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DEC FDDIcontroller™ 400

digital™

Installation/Problem Solving

Order Number: EK–DEMFA–IP–001

CAUTION

This equipment is in the 1st Class category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council For Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in commercial and/or industrial areas. Consequently, when used in a residential area or in an adjacent area thereto, radio interference may be caused in radios and TV receivers etc. Read the instructions for correct handling.

NOTICE – Class A Computing Device:
This equipment generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such radio frequency interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference; in which case, measures taken to correct the interference are at the user's expense.

DEC FDDIcontroller™ 400

Installation/Problem Solving

October 1991

This manual describes how to install and troubleshoot the DEC FDDIcontroller 400 unit. The information includes a product overview, installation and verification procedures, problem-solving methods, and FRU replacement procedures.

Supersession/Update Information: This is a new manual.

digital™

Order Number: EK–DEMFA–IP–001

EK–DEMFA–IP–001
October 1991

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Safety ⚠

Any warning or caution that appears in this manual is defined as follows:

WARNING	Contains information to prevent personal injury.
CAUTION	Contains information to prevent damage to equipment.
VORSICHT	Enthält Informationen, die beachtet werden müssen, um den Benutzer vor Schaden zu bewahren.
ACHTUNG	Enthält Informationen, die beachtet werden müssen, um die Geräte vor Schaden zu bewahren.
DANGER	Signale les informations destinées à prévenir les accidents corporels.
ATTENTION	Signale les informations destinées à prévenir la détérioration du matériel.
AVISO	Contiene información para evitar daños personales.
PRECAUCIÓN	Contiene información para evitar daños al equipo.

The warnings and cautions that must be observed for the hardware described in this manual are listed below in English, German, French, and Spanish. The pages on which these safety messages appear are also listed.

WARNING ⚠

AC line voltage is present in the cabinet even when the ac input circuit breaker is OFF. Therefore, the only safe way to work on the inside of the cabinet is with the system's main ac power cable unplugged, and with the facility (utility) ac power breaker locked out and tagged. [3–2, 5–4]

VORSICHT

Im Systemgehäuse ist noch Restspannung vorhanden, auch wenn der Sicherungsautomat für die Wechselstomversorgung auf AUS steht. Wenn Sie am System arbeiten, müssen Sie das Hauptstromkabel aus der Steckdose ziehen und den Sicherungsautomaten am Betriebsort sperren und mit einem entsprechenden Hinweis versehen.

DANGER

Mêmelorsque le coupe–circuit d'entrée de courant alternatif est en position ouverte (OFF), du courant circule dans l'armoire. Pour travailler en toute sécurité, il faut d'abord verrouiller et étiqueter le coupe–circuit de l'alimentation générale du site et débrancher le câbled'alimentation du système.

AVISO

La corriente alterna está presente en la carcasa incluso cuando el interruptor del circuito de alimentación de corriente alterna se encuentra desactivado (posición OFF). Por lo tanto, la forma más segura de trabajar con el interior de la carcasa es con el cable de alimentaciónprincipal desenchufado, y con el interruptor de corriente alterna de la instalación (o utilidad) bloqueado y etiquetado.

WARNING ⚠

To avoid bodily injury, be sure to power down the host system cabinet and disconnect the system cabinet's main power cable before performing the following procedure. [3–3, 3–11, 3–21, 5–5, 5–14, 5–22]

VORSICHT

Um Personenschäden zu vermeiden, müssen Sie das Systemgehäuse des Hostrechners abschalten und das Hauptnetzkabel des Systemgehäusesabziehen. Führen Sie anschließend folgende Schritte aus.

DANGER

Afin d'éviter tout risque d'accident corporel, assurez–vous que l'alimentation du système hôte est coupée et que le cordon d'alimentation du boîtier système est débranché avant de passer à la procédure qui suit.

AVISO

Para evitar posibles daños personales, asegúrese de cortar el suministro eléctrico de la carcasa del sistema central y de desconectar el cable de alimentación principal de la carcasa antes de llevar a cabo el procedimiento siguiente.

CAUTION ⚠

To prevent damage to the circuit boards, you must wear an electrostatic discharge (ESD) wrist strap that is connected to the system cabinet whenever you handle the circuit boards or work on the inside of the system cabinet.

If you remove a circuit board from an XMI card cage, place it into a conductive container that is specifically designed to protect circuit cards from ESD damage. [3–3, 3–15, 5–5, 5–18, 5–22]

ACHTUNG

Um Schaden an den Leiterplatten zu vermeiden, müssen Sie bei jeder Arbeit mit den Leiterplatten oder im Systemgehäuse die antistatische Gelenkmanschette tragen, die am Systemgehäuse angebracht ist.

Wenn Sie eine Leiterplatte aus dem XMI–Kartenmagazin entfernen, legen Sie sie in einen leitfähigen Behälter.

ATTENTION

Afin de prévenir toute détérioration des circuits imprimés, utilisez un bracelet de masse connecté au boîtier système, chaque fois que vous manipulez les circuits ou travaillez à l'intérieur du boîtier système.

Si vous devez extraire un circuit d'un panier XMI, placez–le dans un boîtier de protection contre les détériorations électrostatiques.

PRECAUCIÓN

Para evitar deterioros en las placas de circuitos, es preciso usar una muñequera contra descargas electroestáticas conectada a la carcasa del sistema, siempre que se trabaje con las placas de los circuitos o en el interior de la carcasa del sistema.

Si saca una placa de circuito de una caja de tarjetas XMI, póngala en un contenedor conductor.

CAUTION ⚠

The H3063-A bulkhead cannot be installed into any of the top slots of the VAX 6000 series system cabinet I/O bulkheads. Installing the device into any of the top slots interferes with closing the system cabinet I/O bulkhead, and can cause damage to the equipment. [3–13, 3–15]

ACHTUNG

DieAnschlußtafel H3063-A kann nicht in den oberen Steckschlitzen der E/A-Schlußtafeln am VAX6000-Systemgehäuse installiert werden. Wenn Sie dies trotzdem versuchen, kann die Funktion der E/A-Anschlußtafel beim Schließen des Systemgehäuses beinträchtigt werden, und die Geräte können beschädigt werden.

ATTENTION

La platine de raccordement H3063-A ne peut être installée dans aucun des emplacements du haut de la platine de raccordement d'E/S située dans l'armoire d'un système VAX 6000. Si vous installez la platine H3063-A dans un des emplacements du haut, le matériel pourrait subir des dommages.

PRECAUCIÓN

El "bulkhead" (distribuidor) del H3063-A no puede instalarse en ninguna de las ranuras superiores de los "bulkheads" de E/S de la carcasa de sistemas de la serie VAX 6000. Si se instala el dispositivo en ese modo, se interferirá con el cierre del "bulkhead" de E/S de la carcasa del sistema, por lo que el equipo puede sufrir daños.

CAUTION ⚠

Before installing the H3063-A bulkhead into any of the bottom slots of the VAX 6000 series system cabinets, ensure that the cabling (including the cable management bar) behind the selected slot will not interfere with the H3063-A bulkhead when installed.

If no cables are installed in the selected area, be sure that the cable management bar is fastened such that it will not come into contact with the H3063-A bulkhead when installed. Failure to comply with these guidelines can result in damage to the equipment. [3–16]

ACHTUNG

Siekönnen die Anschlußtafel H3063-A in jedem der unteren Steckschlitze am Systemgehäuse der VAX 6000 installieren. Vergewissern Sie sich vor der Installation jedoch, daß die Kabel (einschließlich der Kabelleiste) hinter dem gewünschten Steckschlitz die installierte Anschlußtafel nicht berühren und in Ihrer Funktion beeinträchtigen.

Auch wenn keine Kabel hinter dem gewünschten Steckschlitz vorhanden sind, sollten Sie auf sicheren Sitz der Kabelleiste achten, damit ein Kontakt mit der installierten Anschlußtafel ausgeschlossen ist. Andernfalls können am Gerät Schäden auftreten.

ATTENTION

Avant d’installer la platine de raccordement H3063-A dans un des emplacements du bas de l’armoire d’un système VAX 6000, veillez à ce que le câblage (y compris le porte–câble) se trouvant à l’arrière de l’emplacement choisi ne nuise pas à l’installation de la platine de raccordement H3063-A.

Si l’emplacement choisi ne comporte aucun câblage, assurez–vous que le porte–câble est fixé de façon qu’il n’entre pas en contact avec la platine de raccordement H3063-A une fois cette dernière installée. Sinon, le matériel pourrait subir des dommages.

PRECAUCIÓN

Antes de instalar el “bulkhead” (distribuidor) del H3063-A en cualquiera de las ranuras inferiores de la carcasa de sistemas de la serie VAX 6000, hay que comprobar que el cableado (incluida la barra principal de cables) situado tras las la ranura seleccionada no interfiere con el “bulkhead” del H3063-A una vez instalado.

Si no se instalan cables en el área seleccionada, habrá que comprobar que la barra de cables está asegurada, de forma que no entre en contacto con el “bulkhead” del H3063-A una vez instalado. Si no se siguen estas indicaciones, pueden producirse daños en el equipo.

CAUTION ⚠

The next step requires partially removing the faulty H3063-A bulkhead from the cabinet’s I/O bulkhead, with the internal adapter cable still attached to the H3063 bulkhead. Use care not to damage the internal adapter cable during this procedure. [5–19]

ACHTUNG

Entfernen Sie als nächstes die defekte Anschlußtafel H3063-A teilweise von der E/A-Anschlußtafel am Systemgehäuse. Das interne Adapterkabel darf nicht von der Anschlußtafel H3063-A gelöst werden. Achten Sie darauf, daß das interne Adapterkabel nicht beschädigt wird.

ATTENTION

Au cours de l’étape suivante, il faut partiellement retirer de la platine de raccordement d’E/S la platine de raccordement H3063-A défectueuse, sans toutefois débrancher le câble de carte contrôleur interne qui y est relié. Prenez soin de ne pas endommager ce câble durant la procédure.

PRECAUCIÓN

El paso siguiente requiere extraer parcialmente del “bulkhead” de E/S de la carcasa el “bulkhead” defectuoso del H3063-A, con el cable interno del adaptador todavía conectado al “bulkhead” del H3063. Evítese cualquier daño que pueda sufrir dicho cable durante este procedimiento.

Preface

This manual describes how to install, verify, and troubleshoot the DEC FDDIcontroller 400. The information includes a product overview, problem-solving methods, and FRU replacement procedures.

Intended Audience

This guide is intended for personnel who install or replace the DEC FDDIcontroller 400 in the field.

Structure of This Document

This guide has five chapters and four appendixes, as follows:

Chapter 1	Provides a product overview that includes a list of the major assemblies and Light Emitting Diode (LED) indicators, a simplified functional description of the product, and the product specifications.
Chapter 2	Lists the shipping contents and includes important site verification information that should be considered before installation.
Chapter 3	Provides procedures for installing the DEC FDDIcontroller 400 into an XMI-based system mainframe and for verifying that it is operating properly in the network environment.
Chapter 4	Provides a diagnostic flowchart for troubleshooting the DEC FDDIcontroller 400 to the optimum field replaceable unit (FRU).
Chapter 5	Provides removal and replacement procedures for the device's FRUs.
Appendix A	Describes the DEMFA line counters.

Appendix B	Describes the use of the Error Log Formatter, used to check system error log entries.
Appendix C	Describes the data fields shown in the System Dump Analyzer screen images.
Appendix D	Lists related product documentation orderable from Digital.

The postage-paid Reader's Comments form on the last page of this manual requests your critical evaluation to assist us in preparing future documentation.

Related Documents

Refer to Appendix D for a list of additional documents that provide related information about the DEC FDDIcontroller 400. Ordering information is provided at the back of this manual.

1

Introduction

This chapter provides a physical description of the DEC FDDIcontroller 400, also called the DEMFA. The remainder of this manual refers to the DEC FDDIcontroller 400 as the DEMFA.

There are two versions of the DEMFA:

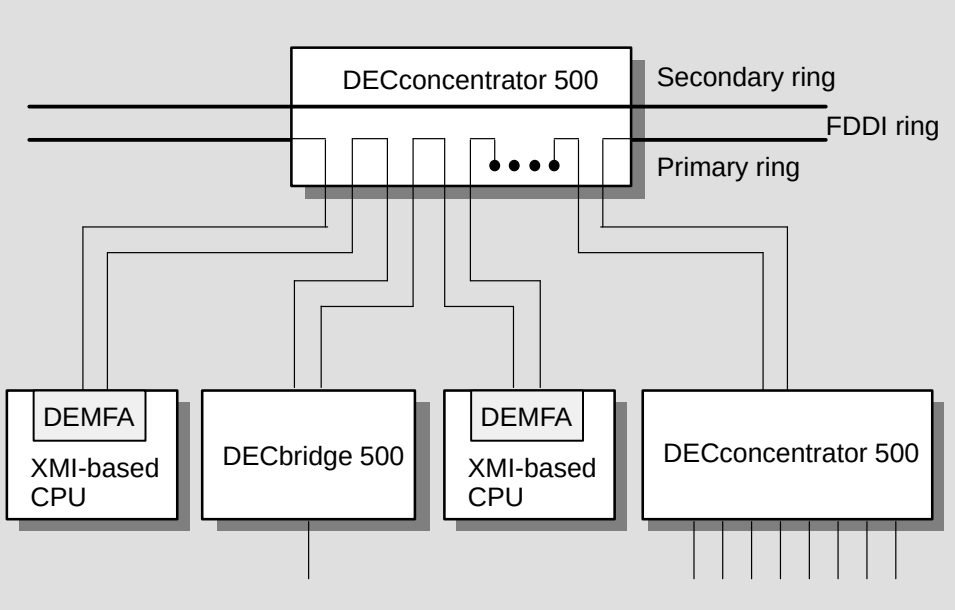
- DEMFA-AA — for VAX 6000 systems
- DEMFA-AB — for VAX 9000 systems

1.1 Overview

The DEMFA is a high-speed, single attachment station (SAS) FDDI controller. It allows end nodes that implement the XMI bus standard to connect to a Fiber Distributed Data Interface (FDDI) 100-Mb/s, fiber optic, token ring network through the DECconcentrator 500 unit (see Figure 1–1).

The DEMFA can be connected to any system that supports an XMI backplane and CPU that has a software driver capable of supporting the device.

Figure 1–1: DEMFA Configuration Example



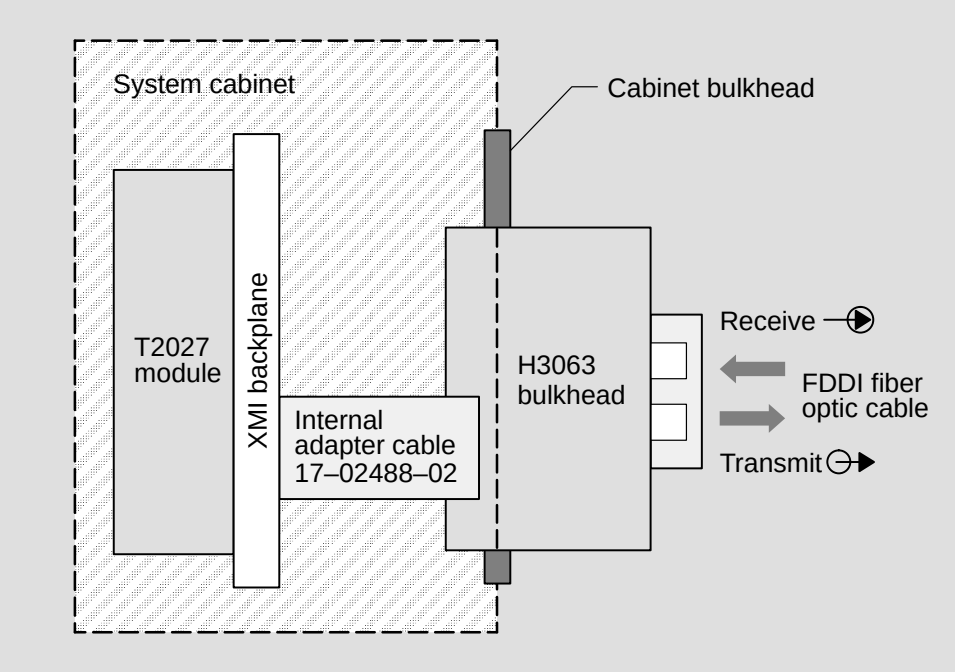
As shown in Figure 1–2, the DEMFA consists of an active I/O bulkhead (the H3063 bulkhead) with FDDI fiber connections cabled to XMI interface logic on a separate high-speed controller board (the T2027 module).

Drivers in the host operating system provide software control. Data destined for the FDDI ring passes to the DEMFA's FDDI port, is converted into FDDI packets, and then transmitted over the ring.

The H3063 bulkhead converts received optical signals from the FDDI network to electrical pulses and gates them to the T2027 module. The pulses are then translated to data usable by the end node and passed on to the XMI bus.

Signals *from* the XMI bus are encoded by the T2027 module and gated to the H3063 bulkhead where they are converted to optical signals for transmission over the FDDI network.

Figure 1–2: DEMFA XMI Bus-to-FDDI Adapter



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1.2 Self-Test and Diagnostics

The DEMFA firmware contains a self-test diagnostic program that is the primary diagnostic tool for isolating faults in the DEMFA.

Testing is accomplished in two stages:

Stage 1.

Power up self-test—automatically performed during the first eight seconds following a node reset or power up.

During this stage the on-board processor tests and verifies the DEMFA, with the exception of some of the ESP state machines, the XMI corner, and the fiber optic transceivers (see Note).

Stage 2.

ESP Special Test—automatically performed (after self-test executes successfully) when the host driver, or controlling software, issues an INIT command to the DEMFA.

During this stage the ESP Special Test checks the XMI corner components and the ESP internal state machines. Testing consists of a Read/Write check to host memory, looping a packet from host memory through the DEMFA, and then looping the packet back to host memory.

When both stages of the tests are completed, FRU pass/fail indications are shown by the states of the LED indicators on the T2027 module.

See Section 1.3 for a description of the components that compose the DEMFA, their LED locations, and for a description of the LED states and meanings.

Section 3.3.2 provides more information about DEMFA's self-test and diagnostics.

NOTE

The fiber optic transceivers, mentioned in the stage 1 description above, are tested by the physical layer firmware (resident in the DEMFA) during the time that the FDDI network link is created.

1.3 Physical Description

This section describes the DEMFA components. There are two versions of the DEMFA (DEMFA-AA and DEMFA-AB); the only difference between the two versions is the physical characteristics of the H3063 bulkhead (refer to Section 1.3.2). Three major components compose the DEMFA:

- T2027 module
- H3063 bulkhead
- Internal adapter cable

1.3.1 T2027 Module

The T2027 module (see Figure 1–3) is the high-speed controller component of the DEMFA. It contains the firmware that enables the host to interface to the FDDI network. Note the location of the two LED indicators: the Self-test LED (yellow), and the Status LED (green). The combined states of the two LEDs indicate the status of the DEMFA Field Replaceable Units (FRUs).

Figure 1–3: T2027 Module

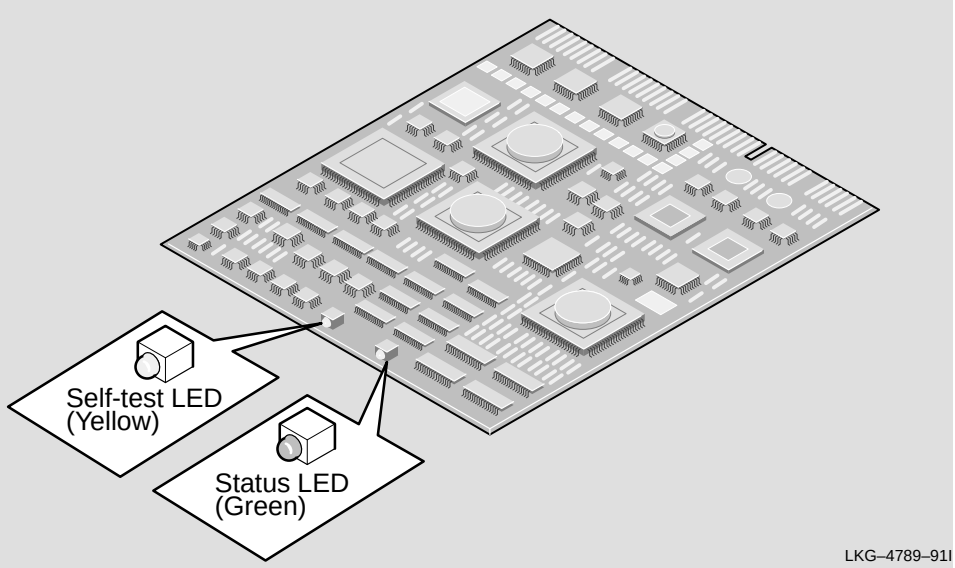


Table 1–1 defines the various combined states the LEDs can be in during operation of the unit.

