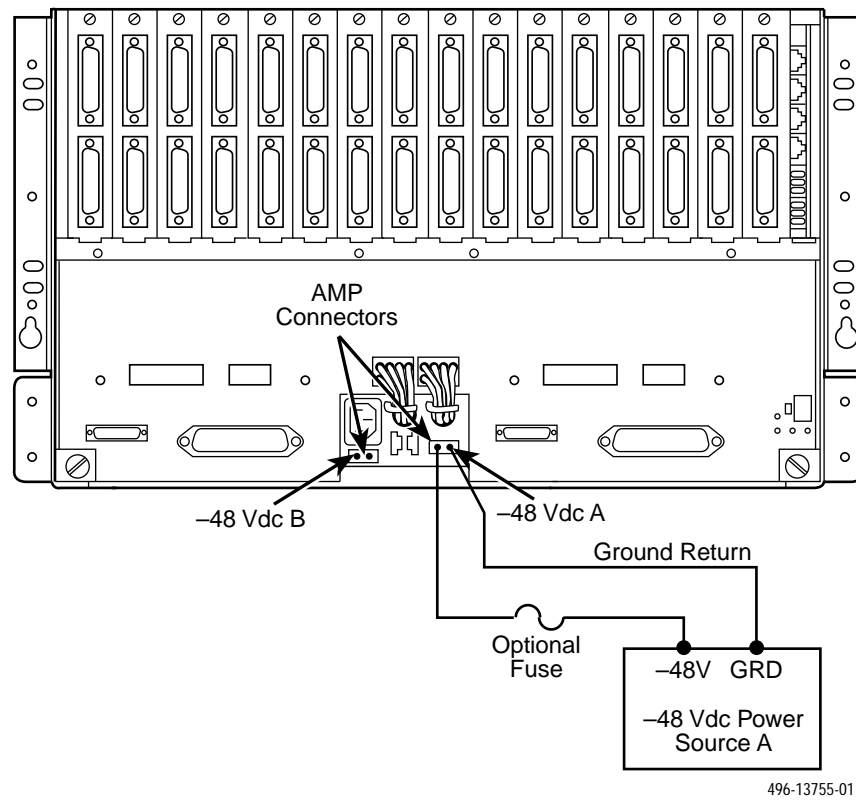


Figure 2-5. Using One Power Source and One Input Power Cable for Basic (shown) or Redundant Mode

NOTE

The option straps must be set for the Independent mode of operation. For the correct settings, see the *Setting the Option Straps* section earlier in this guide.

To provide power to the CO Power Unit operating in Independent mode:

► **Procedure**

1. Use the two connector housings (AMP part number 1-480698-0) and four crimp-type contacts (AMP part number 350550-1) to attach the connector(s) to your –48 Vdc power input cable(s). Note that you need a hand crimping tool (AMP part number 90296-2 or equivalent) to build the connector(s).

(The contacts are crimp type and are intended for use with 20 AWG through 14 AWG wire with a maximum insulation diameter of .130 inches. For additional information, see [Appendix A](#) of this guide.)

2. Provide external fusing, if desired. (The fuses shown in [Figures 2-6](#) and [2-7](#) are optional as per your requirements.) An optional external fuse should have a rating of 6 amperes, 250 volts and be a fast-acting type. Use a fuse similar to Littlefuse #312006.
3. If you have two input power cables and two separate –48 Vdc power sources (e.g., Source A and Source B), plug one input power cable from one of your –48 Vdc power sources (e.g., Source A) to the **–48VDC A** connector to provide power to the left side of the carrier. Plug the other input power cable from a different –48 Vdc power source (e.g., Source B) to the **–48VDC B** connector to provide power to the right side of the carrier. See [Figure 2-6](#). (The option strap settings for this power option are listed in [Table 2-3](#).)

If you have two input power cables and one –48 Vdc power source, plug one input power cable into the **–48VDC A** connector and the second input power cable into the **–48VDC B** connector. Then, connect both power cables into the same –48 Vdc power source. See [Figure 2-7](#). (The option strap settings for this power option are listed in [Table 2-3](#).)

NOTE

The appropriate option strap settings must be set. For the correct settings, see the *Setting the Option Straps* section earlier in this guide.

To provide power to the CO Power Unit operating in the Redundant mode:

► **Procedure**

1. Use the two connector housings (AMP part number 1-480698-0) and four crimp-type contacts (AMP part number 350550-1) to attach the connector(s) to your –48 Vdc power input cable(s). Note that you need a hand crimping tool (AMP part number 90296-2 or equivalent) to build the connector(s).

(The contacts are crimp type and are intended for use with 20 AWG through 14 AWG wire with a maximum insulation diameter of .130 inches. For additional information, see [Appendix A](#) of this guide.)

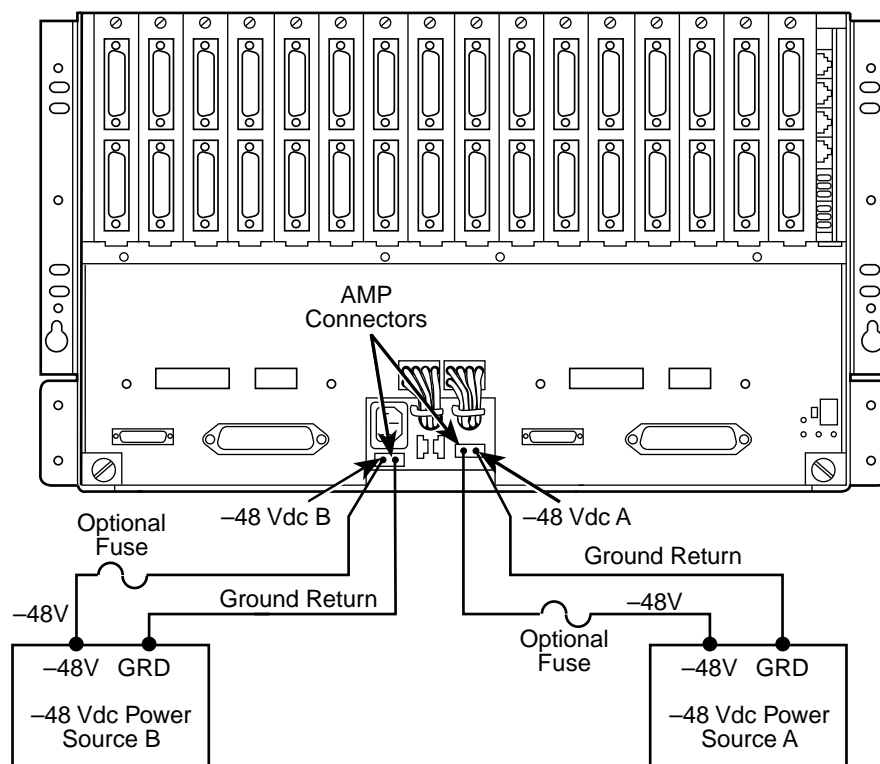
2. Provide external fusing, if desired. (The fuses shown in [Figures 2-5](#), [2-6](#), and [2-7](#) are optional as per your requirements.) An optional fuse should have a rating of 6 amperes, 250 volts and be a fast-acting type. Use a fuse similar to Littlefuse #312006.

