

DNCP Solutions, LLC

- A Platinum Equity Company

U916 T1/E1 PCI Card Installation Guide

Part Number: MAN0064-00

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About This Guide

Purpose

This guide provides an overview of the U916 PCI (peripheral component interconnect) card. It also describes how to install or replace the card in a DNCP (*Distributed Network Control Platform*) Series 400/400-CO system. (The abbreviation CO indicates a Central Office system.) Procedures are provided for the *cabinet* version of the DNCP Series 400/400-CO systems.

Audience

This guide is intended for DNCP Solutions customers who are installing or maintaining a U916 T1/E1 PCI card in a DNCP Series 400/400-CO system.

Revision Information

This is the first edition of this document.

Operating System Information

“Software Requirements” in Chapter 1 lists the minimum operating system versions required to use the U916 in each DNCP Series 400/400-CO system.

How to Use This Guide

Read...	To Learn About...
Chapter 1	The U916 PCI card, the location of the cards in the DNCP Series 400/400-CO system, how to handle the cards, cabling specifications, and hardware and software requirements.
Chapter 2	How to install and replace a U916 PCI card in a Series 400/400-CO system.
Chapter 3	How to get help and how to interpret U916 PCI card status lights.

Notation and Terminology Conventions

Convention	Indicates	Example
<i>Italics</i>	Introduces or defines terms	This chapter provides an overview of the U916 PCI card and <i>peripheral component interconnect</i> cards in general.
Boldface	Emphasis	Always store the PCI card in its static-protective envelope if it is not installed in the system.
Monospace	Commands, functions, code fragments, file names, directories	As long as your system has power, you can initiate a reboot through the <code>shutdown</code> or <code>init</code> commands.

Product Documentation

The DNCP Series 400 and 400-CO system documentation is shipped on a *DNCP Series 400/400-CO Documentation* CD-ROM containing the following documentation:

- *DNCP Series 400 and 400-CO: Site Planning Guide* (MAN0050)
- *DNCP Series 400 and 400-CO: Attaching and Removing the Caster Plates* (MAN0051)
- *DNCP Series 400 and 400-CO: D859 CD-ROM Drive: Installation and Operation Guide* (MAN0052)
- *DNCP Series 400 and 400-CO: T807/T808 Tape Drive Release Notes* (MAN0053)
- *DNCP Series 400 and 400-CO: D84X Disk Drive Release Notes* (MAN0054)

- *DNCP Series 400 and 400-CO: Tape Drive Installation and Operation Guide* (MAN0055)
- *DNCP Series 400 and 400-CO: Operation and Maintenance Guide* (MAN0056)
- *DNCP Series 400 and 400-CO: PA-8600 Suitcase Replacement and Upgrade Guide* (MAN0057)
- *U406 Synchronous PCI Card Installation Guide* (MAN0058)
- *U450 Asynchronous PCI Card Installation Guide* (MAN0059)
- *U501 SCSI PCI Card Installation Guide* (MAN0060)
- *U512 Ethernet PCI Card Installation Guide* (MAN0061)
- *U522 Ethernet PCI Card Installation Guide* (MAN0063)
- *U916 T1/E1 PCI Card Installation Guide* (MAN0064)

Related Books

In addition to this document, the following documentation contains information related to the DNCP fault-tolerant platforms and supported operating systems:

Software

HP-UX

- *HP-UX Operating System: Fault Tolerant System Administration* (MAN0004)
- *HP-UX Operating System: Read Me Before Installing* (MAN0003)
- *HP-UX Operating System: Peripherals Configuration* (MAN0001)
- *HP-UX Operating System: Installation and Update* (MAN0002)
- *HP-UX Operating System: LAN Configuration Guide* (MAN0005)
- *HP-UX Operating System: X.25 T1 Installation and Configuration Guide* (MAN0013)
- *SINAP/MultiStack: Installation Guide for UNIX Systems* (R8060)
- *SINAP/MultiStack User's Guide and Reference* (R8051)
- *SINAP/MultiStack Programmer's Guide and Reference vol. 1 and vol. 2* (R8052)
- *SINAP/MultiStack ISDN User's Part (ISUP) User's Guide and Programmer's Reference* (R8053)
- *SINAP/MultiStack Technical Overview* (R8055)

Hardware

- *DNCP Series 400 and 400-CO: Site Planning Guide* (MAN0050)
- *DNCP Series 400 and 400-CO: Operation and Maintenance Guide* (MAN0056)
- *U450 Asynchronous PCI Card Installation Guide* (MAN0059)
- *U501 SCSI PCI Card Installation Guide* (MAN0060)
- *U512 Ethernet PCI Card Installation Guide* (MAN0061)
- *U513 Ethernet PCI-Card Installation Guide* (MAN0062)
- *U522 Ethernet PCI Card Installation Guide* (MAN0063)

A Note on the Contents of DNCP Books

DNCP books document all of the subroutines and commands of the user interface. Any other commands and subroutines contained in the operating system are intended solely for use by DNCP Solutions personnel and are subject to change without warning.

Ordering Documentation

You can order additional manuals or documentation CD-ROMs in either of the following ways:

- If your system is connected to the Remote Service Network (RSN), add a call using the Site Call System (SCS). See the *scsac(1)* man page for more information.
- Call the Customer Assistance Center (see “Customer Assistance Center”). Your order will be forwarded to Order Administration.

You can also download manuals from the DNCP Solutions Patch Manager web site at <http://pman3.com/pman>. You will need your Site ID and password to access this site.

How to Send Comments About This Document

If you have comments about this document, you can fill out and mail the postage-paid response card at the back of this document.

We welcome any corrections and suggestions for improving this document.

Customer Assistance Center

You may contact the DNCP Solutions *Customer Assistance Center (CAC)*, 24 hours a day, 7 days a week by calling one of the phone numbers listed below.

Service Area	CAC Location	Phone Number
North and South America	Scottsdale, Arizona USA	800-404-1561 (within North America) 480-391-8561 (outside North America)
EMEA (Europe, Middle East and Africa)	Sophia Antipolis, France	+33-492-386-208
Greater China	Hong Kong, China	+852-8202-2562
Asia / Pacific	Tokyo, Japan	0120-787287 (within Japan) 81-3-3589-6034 (outside Japan)

Chapter 1

Overview

This chapter provides an overview of the U916 PCI card and *peripheral component interconnect* (PCI) cards in general. This chapter contains the following sections:

- U916 4-Port T1/E1 PCI Card
- Locating the PCI Cards
- Handling PCI Cards
- Cabling Specifications
- Hardware Requirements
- Software Requirements

U916 4-Port T1/E1 PCI Card

The U916 PCI card is a programmable communications adapter that connects up to four T1/E1 ports in a DNCP Series 400/400-CO system.

The U916 PCI card supports high-speed communications over *wide-area network* (WAN) T1 or E1 circuits. The T1/E1 standard defines a *1.544-megabits-per-second* (Mbps) transfer rate in North America and Japan and a 2.048-Mbps transfer rate in Europe.

The U916 PCI card uses a 64-bit PCI bus architecture that optimizes data flow between the system and the network, resulting in the highest possible throughput with low CPU utilization. The U916 PCI card supports the off-loading of real-time tasks from the system processor and provides bus mastering across the PCI bus. In addition, the U916 performs *error checking and correction* (ECC) for improved data accuracy.

Use of the U916 PCI card requires the prior installation of a T1/E1 line. Connection to a T1 line also requires a *channel service unit/data service unit* (CSU/DSU). A CSU/DSU is a network termination device that provides the physical and electrical termination between the U916 PCI card and the network.

This guide assumes T1/E1 line(s) and one or more appropriate CSU/DSUs are installed and configured at your site. The DNCP Series 400/400-CO system can support up to eight U916 PCI cards, four in each card cage (32 total ports).

Figure 1-1 shows the U916 PCI card.