Table 1–1: T2027 Module LEDs

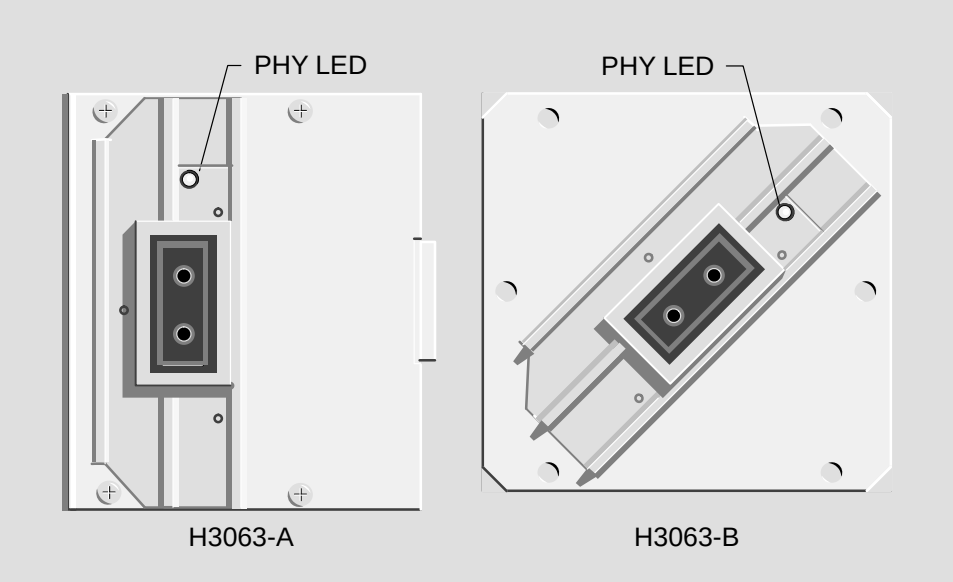
Self-Test LED State (Yellow)	Status LED State (Green)	Description
OFF	ON	Self-test failed. The H3063 bulkhead (or internal adapter cable) is faulty.
OFF	OFF	Self-test failed. The T2027 module is faulty.
ON	Blinking	The ESP special test has not executed. Possible causes are:
		Operating system has not booted network software.
		Host driver is not installed or is improperly enabled.
		Host driver and firmware are not compatible.
		XMI backplane or XMI interface not operating properly (T2027 module not initializing).
ON	OFF	The ESP special test failed. T2027 module is faulty.
ON	ON	The T2027 module has passed the self-test and the ESP special test.

1.3.2 H3063 Bulkhead

The H3063 bulkhead provides the fiber optic interface between the DEMFA and the FDDI network.

There are two versions of the H3063 bulkhead: H3063-A and H3063-B (see Figure 1–4). The H3063-A version installs into a 4.0-inch square (system-cabinet) bulkhead slot, such as those used on the VAX 6000 series mainframes. The H3063-B installs to a 3.5-inch square (system-cabinet) bulkhead slot, such as those used with the VAX 9000 series mainframes.

Figure 1–4: H3063 Bulkhead



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The H3063 bulkhead connects to, and receives power from, the T2027 module through a 30-conductor internal adapter cable that connects to the host system's XMI backplane. The H3063 bulkhead has one LED, the PHY LED (Green), that indicates the status of the connection between the T2027 module and the FDDI network.

Table 1–2 defines the PHY LED states.

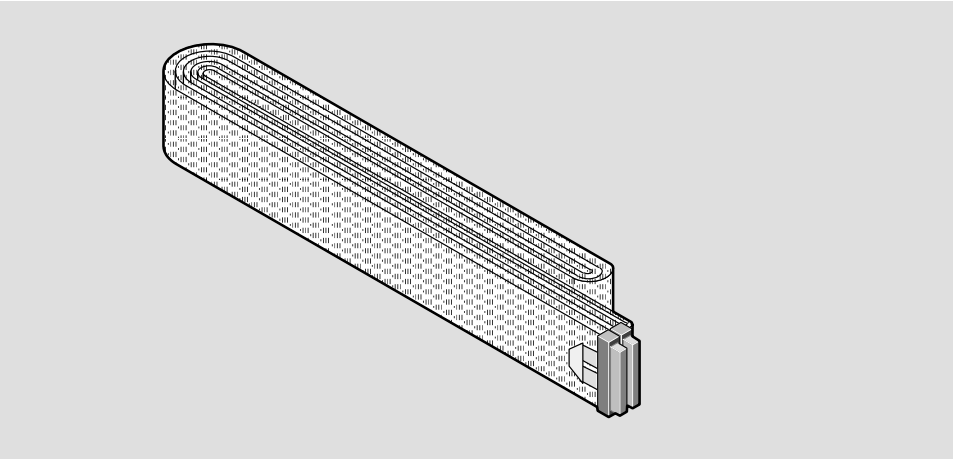
Table 1–2: H3063 Bulkhead PHY LED

PHY LED State	Description
OFF	Port disabled
Blinking	Attempting to connect; not completed
ON	Good PHY connection

1.3.3 Internal Adapter Cable

The internal adapter cable (P/N 17-02488-02), shown in Figure 1–5, provides power and data signals between the T2027 module and the H3063 bulkhead.

Figure 1–5: Internal Adapter Cable



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1.4 Product Specifications

This section describes the DEMFA's electrical and environmental specifications.

1.4.1 Power Dissipation

Table 1–3 lists the electrical characteristics for the T2027 module.

Table 1–3: T2027 Module Electrical Specifications

Voltage	Current (Ampere)	Power (Watts)
+5.0 V	12.4 A	62 W

Table 1–4 lists the electrical characteristics for the H3063 bulkhead.

Table 1–4: H3063 Bulkhead Electrical Specifications

Voltage	Current (Ampere)	Power (Watts)
+5.0 V	0.09 A	0.45 W
–5.2 V	0.98 A	5.10 W

1.4.2 Environmental Requirements

Table 1–5 lists the DEMFA's environmental requirements.

Table 1–5: Environmental Requirements

Parameter	Value
Operating Environment:	
Temperature (at sea level)	10° C to 40° C (50° F to 104° F)
Temperature (above sea level)	Reduce the maximum operating ambient temperature by 1.8° C per 1000 meters (1° F per 1000 feet) for operation at high altitude sites.
Maximum rate of change	11° C/hr ± 2° C/hr (20° F/hr ± 4° F/hr)
Relative humidity	10% to 90%
Wet-bulb temperature	28° C (82° F)
Altitude	Up to 2.4 km (8000 ft)
Nonoperating environment:	
Temperature	–40° C to 66° C (–40° F to 151° F)
Relative humidity	Up to 95% (non-condensing)
Altitude	Up to 4.9 km (16,000 ft)

1.5 Network Device Cabling

The DEMFA connects to the FDDI network through the DECconcentrator 500 (DEFCN). The maximum distance that can be achieved between the DEMFA and the DEFCN depends on the DEFCN module type (port card) used for the connection.

Table 1–6 specifies the maximum distances that can be achieved using either module type.

Table 1–6: Network Cabling

Module Type	Maximum Distance
DEFCN-N (Standard Optics)	2 km (1.24 mi)
DEFCN-L (Low-Power Optics)	1 km (.62 mi)

2

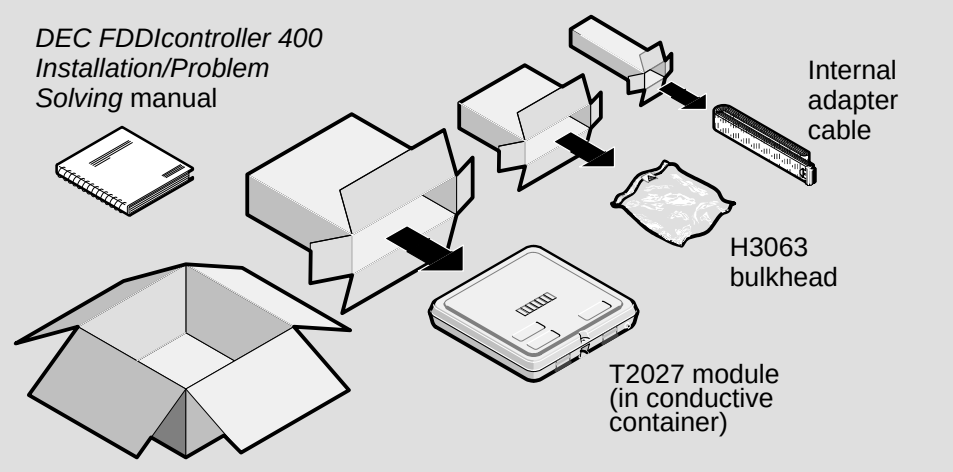
Preparing for Installation

This chapter describes the contents of the shipment and provides important site verification information to consider before installation.

2.1 Packaging

A single shipment is packaged as shown in Figure 2–1.

Figure 2–1: DEMFA Packaging



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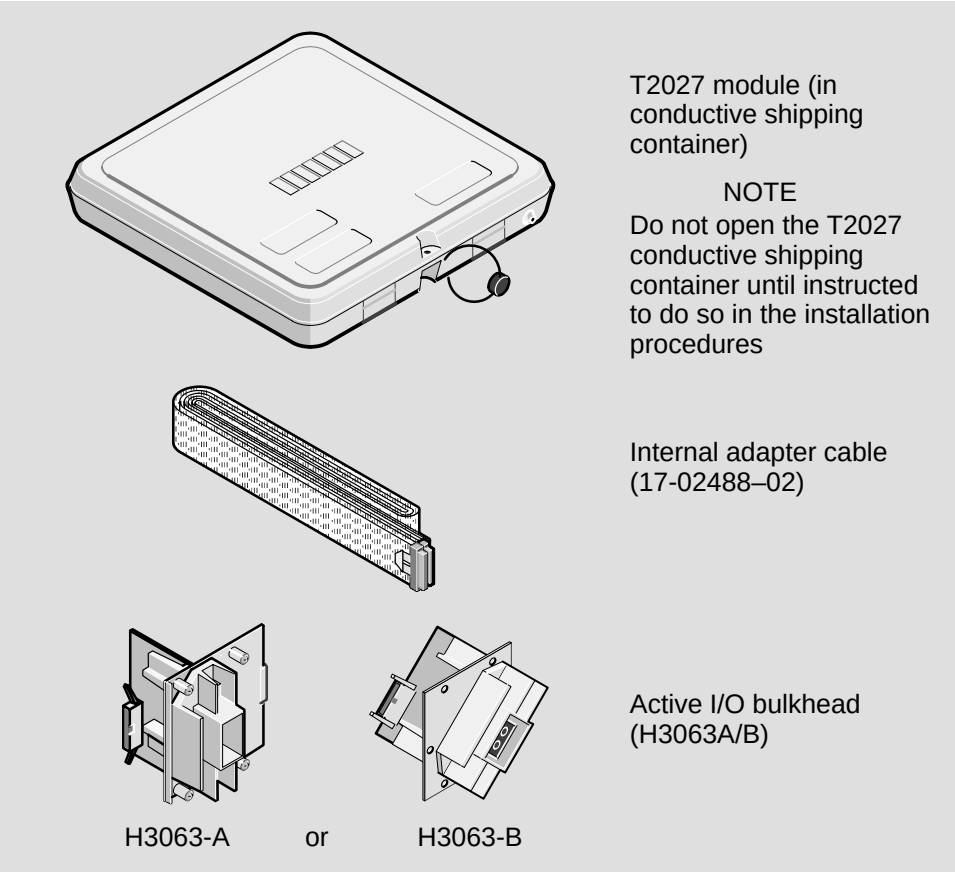
2.2 Checking the Contents of Shipment

Check the shipment for damage or missing parts (see Figure 2–2). If any items are damaged or missing, immediately notify the delivery agent and the Digital sales representative.

NOTE

Save the original packing material should you need to return the unit to Digital.

Figure 2–2: Checking Contents of Shipment



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2.3 Site Verification Checklist

Site verification ensures that the site has been properly prepared to accept the installation with a minimum of system downtime. Use the following checklist to verify all site preparation tasks have been completed before beginning the DEMFA installation:

Environmental Requirements

- ☐ Ensure that the environmental requirements for temperature and humidity are within the ranges described in the DEMFA specifications listed in Chapter 1.

Cabling Requirements

- ☐ Ensure that the required fiber optic cabling is in place, tested, tagged, and conforms to Digital's General Specification 1710002–GS. Digital recommends using 62.5/125 Graded Index Multimode Optical Fiber to achieve maximum distances between stations (2 kilometers [1.24 miles]).

Software

- ☐ Ensure that the proper version operating system has been installed.

Service

- ☐ Make sure the (optional) service contracts are in place. Call your Digital sales representative for information on available hardware and software services to support the DEMFA.

General

- ☐ Ensure that the system manager is notified that the system is to be shut down during the installation.
- ☐ Ensure that precautions are taken to prevent damage to the circuit cards due to electrostatic discharge (ESD). You must wear an ESD ground strap that is connected to the cabinet whenever you handle the circuit boards or work on the inside of the cabinet.

3

Installation

This chapter provides step-by-step procedures for installing the DEMFA into a VAX 6000 series system or a VAX 9000 series system, and for verifying that it is operating properly in the network environment.

Before you begin these procedures, read and follow the instructions given in the Site Verification Checklist (refer to Section 2.3).

3.1 Installing the DEMFA

You must perform three tasks to install the DEMFA:

- Hardware installation
- Verifying the hardware installation
- Verifying DEMFA's operation in the FDDI network

As described in the following sections, complete all three parts of the installation procedures in the order given. Do not skip any part of the procedures.

3.2 Installing the Hardware

This section describes how to install the DEMFA hardware into the XMI-based host system cabinet. The hardware installation comprises five subsections:

- Powering Down the Host System Cabinet
- Installing the T2027 Module
- Installing the H3063 Bulkhead
- Installing the Internal Adapter Cable
- Connecting the FDDI Cables

3.2.1 Powering Down the Host System Cabinet

Power down the host system cabinet by completing the following steps:

1. Inform the system manager that the system will be powered down during the DEMFA installation.

WARNING ⚠

AC line voltage is present in the cabinet even when the ac input circuit breaker is OFF. Therefore, the only safe way to work on the inside of the cabinet is with the system's main ac power cable unplugged, and with the facility (utility) ac power breaker locked out and tagged.

2. Power down and disconnect the main ac power from the system according to the instructions given in the documentation for the specific system you are working on:
   - To power down the VAX 6000 series system cabinets, refer to the VAX 6000 series system documentation and *be sure* to use tag-out and lock-out procedures to ensure your safety while working on the system.
   - To power down the VAX 9000 series system cabinets, refer to the *VAX 9000 Family Maintenance Guide, Volume 1* (Order No. EK-KA901-MG).

3.2.2 Installing the T2027 Module

Install the T2027 module to the system cabinet's XMI card cage by completing the following steps:

1. Be sure that the system cabinet has been powered down (refer to Section 3.2.1).

WARNING ⚠

To avoid bodily injury, be sure to power down the host system cabinet and disconnect the system cabinet's main power cable before performing the following procedure.

2. Get the conductive shipping container that houses the T2027 module. *Do not open the container yet.*

NOTE

The system cabinets have door lock keys for internal access to the cabinets. One key (to be used by Customer Service) fits all the cabinet door locks.

3. Unlock the front and back doors of the system cabinet.

4. Open the front door of the system cabinet and attach the electrostatic (ESD) ground strap to your wrist. (The ESD ground straps are in a pocket attached to each cabinet door.)

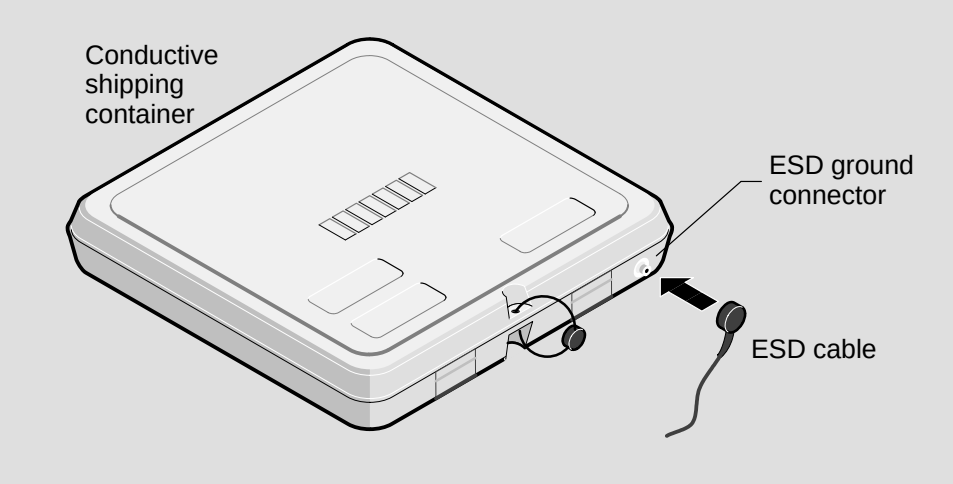
CAUTION ⚠

To prevent damage to the circuit cards, you must wear an electrostatic discharge (ESD) ground strap that is connected to the system cabinet whenever you handle the circuit cards or work on the inside of the system cabinet.

If you remove a circuit card from an XMI card cage, place it into a conductive container that is specifically designed to protect circuit cards from ESD damage.

5. Attach the other lead from the ESD ground strap to the ground connector located on the front of the conductive shipping container (see Figure 3–1).

Figure 3–1: Conductive Shipping Container



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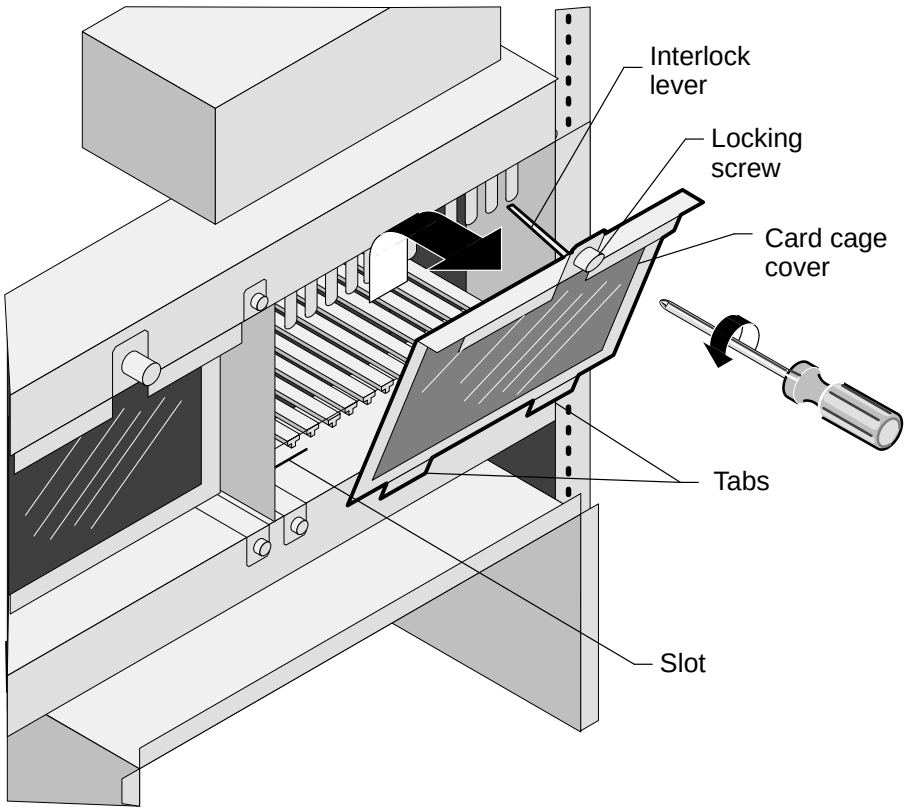
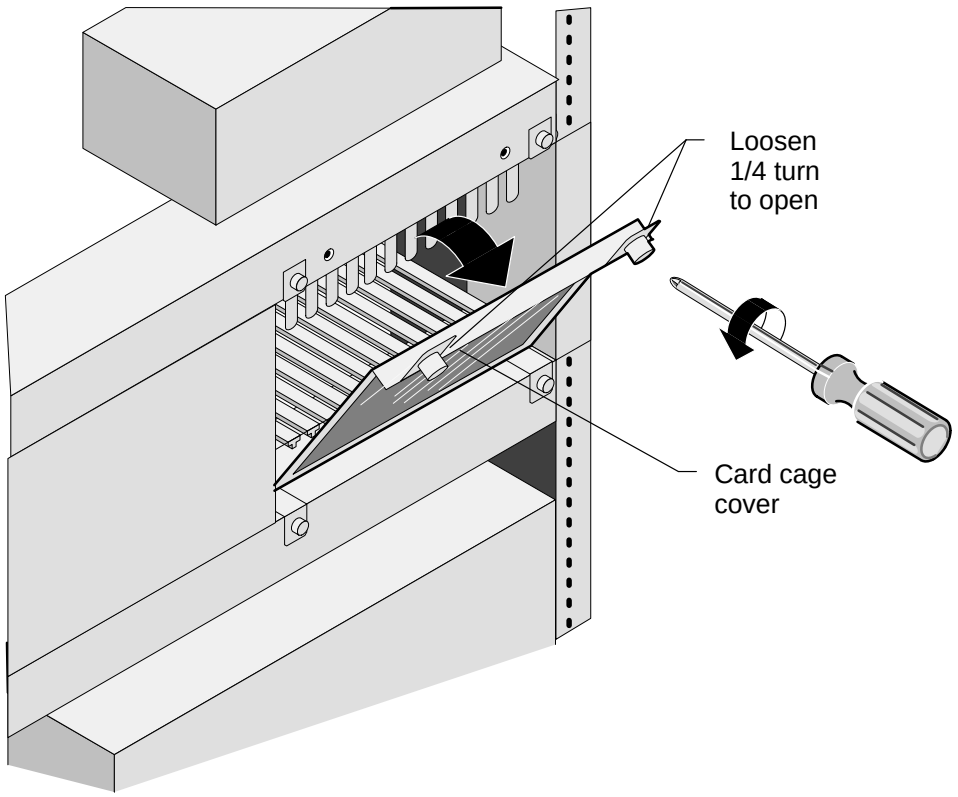
6. For VAX 6000 series cabinets, remove the (Plexiglas) cover on the front of the card cage (see Figure 3–2).