3. If you have one input power cable and one -48 Vdc power source, plug the input power cable to *either* the -48VDC A connector or the -48VDC B connector. See [Figure 2-5](#). (The option strap settings for this power option are listed in [Table 2-4](#).)

If you have two input power cables and one -48 Vdc power source, plug one input power cable to the -48VDC A connector and the second input power cable to the -48VDC B connector. Then, connect both input power cables to your single -48 Vdc power source. See [Figure 2-7](#).

(The option strap settings for this power option are listed in [Table 2-5](#).)

If you have two power cables and two separate -48 Vdc power sources (e.g., Source A and Source B), plug one input power cable from a -48 Vdc power source (e.g., Source A) to the -48VDC A connector. Plug an input power cable from a different -48 Vdc power source (e.g., Source B) to the -48VDC B connector. See [Figure 2-6](#). (The option strap settings for this power option are listed in [Table 2-5](#).)



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Figure 2-6. Using Two Separate Power Sources for Independent Mode or Redundant Mode

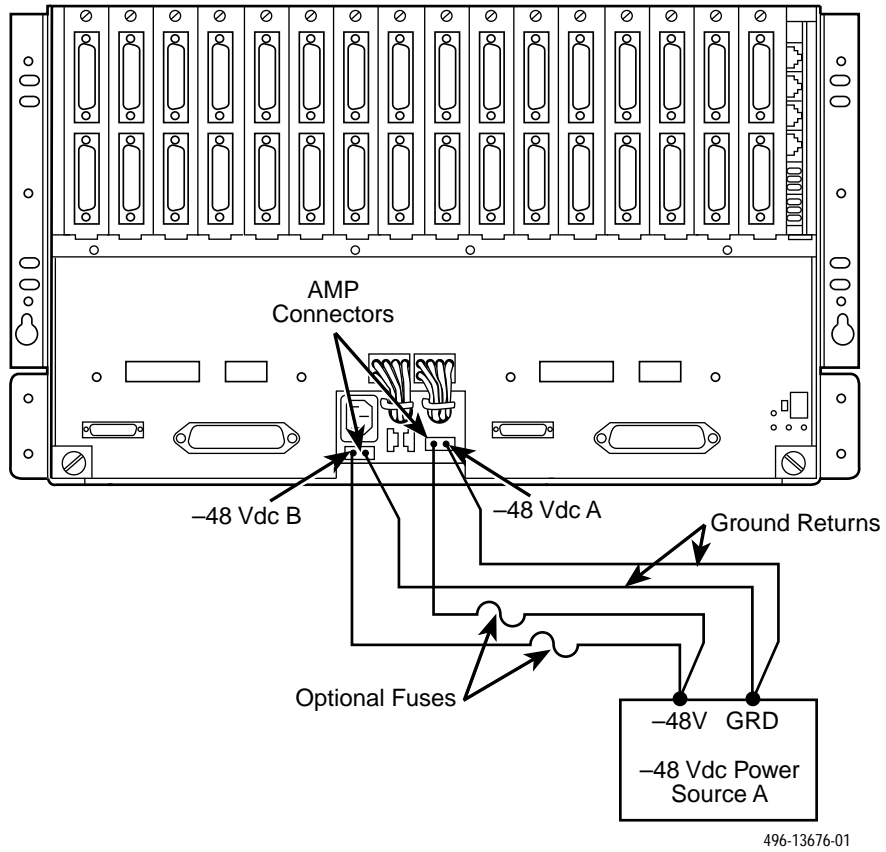


Figure 2-7. Using One Power Source and Two Input Power Cables for Independent Mode or Redundant Mode

Installing an SDCP

If you want to mount an SDCP and the SDCP ribbon cable is not installed, remove the CO Power Unit from the carrier and follow the instructions in the *SDCP Ribbon Cable Installation* section in the *COMSPHERE 3000 Series Carrier Installation Manual*.

NOTE

This procedure is only used when installing an SDCP onto a carrier operating with a CO Power Unit. All other carriers use the standard SDCP installation procedure as described in the Shared Diagnostic Control Panel (SDCP) Installation section in the *COMSPHERE 3000 Series Carrier Installation Manual*.

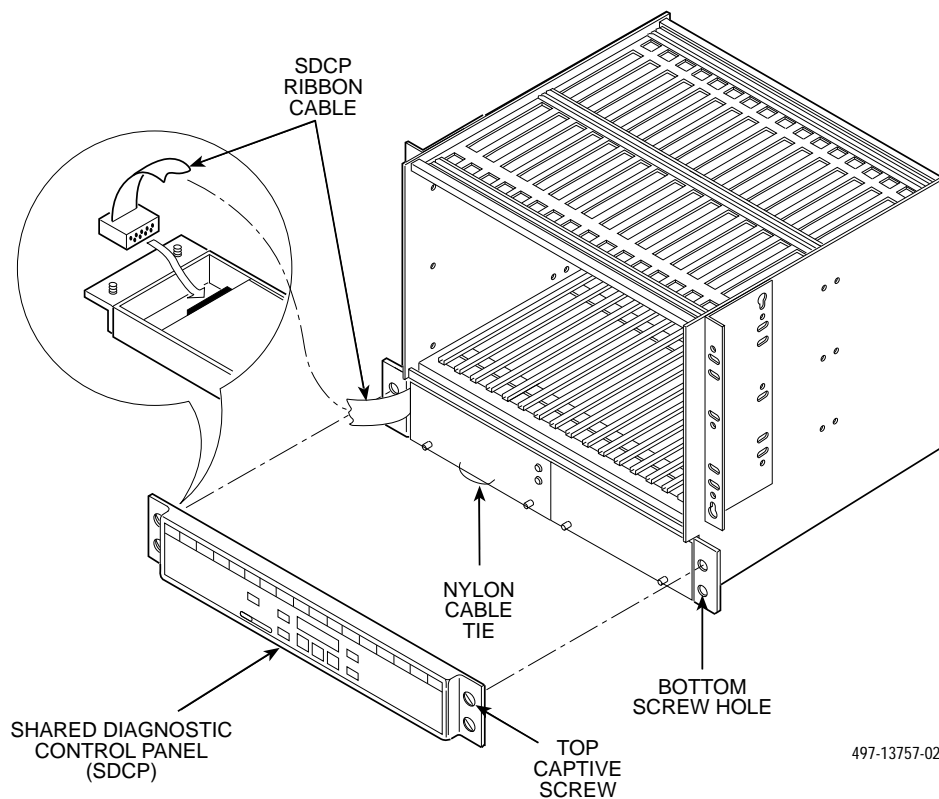
If you want to mount a shared Diagnostic Control Panel (SDCP) on the carrier and the SDCP ribbon cable is installed (refer to [Figure 2-8](#)):