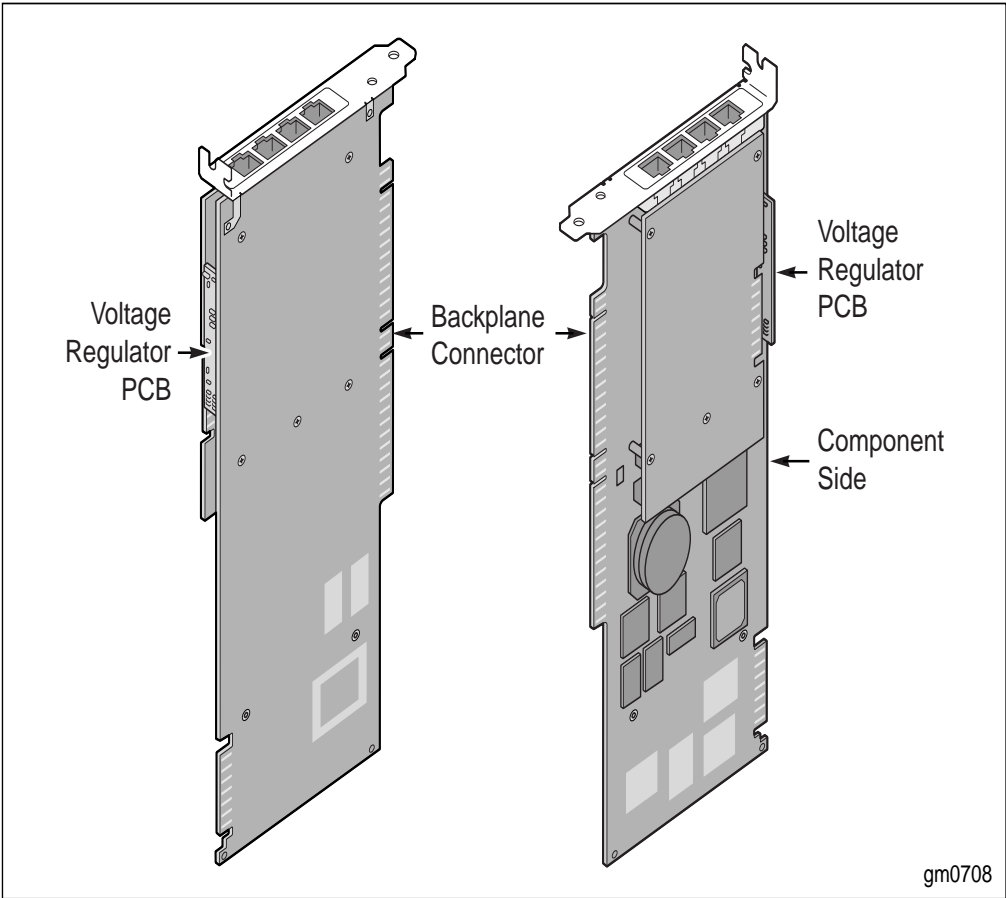


Figure 1-1. Top and Bottom Views of the U916 4-Port T1/E1 PCI Card

Locating the PCI Cards

The PCI cards in a DNCP Series 400/400-CO system are installed in one of two PCI card cages, which are located in the rear of the cabinet (Figure 1-2)

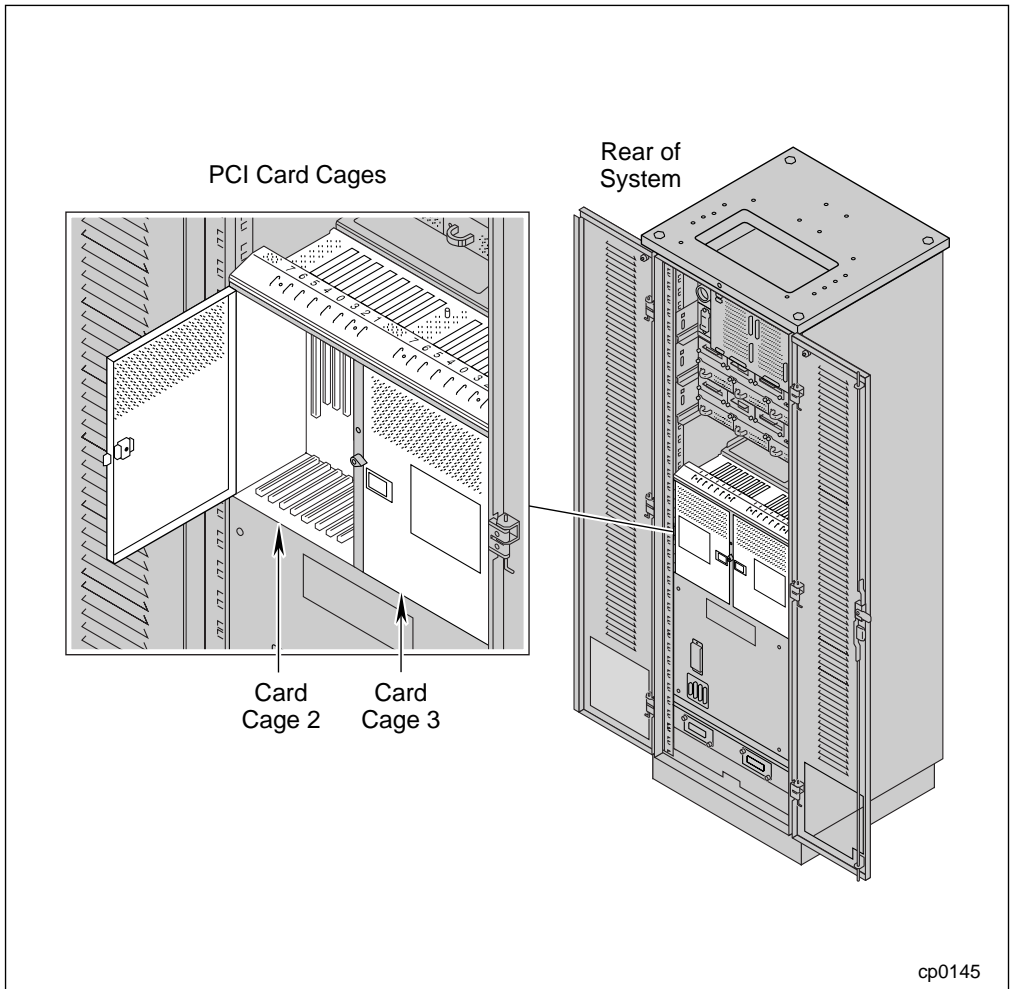


Figure 1-2. Location of PCI Card Cages

Figure 1-3 shows the location of the PCI cards in the PCI card cages. The U916 PCI card can be installed in any of the “optional PCI card” slots.