Figure 3–2: Removing the VAX 6000 Series Card Cage Front Cover



7. For VAX 9000 series cabinets, open the (Plexiglas) cover on the front of the card cage (see Figure 3–3).

Figure 3–3: Opening the VAX 9000 Series Card Cage Front Cover



8. Determine the slot that will be used to install the T2027 module (see Figure 3–4).

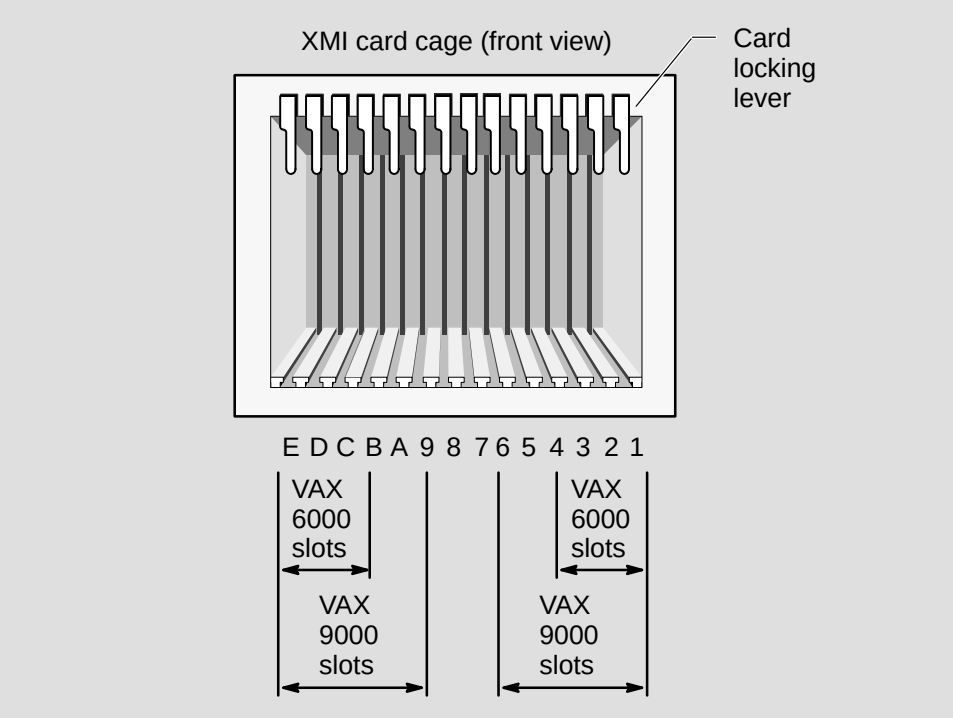
NOTE

In a VAX 6000 system, the T2027 module can be installed into slots 1 through 4 or slots B through E (see Figure 3–4).

In a VAX 9000 system, the T2027 module can be installed into any slot *except* slot 7 and slot 8 (see Figure 3–4).

9. Lift the card locking lever to access the chosen slot.

Figure 3–4: XMI Card Cage



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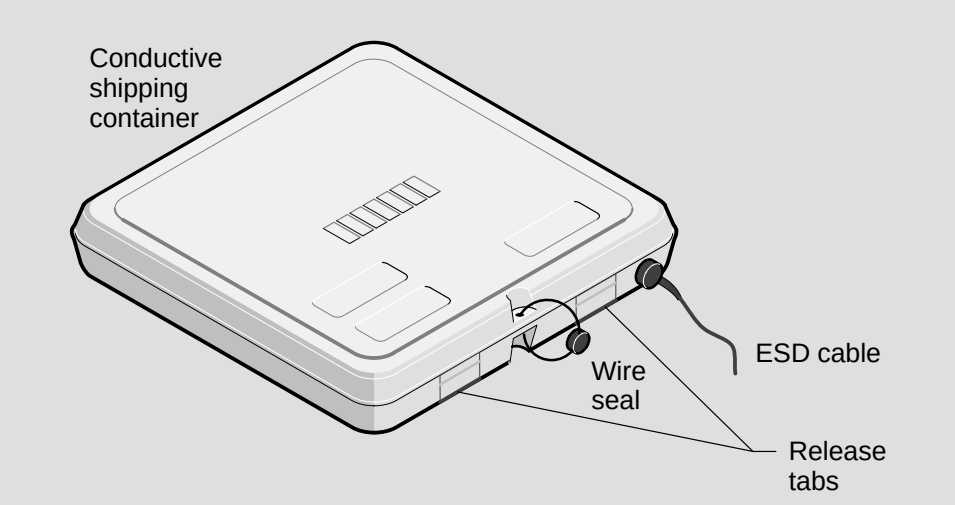
10. Cut and remove the wire seal at the front of the conductive container housing the T2027 module (see Figure 3–5). Release the tabs on the front edge of the container and open the cover.

Figure 3–5: Opening the Conductive Shipping Container



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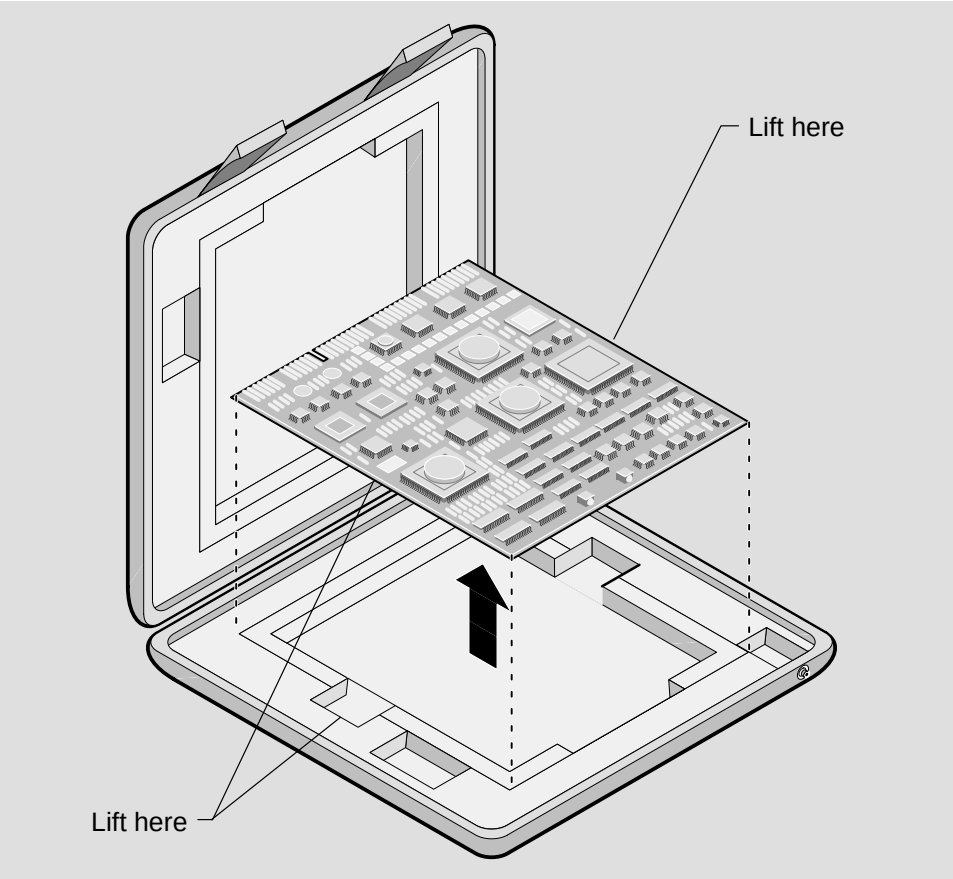
11. Remove the T2027 module from the conductive container (see Figure 3–6). Do not touch or allow any contact with the integrated circuits (ICs).

Figure 3–6: Removing the T2027 Module



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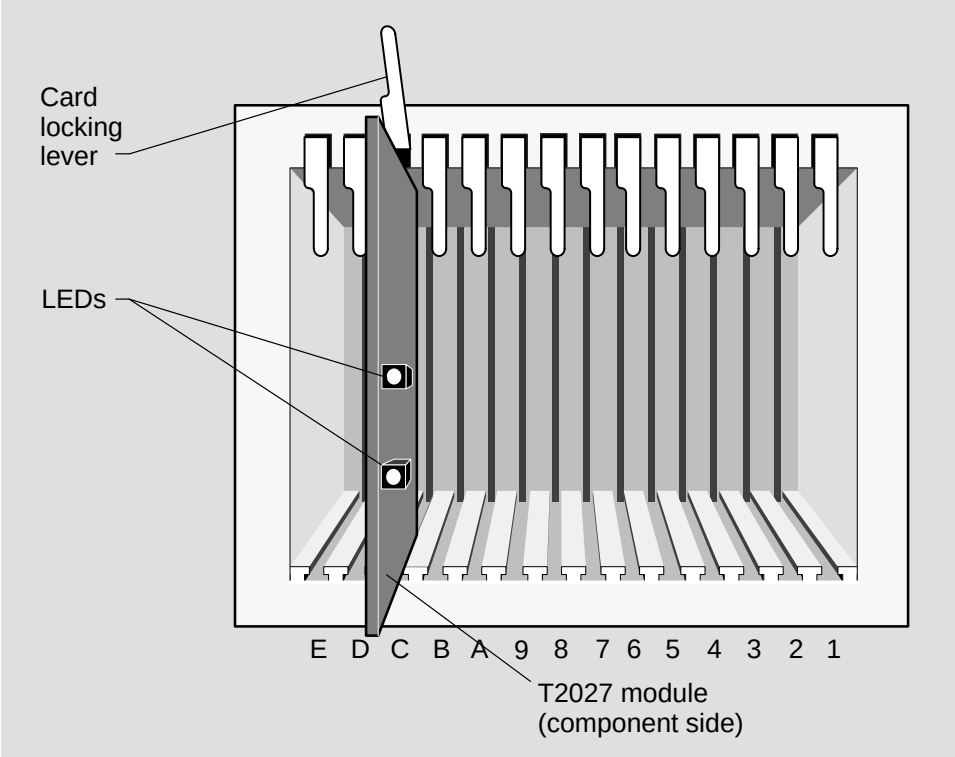
12. Slide the T2027 module into the open card cage slot (see Figure 3–7) until it stops (this is a zero-insertion-force card cage).

13. Set the card locking lever back to its normal position, locking the T2027 module into the slot.

Figure 3–7: T2027 Module Installation



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14. Replace (or close) the Plexiglas cover on the front of the card cage (see Figure 3–2 and Figure 3–3).

15. Remove the ESD ground strap from your wrist and from the conductive shipping container. Return the ESD ground strap to the pocket on the system cabinet door.

16. Go to Section 3.2.3 to install the H3063 bulkhead.

3.2.3 Installing the H3063 Bulkhead

This section describes how to install the H3063-A/B bulkhead into a VAX 6000 series cabinet or into a VAX 9000 series cabinet. The H3063-A version bulkhead is used for the VAX 6000 series cabinets and the H3063-B version bulkhead is used for the VAX 9000 series cabinets. The H3063 versions cannot be interchanged between systems.

Install the H3063 bulkhead to the system cabinet's I/O bulkhead by completing the following steps:

1. Be sure that the system cabinet has been powered down (refer to Section 3.2.1).

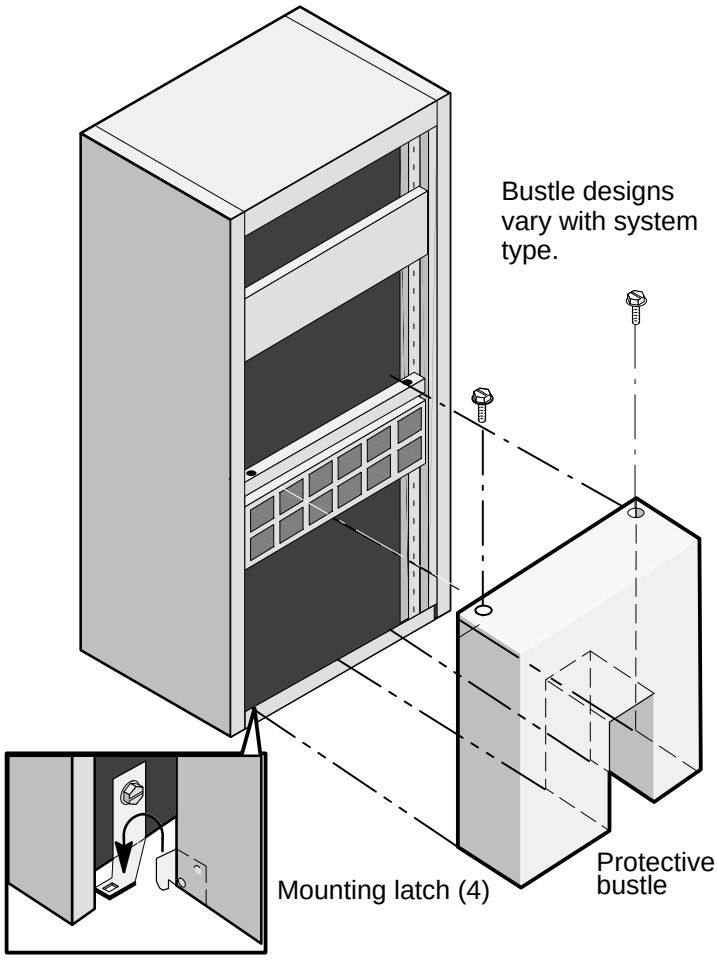
WARNING ⚠

To avoid bodily injury, be sure to power down the host system cabinet and disconnect the system cabinet's main power cable before performing the following procedure.

2. Open the back door of the system cabinet.

3. For VAX 9000 series cabinets only, remove the protective bustle installed over the I/O cabinet's external cabling (see Figure 3–8).

Figure 3–8: Removing the VAX 9000 Series Protective Bustle



4. Locate the system cabinet's I/O bulkhead:
   - See Figure 3–9 for VAX 6000 systems.
   - See Figure 3–10 for VAX 9000 systems.

The H3063 bulkhead can be installed into any shaded area shown in the figures.

CAUTION ⚠

The H3063-A bulkhead cannot be installed in any of the top slots of the VAX 6000 series system cabinet I/O bulkheads. Installing the device in any of the top slots interferes with closing the system cabinet I/O bulkhead, and can cause damage to the equipment.

Figure 3–9: VAX 6000 Series System Cabinet I/O Bulkhead Locations

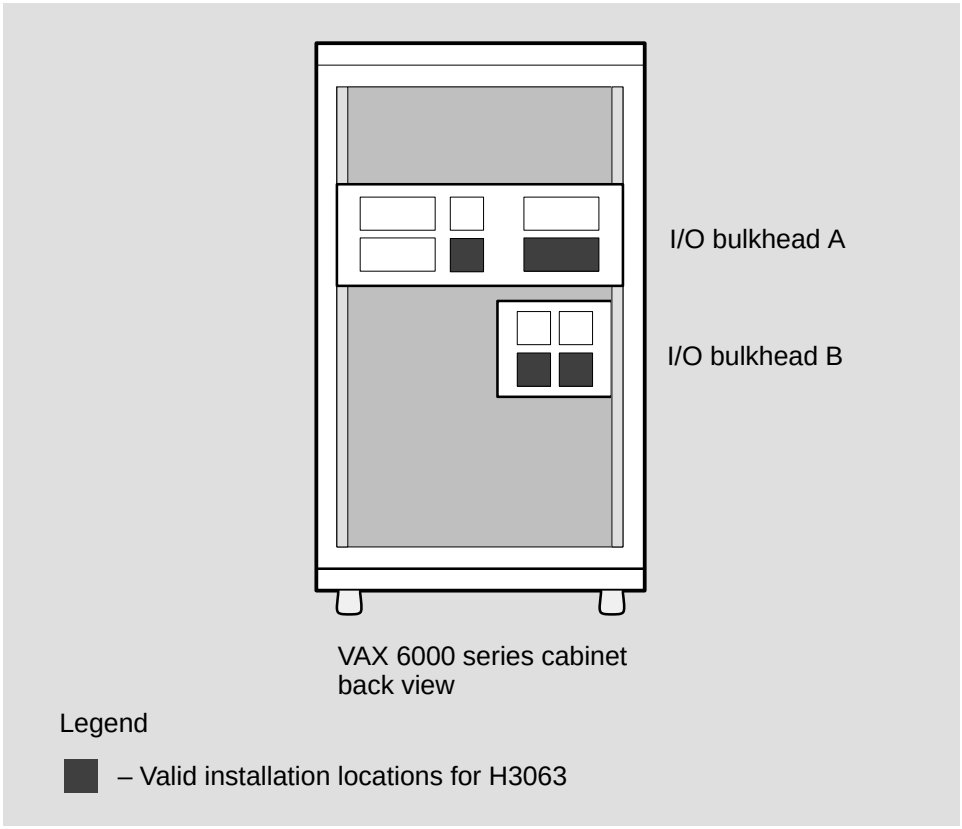


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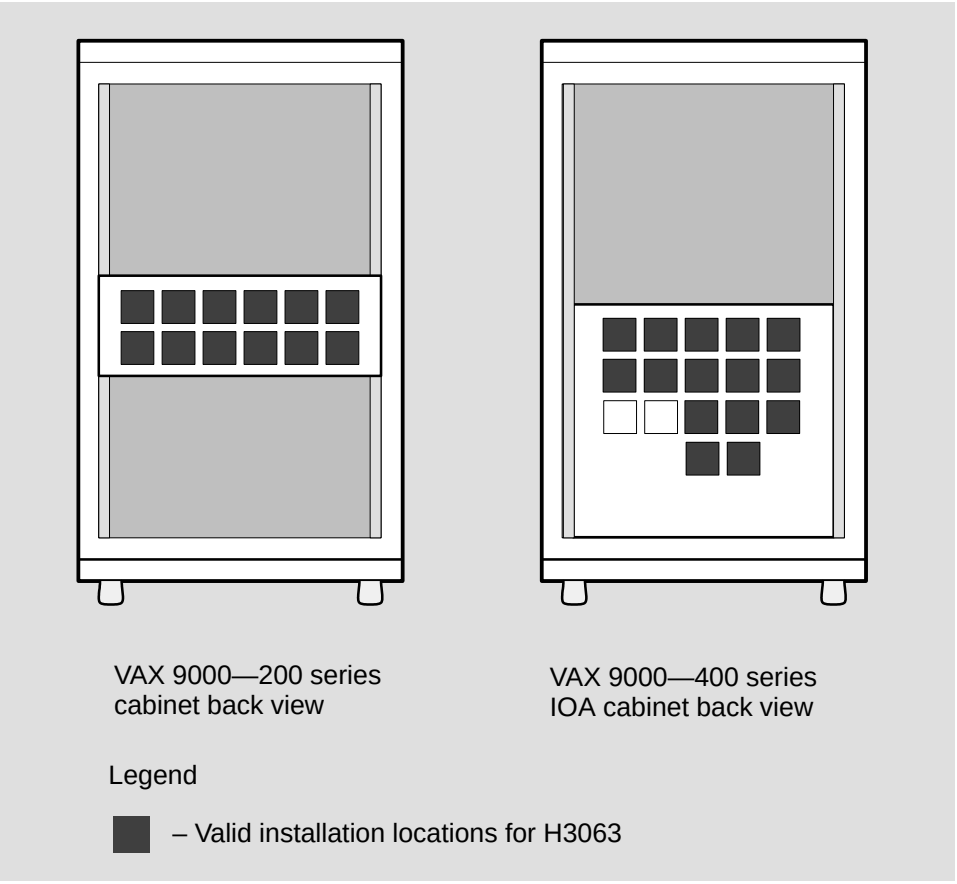
Figure 3–10: VAX 9000 Series System Cabinet I/O Bulkhead Locations



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5. Locate the electrostatic (ESD) ground strap and attach it to your wrist. (The ESD ground straps are in a pocket attached to each cabinet door.)

CAUTION ⚠

To prevent damage to the circuit cards, you must wear an electrostatic discharge (ESD) ground strap that is connected to the system cabinet whenever you handle the circuit cards or work on the inside of the system cabinet.

If you remove a circuit card from an XMI card cage, place it into a conductive container that is specifically designed to protect circuit cards from ESD damage.

6. If you are installing an H30363-A version bulkhead to a VAX 6000 series cabinet, go to Section 3.2.3.1.

7. If you are installing an H30363-B version bulkhead to a VAX 9000 series cabinet, go to Section 3.2.3.2.

3.2.3.1 H3063-A Bulkhead Installation

VAX 6000 series cabinets have two I/O bulkheads where the H3063-A bulkhead can be installed (see Figure 3–9). I/O bulkhead A is hinged and can be opened for access to the XMI card cage, cable installation, and cable management. I/O bulkhead B cannot be opened and requires a slight variation to the installation steps as described in the following procedures.

To install the H3063-A bulkhead, proceed as follows:

1. Remove one of the blank filler panels from the system cabinet's I/O bulkhead, at the location chosen for the H3063-A bulkhead installation. Note that this location must be on the bottom row of the system cabinet's I/O bulkheads when installing an H3063-A bulkhead into a VAX 6000 series system cabinet.

CAUTION ⚠

The H3063-A bulkhead cannot be installed in any of the top slots of the VAX 6000 series system cabinet I/O bulkheads. Installing the device in any of the top slots interferes with closing the system cabinet I/O bulkhead, and can cause damage to the equipment.

CAUTION ⚠

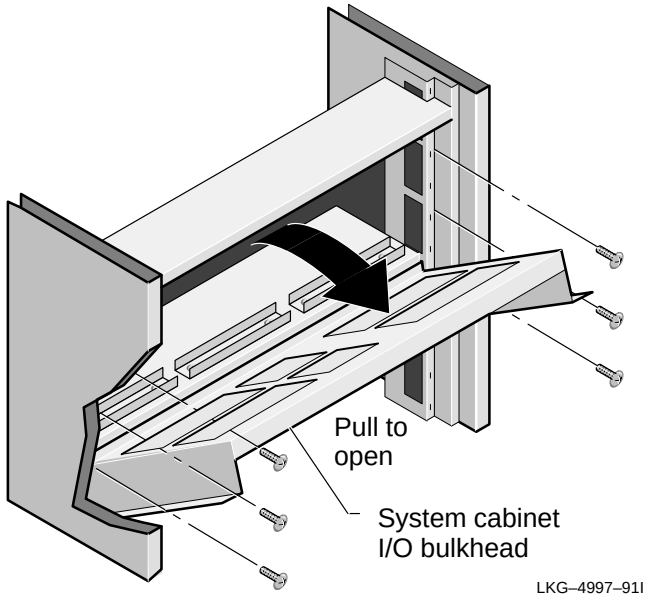
Before installing the H3063-A bulkhead into any of the bottom slots of the VAX 6000 series system cabinets, ensure that the cabling (including the cable management bar) behind the selected slot will not interfere with the H3063-A bulkhead when installed.