► Procedure

1. Raise the carrier 1.5 inches above the carrier below it.

(In a Paradyne COMSPHERE 72-inch cabinet (4000-B2-201), if you mount an SDCP onto a carrier operating with a CO Power Unit, then only five carriers can be installed in the cabinet instead of the usual six.)

2. Remove the power module (the left power module if there are two power modules in the CO Power Unit) by loosening the two captive screws on the front of the power module. Hold onto the power module handle and slide the power module out. Then, remove the handle on the power module by using a small Phillips-head screwdriver to loosen the screws behind the power module's faceplate.



497-13757-02

Figure 2-8. Installing the SDCP

3. Secure a nylon cable tie in the handle mounting holes.
4. Place the power module in the card guides and slide the power module to the rear of the carrier. When sliding the left power module into the CO Power Unit, hold the SDCP ribbon cable to the left of the power module. Then, tighten the two captive screws on the front of the power module (see [Figure 2-3](#)).
5. If the CO Power Unit has an optional second power module, repeat Steps 2 through 4 for the right power module and proceed to the next step.
6. Attach the SDCP ribbon cable to the back of the SDCP as shown in [Figure 2-8](#).
7. Mount the SDCP to the front of the carrier by securing the two top captive screws of the SDCP into the two bottom screw holes of the carrier.

Connecting the Alarm Contacts to a CO Alarm System

The CO Power Unit monitors the power output levels and the fan's low-speed sensor for proper operation of the power module. Both major (power failure) and minor (fan failure) alarms can be sent to a CO alarm system. A major alarm is sent to a CO alarm system if a power failure occurs in either the –48V input or low voltage output. A minor alarm is sent to a CO alarm system if a fan failure occurs or if the fan speed drops below 1900 rpm. After the CO Power unit is installed, you can connect the power unit to a CO alarm system.

NOTE

The CO alarm cables and mating connectors are customer-supplied components.

To connect the CO Power Unit to a CO alarm system:

► Procedure

1. At the rear of the carrier, locate the cable connectors labeled **Alarm A** and **Alarm B** (see [Figure 2-4](#)).
2. To send alarm signals from the left power module to a CO alarm system, plug a customer-supplied mating connector (AMP part number 103957-4) and cable into the **Alarm A** connector. To send alarm signals from the right power module, if the CO Power Unit has two power modules, to a CO alarm system, plug a customer-supplied mating connector (AMP part number 103957-4) and cable into the **Alarm B** connector.

For pin assignments of the **Alarm A** and **Alarm B** connectors, see [Appendix A](#) of this guide.

Connecting the Alarm Contacts to a 6800 Series NMS Via a Modular 3611 DSU

The CO Power Unit can also send alarms to a 6800 Series NMS using the external alarm functions of a Modular 3611 DSU. After the CO Power Unit is installed, connect the power unit to the external leads of a Modular 3611 DSU by using an NMS adapter cable.

Before you can forward CO alarms to the 6800 Series NMS via the external leads, you must configure the Modular 3611 DSU for alarm forwarding by setting the appropriate jumpers. To do this, remove the Modular 3611 DSU from the carrier and set Jumpers J20 and J21 (for Model 3611-B3) or Jumper E5 and Switch S1-2 (for Model 3611-B4) as shown in Table 2-6.

**Table 2-6
Jumper Settings**

Model	Jumper or Switch	Setting to Enable -48 Vdc Alarm Monitoring
3611-B3	Jumper J20	Left
3611-B3	Jumper J21	Left
3611-B4	Jumper E5	Left
3611-B4	Switch S1-2	On

After setting the jumpers, reinstall the Modular 3611 DSU in the carrier. Then, set the firmware configuration External Leads (**Ext Leads**, in the General branch) parameter as shown:

Ext Leads: RPower

NOTE

Remember, for **Basic** or **Independent mode of operation**, the Modular 3611 DSU (configured for alarm forwarding) must be installed in a different carrier (that is, a carrier in the cabinet other than the one you want to manage). This arrangement ensures that all alarm signals are forwarded even if power has disrupted service to the carrier.

For **Redundant mode of operation**, you may want to install the Modular 3611 DSU in a different carrier in the unlikely event of a double power module failure.

To connect the alarm contacts to the external leads of a Modular 3611 DSU (configured for alarm forwarding):

► Procedure

1. At the rear of the carrier, plug the 6-wire modular plug end of the NMS adapter cable into the J1 connector (a 6-position modular jack) on the CO Power Unit's backplane (see Figure 2-9).
2. If there is an EIA-232 cable on the top connector (labeled EIA232/V.24) of a Modular 3611 DSU's

rear connector plate, remove the ferrite choke and the EIA-232 cable. Plug the DB25 male end of the NMS adapter cable into the top connector of the rear connector plate. Tighten the screws to hold the cable in place. Then, attach the ferrite choke to the NMS adapter cable. Plug the EIA-232 cable into the DB25 female end of the NMS adapter cable. Tighten the screws to hold the cable in place. See Figure 2-9.