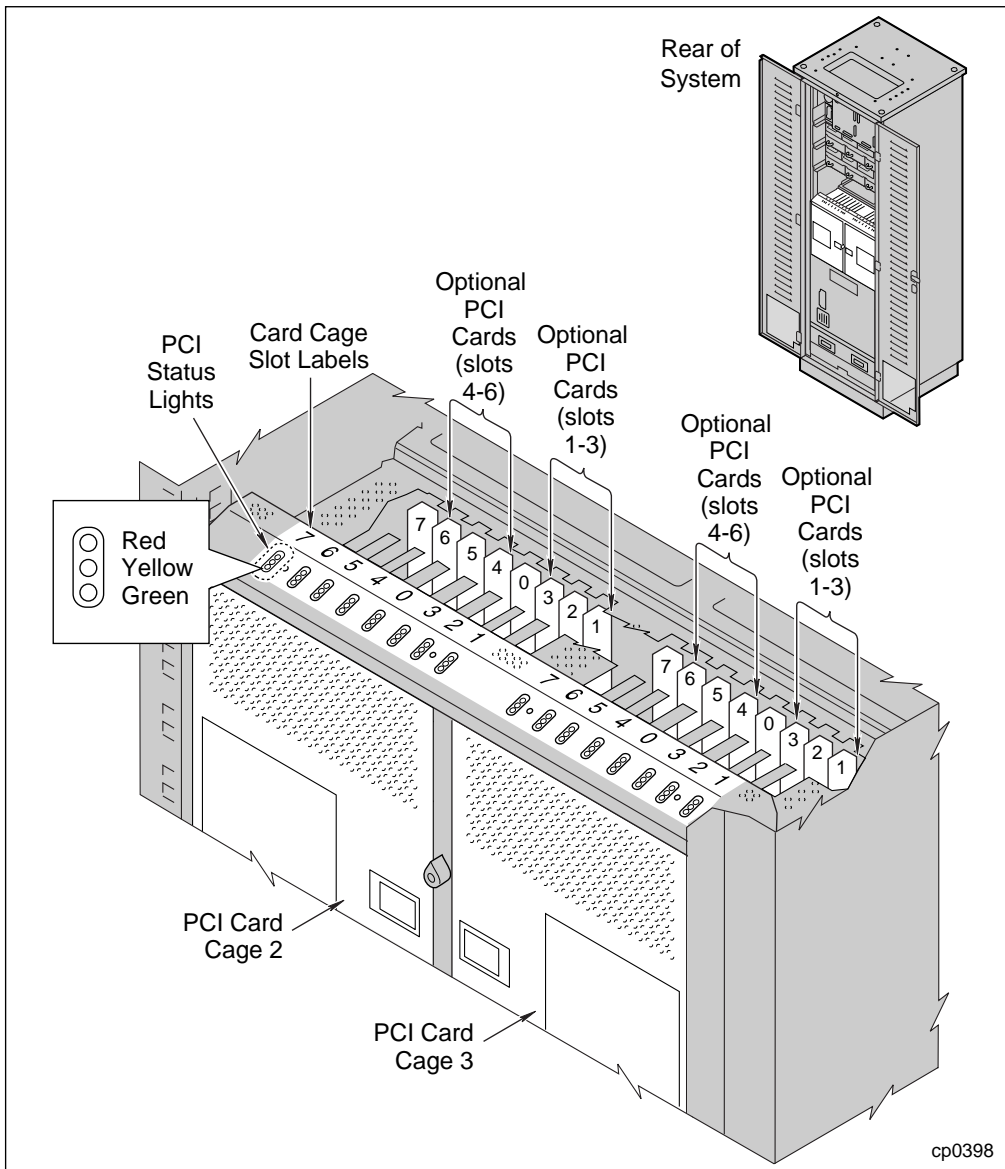


Figure 1-3. Location of PCI Cards

Handling PCI Cards

PCI cards are extremely sensitive to electrostatic discharge. To avoid damaging a PCI card during handling, take the following precautions.



CAUTION

Do **not** walk around carrying a PCI card that is not in its static-protective envelope. Static electricity can damage the card.

- **Always** store the PCI card in its static-protective envelope if it is not installed in the system.
- **Always** hold a PCI card by its edges.
- **Always** ground yourself before handling a PCI card. To ground yourself, touch the inside of the PCI card cage to discharge any static electricity, or you can wear a grounding strap. If you have a grounding strap, attach one end to the rear of the system, and place the other end around your wrist (Figure 1-4). Figure 1-4 shows the location of the grounding-strap jacks in the system.

Figure 1-4 shows the location of the grounding-strap jacks in the system.

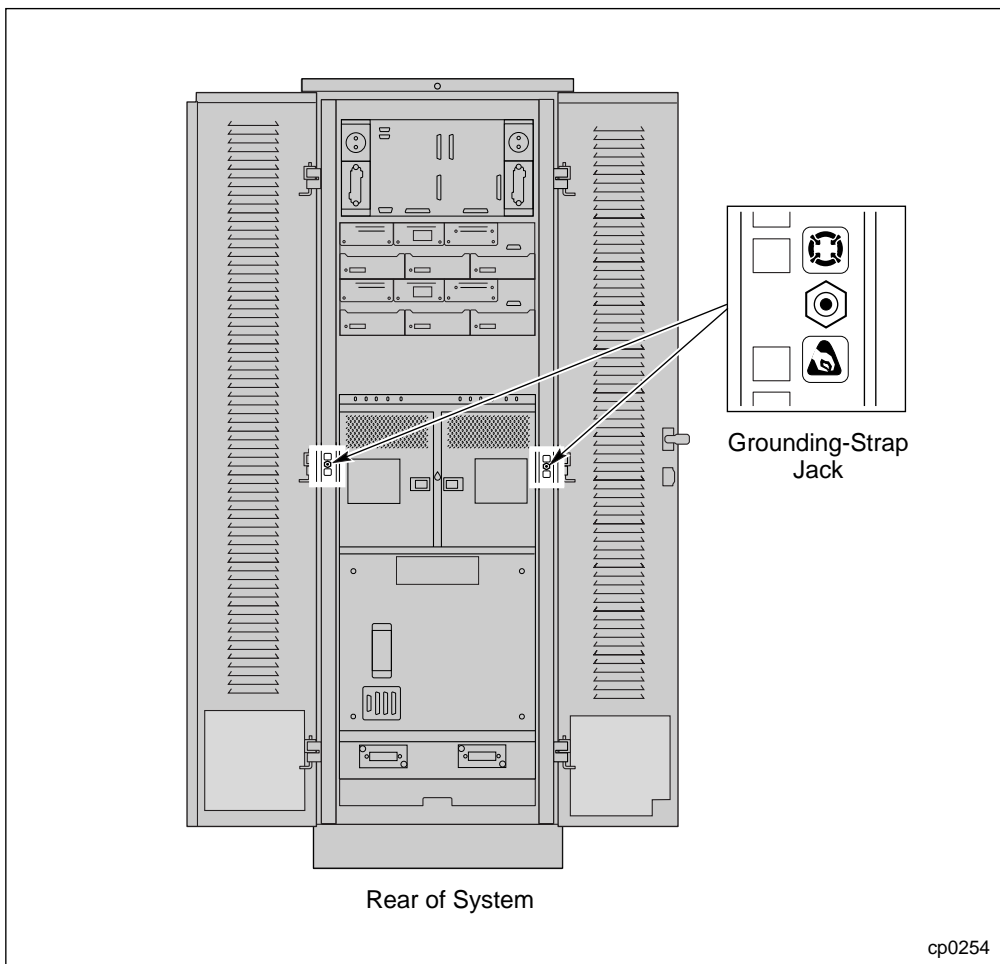


Figure 1-4. Grounding-Strap Jacks

Cabling Specifications

DNCP Solutions does not supply adapter cables that provide the interface between the U916 PCI card and a T1/E1 network. The U916 uses standard, off-the-shelf, category 5 cable with RJ-48C connectors.

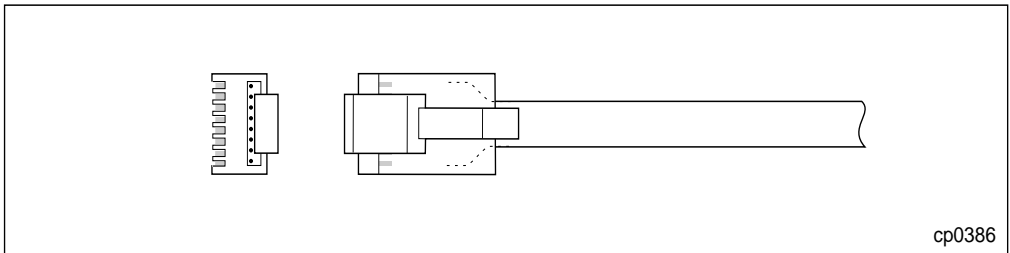
NOTE

For connection to an E1 circuit that requires a 75-ohm BNC termination, a G.703 75- to 120-ohm adapter (DNCP Solutions Part Number B333) is available.

To connect to a T1 line, you must have one *channel service unit/data service unit* (CSU/DSU) for each U916 PCI card port you intend to use (four ports per card). The connection from the U916 PCI card to the CSU/DSU also requires an eight-pin RJ-48C connector (Figure 1-5). To make the connection(s) from the card to the CSU/DSU(s), one RJ-48C cable must be attached from the CSU/DSU to each port on the U916 (Figure 1-6).

NOTE

The maximum length of the cable is 655 feet (approximately 200 meters) without a repeater.



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Figure 1-5. RJ-48C Connector