If no cables are installed in the selected area, make certain that the cable management bar is fastened such that it will not come into contact with the H3063-A bulkhead when installed. Failure to comply with these guidelines will result in damage to the equipment.

2. Remove the six screws securing the system cabinet's I/O bulkhead A (see Figure 3–11). Pull it down to the open position (the system cabinet bulkhead is hinged).

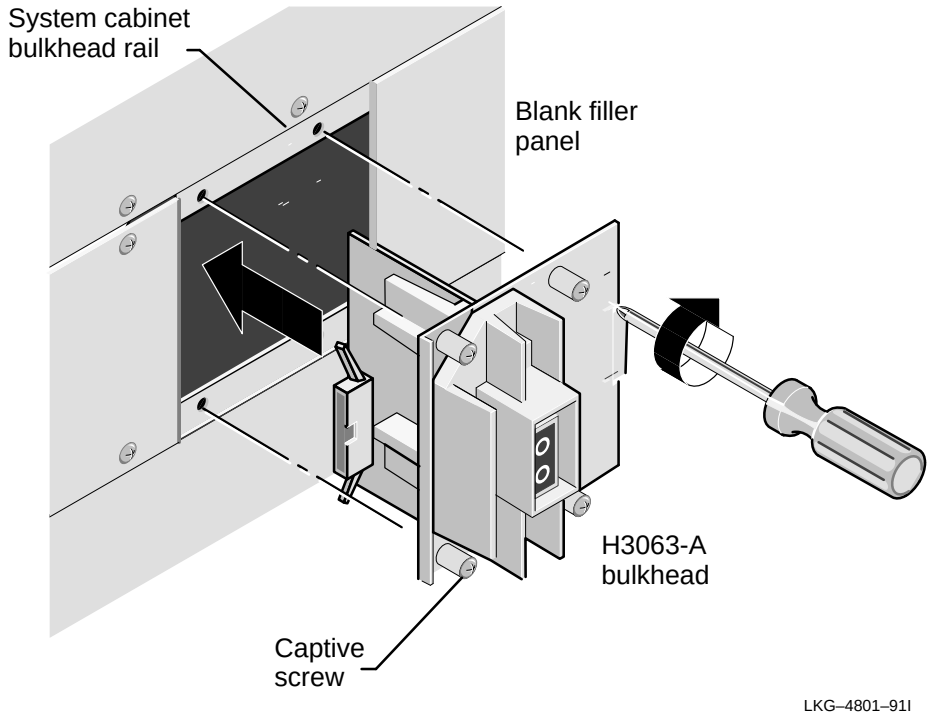
3. If you are installing the H3063-A bulkhead into I/O bulkhead B, go to Step 9.

Figure 3–11: Opening the System Cabinet's I/O Bulkhead



4. Check the cables and cable management bar directly behind the I/O location chosen to install the H3063-A bulkhead. Ensure that any installed cables are fastened under the cable management bar and that the bar is fastened such that it will not contact the H3063-A bulkhead when it is installed.
5. Close the system cabinet I/O bulkhead. Do not replace the screws at this time.
6. Install the H3063-A bulkhead into the allocated space using the four captive screws on the H3063-A bulkhead (see Figure 3–12).

Figure 3–12: H3063-A Bulkhead Installation



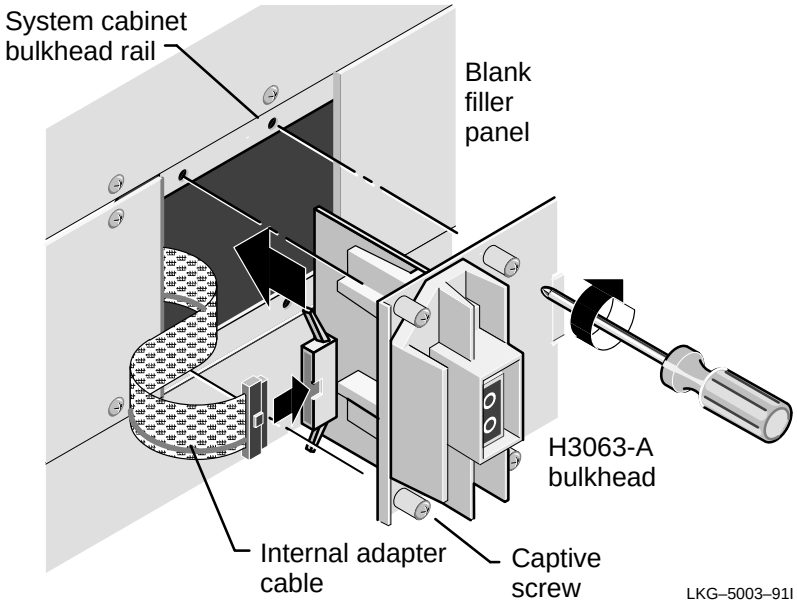
7. Install a blank filler panel (if necessary) to fill any space adjacent to the just-installed H3063-A bulkhead.

NOTE

Various size blank filler panels and associated hardware are stored at the base of the system cabinet.

8. Do not remove the ESD ground strap from your wrist. Go to Section 3.2.4 to install the internal adapter cable.
9. To install the H3063-A bulkhead at I/O location B, proceed as follows:
    a. Get the internal adapter cable (from the shipping container), and set it in place in the cable chute behind the open I/O bulkhead.
    b. Route one end of the internal adapter cable through the open slot you have chosen to install the H3063-A bulkhead.
    c. Connect the internal adapter cable plug to the H3063-A bulkhead connector by aligning the key slots (on plug and connector) and secure it with the locking tabs (see Figure 3–13).
    d. Carefully position the H3063-A bulkhead (with internal adapter cable attached) over the open slot on the I/O bulkhead and secure it with the four captive screws.

Figure 3–13: H3063-A Cable Connection



e. Do not remove the ESD ground strap from your wrist. Go to Section 3.2.4 to install the other end of the internal adapter cable to the XMI backplane.

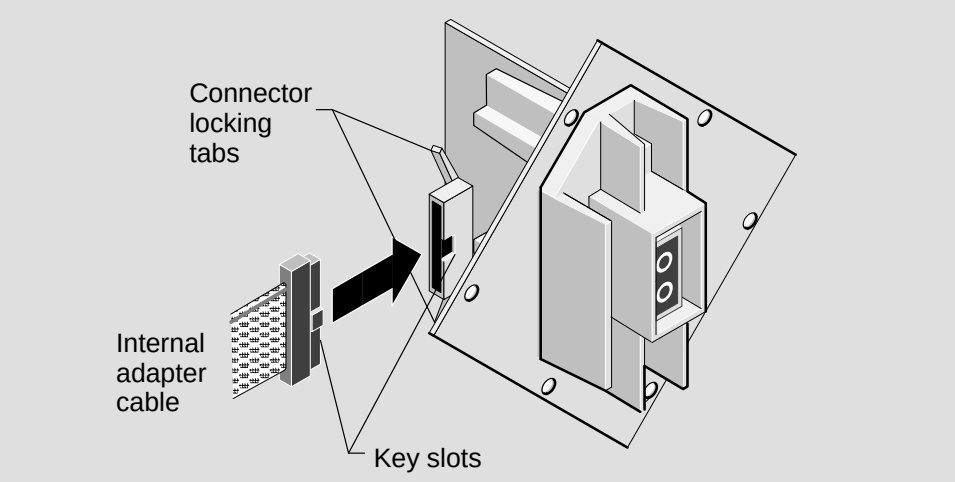
3.2.3.2 H3063-B Bulkhead Installation

The H3063-B version bulkhead can be installed into VAX 9000 series IOA cabinets only.

To install the H3063-B bulkhead, proceed as follows:

1. Remove and save the six hex-head screws securing one of the blank filler panels from the IOA cabinet's I/O bulkhead.
2. Remove the internal adapter cable from the shipping container and set it in place in the cable chute behind the I/O bulkhead.
3. Route one end of the internal adapter cable through the open slot you have chosen to install the H3063-B bulkhead.
4. Connect the internal adapter cable plug to the H3063-B bulkhead connector by aligning the key slots (on plug and connector) and secure it with the connector locking tabs (see Figure 3–14).

Figure 3–14: H3063-B Cable Connection



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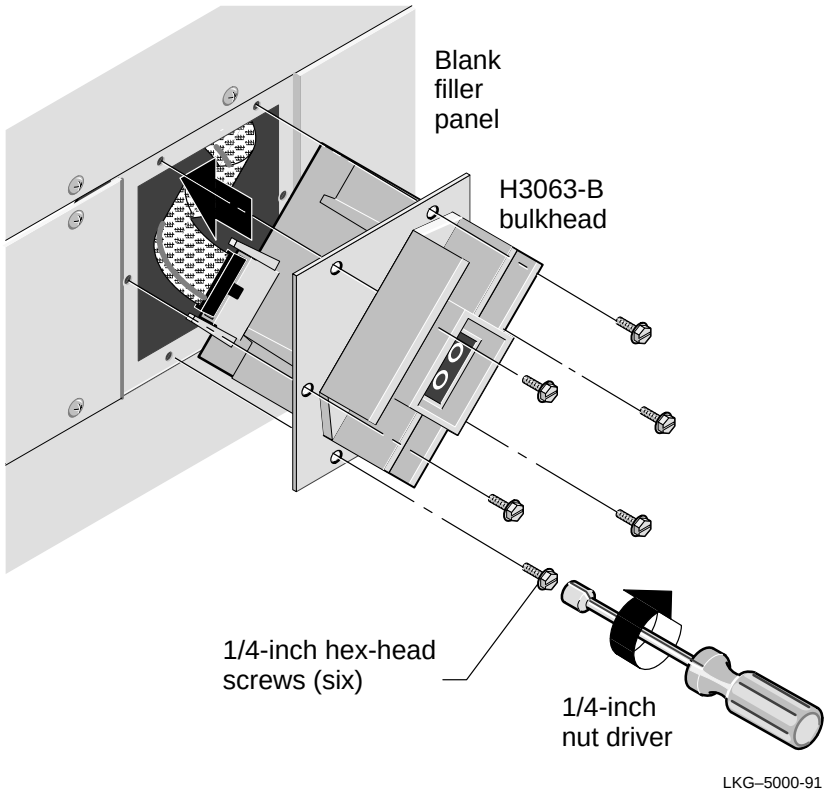
5. Carefully position the H3063-B bulkhead (with internal adapter cable attached) over the open slot on the I/O bulkhead. Using a 1/4-inch nut driver, reinstall the six hex-head screws removed from step 1 (see Figure 3–15).

Figure 3–15: H3063-B Bulkhead Installation



6. Do not remove the ESD ground strap from your wrist. Go to Section 3.2.4 to install the other end of the internal adapter cable to the XMI backplane.

3.2.4 Installing the Internal Adapter Cable

The internal adapter cable connects the system cabinet's XMI backplane to the H3063 bulkhead.

Install the internal adapter cable by completing the following steps:

1. Be sure that the system cabinet has been powered down (refer to Section 3.2.1).

WARNING ⚠

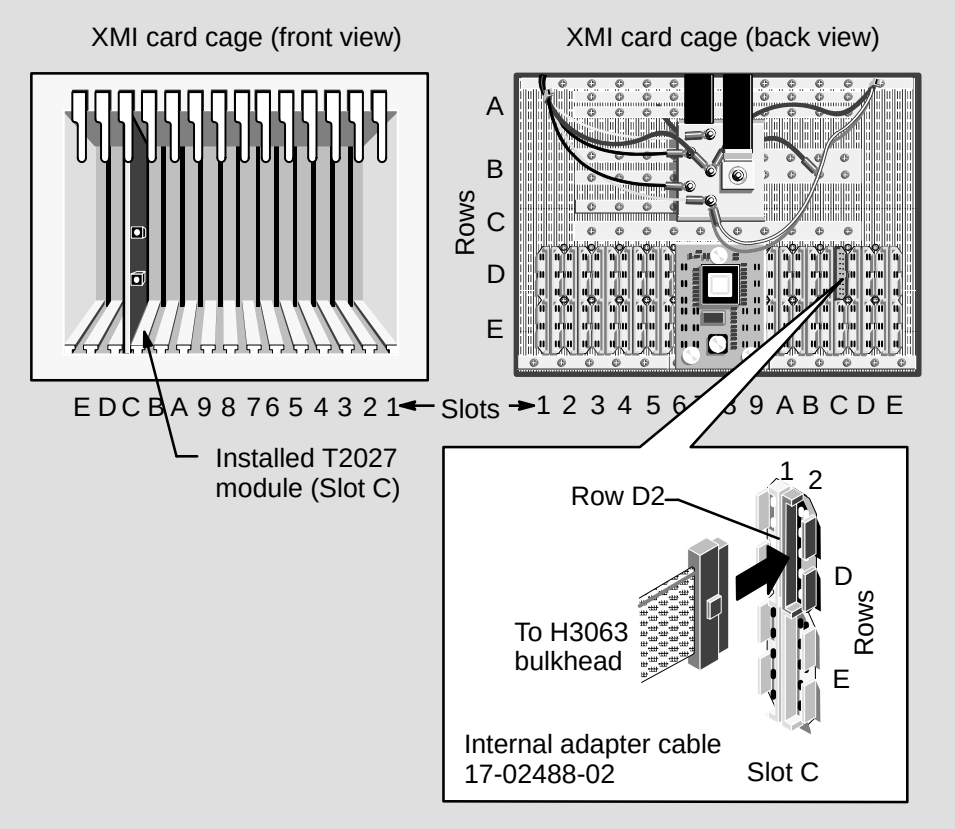
To avoid bodily injury, be sure to power down the host system cabinet and disconnect the system cabinet's main power cable before performing the following procedure.

2. Pull the system cabinet's I/O bulkhead (location A) down to the open position.
3. Connect one end of the internal adapter cable to connector D2 of the XMI backplane slot that corresponds to the slot chosen for the T2027 module (see Figure 3–16).

NOTE

Both plugs on the internal adapter cable are keyed to align with the slots provided in the mating connectors on the XMI backplane and on the H3063 bulkhead.

Figure 3–16: XMI Backplane



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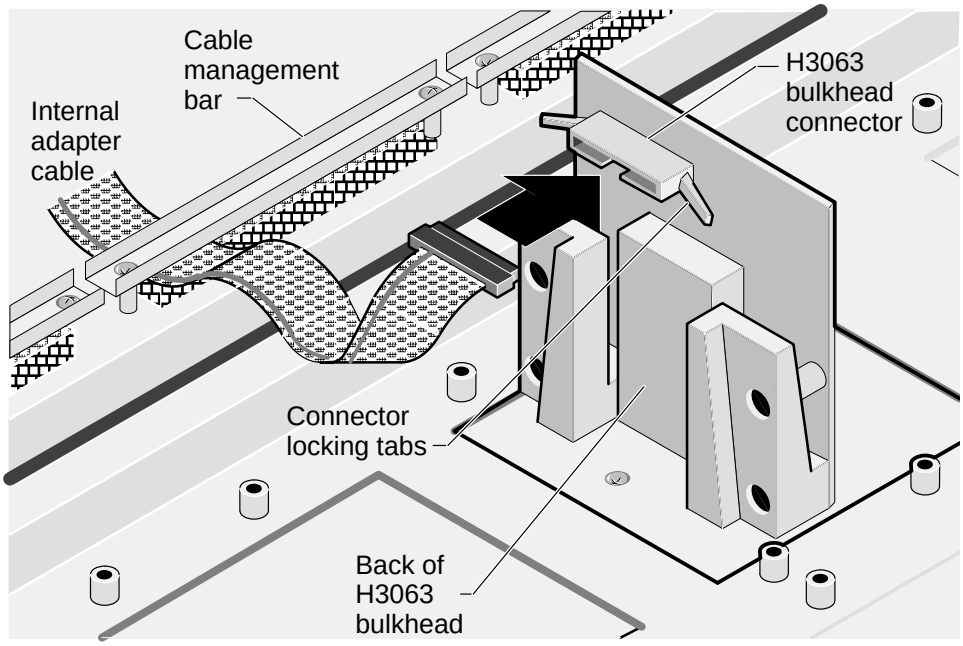
4. For VAX 6000 systems, remove the cable management bar located behind the installed H3063 bulkhead. Set the cable management bar aside for now.

5. Connect the other end of the internal adapter cable (if not previously installed in prior steps) to the H3063-A bulkhead connector by aligning the key slots (on plug and connector) and secure it with the connector locking tabs (see Figure 3–17).

Figure 3–17: H3063 Bulkhead Cable Connection



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6. For VAX 6000 systems, place the internal adapter cable into the cable management slot behind the H3063 bulkhead. Replace the cable management bar over the cable(s) and fasten it securely. Be sure sufficient slack in the cable allows opening and closing of the system cabinet bulkhead without binding the internal adapter cable.

7. For VAX 9000 systems equipped with a clear plastic cable management strip, loop the internal adapter cable once around the strip. For all VAX 9000 systems, secure the internal adapter cable loosely with cable ties, as appropriate, to minimize electrical and mechanical interference.

8. Close the system cabinet I/O bulkhead and fasten it with the six screws removed previously.

9. Remove the ESD ground strap from your wrist and return it to the pocket on the system cabinet door.

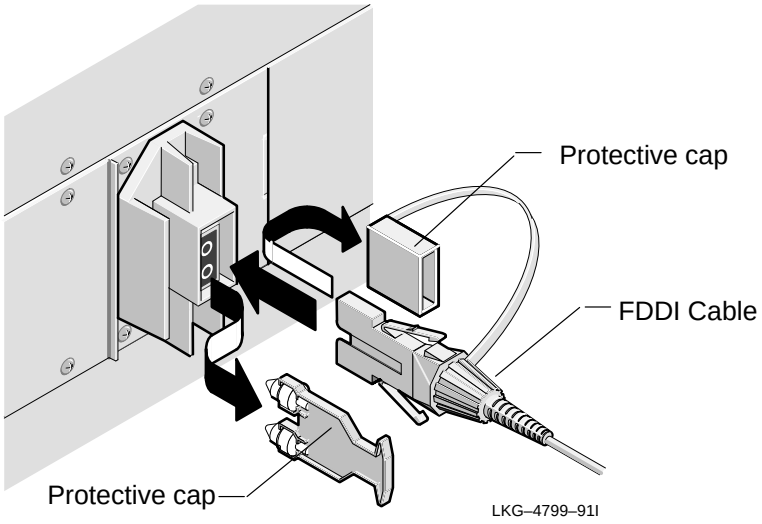
10. Go to Section 3.2.5 to connect the FDDI cables.

3.2.5 Connecting the FDDI Cable

The FDDI cable should have been installed, tested, and tagged at the site, prior to this installation. To complete this hardware installation, connect the FDDI cable plug to the H3063 bulkhead (see Figure 3–18):

1. Locate the tagged FDDI cable (the cable installer should have labeled the cable while installing the cable runs).
2. Remove the protective caps from the FDDI connector on the H3063 bulkhead and from the FDDI cable plug.
3. Align the key on the FDDI cable plug with the keyway on the H3063 bulkhead's FDDI connector.
4. Push the FDDI cable plug into the H3063 bulkhead's FDDI connector, ensuring that the locking clips on the sides of the plug snap into the locked position.
5. Hardware installation is complete. Go to Section 3.3 to verify the installation.

Figure 3–18: Connecting the FDDI Cable



3.3 Verifying the Hardware Installation

This section describes how to verify the DEMFA hardware installation. It includes two subsections:

- Initial Power Up
- Hardware Verification

Verify that the DEMFA is operational by running the automatic self-test and ESP special test routines resident (see note) in the DEMFA firmware. The routines are initiated automatically on power up or by a forced node reset. Test results (pass or fail) are indicated by the LEDs on the T2027 module and on the H3063 bulkhead (see Figure 3–19 and Figure 3–20).

NOTE

Although the self-test and ESP special test routines reside in the DEMFA, they require that the host operating system is functioning properly and that the software driver has been installed and is operational.

Figure 3–19: LED Locations — T2027 Module

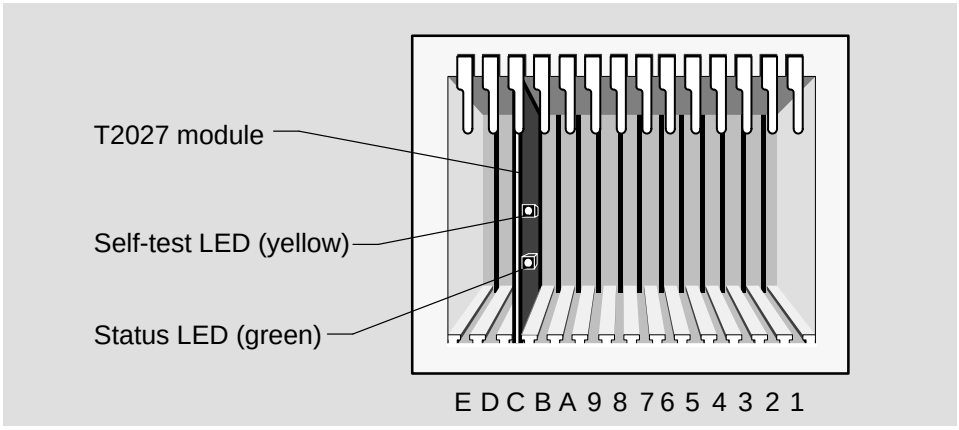


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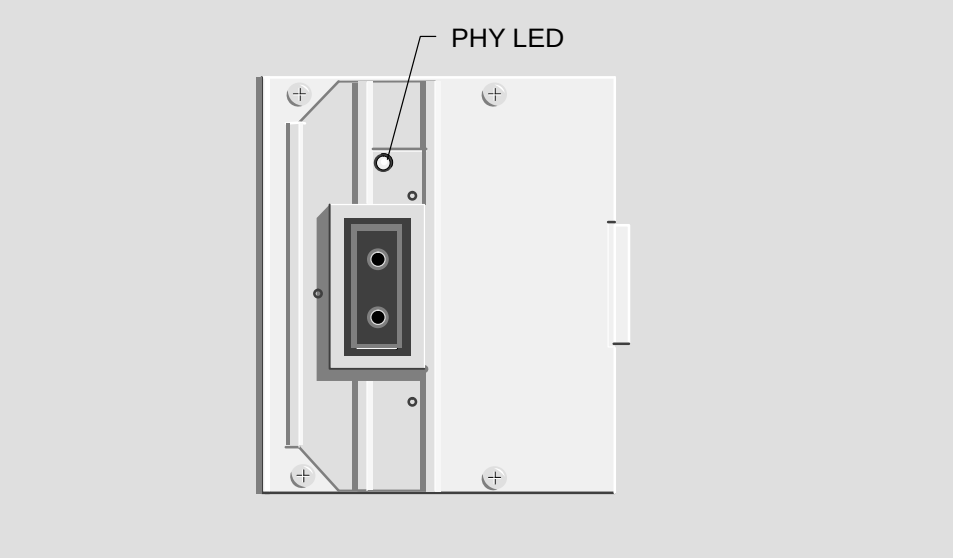
Figure 3–20: LED Location — H3063 Bulkhead



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The following subsections describe how to power up the system cabinet (which initiates the self-test and diagnostic routines) and how to interpret the status LEDs, thus verifying the DEMFA's installation.