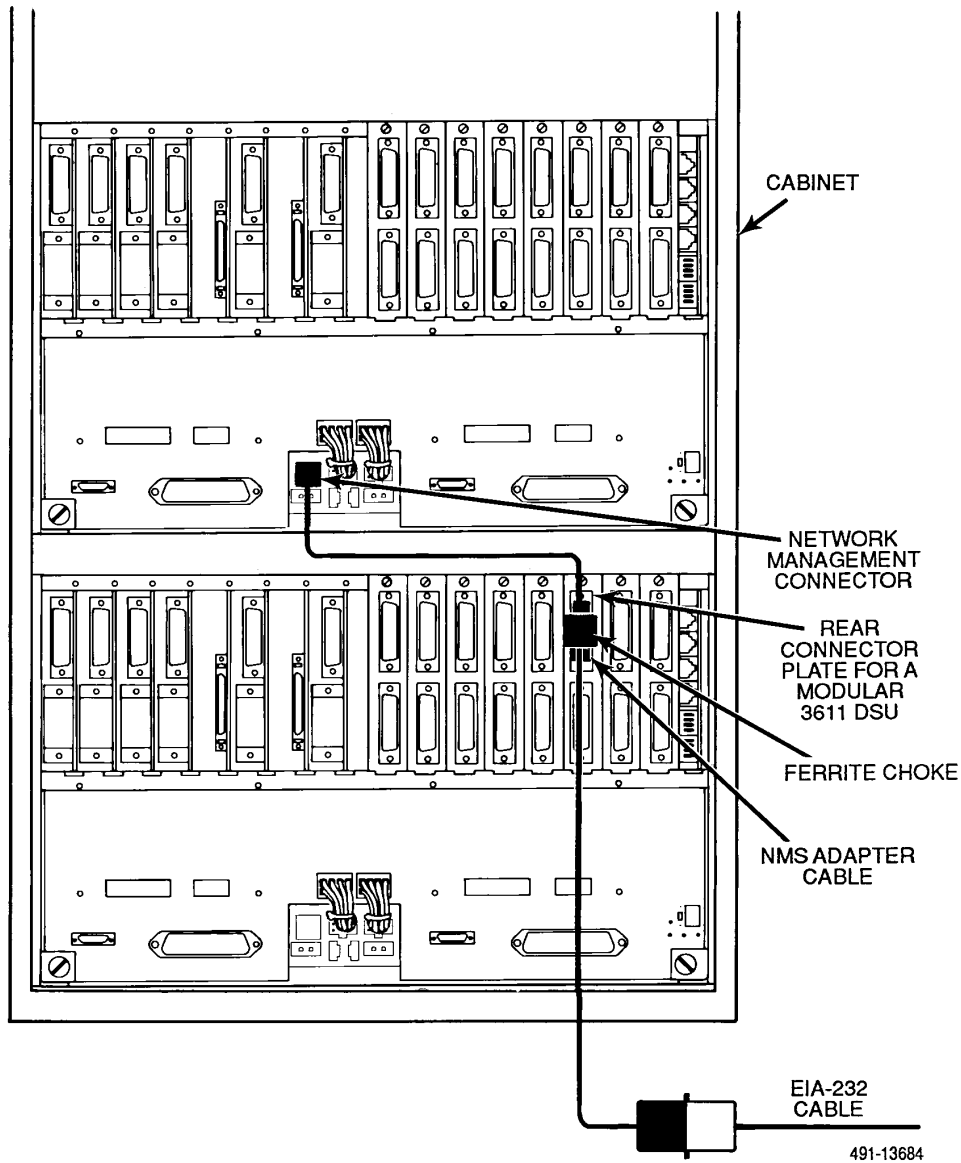


Figure 2-9. Connecting an NMS Adapter Cable to a Modular 3611 DSU When the DTE Interface is EIA-232

3. If there is a V.35 cable on the bottom connector, labeled V.35 (3600/3500), of a Modular 3611 DSU's rear connector plate, then plug the DB25 male end of the NMS adapter cable into the top

connector of the rear connector plate. Note that the DB25 female end of the NMS adapter cable has no connection. See [Figure 2-10](#).

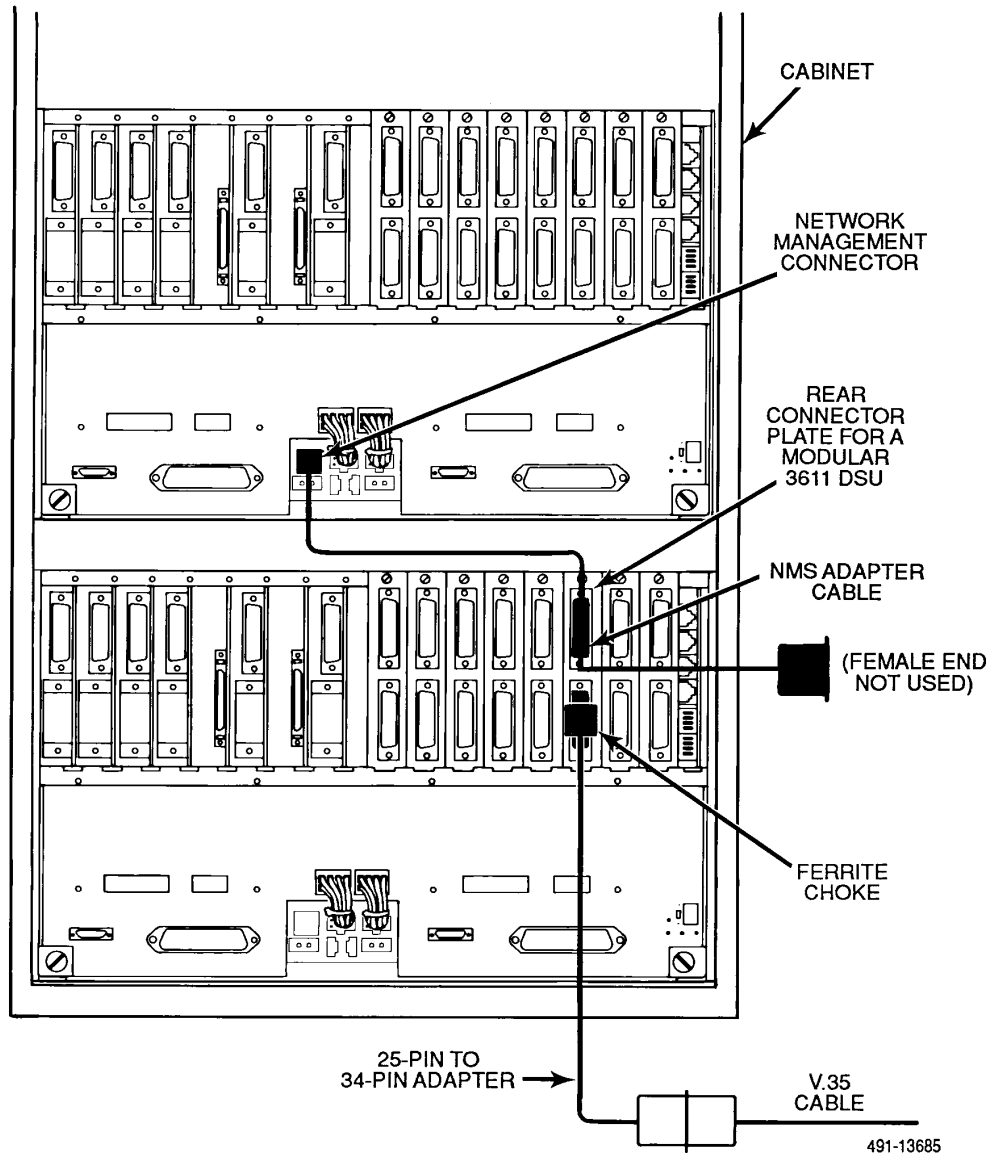


Figure 2-10. Connecting an NMS Adapter Cable to a Modular 3611 DSU When the DTE Interface is V.35

Air Filter and Brackets Installation (Optional)

The air filter (part number 3000-F1-020) prevents dust from entering the carrier. It is an optional component and must be ordered separately. However, the air filter brackets and screws are supplied with the CO Power Unit.