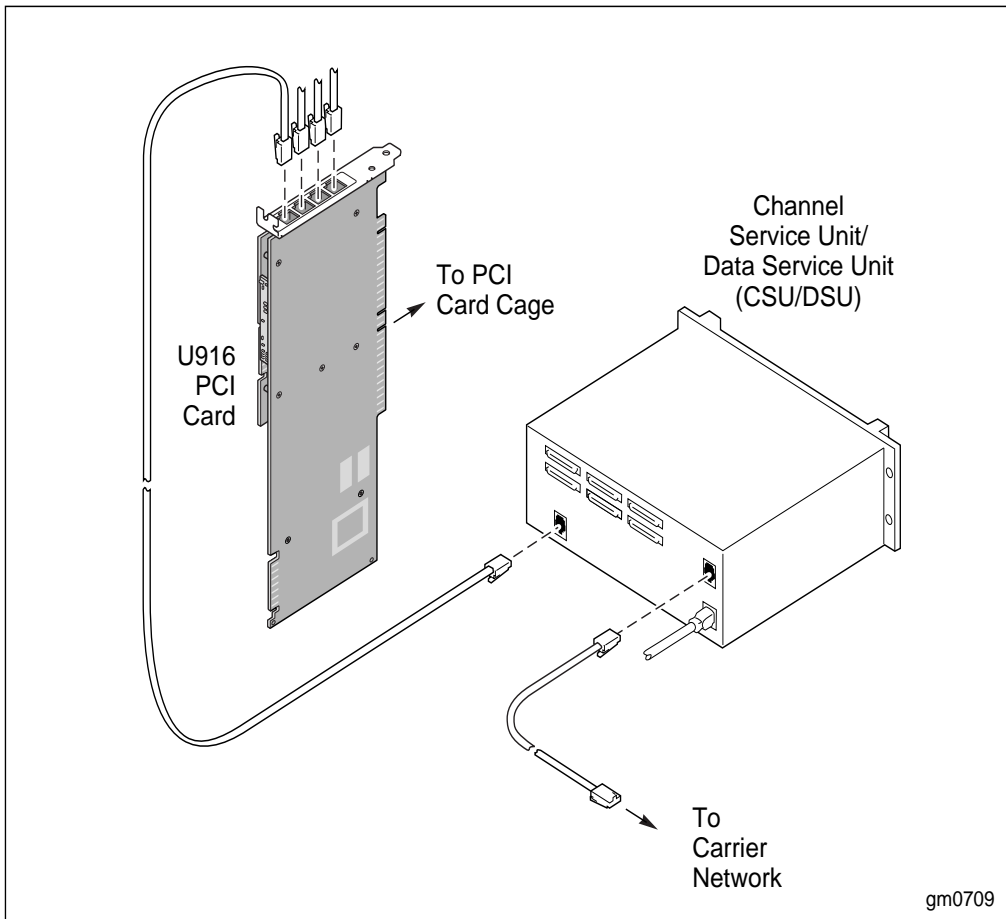


Figure 1-6. T1/E1 Hardware Components

Interface Cables Require Ferrite Bead for FCC Compliance

To maintain FCC emission compliance, a ferrite bead (Figure 1-7) must be installed around the interface cables that run from the U916 PCI card to the network.

For each U916 adapter, one ferrite bead must be placed around the interface cables at the U916 end of the cable near the connector. The ferrite bead can hold up to 4 cables and is provided with the U916 card.

If additional ferrite beads are required, the manufacturer is Fair-Rite Products, and the manufacturer's part number is 0431173551. For more information about the bead, go to the following Fair-Rite Products web site at <http://www.fair-rite.com/>.



Figure 1-7. Ferrite Bead for Interface Cables

Hardware Requirements

Depending on how the card will be used, one or more of the following must be installed or available at your site.

- DNCP Series 400/400-CO system with PA-8600 or PA-8500 processor based CPUs.
- 4-Port E1 RJ-48C cable
- 4-Port T1 RJ-48C cable
- 4-Port E1 BNC grounded cable
- 4-Port E1 BNC ungrounded cable
- Ferrite bead(s) for FCC emission compliance
- For connection to a T1 line, a channel service unit/data service unit (CSU/DSU)
- For connection to an E1 circuit that requires a 75-ohm BNC termination, a G.703 75- to 120-ohm adapter (DNCP Solutions Part Number B333)

Software Requirements

Before you can install a U916 PCI card, the following software must be installed and configured. See “About this Guide” for related documentation.

- HP-UX version 11.00.61 or 11.00.03 operating system.

and either

- SINAP version 10.3 (or higher)

or both

- Hewlett-Packard X.25 version B.11.00.07 software.

and

- DNCP X.25 Release 2.1 (or later).

Chapter 2

Installing or Replacing a U916 PCI Card

Installing a U916 PCI Card

To install a U916 PCI Card in a DNCP Series 400/400-CO system, perform the following steps. As you perform each step, refer to the associated figure.

Before you can install and configure a U916 PCI card, the appropriate communications hardware and software must be installed on your system. For more information about hardware and software requirements, see Chapter 1.



CAUTION

Opening a card cage door stops the data communications associated with any cards in that card cage. Before you open the card cage door, determine what resources will be affected.

1. Open the door of the PCI card cage (Figure 2-1). When you open the door, the power to that card cage is suspended.

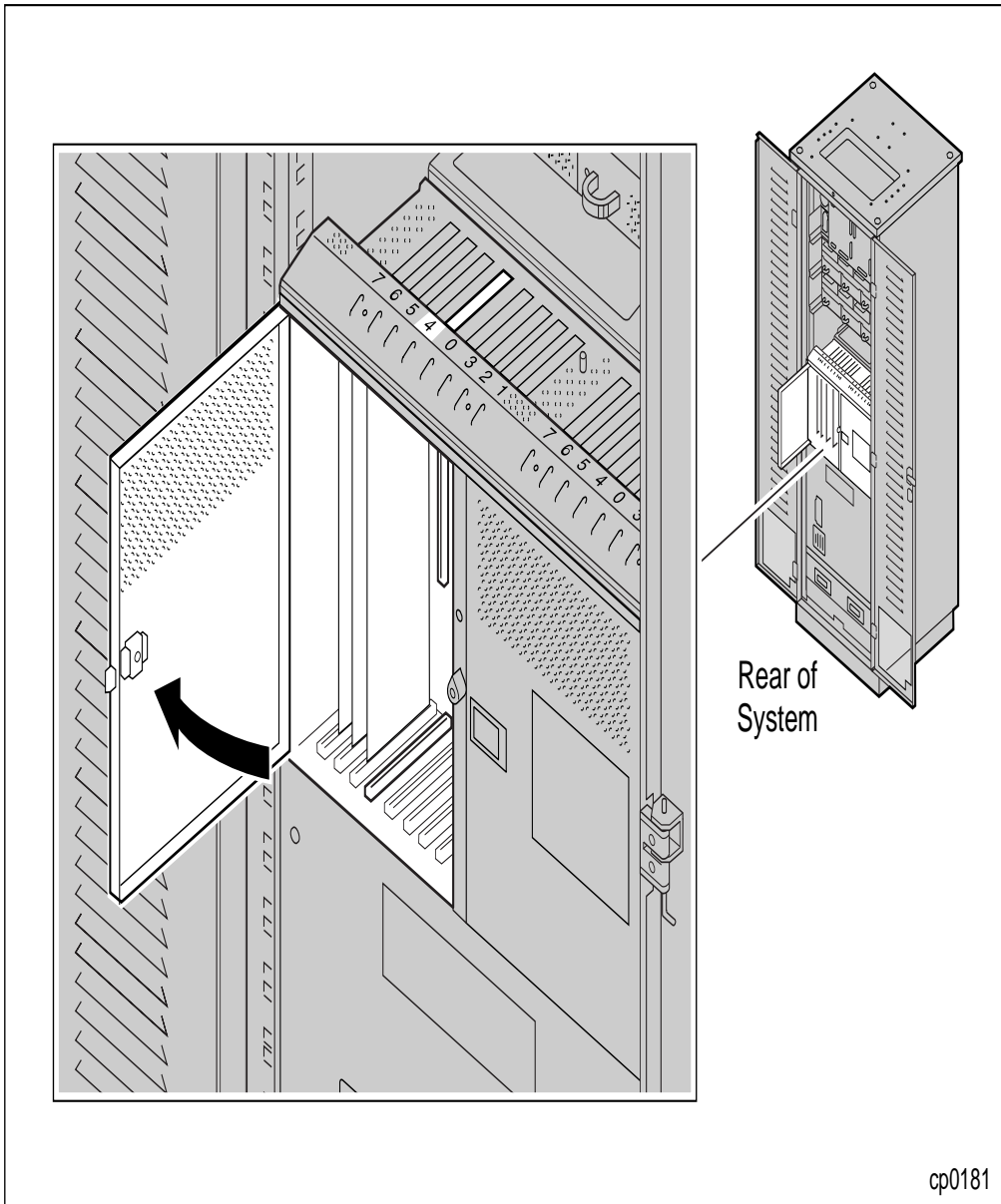


Figure 2-1. Installing a U916 PCI Card: Step 1

2. Identify the slot into which you intend to install the PCI card.
3. Loosen the thumbscrews and open the retainer bar that secures the filler panel to the card cage frame for this slot. Then remove the filler panel (Figure 2-2).