3.3.1 Initial Power Up

Power up the system according to the instructions given in the documentation for the specific system you are working on:

- To power up the VAX 6000 series system cabinets, refer to the VAX 6000 series system documentation.
- To power up the VAX 9000 series system cabinets, refer to the *VAX 9000 Family Maintenance Guide, Volume 1* (Order No. EK-KA901-MG).

3.3.2 Verifying the Hardware

The DEMFA's functionality is automatically tested at power up and each time the device is reset. The DEMFA is Tested in two stages:

1. Power up self-test—performed during the first eight seconds following initialization/power up
2. ESP Special Test—performed when the host driver (or controlling software) issues an INIT command to the DEMFA.

Test results (pass or fail) are indicated by the LEDs on the T2027 module (see Figure 3–19 for LED locations).

Figure 3–21 provides a test summary and shows the status of the LEDs during the two stages of the test.

To verify the unit's correctness, proceed as follows:

1. Observe the LEDs on the T2027 module. If both LEDs—the (yellow) Self-Test LED and the (green) Status LED—are ON (steady and not blinking), the unit is installed correctly. Go to Step 2 to verify that the device is operational in the FDDI network.

2. Observe the (green) PHY LED on the H3063 bulkhead (see Figure 3–20). The LED should be ON (steady and not blinking), indicating that the DEMFA is operational in the FDDI network.

3. Use NCP to perform a loop test through the FDDI network as follows:

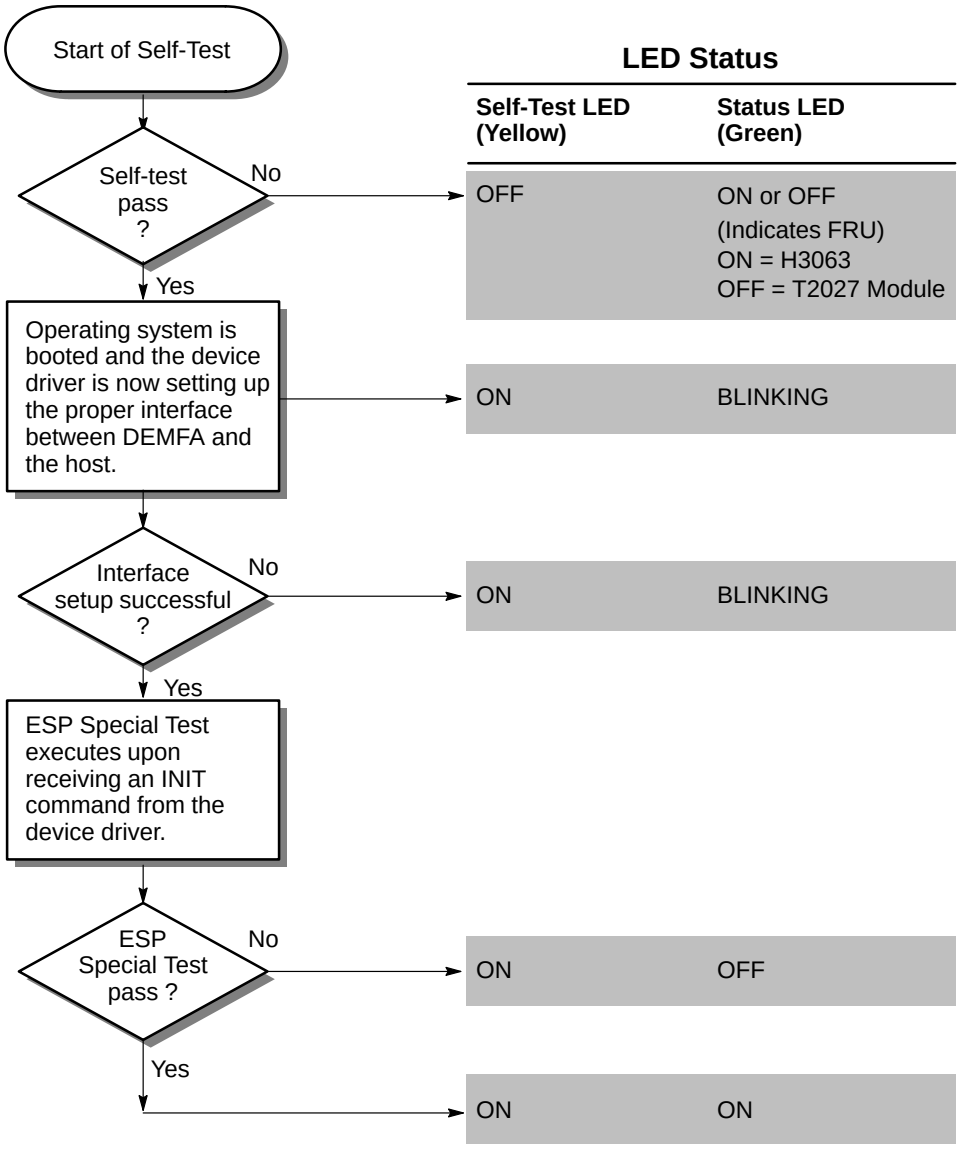
```
$ MCR NCP  Return

NCP> LOOP NODE (NODE-NAME)  Return
NCP>
```

(The return of the `NCP>` prompt indicates that the test was successful.)

4. If any other condition appears, the unit is faulty or installed improperly. Go to Chapter 4 to diagnose and resolve the fault.

Figure 3–21: LED Status During Tests



4

Problem Solving

This chapter provides problem-solving information related to installation verification and helps diagnose failures that can occur during operation.

4.1 Troubleshooting Methodology

The troubleshooting information provided in this chapter is designed to isolate faults to the optimum field replaceable unit (FRU) or to an associated device that can be the source of the problem:

- When troubleshooting during the initial installation of the device, use Table 4–1. This table lists symptoms, probable causes, and suggests corrective actions to remedy problems related to possible installation faults.
- If the DEMFA was operational in the FDDI network, and now indicates a fault, it is possible that a fault in a related device is causing the problem. In some cases this type of fault initially appears to be in the DEMFA. However, careful execution of the troubleshooting procedures given in the diagnostic flowcharts (see Figure 4–1 and Figure 4–2) will either isolate the fault to the DEMFA or point to other causes of the malfunction.
- When corrective action is indicated (such as checking for loose cables, and so on) power down the system before performing those actions. After performing the corrective action, perform the verification procedures provided in Chapter 3.

- When the fault is isolated to a FRU, go to Chapter 5 for instructions on replacing the FRU.
- When the fault is isolated to a malfunction of a device or cable, other than the DEMFA, use the appropriate documents and tools to troubleshoot those devices.

4.2 Normal Power Up

During system power up, or during a node reset, the DEMFA automatically initiates self-test diagnostic routines that test and verify the operation of the unit. The self-test routines display pass/fail results for each of the FRUs via the unit's LEDs

The following sequence of events occur at power up or node reset:

1. Core tests are run (CPU, EEPROM, SRAM) from the EEPROM.

   If the EEPROM test fails, control is passed to the firmware kernel. Otherwise, the rest of the diagnostics are copied to SRAM and run.

2. Results are displayed via the FRU LEDs, and the on board EEPROM-based error log is updated if an error occurred.
3. Upon successful completion of self-test, the DEMFA's operational firmware executes and DEMFA transitions to the normal mode of operation.

4.3 Troubleshooting Tips

The following list provides some commonly overlooked causes to consider before extensive troubleshooting begins:

- VAX 6000 series XMI card cages are designed with interlocks that cut off power to the card cage unless the card cage front cover is installed. This is to ensure proper air flow to the cards. Install the card cage front cover before attempting power up.
- Loose cable connections: Be sure that the internal adapter cable is secure at the XMI backplane connection and is locked securely in place at the H3063 bulkhead connector with the connector's locking tabs.
- Be sure that the internal adapter cable is connected to the XMI backplane slot corresponding to the card slot chosen for the installation of the T2027 module.
- Verify that the internal adapter cable is dressed properly under the cable management bar in the system cabinet, and that the cable is not pinched when the system cabinet I/O bulkhead is closed.
- **Always** use the ESD ground strap when handling the circuit cards to prevent damage to the cards.
- Consider possible environment problems, such as power fluctuations, high ambient temperatures, and interference from other equipment.

4.4 Troubleshooting Tools

Use the following equipment to test the DEMFA:

- Nonattenuated FDDI loopback connector (P/N 12-32005-01) for testing the FDDI port
- SDU optical power meter kit (P/N 29-28384-01) for measuring power at the FDDI port

4.5 Troubleshooting During Initial Installation

Pass or fail test results are indicated by the *combined* states of the Self-Test (yellow) LED and the Status (green) LED located on the T2027 module. Table 4–1 lists typical combined states of the LEDs for various error conditions that can occur during initial installation of the device, along with probable causes and suggested corrective actions to take.

NOTE

If the DEMFA was previously operational in the FDDI network environment when the problem occurred, use the diagnostic flowcharts and procedures described in Section 4.6 to isolate and resolve the problem.

Table 4–1: Problem Solving Using the LEDs

Symptom	Probable cause	Corrective Action
T2027 Module LEDs:		
Self-test LED off, but status LED is on.	The H3063 bulkhead (or internal adapter cable) is faulty.	First, check the internal adapter cable's connection between the T2027 module and the H3063 bulkhead. The XMI backplane connection should correspond to the card cage slot chosen for the T2027 module (see Figure 3–3). Replace the internal cable with a known good cable. Replace the H3063 bulkhead (Go to Chapter 5, FRU Removal and Replacement).
Self-test LED off, and status LED is off.	The T2027 module is faulty.	Replace the T2027 module (Go to Chapter 5, FRU Removal and Replacement).
Self-test LED on, but status LED is blinking.	The ESP special test is not operational.	Be sure that the host driver has been properly installed and enabled.
Self-test LED off, but status LED is off.	The ESP special test failed.	Replace the T2027 module (Go to Chapter 5, FRU Removal and Replacement).

Table 4–1 (Cont.): Problem Solving Using the LEDs

Symptom	Probable cause	Corrective Action
H3063 Bulkhead (PHY) LED:		
PHY LED remains off.	No transmit or receive power.	Check all cable connections to and from the H3063 bulkhead. Replace the H3063 bulkhead (Go to Chapter 5, FRU Removal and Replacement).
PHY LED blinking	Insufficient transmit or receive power.	Use the SDU optical power meter to verify optical power levels are within specifications (refer to Section 4.8).

4.6 Troubleshooting a Previously Operational DEMFA

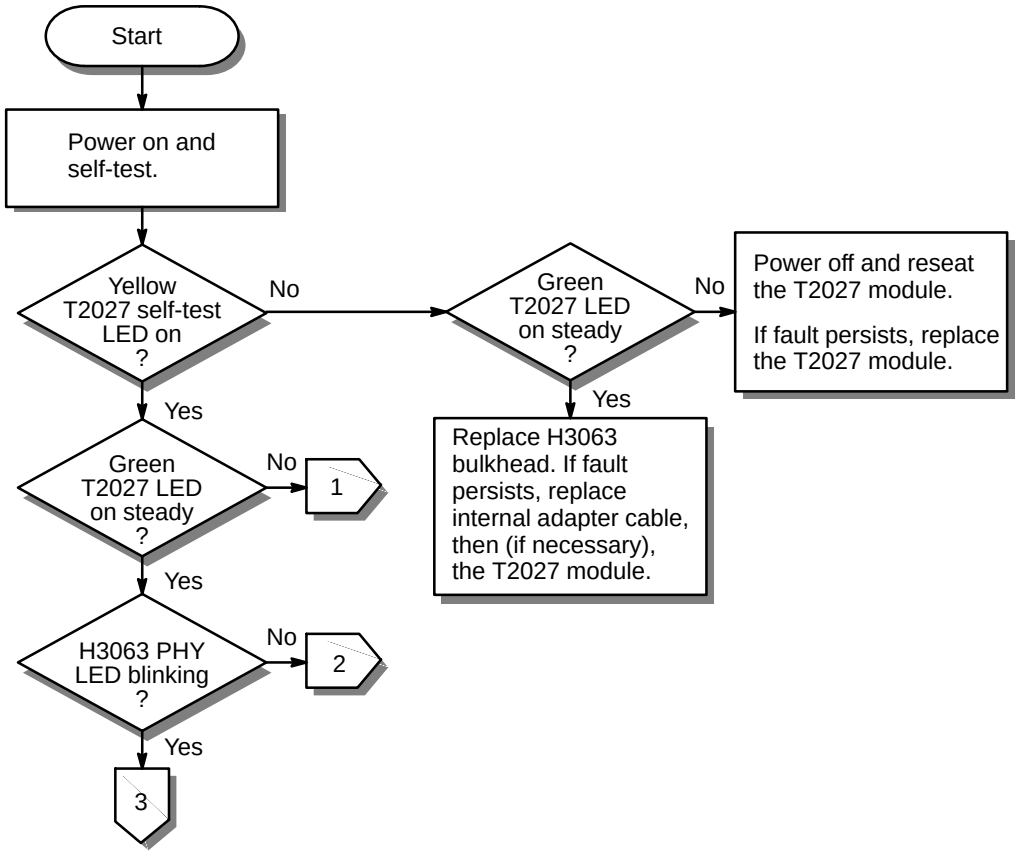
If the DEMFA has been previously verified operational in the FDDI network environment, but is now failing or not meeting network expectations (performance degradation), do the following:

- If DEMFA's LEDs clearly indicate a fault, follow the instructions given in Figure 4–1.
- If DEMFA's LEDs do not indicate a fault, but network performance is somehow degraded follow the instructions given in Figure 4–2.

IMPORTANT

Use of the System Dump Analyzer (SDA), described in the following sections, is intended for Digital Field Service personnel only. SDA is provided as an interim tool and is subject to change without notice.

Figure 4–1: Diagnostic Flowchart



Legend:

= Off-page reference tag.

= On-page reference tag.