Only the 3000-F1-020 air filter may be used. Under normal environmental conditions, you should inspect and/or replace the 3000-F1-020 air filter every three months.

This section describes the procedure for installing the air filter and brackets. This procedure must be performed before installing the carrier into the cabinet.

NOTE

If the carriers in the cabinet are stacked directly on top of each other, then only the bottom carrier in the cabinet needs an air filter.

Keep in mind that the air filter brackets take up an additional 0.6 inches (1.5 cm) in height and if mounted on one of the carriers in the COMSPHERE 72-inch cabinet (4000-B2-201), then only five carriers can be installed in the cabinet instead of the usual six.

To install the air filter and brackets:

► Procedure

1. Raise the carrier 0.6 inches from the bottom of the cabinet (or above the carrier below it).
2. Fasten the two identical brackets to the bottom of the CO power tray using the four #6 Phillips-head screws provided. See [Figure 2-11](#).
3. Place the air filter with the grill-side face up on the guides of the brackets and slide the air filter in place.

If you were directed to this section during the CO Power Unit Installation procedure, then return to that procedure now.

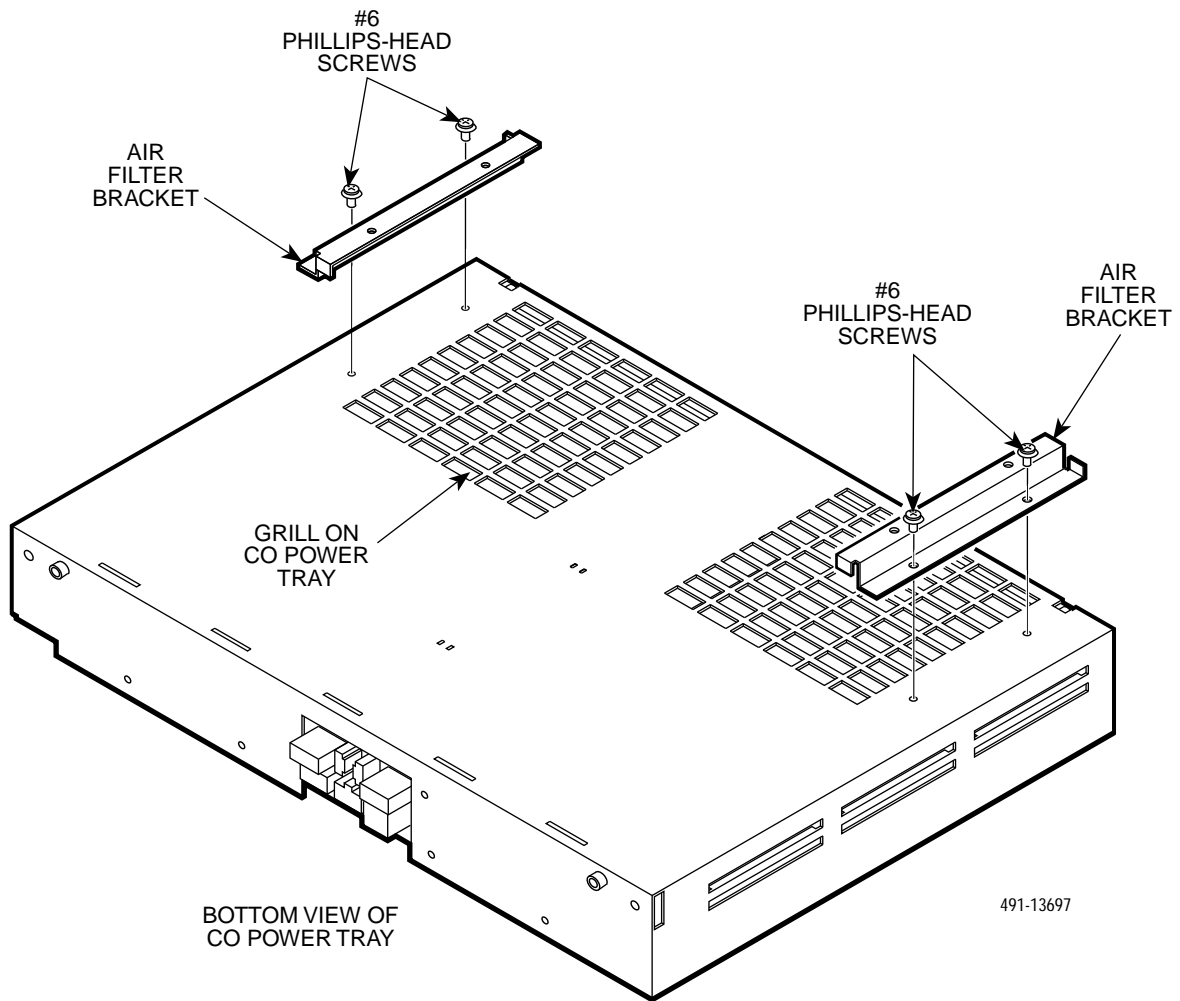


Figure 2-11. Air Filter Brackets Installation

Troubleshooting and Maintenance **3**

Overview	3-1
Indicators and Controls	3-1
Troubleshooting	3-2
Power Module Replacement Instructions	3-3
Preventive Maintenance	3-4

Overview

This chapter describes the status indicators on the power module's faceplate, provides troubleshooting guidelines and replacement instructions for the power module, and a preventive maintenance schedule for the optional air filter.

Indicators and Controls

The CO Power Unit detects power module and/or fan failures by monitoring the power output levels and the fan's low-speed sensor for proper operation of the power module. When a failure occurs, an alarm indication light appears on the faceplate of the affected power module.