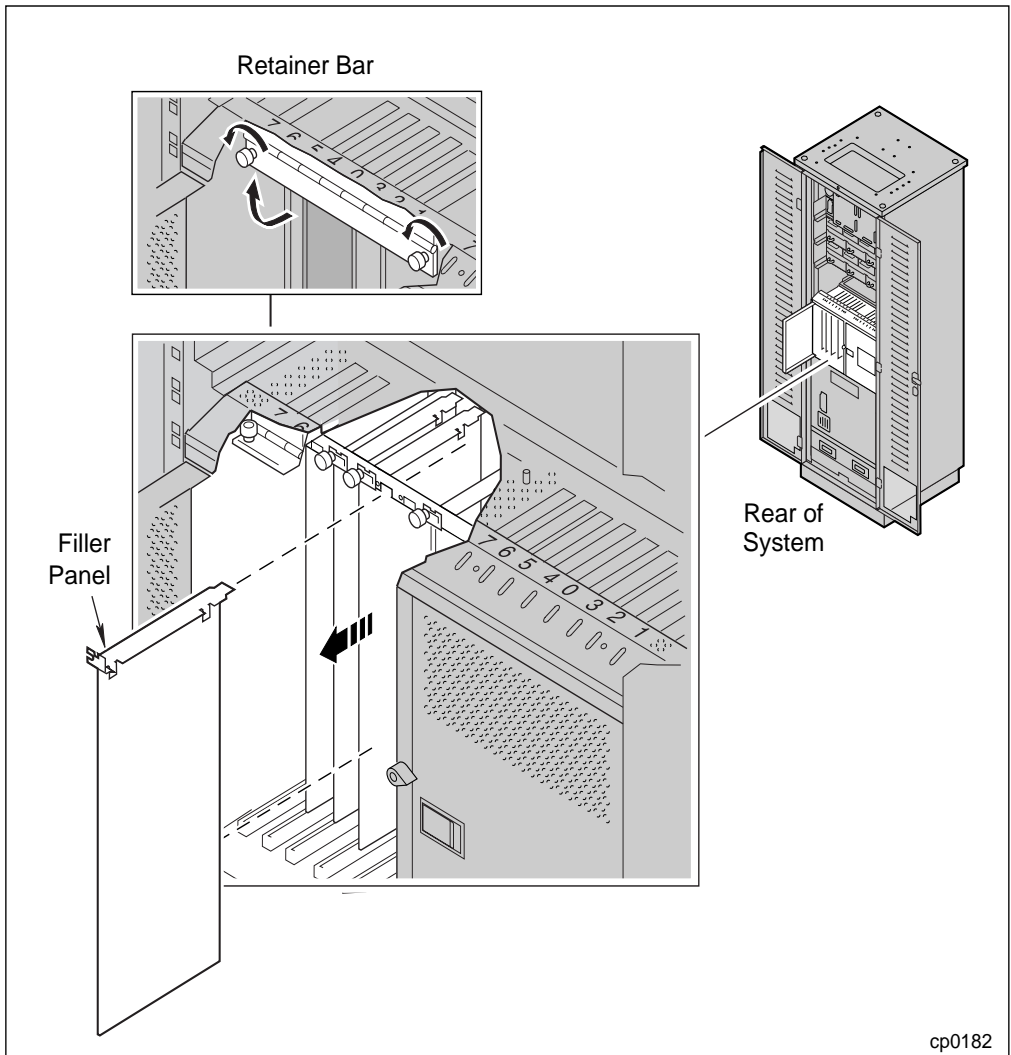


Figure 2-2. Installing a U916 PCI Card: Step 3

4. Touch the side of the PCI card cage to discharge any static electricity.



CAUTION

To avoid damaging the PCI card, leave the card in its static-protective envelope until you are ready to install it. When you remove the card, hold it by its edges.

5. Remove the U916 PCI card from its static-protective envelope.

6. Align the U916 PCI card with the appropriate slot in the card cage frame and with the backplane connector (Figure 2-3).



CAUTION

To avoid snapping the voltage regulator, position your hand and thumb above that component as you install the card.

7. Press the U916 PCI card gently but firmly into the backplane connector.
8. Close the retainer bar that secures the PCI card to the card cage frame and tighten the thumbscrews.

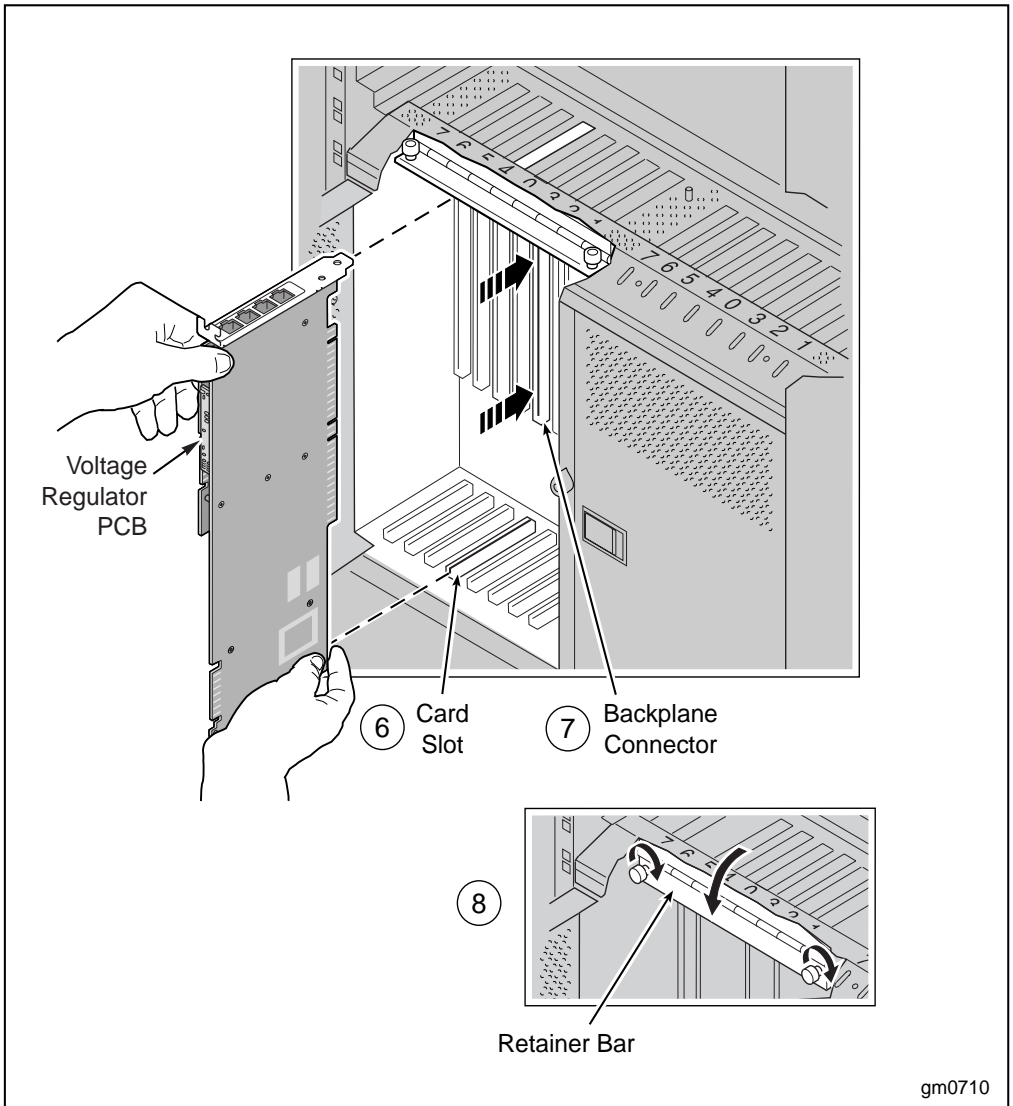


Figure 2-3. Installing a U916 PCI Card: Steps 6–8

Connecting the Cable and Configuring the Card

After you have installed the U916 PCI card in the PCI card cage, you must connect the cable to the card and, if necessary, configure the card.

1. Connect the cable to the card connector on the top of the PCI card cage. Once the cable is installed, adjust the latch to secure the cable to the card (Figure 2-4).

NOTE

For the DNCP Series 400/400-CO system, route the cable from the card connector through the opening at the top of the cabinet. Make sure the U916 PCI card cable does not interfere with other PCI card cables, or damage can result.

2. For each U916 adapter, install one ferrite bead around the interface cables at the U916 end of the cable near the connector. The ferrite bead can hold up to 4 cables and is provided with the U916 card.

NOTE

All configured ports not in use can be terminated with a loopback plug to avoid performance degradation. DNCP Solutions recommends the following vendor as a supplier for loopback plugs: Radisys Corporation (www.radisys.com).