Figure 4–1 (Cont.): Diagnostic Flowchart

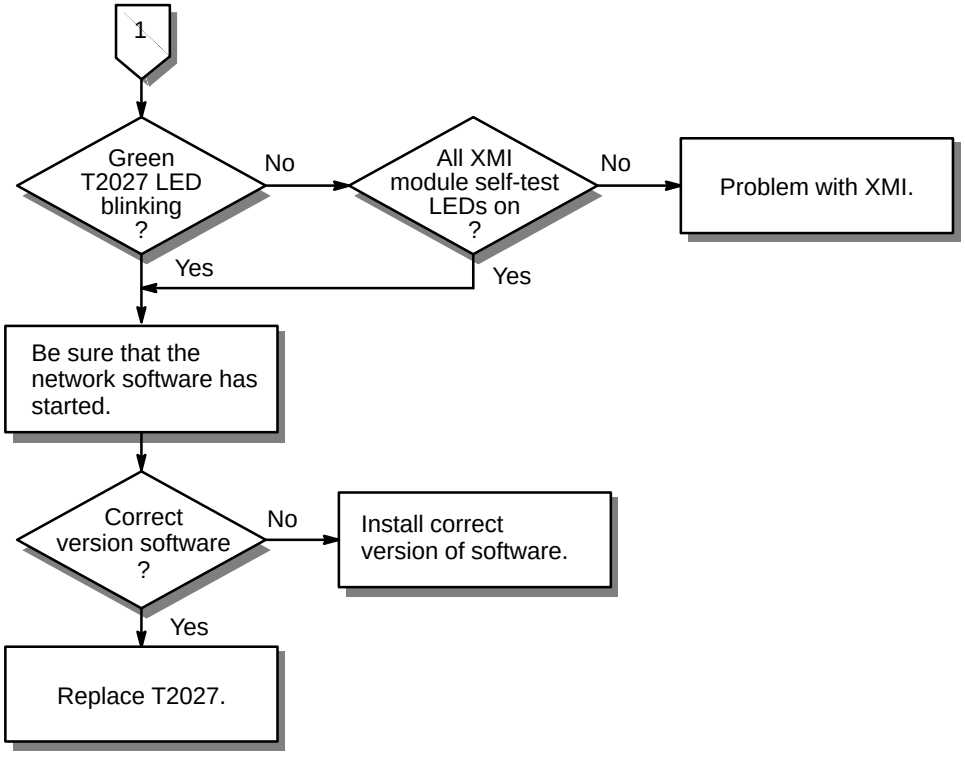


Figure 4–1 (Cont.): Diagnostic Flowchart

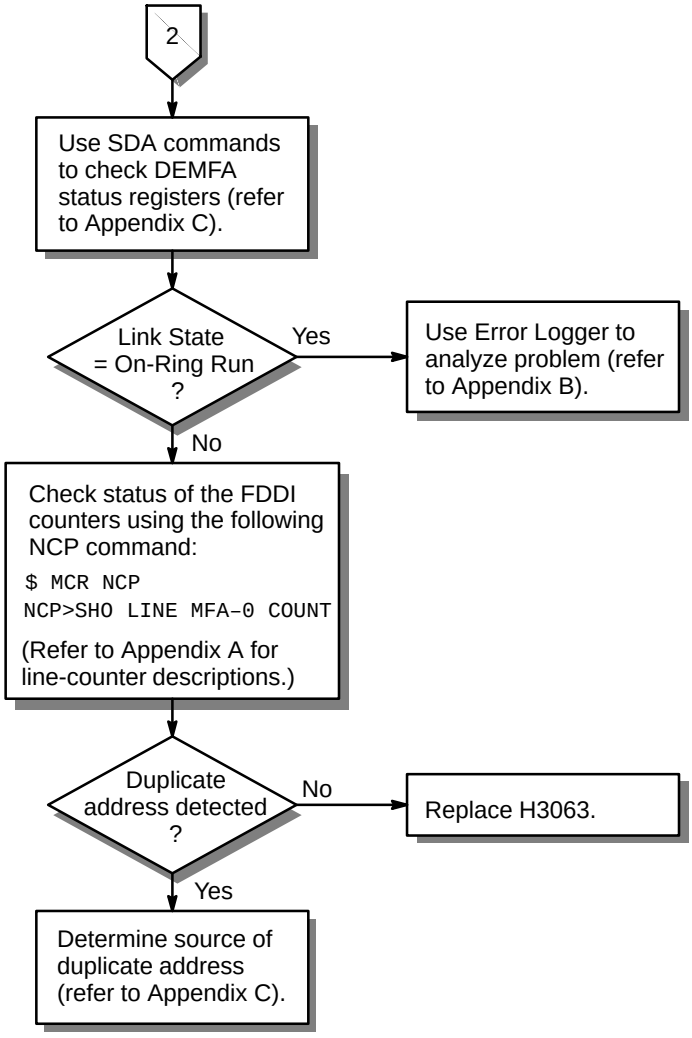


Figure 4–1 (Cont.): Diagnostic Flowchart

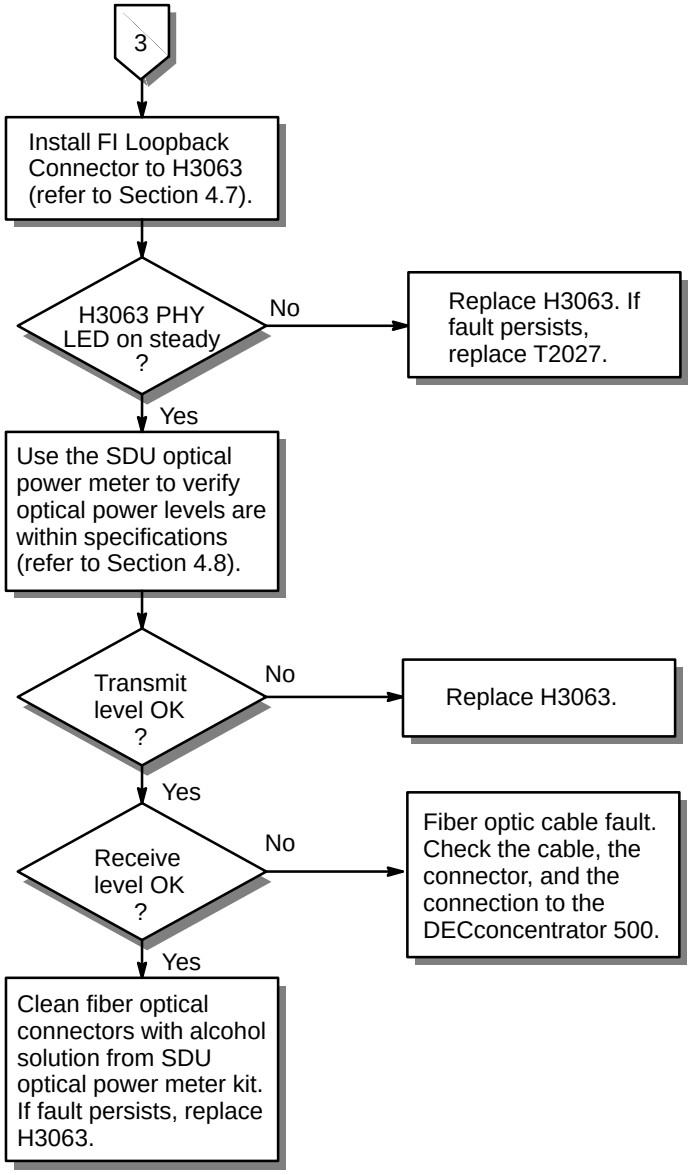


Figure 4–2: Diagnosing Performance Problems

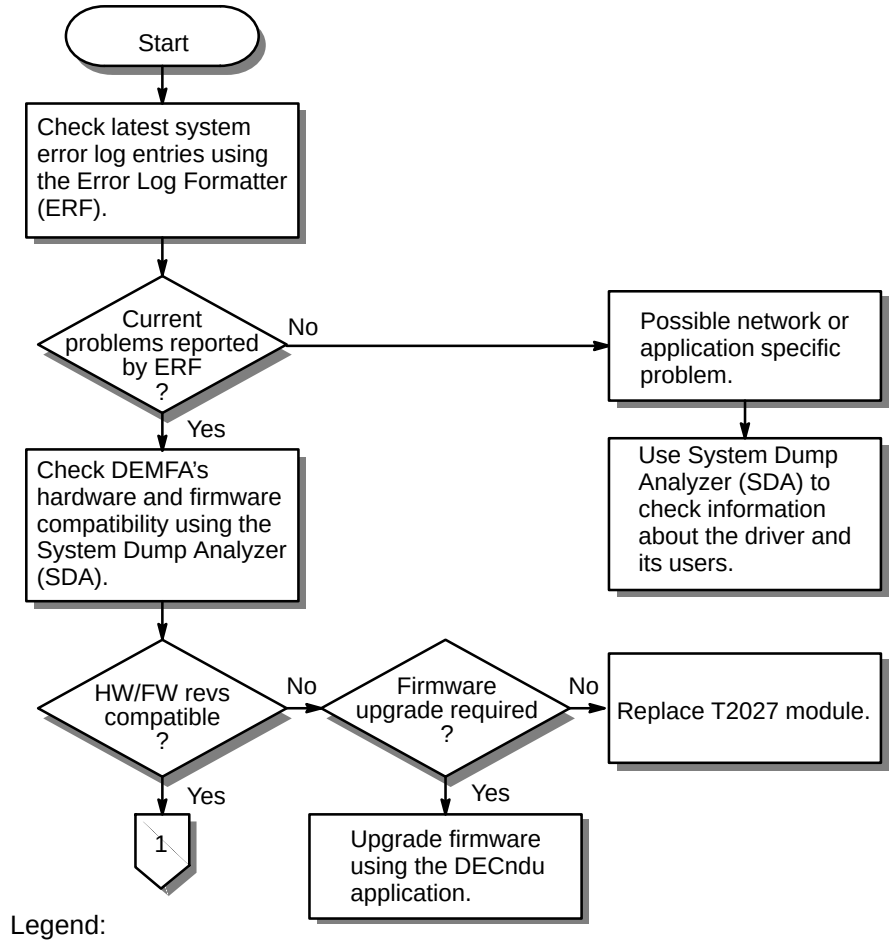
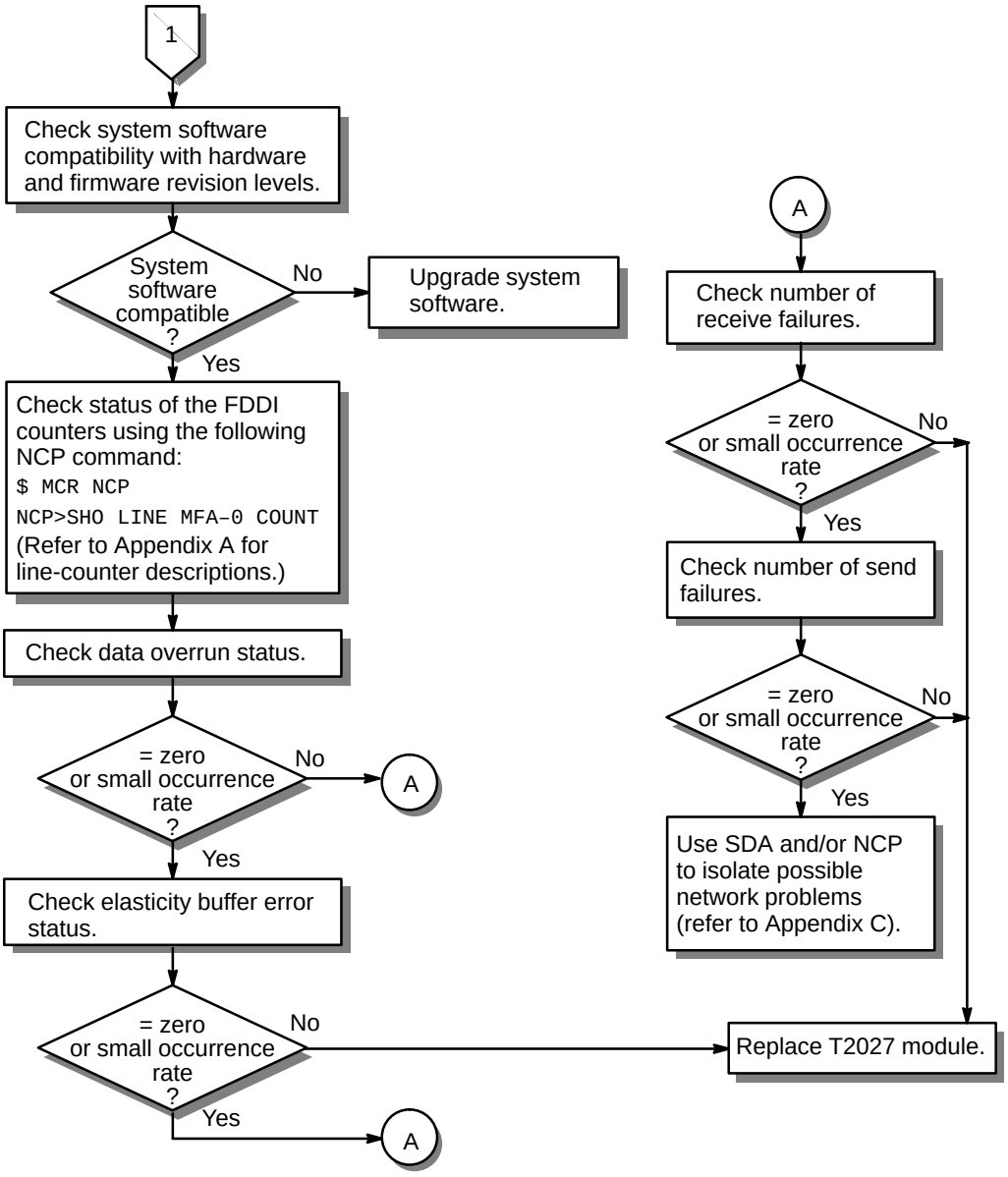


Figure 4–2 (Cont.): Diagnosing Performance Problems



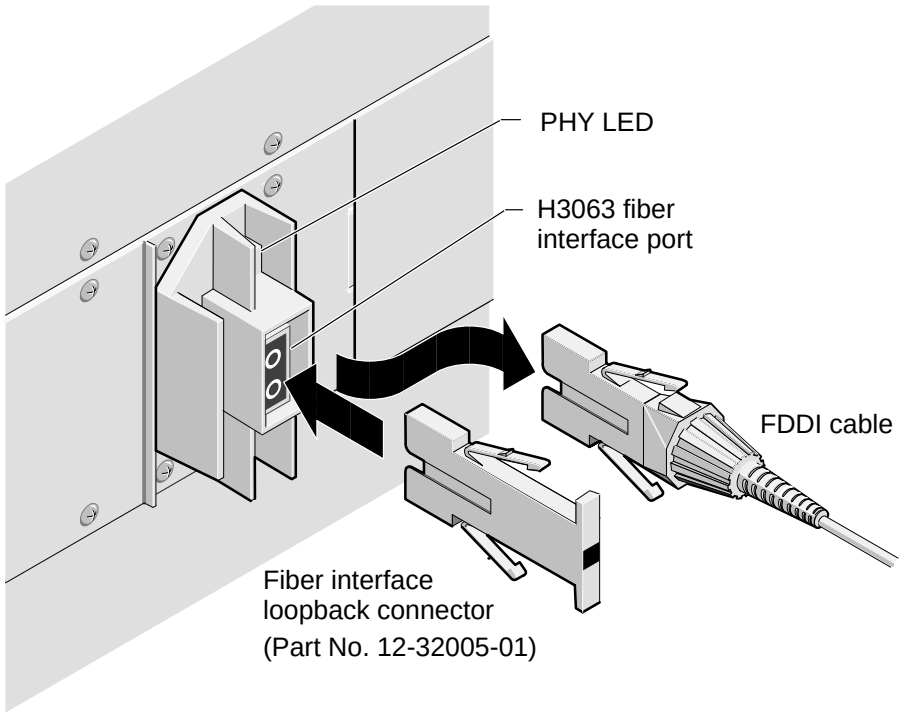
4.7 Installing the Fiber Interface Loopback Connector

If test results indicate a port interface problem (green H3063 PHY LED blinking), you can install a fiber interface loopback connector to the H3063 fiber interface port to determine if the fault is in the H3063 port or in the fiber optic cable (or in the up-stream device connected to the DEMFA port).

Loopback testing of the H3063 fiber interface port (see Figure 4–3) is performed by disconnecting the FDDI cable, installing the nonattenuating fiber interface loopback connector, and observing the PHY LED. Refer to the diagnostic flow chart in Figure 4–1 for recommended corrective actions.

The fiber interface loopback connector routes the output of the fiber optic transmitter in that port back into the fiber optic receiver.

Figure 4–3: Installing the Fiber Interface Loopback Connector



4.8 Using the SDU Optical Power Meter Kit

If the H3063 PHY LED is *blinking* (indicating a fault), but changes to an *on steady* condition when the FI loopback connector is installed, check the transmit and receive optical power levels entering and leaving the H3063 bulkhead port to determine if they are within specifications.

To measure the optical power levels of the transmit and receive signals, use the SDU optical power meter kit (P/N 29-28384-01). This kit contains an optical power meter, a receive cable, and cleaning pads.

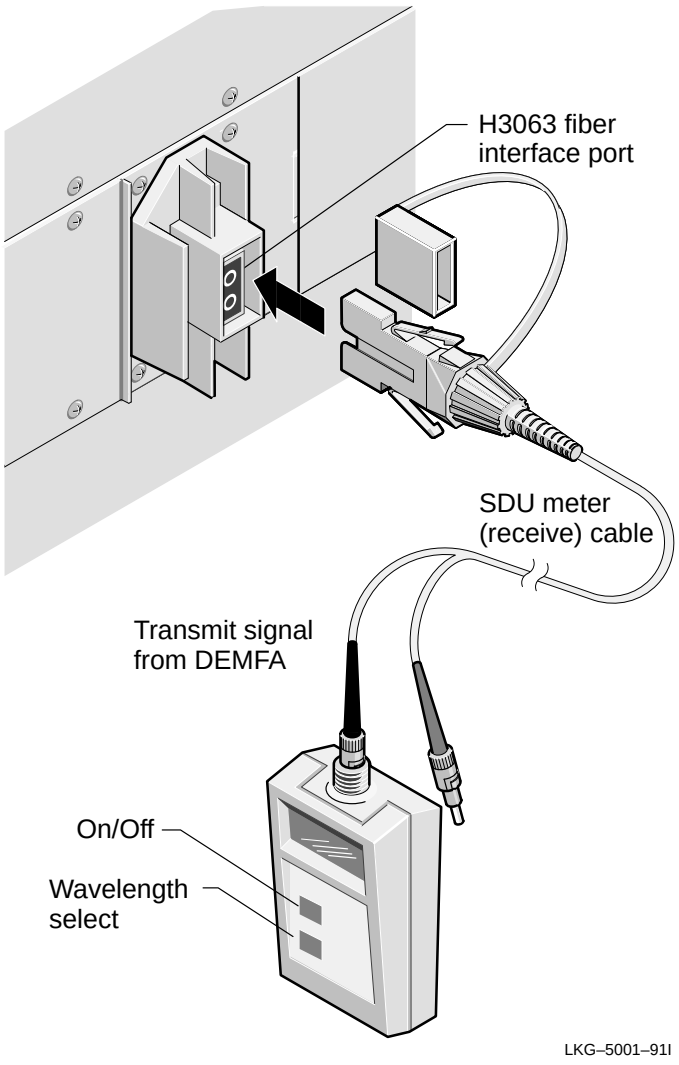
To use the SDU optical power meter, proceed as follows:

1. Remove the FI loopback connector or the FDDI connector from the H3063 bulkhead (if either is installed).
2. Set up the SDU optical power meter as follows:
   a. Remove the protective cap from the input test head.
   b. Turn on the meter by pressing the ON/OFF switch.
   c. Use the λ select switch to select the 1300-nm wavelength range. The wavelength value will appear on the liquid crystal display (LCD).
3. Remove the protective caps from the test cable connectors and, using a cleaning pad provided in the kit, clean the connector faces. This ensures a clean test connection.
4. To measure the power of the fiber optic signal *transmitted* by the H3063 bulkhead, complete the following steps (see Figure 4–4):
   a. Connect the FDDI connector end of the SDU meter's receive cable to the H3063 bulkhead at the fiber interface port.
   b. The other end of the SDU meter's receive cable has two leads (terminated with fiber optic connectors). The lead with the arrow pointing towards the FDDI connector end carries the transmit signal from the H3063 bulkhead fiber interface port. Plug this lead into the test head of the SDU meter.
   c. Read the optical power level of the transmit signal on the SDU meter's LCD display. The power level of the transmit signal must be between –14.5 and –19.5 dBm.

d. Refer to the diagnostic flow chart in Figure 4–1 for recommended corrective actions.

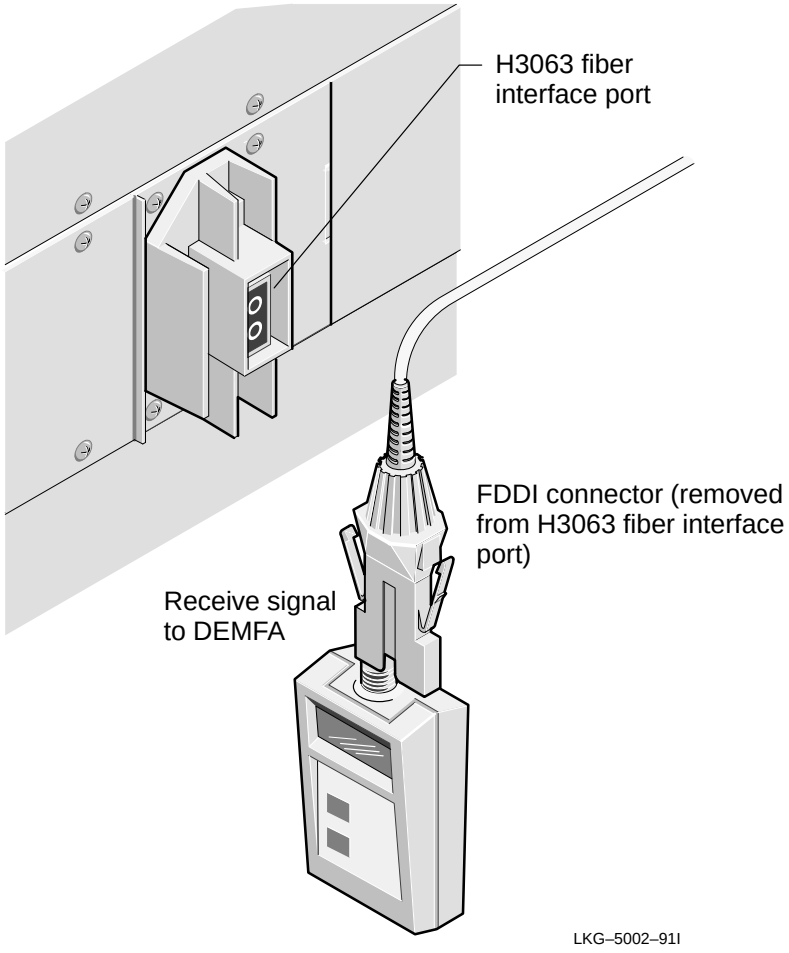
e. Disconnect the SDU meter (receive) cable from the H3063 bulkhead fiber interface port and from the SDU meter.

Figure 4–4: Measuring the H3063 Bulkhead Transmit Power



5. To measure the power of the fiber optic signal *received* by the DEMFA, complete the following steps (see Figure 4–5):

Figure 4–5: Measuring the H3063 Bulkhead Receive Power



a. Move the power meter close to the FDDI cable that normally plugs into the DEMFA's fiber interface port.

b. Plug the FDDI cable's output connector (which is the receive input to the DEMFA) into the test head of the SDU meter. (Note: The output connector is the smaller of the two connectors on the FDDI cable.)

c. The optical power level of the receive signal will be displayed on the SDU meter's LCD display. The power level of the transmit signal must be between –14.5 and –30.5 dBm.

NOTE

If there is no reading when you perform Step 5-c, you could be checking the wrong connector (that is, the input connector rather than the output connector). If this occurs, measure the optical power level at the other connector.

d. Refer to the diagnostic flow chart in Figure 4–1 for recommended corrective actions.

NOTE

The optical power level of the *transmit* signal must be between –14.5 and –19.5 dBm.

The optical power level of the *receive* signal must be between –14.5 and –30.5 dBm.

4.9 Downline Loading Firmware Upgrades

Downline upgrades to the DEMFA firmware can be done through the downline upgrade utility (DECndu) or through the Network Control Program* (NCP) for VMS hosts. Contact Digital Customer Services for more information on the downline upgrade utility and kits that are available.

*NCP is called the Network Command Language (NCL) in DECnet Phase V.

5

FRU Replacement Procedures

This chapter provides replacement procedures for the DEMFA field replaceable units (FRUs). After performing any of the procedures described in this chapter, perform the verification procedures provided in Chapter 3.

5.1 Introduction

The maintenance philosophy for the DEMFA is to replace defective components at the FRU level. DEMFA components designated as FRUs are:

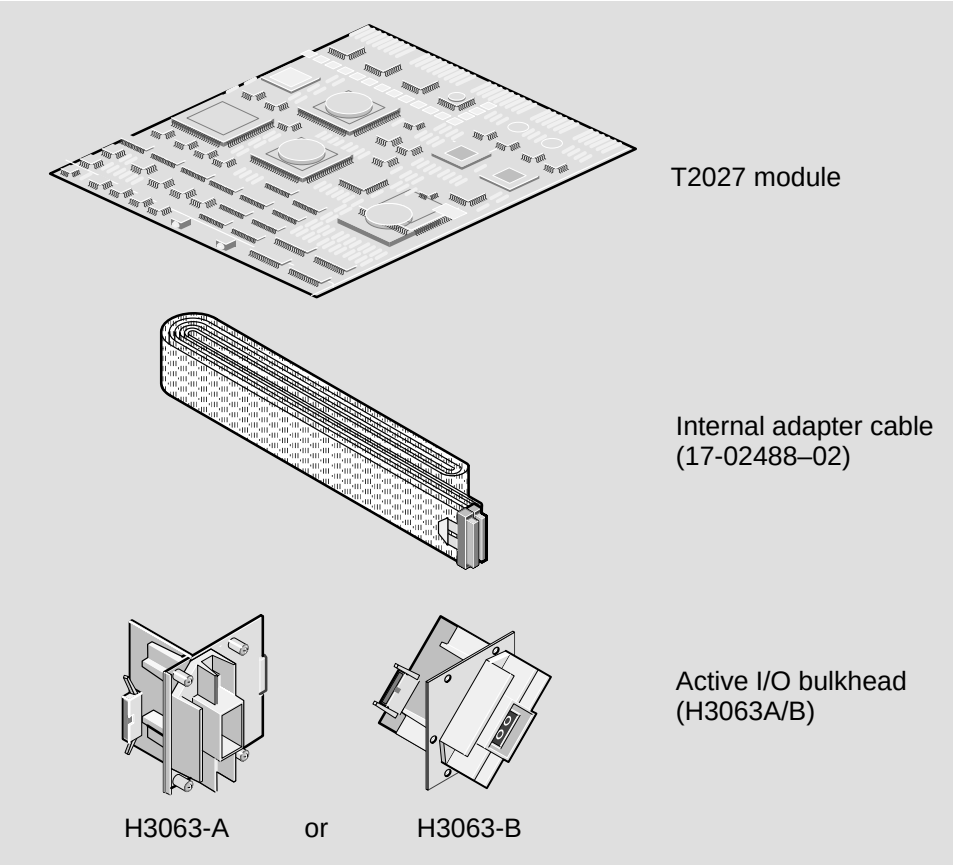
- The T2027 module
- The internal adapter cable
- The H3063 bulkhead

Table 5–1 lists the DEMFA's FRUs with their associated Digital part numbers. The FRUs are shown in Figure 5–1.