There are two LED status indicators (**Figure 3-1**) on the power module's faceplate: the Power LED and the Fan Alarm LED. The Power LED provides the status of the power module. A green light indicates that the power module is operating properly. A red light indicates a power module failure. No light indicates that the CO Power Unit is not receiving input power. The Fan Alarm LED provides the status of the fan in the power module. If the Fan Alarm LED is not lit and the Power LED is green, the fan is operating properly. If the LED is yellow, it indicates either a fan failure or a fan speed below 1900 rpm.

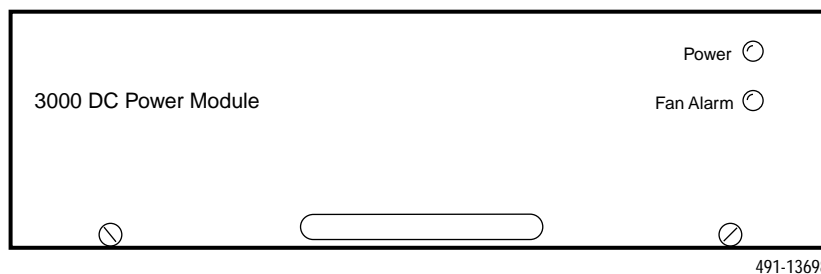


Figure 3-1. LED Status Indicators

Troubleshooting

If operating in the Basic mode and the power module's Power LED is red, check the DCEs in the carrier. If the LEDs on the DCEs are not lit, try resetting the power module. (Reset the power module by removing the power module and then reinstalling it.) If the Power LED remains red after resetting the power module, you should replace the power module. Do *not* remove the failed power module until a replacement power module is available. If the power LED is red and the DCEs appear to be working, schedule maintenance for the power module after peak hours at which time you can try resetting the power power module and/or replacing it. If the Fan Alarm LED is yellow and the DCEs in the carrier appear to be working, you may want to schedule maintenance after peak hours.

If operating in the Independent mode and one of the power module's Power LED is red, check the DCEs in the carrier.

- If the LEDs on the DCEs above the power modules are not lit, try resetting the power module. (Reset the power module by removing the power module and then reinstalling it.) If the Power LED remains red after resetting the power module, you should replace the power module. Do not remove the failed power module until a replacement power module is available.
- If the DCEs appear to be working, schedule maintenance for the power module after peak hours at which time you can try resetting the power module and/or replacing it.

Also in Independent mode, if the Fan Alarm LED is yellow and the DCEs in the carrier appear to be working, you may want to schedule maintenance after peak hours.

If operating in the Redundant mode and one of the power module's Power LED is red, try resetting the power module by removing the power module and then reinstalling it. If the Power LED remains red, you should replace the power module.

In addition, if the Fan Alarm LED is yellow, try resetting the power module. If the Fan Alarm LED remains yellow, you should replace the power module.

In all modes of operation, if the Power LED is not lit, check the input power source and external fuses before replacing the power module. If –48V is present at the input connector, replace the power module. If –48V is not present, check your distribution system.

Power Module Replacement Instructions

If the power module fails, you should replace it immediately. In the Redundant mode of operation, you can replace a failed power module without disrupting service to the carrier. In the Independent mode of operation, you will only disrupt service to one-half of the carrier (the affected half).

To replace a power module (refer to [Figure 3-2](#)):

NOTE

The power module replacement procedure contained in this section must be performed by a qualified service person.

CAUTION

In any mode of operation (Basic, Independent, or Redundant), you must have either one power module and cover plate, or two power modules in the CO Power Unit at all times. Do not remove a defective power module until a replacement is available. Leaving half of the CO Power Unit exposed is a safety hazard.

► Procedure

1. Make sure the new power module is configured with the same option settings as the failed power module. To set the option straps, see the *Setting the Option Straps* section in Chapter 2.
2. If an SDCP is not associated with this carrier and the power modules' faceplates are visible, loosen the two captive screws on the front of the failed power module. Remove the failed power module from the CO power tray by holding onto the power module handle and sliding the power module out.

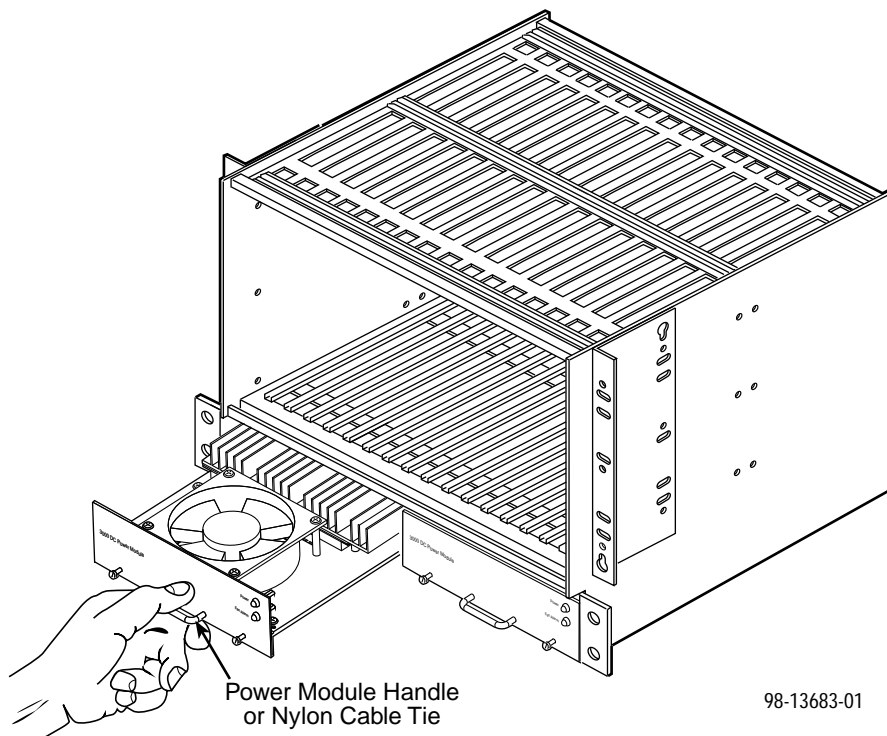


Figure 3-2. Replacing a Power Module

If an SDCP is mounted on this carrier, remove the SDCP by loosening the two captive screws and disconnecting the SDCP cable. Set the SDCP aside for mounting later on. Loosen the two captive screws on the failed power module. Then, remove the failed power module from the CO power tray by holding onto the nylon cable tie and sliding the power module out.

3. When the failed power module is removed, place the new power module in the card guides and slide the power module to the rear of the carrier. Then, tighten the two captive screws on the bottom of the power module's faceplate.

Remember, if an SDCP needs to be remounted on this carrier, you must remove the handle on the new power module and install a nylon cable tie prior to installing the power module. Also, if installing a new power module into the left side of the power unit, hold the SDCP ribbon cable to the left of the power module when sliding the power module into the CO Power Unit. Once the power module is installed and proper operation is verified, then the SDCP can be mounted.