Radisys Corporation can be reached by telephone in the USA at 800-950-0044 and in Europe at 31 36 546 1070. Use the Radisys Part Number 87H3588, ARTIC 1000/2000 1 Port RJ-48 Plug, when ordering.

3. Close the card cage door. When you close the door, power is restored to the card cage.
4. When the card is online, both the green and the yellow lights are illuminated, indicating that the card is running correctly. If this is a first-time installation, you must configure the software for the card. For more information about how to configure the communications software, refer to the manuals listed in "About This Guide."

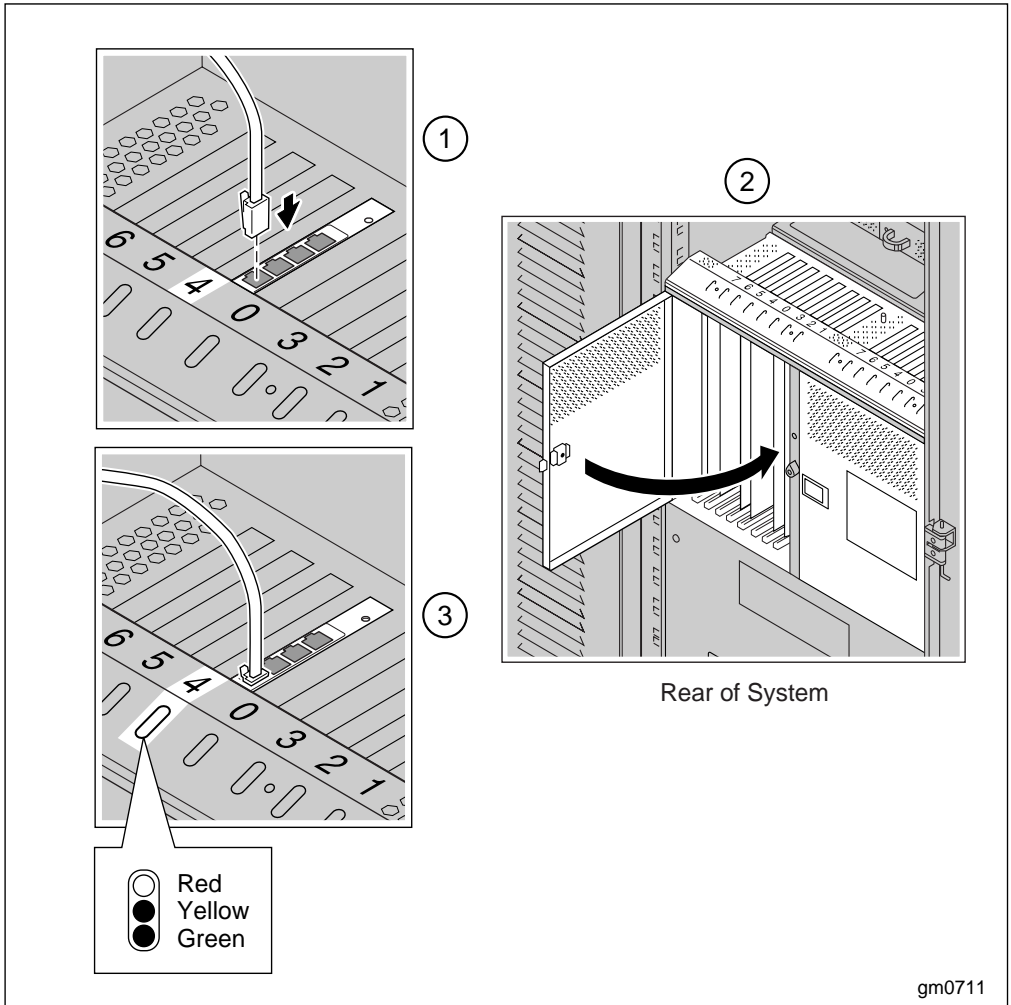


Figure 2-4. Connecting the Cable and Closing the Card Cage

Removing a U916 PCI Card



CAUTION

When you handle a PCI card, always ground yourself to prevent electrostatic discharge from damaging the card. In addition, always hold the card by its edges; never touch the components on the card.

1. Check to see whether the red indicator light is illuminated. If it is, do not remove the card from service without consulting your local DNCP Solutions Customer Assistance Center. See “Getting Help” in Chapter 3. Otherwise, proceed to the next step.
2. Stop any processes or software that are using the U916 PCI card, and all other cards in the associated card cage. Opening the card cage will remove all power in that card cage from the network.
3. Disable the PCI card. Refer to *HP-UX Operating System: Fault Tolerant System Administration* (MAN0004) for disabling instructions.
4. Disconnect the cable from the PCI card by squeezing the latch on the cable connector and gently pulling the cable out of the PCI card (Figure 2-5).



CAUTION

Opening a card cage door stops the communications associated with any cards in that card cage. Before you open the card cage door, determine what resources will be affected.

5. Open the door of the PCI card cage from which you intend to remove the card (Figure 2-5). When you open the door, the power to that card cage is suspended.

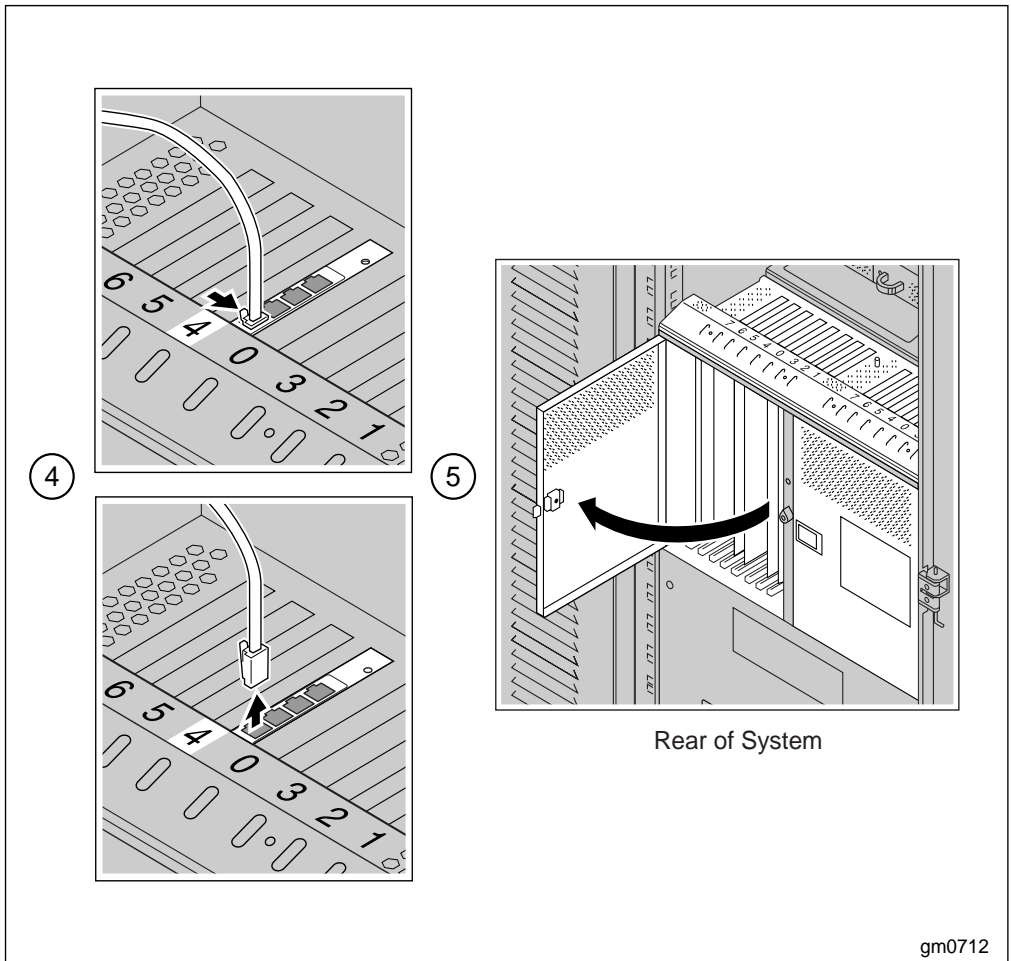


Figure 2-5. Removing a U916 PCI Card: Steps 4 and 5

6. Identify the slot from which you intend to remove the PCI card.

NOTE

Due to the heat generated when the system is running, a PCI card may feel warm when you remove it. The PCI card will cool if you wait for two minutes after opening the card cage door before you remove the card.