Table 5–1: DEMFA FRU Part Numbers

Field Replaceable Unit	Digital Part Number
T2027 Module	T2027
Internal Adapter Cable	17-02488-02
H3063 Bulkhead	H3063A/B

Figure 5–1: DEMFA Field Replaceable Units



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5.2 Required Tools

The following tools are required for removal and replacement of the DEMFA FRUs:

- Flat-blade screwdriver
- Phillips-head screwdriver
- Nut drivers (5/16-inch and 1/4-inch)

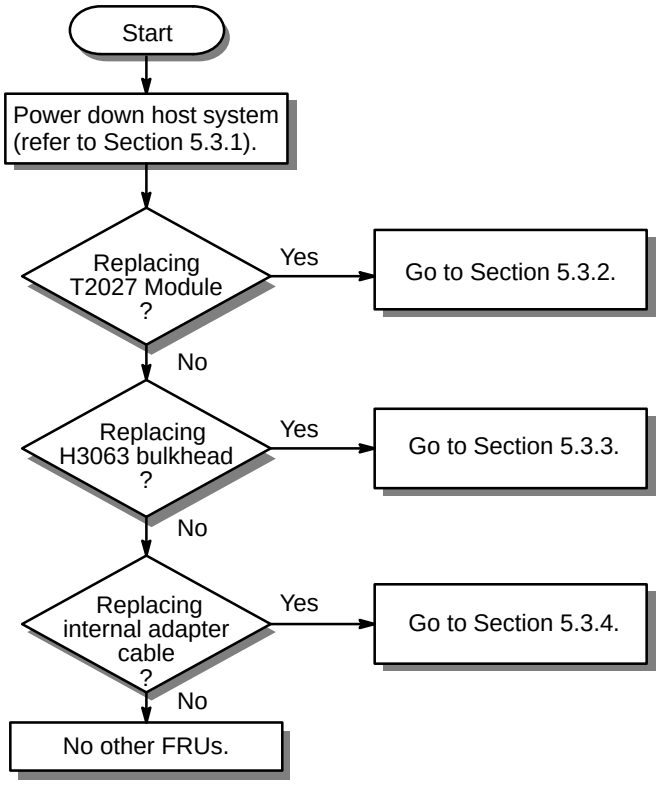
5.3 Replacing the FRUs

The replacement procedures comprise four sections:

- Powering Down the Host System Cabinet
- Replacing the T2027 Module
- Replacing the H3063 Bulkhead
- Replacing the Internal Adapter Cable

Figure 5–2 provides a flowchart that describes the steps to take when replacing FRUs.

Figure 5–2: FRU Replacement Methodology



5.3.1 Powering Down the Host System Cabinet

Power down the host system cabinet by completing the following steps:

1. Inform the system manager that the system will be powered down during the DEMFA installation.

WARNING ⚠

AC line voltage is present in the cabinet even when the ac input circuit breaker is OFF. Therefore, the only safe way to work on the inside of the cabinet is with the system's main ac power cable unplugged, and with the facility (utility) ac power breaker locked out and tagged.

2. Power down and disconnect the main ac power from the system according to the instructions given in the documentation for the specific system you are working on:

   - To power down the VAX 6000 series system cabinets, refer to the VAX 6000 series system documentation and *be sure* to use tag-out and lock-out procedures to ensure your safety while working on the system.
   - To power down the VAX 9000 series system cabinets, refer to the *VAX 9000 Family Maintenance Guide, Volume 1* (Order No. EK-KA901-MG).

3. Refer to the designated section of this manual to replace the faulty FRU:

   - Section 5.3.2 to replace the T2027 module
   - Section 5.3.3 to replace the H3063 bulkhead
   - Section 5.3.4 to replace the internal adapter cable

5.3.2 Replacing the T2027 Module

Replace the T2027 module by completing the following steps:

1. Power down the host system cabinet (refer to Section 5.3.1).

WARNING ⚠

To avoid bodily injury, be sure to power down the host system cabinet and disconnect the system cabinet's main power cable before performing the following procedure.

2. Get the conductive shipping container that houses the replacement T2027 module. Do not open the container at this time.

NOTE

The system cabinets have door lock keys for internal access to the cabinets. One key (to be used by Customer Services) fits all the cabinet door locks.

3. Unlock the front door of the system cabinet.
4. Open the front door of the system cabinet and attach the electrostatic (ESD) ground strap to your wrist. (The ESD ground straps are in a pocket attached to each cabinet door.)

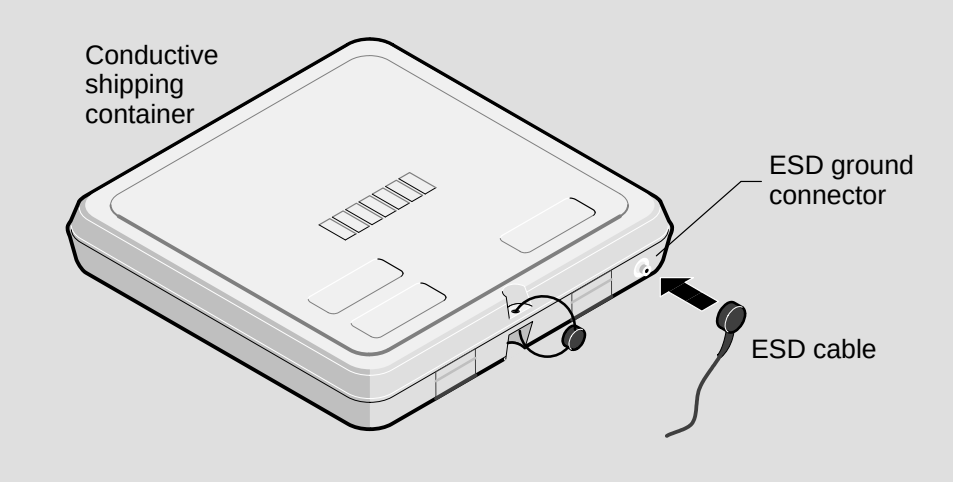
CAUTION ⚠

To prevent damage to the circuit cards, you must wear an electrostatic discharge (ESD) ground strap that is connected to the system cabinet whenever you handle the circuit cards or work on the inside of the system cabinet.

If you remove a circuit card from an XMI card cage, place it into a conductive container that is specifically designed to protect circuit cards from ESD damage.

5. Attach the other lead from the ESD ground strap to the ground connector located on the front of the conductive shipping container (see Figure 5–3).

Figure 5–3: Conductive Shipping Container



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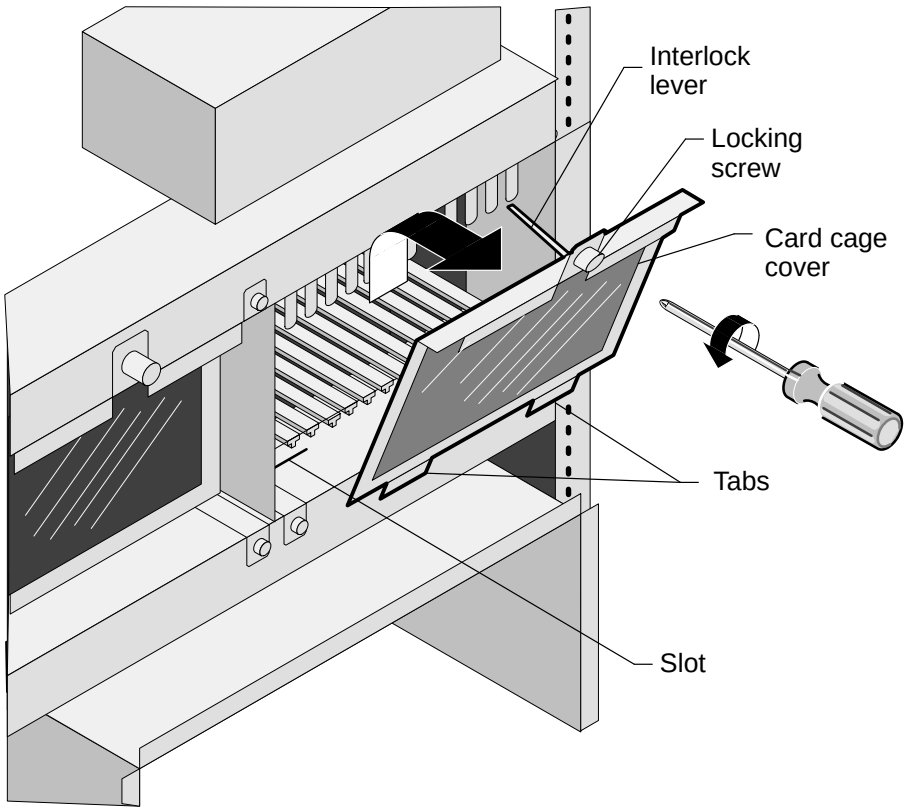
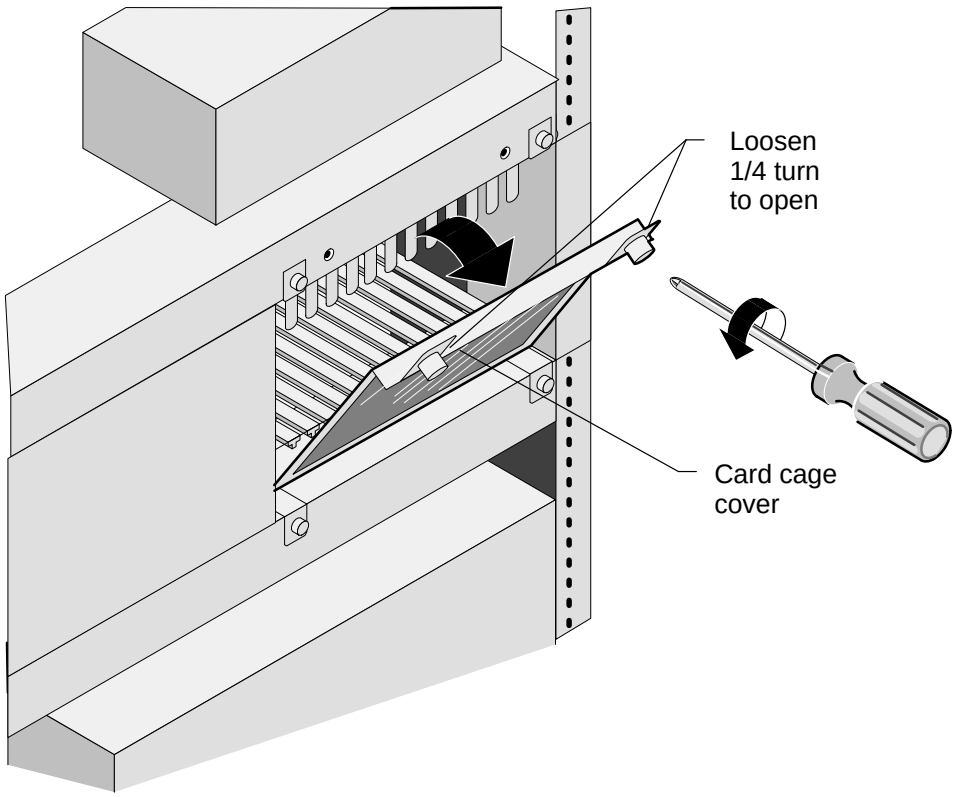
6. For VAX 6000 series cabinets, remove the (Plexiglas) cover on the front of the card cage (see Figure 5–4).

Figure 5–4: Removing the VAX 6000 Series Card Cage Front Cover



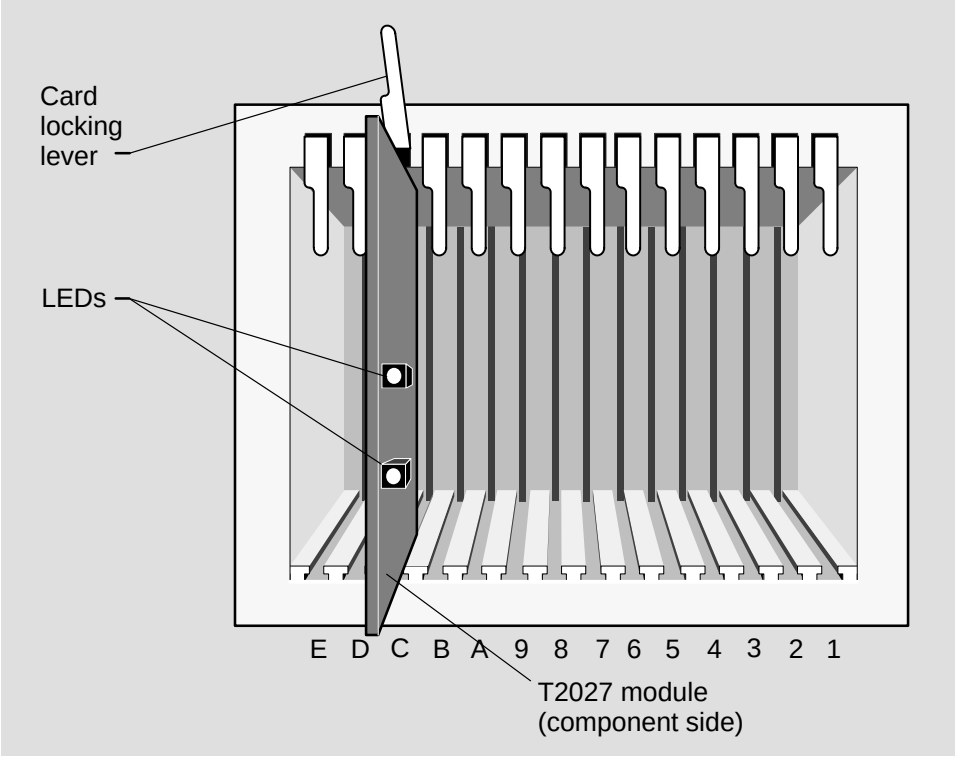
7. For VAX 9000 series cabinets, open the Plexiglas cover on the front of the card cage (see Figure 5–5).

Figure 5–5: Opening the VAX 9000 Series Card Cage Front Cover



8. Lift the card locking lever and remove the faulty T2027 module from the card slot (see Figure 5–6). Place the faulty T2027 module into a conductive container and set aside for now.

Figure 5–6: Removing the T2027 Module



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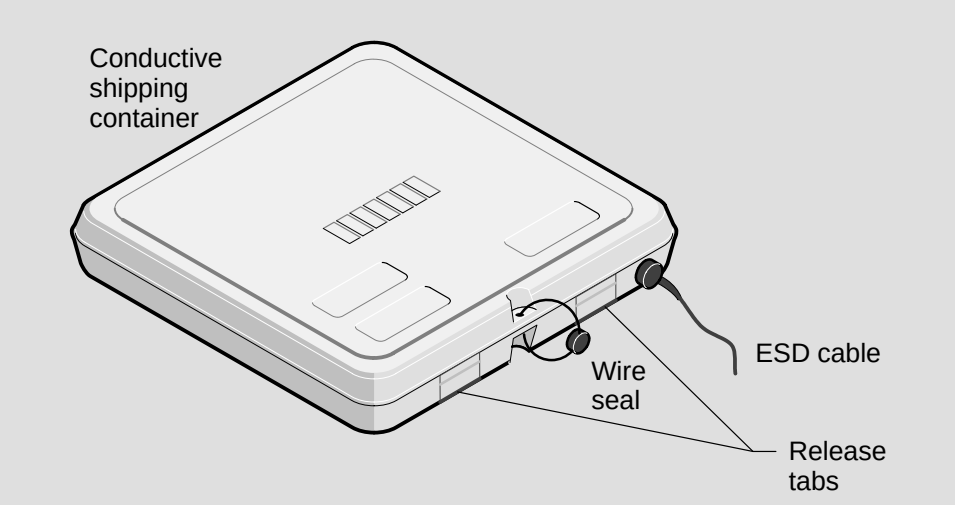
9. Cut and remove the wire seal at the front of the conductive container housing the replacement T2027 module (see Figure 5–7). Release the tabs on the front edge of the container and open the cover.

Figure 5–7: Opening the Conductive Shipping Container



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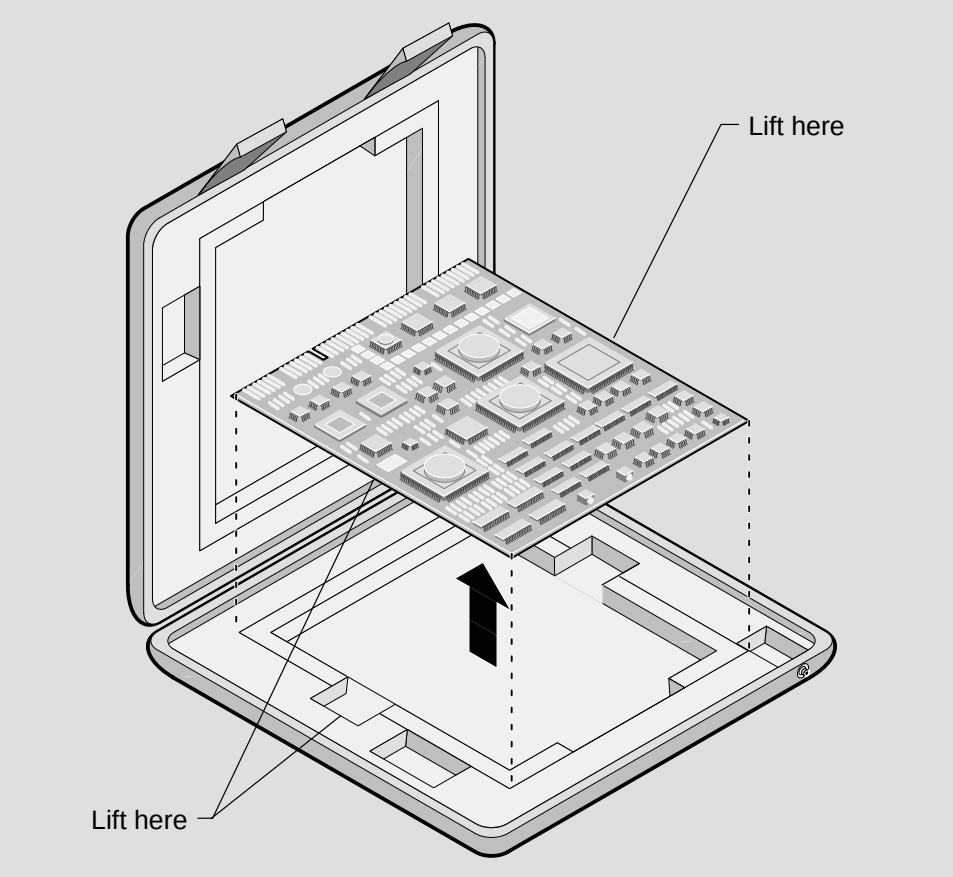
10. Remove the T2027 module from the conductive container (see Figure 5–8), using care not to touch, or allow any contact with, the integrated circuits (ICs).

Figure 5–8: Removing the T2027 Module



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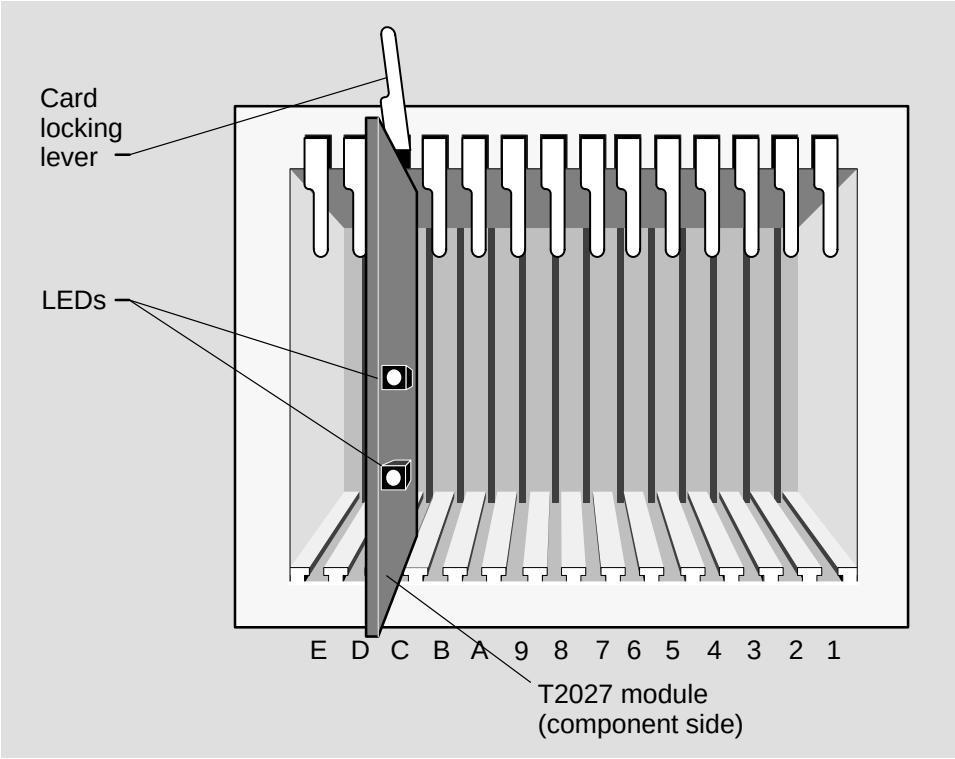
11. Slide the T2027 module into the open card cage slot (see Figure 5–9) until it stops (this is a zero-insertion force card cage).

Figure 5–9: T2027 Module Installation



12. Set the card locking lever back to its normal position, locking the T2027 module into the slot.

13. Replace (or close) the Plexiglas cover on the front of the card cage (see Figure 5–4 and Figure 5–5).
14. Place the faulty T2027 module into the empty conductive container for shipment to the repair depot.
15. Close the conductive container and secure it by fastening the tabs on the front edge of the container.
16. Remove the ESD ground strap from your wrist and from the conductive shipping container. Return the ESD ground strap to the pocket on the system cabinet door.
17. Close the front door of the system cabinet.
18. Go to Chapter 3 (Section 3.3) to verify the new installation.

5.3.3 Replacing the H3063 Bulkhead

This section describes how to replace a faulty H3063-A/B bulkhead. The H3063-A version bulkhead is used for the VAX 6000 series cabinets and the H3063-B version bulkhead is used for the VAX 9000 series cabinets. The H3063 versions cannot be interchanged between systems.