Preventive Maintenance

In normal environments, you should inspect and/or replace the optional air filter (part number 3000-F1-020) every three months.

Interface Connections **A**

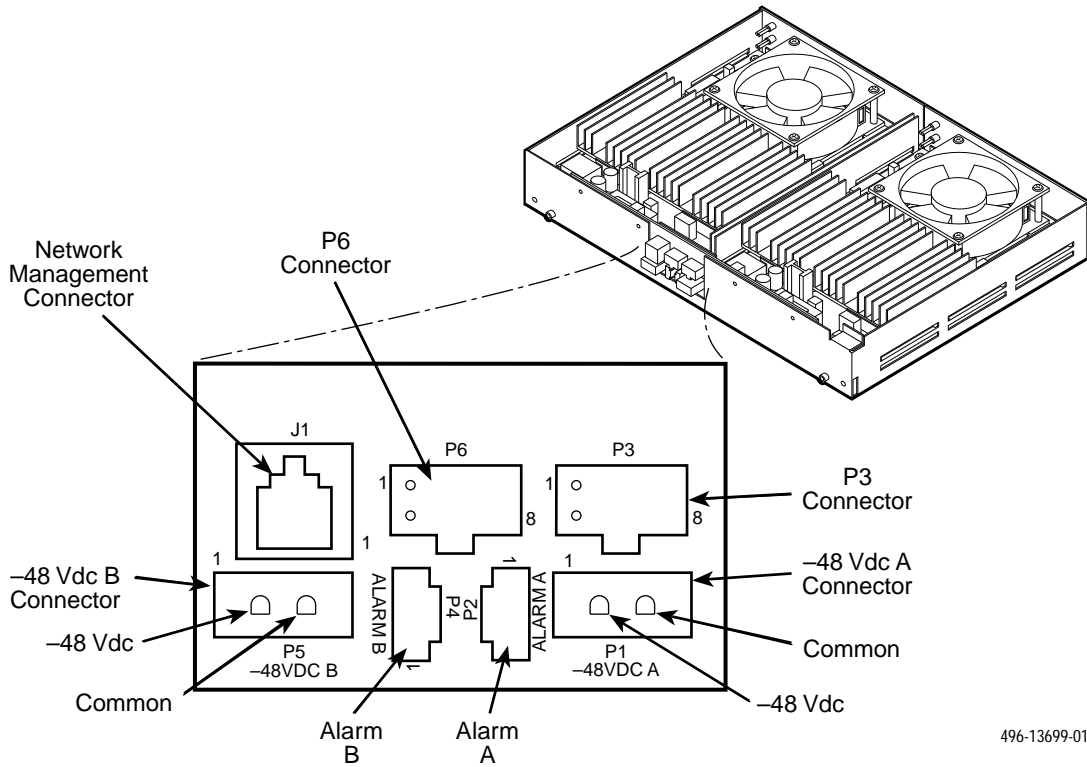
Overview	A-1
DC Inputs	A-1
CO Alarm System Outputs	A-4
NMS Alarm Outputs	A-5

Overview

This appendix provides pin assignments for the dc input connectors and alarm output connectors. It also provides illustrations of the connectors on the rear of the CO Power Unit and an NMS alarm adapter cable.

DC Inputs

A pair of 2-pin AMP connectors on the CO Power Unit's backplane provides an interface between the dc power input cable and the CO Power Unit (see [Figure A-1](#)). [Table A-1](#) lists the pin assignments for the dc inputs.



496-13699-01

Figure A-1. CO Power Unit (Rear)

Table A-1
Pin Assignments of the DC Inputs

Pin Number	Assigned To ...
1	-48V
2	-48V CO ground return

The backplane connector is a Universal MATE-N-LOK connector (AMP part number 350428-1). The corresponding supplied connector housing is also a Universal MATE-N-LOK connector (AMP part number 1-480698-0). Table A-2 lists AMP part numbers for the individual contacts that can be used for various wire sizes. Figure A-2 illustrates the connector housing and contact.

Table A-2
AMP Part Numbers

Wire Size	Insulation Diameter	Contact Number
24–18 AWG	04"–10"	350689-1
20–14 AWG	06"–13"	350550-1 ¹
20–14 AWG	13"–20"	350551-1
12–10 AWG	20" max.	640310-3

¹ Six contacts are provided in the installation kit.

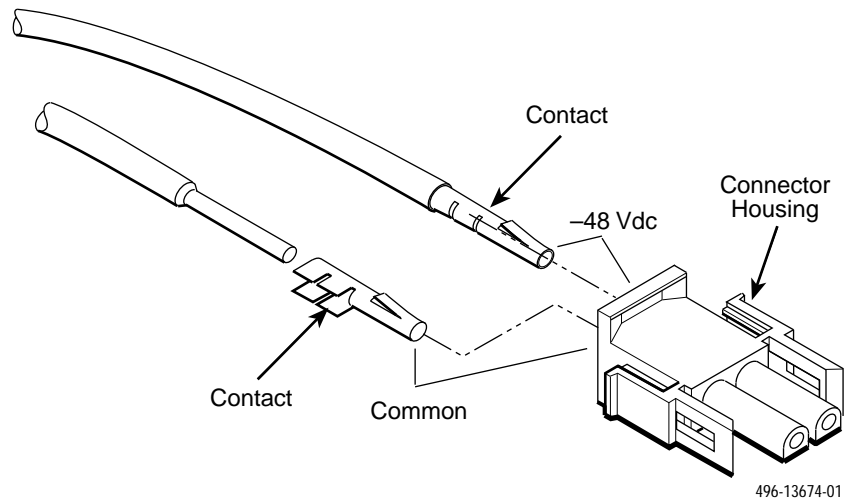


Figure A-2. Connector Housing and Contact

CO Alarm System Outputs

Both major (power) and minor (fan) alarms can be sent to the CO alarm system via the Alarm A and Alarm B output connectors. **Figure A-1** illustrates these connectors. The connector on the CO Power Unit's backplane is an AMP 5-position single row header. The mating connector is an AMP MTE-type connector (part number 103957-4).

The CO alarm system outputs are relay contact closures. **Table A-3** lists the pin assignments for the CO alarm system outputs.