7. Loosen the thumbscrews and open the retainer bar that secures the card to the frame of the PCI card cage (Figure 2-6).

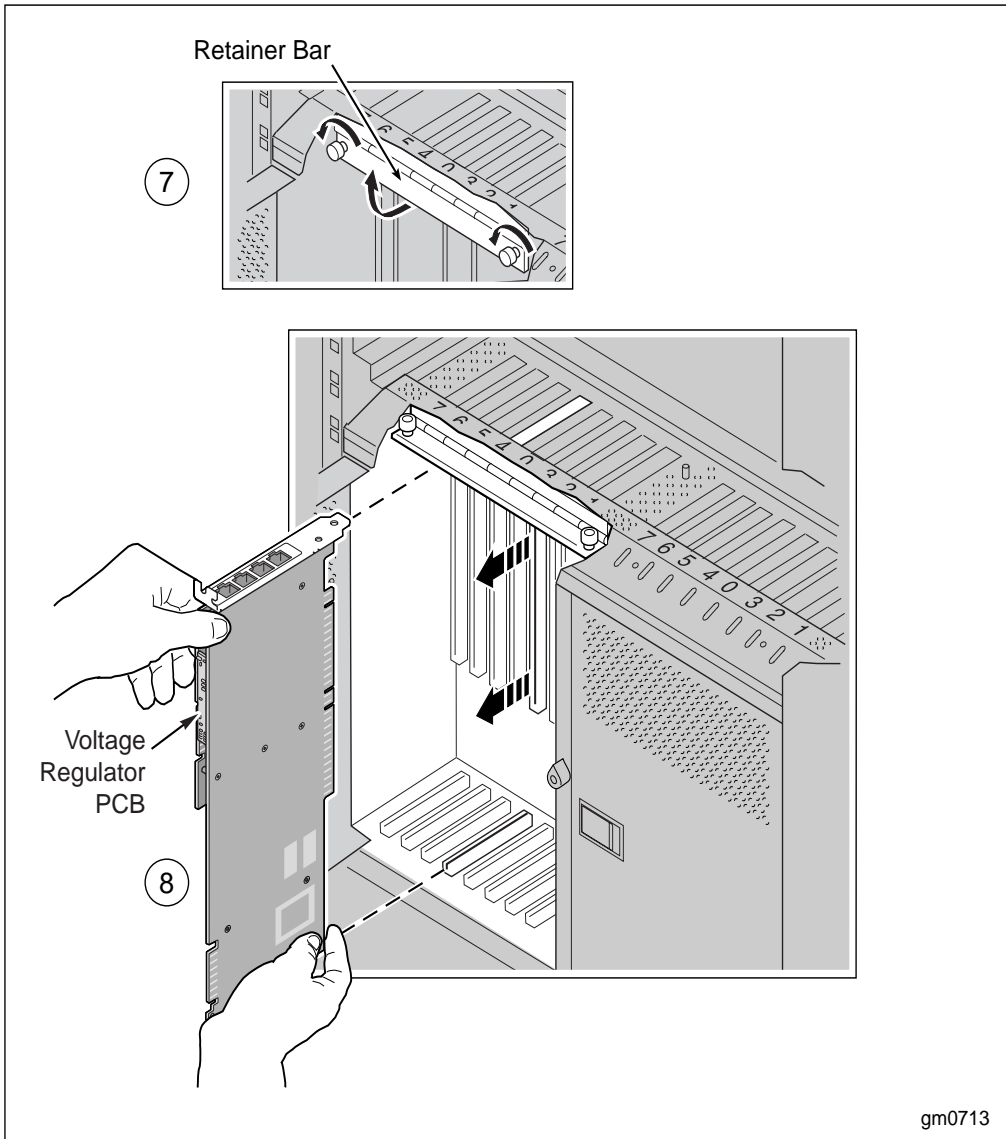


Figure 2-6. Removing a U916 PCI Card: Steps 7 and 8

8. Grasp the top of the card with both hands (remember not to touch the components on the card, especially the voltage regulator). Pull one end of the card outward to loosen it from the backplane connector, and then pull the other end outward to remove the card from the connector. When the card is free, gently pull it out of the card cage.

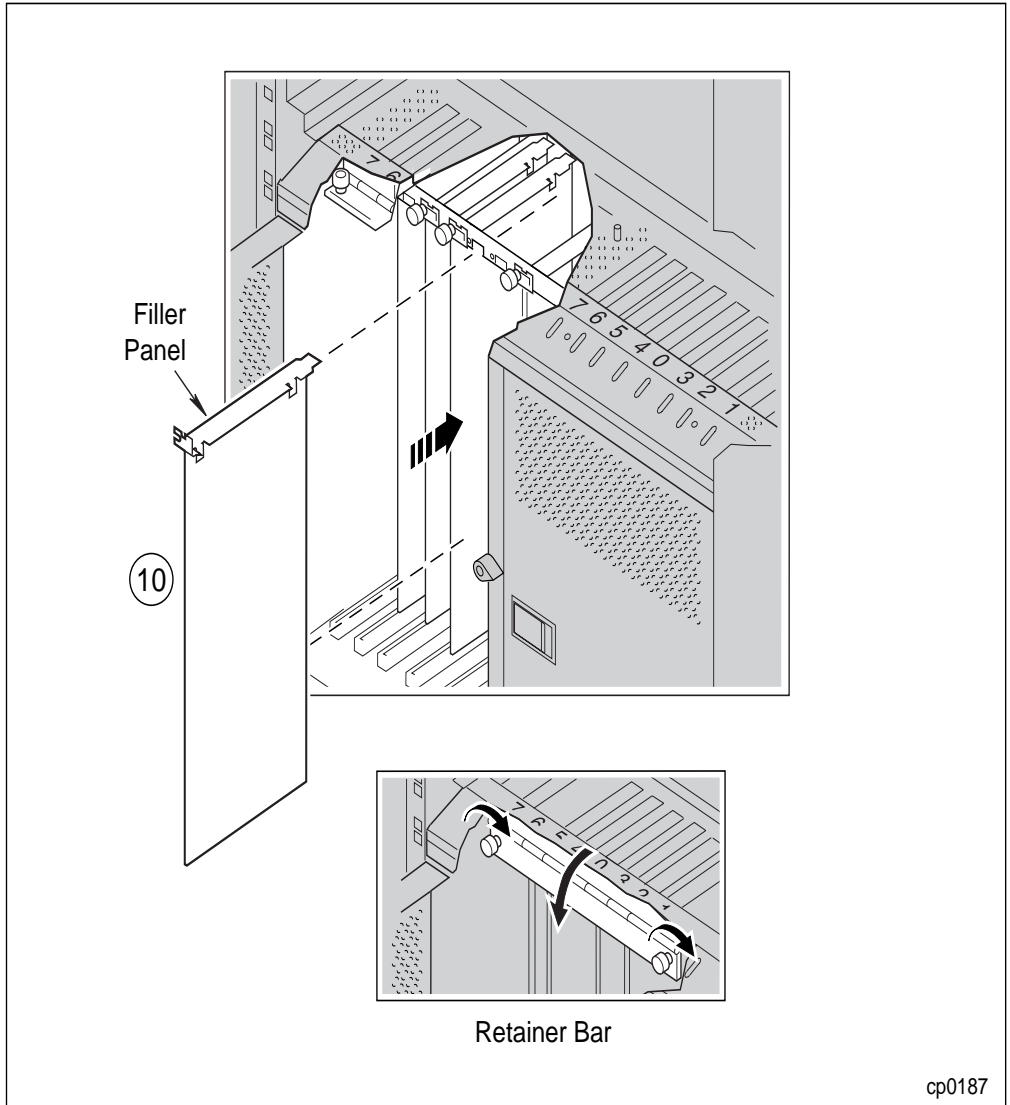


Figure 2-7. Removing a U916 PCI Card: Step 10

9. Store the PCI card in a static-protective envelope to avoid damaging it.
10. Install the filler panel that covers the opening in the rear of the card cage frame. Then, close the retainer bar that secures the PCI card to the card cage frame and tighten the thumbscrews (Figure 2-7). If you are replacing the PCI card with a new card, see the “Installing a U916 PCI Card” section in this chapter now. If not, proceed to the next step.

11. Close the card cage door. When you close the door, power is restored to the card cage.
12. If you are replacing the PCI card, you must now enable it. See *HP-UX Operating System: Fault Tolerant System Administration* (MAN0004) for more information.

Chapter 3

Troubleshooting

DNCP Solutions maintenance software continuously monitors the function of PCI cards. If a PCI card malfunctions, the system determines the severity of the problem. If a malfunction is transient, the PCI card restarts automatically. If a malfunction is permanent, the system takes the card out of service and the red status light on the PCI card cage is illuminated.

In addition, the system records all PCI malfunctions in the online system error log files, and displays corresponding error messages on the system console. HP-UX error log files use the following path name: `/var/adm/syslog/syslog.log`

Getting Help

DNCP Solutions systems offer a unique failure-reporting and remote diagnosis feature known as the *Remote Service Network (RSN)*. If the RSN is connected to your system, it automatically reports all part failures to the DNCP Solutions *Customer Assistance Center (CAC)*, which then notifies you of the problem and diagnoses its cause. (If you are serviced by a distributor, the remote diagnosis and service process may vary.) If the problem is caused by a failed PCI card, the CAC provides you with a replacement procedure.

You may contact the DNCP Solutions *Customer Assistance Center (CAC)*, 24 hours a day, 7 days a week by calling one of the phone numbers listed below.

Service Area	CAC Location	Phone Number
North and South America	Scottsdale, Arizona USA	800-404-1561 (within North America) 480-391-8561 (outside North America)
EMEA (Europe, Middle East and Africa)	Sophia Antipolis, France	+33-492-386-208
Greater China	Hong Kong, China	+852-8202-2562
Asia / Pacific	Tokyo, Japan	0120-787287 (within Japan) 81-3-3589-6034 (outside Japan)

DNCP Solutions does not expect you to diagnose complex problems or perform major repairs. However, in some cases you may be able to solve a problem without replacing the PCI card or contacting the CAC. When a status light or console message suggests that either a U916 PCI card has failed or there is a network problem, follow these steps.

1. Check the `syslog.log` file, which may provide more detailed information about the problem.
2. If the CAC has not contacted you, notify the CAC of the card failure. The CAC will verify your diagnosis.

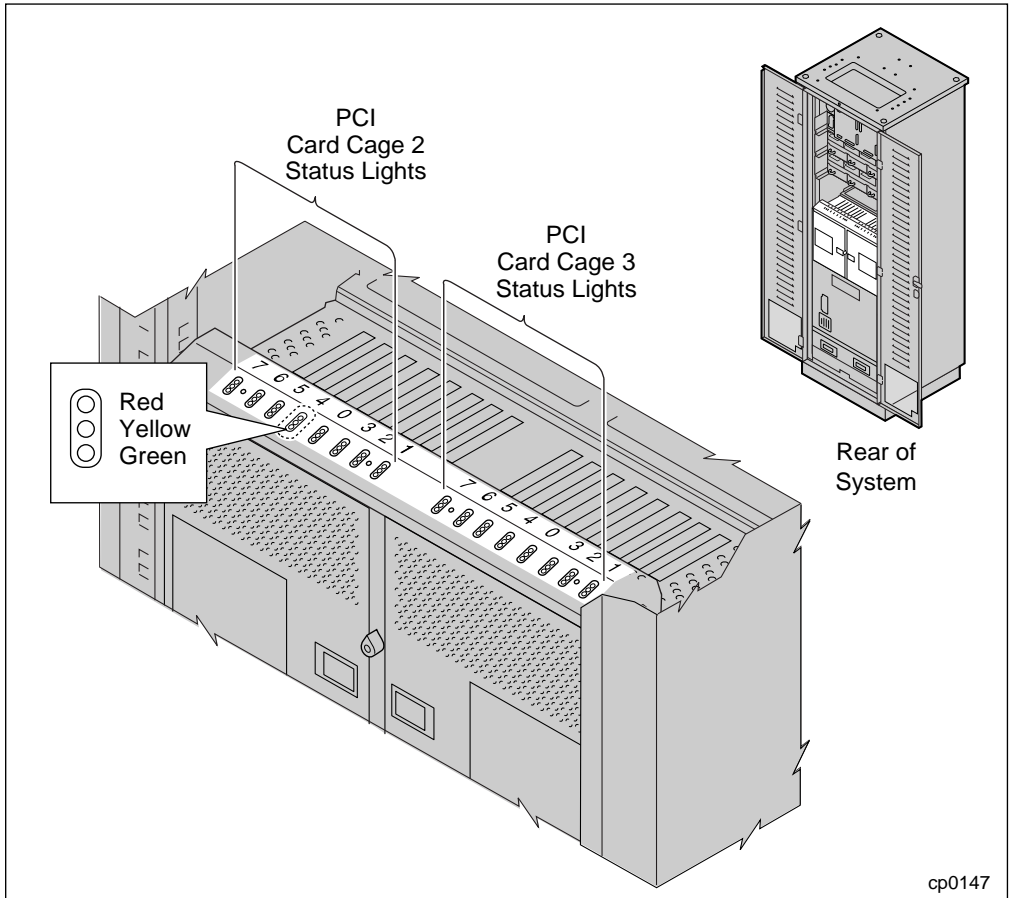
NOTE

By helping you perform online diagnostic tests, the CAC may be able to assist you in fixing a PCI-card related problem without replacing the PCI card.

3. If the CAC advises you to replace a PCI card, see Chapter 2, “Installing or Replacing a U916 PCI Card” for the replacement procedures.

Interpreting the PCI Card Cage Status Lights

Each PCI card slot has three status lights that are arranged in a traffic-light configuration directly above the PCI card on the PCI card cage. These status lights indicate the current condition of the card. Figure 3-1 shows the status lights for the DNCP Series 400/400-CO system. Table 3-1 explains their meaning for both systems. A status light legend is located below the PCI card cage doors, for easy reference.



cp0147

Figure 3-1. PCI Card Cage Status Lights**Table 3-1. PCI Card Cage Status Lights**

Light	State	Meaning	Action
Red Yellow Green	On Off Off	1. The PCI card has failed, or has been disabled by the user; or: 2. The light is temporarily illuminated when the card is being initialized.	1. Do not remove the card from service without consulting the CAC. See the "Getting Help" section in this chapter. 2. No action is required.
Red Yellow Green	Off On On	The PCI card is functioning correctly.	No action is required.

Interpreting The U916 PCI Card Status Light

In addition to the PCI card cage status lights, the U916 PCI card contains one status light that indicates the operating status of the PCI card. Figure 3-2 shows the status light on the U916 PCI card, and Table 3-2 explains its meaning.

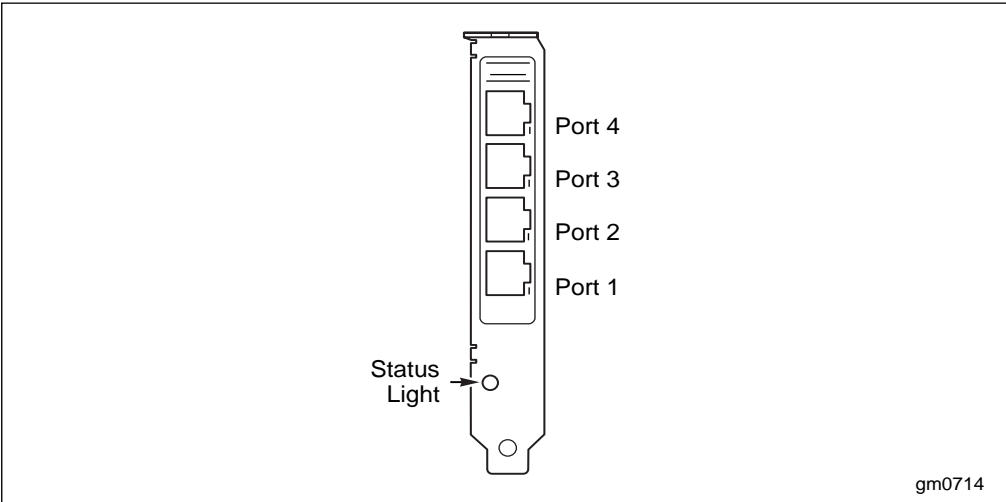


Figure 3-2. Status Light on the U916 PCI Card

Table 3-2. LED Messages

Light	Meaning
Green	Indicates card successfully passed initialization bring-up code.
Yellow	Indicates either the card is in the initialization state, or if the light remains yellow, initialization has failed.

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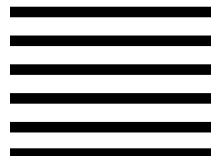
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