Table A-3
Pin Assignments for the
CO Alarm System Outputs

Pin Number	Assigned To ...
1	Major Alarm (power failure)
2	Major Alarm (power failure)
3	No Connection
4	Minor Alarm (fan failure)
5	Minor Alarm (fan failure)

A contact closure is provided between Pin Numbers 1 and 2 to indicate a power failure. A contact closure is provided between Pin Numbers 4 and 5 to indicate a fan failure. Note that a major alarm signal is sent to a CO alarm system upon a failure in either the –48V input or low voltage output circuits, and that a minor alarm signal is sent if the fan speed falls below 1900 rpm.

CAUTION

The relay contacts on the CO Power Unit for the CO alarm system have a rating of 0.1 amp maximum at 70 Vdc maximum.

NMS Alarm Outputs

CO alarms can be sent to a Modular 3611 DSU (which will then notify a 6800 Series NMS) via a 6-wire modular jack on the CO Power Unit's backplane (see [Figure A-1](#)). (The Modular 3611 DSU must be configured to forward alarms to a 6800 Series NMS.) [Table A-4](#) lists the pin assignments for the NMS adapter cable. [Figure A-3](#) illustrates the NMS adapter cable.

Note that a power failure alarm signal is sent to an NMS upon a failure in either the -48V input or low

voltage output circuits, and that a fan failure alarm signal is sent if the fan speed falls below 1900 rpm.

NOTE

To avoid potential problems caused by incorrect connections (e.g., grounding the +12 Vdc source), do not set Jumper J21 as shown in [Figure 2-10](#) of Chapter 2 if you are not using an NMS adapter cable.

Table A-4
Pin Assignments for the NMS Adapter Cable

EIA 25-Pin Male End ¹	Modular Plug End	NMS Alarm Function
1 ²	6	+12 Vdc Source
11	4	None
14	3	None
16	5	None
19	2	Fan Status Alarm
23	1	Power Status Alarm

¹ All other pins on the 25-pin male connector are wired straight through to the 25-pin female connector.

² This pin only functions as a +12 Vdc source when Jumper J21 is set as shown in [Figure 2-10](#) of Chapter 2.

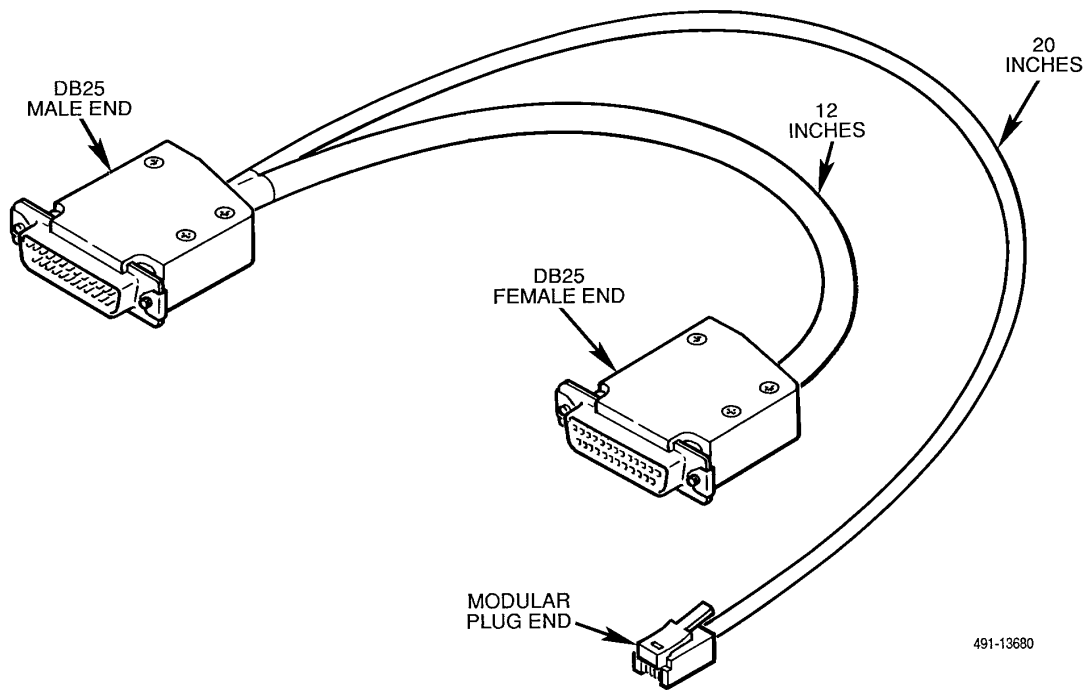


Figure A-3. NMS Adapter Cable (Feature Number 3000-F2-510)

Glossary

Basic mode	A mode of operation in which the single power module in the CO Power Unit supplies power to the entire carrier.
carrier	The rack mounting that contains 17 slots: 1 control slot and 16 DSU or modem slots.
data communication equipment (DCE)	A device, such as a DSU, that provides an interface between a DTE device and a digital or analog network. (Also called data circuit-terminating equipment.)
data service unit (DSU)	A DCE device that interprets, interfaces, and provides timing and signal control between a DTE device and a digital network.
data terminal equipment (DTE)	A computer or peripheral device, such as a terminal or printer; a data source or sink.
Independent mode	A mode of operation in which each power module in the CO Power Unit supplies power to one-half of the carrier.
LED	Light-emitting diode. A light or status indicator on the front panel that glows in response to the presence of a certain condition (e.g., Fan Alarm).
Modular 3611 DSU	A circuit card that contains “gold finger” contacts on its rear edge. A modular DSU can be removed from the front of the carrier without disturbing the DTE cables at the rear of the carrier.
rear connector plate	Used with a modular DSU, such as the Modular 3611 DSU. The rear connector plate is a panel that is attached to the rear of the 3000 Series Carrier. It contains two DTE connectors and functions as an interface between the Modular 3611 DSU and the DTE.
Redundant mode	A mode of operation in which both power modules in the CO Power Unit supply power to all the slots in the carrier.
shared diagnostic control panel (SDCP)	A feature that allows carrier-mounted DSUs and modems to share the same diagnostic control panel. Installed at eye-level into one COMSPHERE 3000 Series Carrier, it controls and monitors the DSUs and modems in all the carriers in the cabinet. A single SDCP can control up to 8 carriers, with a total of 128 DSUs (and if present, 128 DBMs) and modems.

**shared diagnostic unit
(SDU)**

A circuit card that plugs into a dedicated slot in the COMSPHERE 3000 Series Carrier to provide the shared diagnostic control panel and network management interfaces to the DSUs in the carrier. It translates the network management protocol to the devices in the carrier and routes incoming messages to the appropriate slots.

**6800 Series Network
Management System
(NMS)**

A Paradyne automated network management system that supports the CO Power Unit and other devices. It allows an operator to monitor network conditions, analyze problems, and take restorative measures.

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