Replace the faulty H3063 bulkhead by completing the following steps:

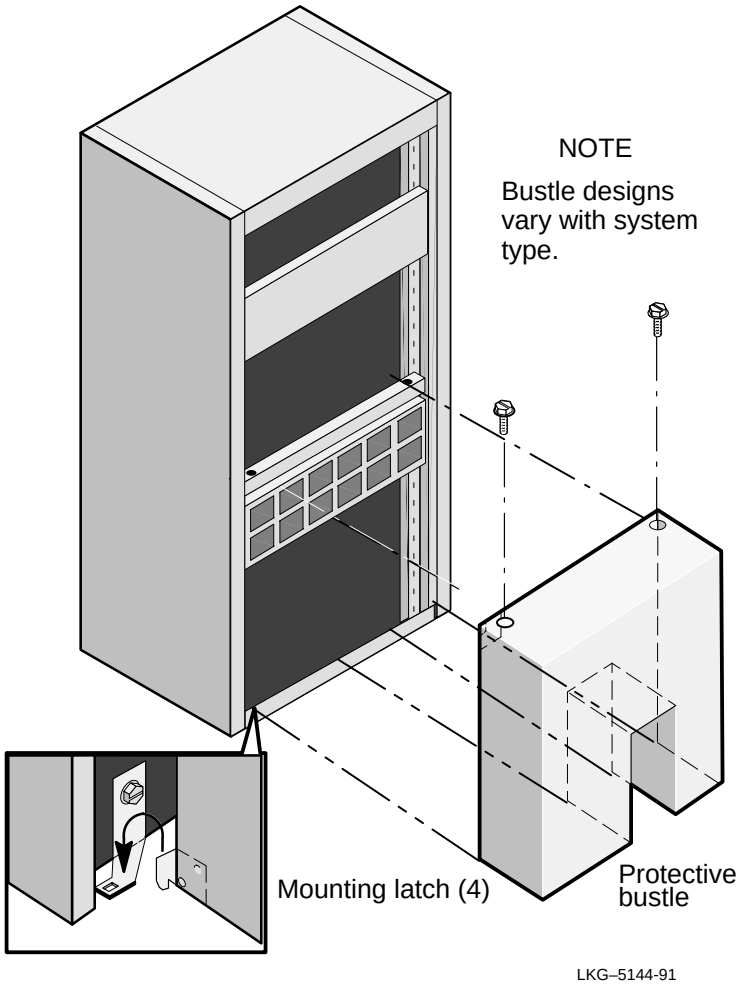
1. Be sure that the system cabinet has been powered down (refer to Section 3.2.1).

WARNING ⚠

To avoid bodily injury, be sure to power down the host system cabinet and disconnect the system cabinet's main power cable before performing the following procedure.

2. Open the back door of the system cabinet.
3. For VAX 9000 series cabinets only, remove the protective bustle installed over the I/O cabinet's external cabling (see Figure 5–10).

Figure 5–10: Removing the VAX 9000 Series Protective Bustle



4. Locate the system cabinet's I/O bulkhead:
   - See Figure 5–11 for VAX 6000 systems.
   - See for Figure 5–12 VAX 9000 systems.

Figure 5–11: VAX 6000 Series System Cabinet I/O Bulkhead Locations

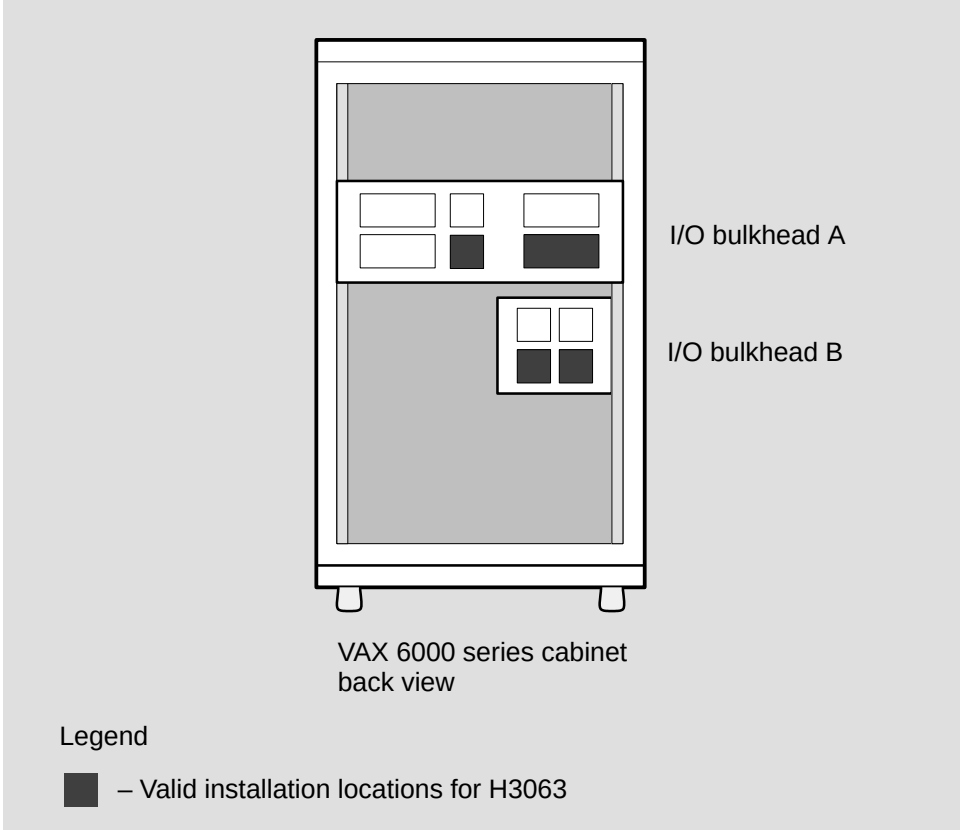


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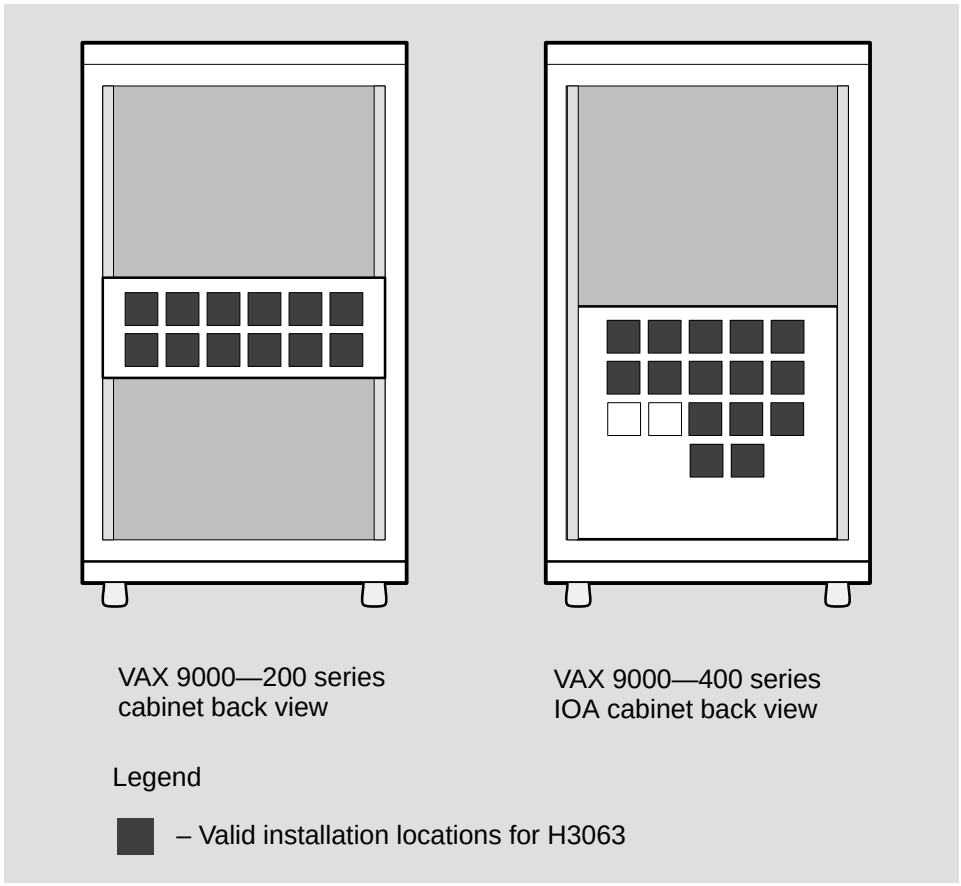
Figure 5–12: VAX 9000 Series System Cabinet I/O Bulkhead Locations



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5. Attach the electrostatic (ESD) ground strap to your wrist. (The ESD ground straps are in a pocket attached to each cabinet door.)

CAUTION ⚠

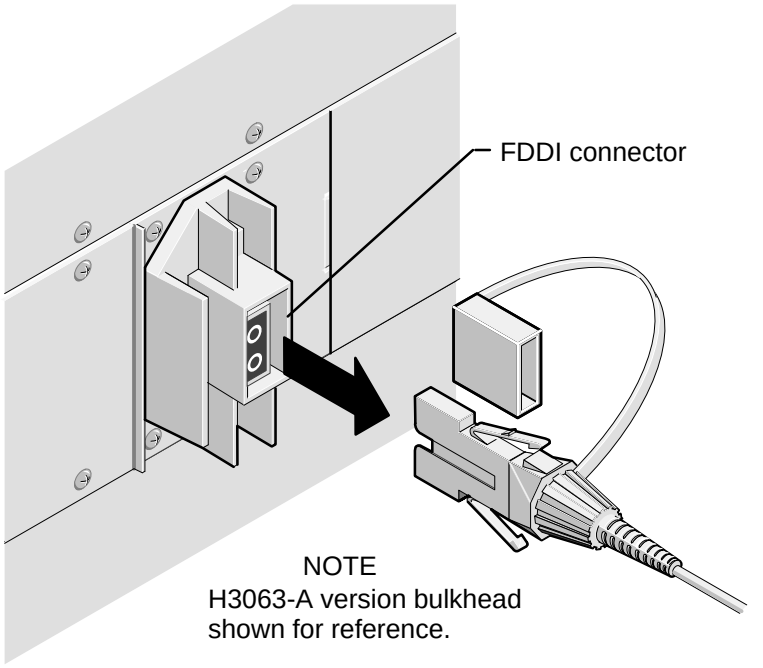
To prevent damage to the circuit cards, you must wear an electrostatic discharge (ESD) ground strap that is connected to the system cabinet whenever you handle the circuit cards or work on the inside of the system cabinet.

If you remove a circuit card from an XMI card cage, place it into a conductive container that is specifically designed to protect circuit cards from ESD damage.

6. Locate the *faulty* H3063 bulkhead on the cabinet's I/O bulkhead.

7. Press and release the locking clips on the FDDI cable plug, then disconnect the FDDI cable plug from the FDDI connector (see Figure 5–13).

Figure 5–13: Disconnecting the FDDI Cable Plug

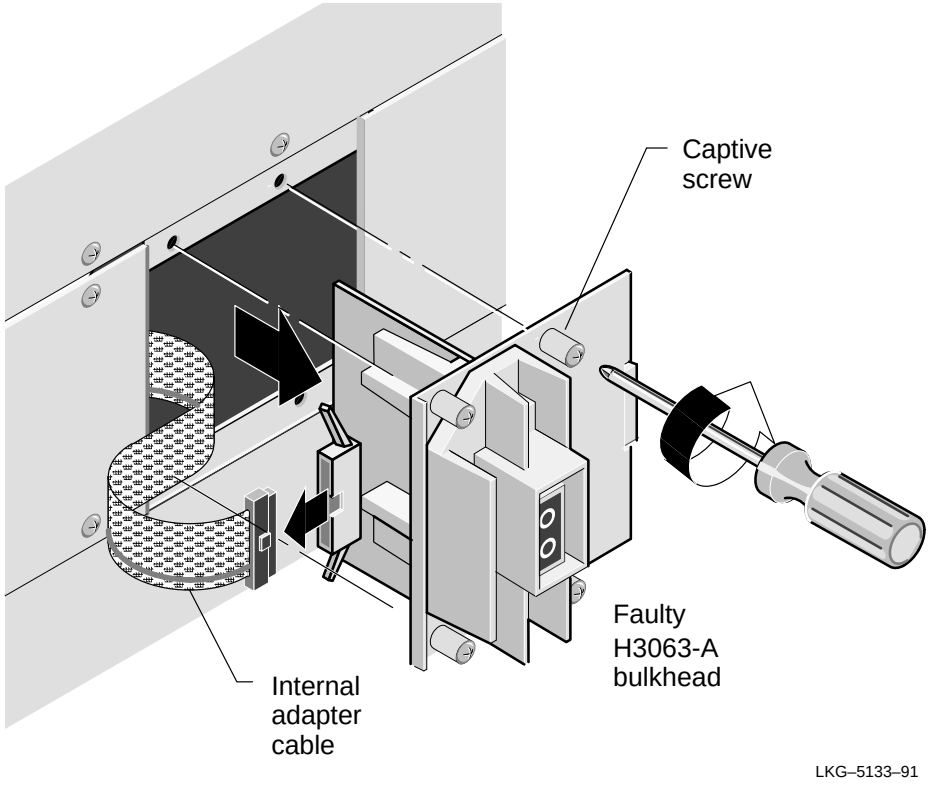


CAUTION ⚠

The next step requires partially removing the faulty H3063 bulkhead from the cabinet's I/O bulkhead, with the internal adapter cable still attached to the H3063 bulkhead. Use care not to damage the internal adapter cable during this procedure.

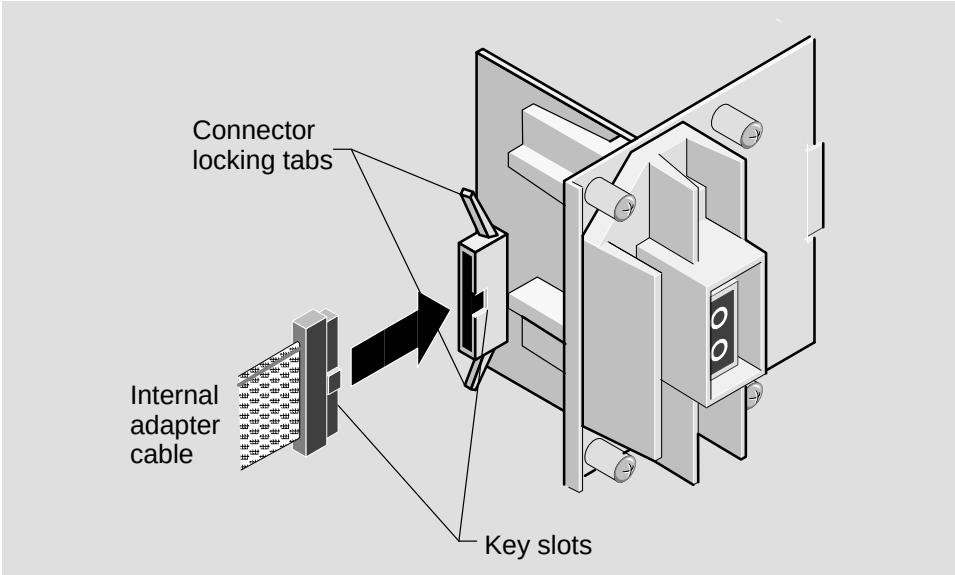
8. Loosen the four captive screws on the front of the faulty H3063-A bulkhead (or remove the six hex-head screws for H3063-B bulkheads) and partially remove it from the cabinet's I/O bulkhead (see Figure 5–14).
9. Release the connector locking tabs and disconnect the internal adapter cable from the faulty H3063 bulkhead connector (see Figure 5–14).

Figure 5–14: H3063 Bulkhead Replacement



10. Get the *replacement* H3063 bulkhead. Reinstall the internal adapter cable (removed in previous step) to the H3063 bulkhead connector by aligning the key slots (on plug and connector) and secure it with the connector locking tabs (see Figure 5–15).

Figure 5–15: H3063-A Cable Connection



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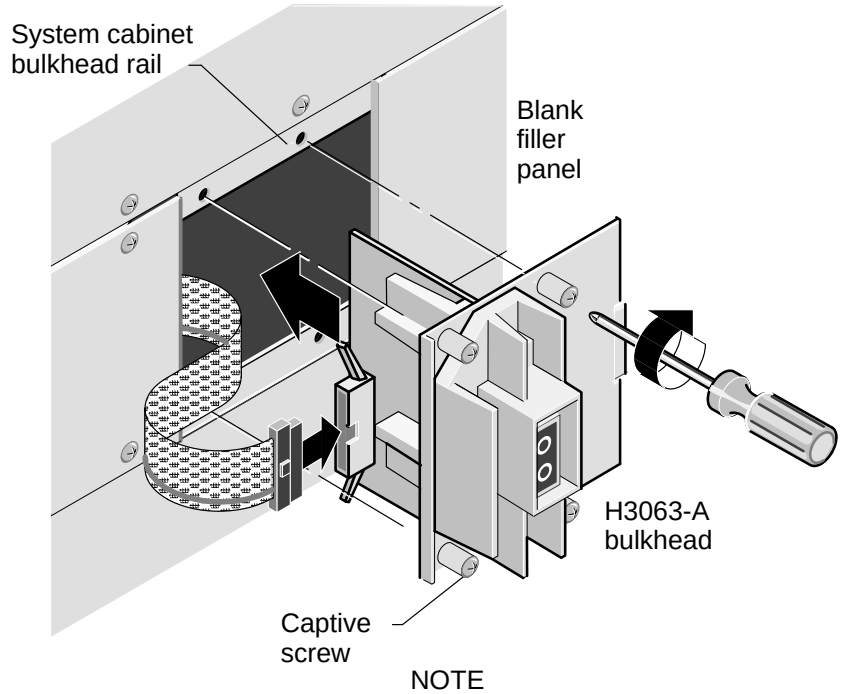
11. Carefully position the H3063 bulkhead (with internal adapter cable attached) over the open slot on the I/O bulkhead. Secure it with four captive screws (or six hex-head screws for H3063-B bulkheads) as described in Figure 5–16.

Figure 5–16: Replacing the H3063 Bulkhead



NOTE

H3063-B bulkheads are not provided with captive screws. Use screws from removed filler panels.

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12. Reinstall the FDDI cable plug into the H3063 bulkhead's FDDI connector, ensuring that the locking clips on the side of the plug snap into the locked position (see Figure 5–13).

13. Remove the ESD ground strap from your wrist and return it to the pocket on the system cabinet door.

14. Close the back door of the system cabinet.

15. Go to Chapter 3 (Section 3.3) to verify the new installation.

5.3.4 Replacing the Internal Adapter Cable

Replace the internal adapter cable by completing the following steps:

1. Be sure that the system cabinet has been powered down (refer to Section 3.2.1).

WARNING ⚠

To avoid bodily injury, be sure to power down the host system cabinet and disconnect the system cabinet's main power cable before performing the following procedure.

2. Open the back door of the system cabinet and attach the electrostatic (ESD) ground strap to your wrist. (The ESD ground straps are in a pocket attached to each cabinet door.)

CAUTION ⚠

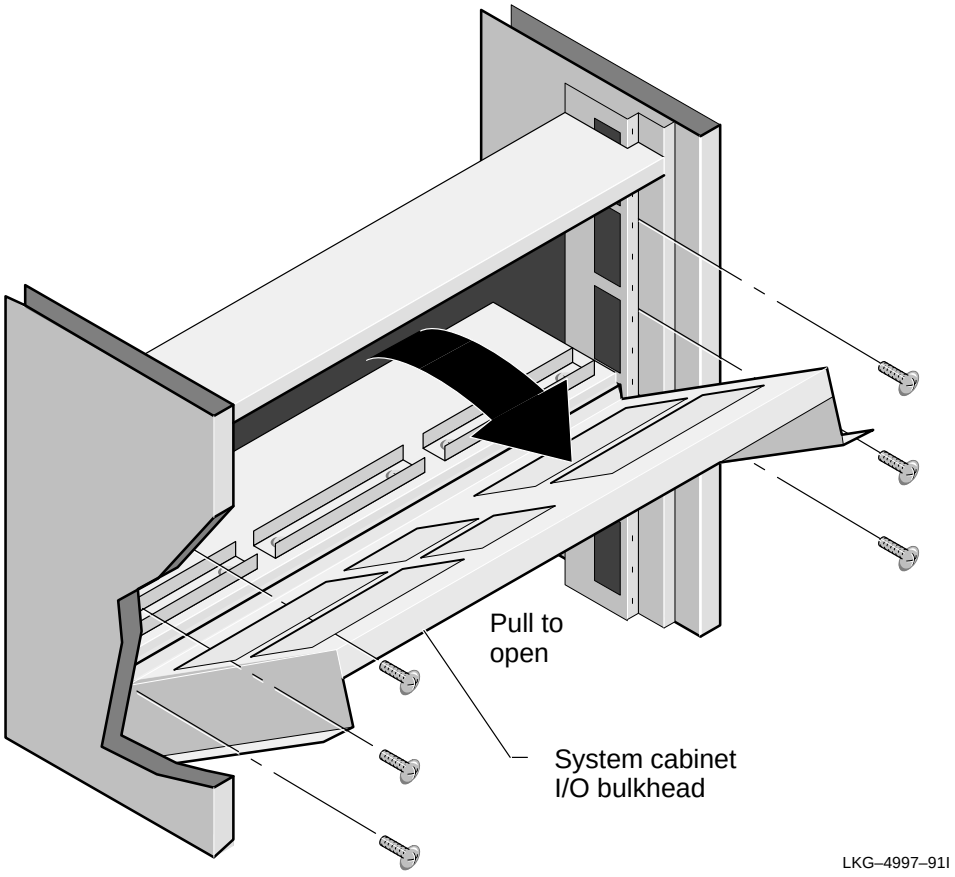
To prevent damage to the circuit cards, you must wear an electrostatic discharge (ESD) ground strap that is connected to the system cabinet whenever you handle the circuit cards or work on the inside of the system cabinet.

If you remove a circuit card from an XMI card cage, place it into a conductive container that is specifically designed to protect circuit cards from ESD damage.

3. If you are replacing the internal adapter cable in a VAX 9000 series cabinet, go to step 5.

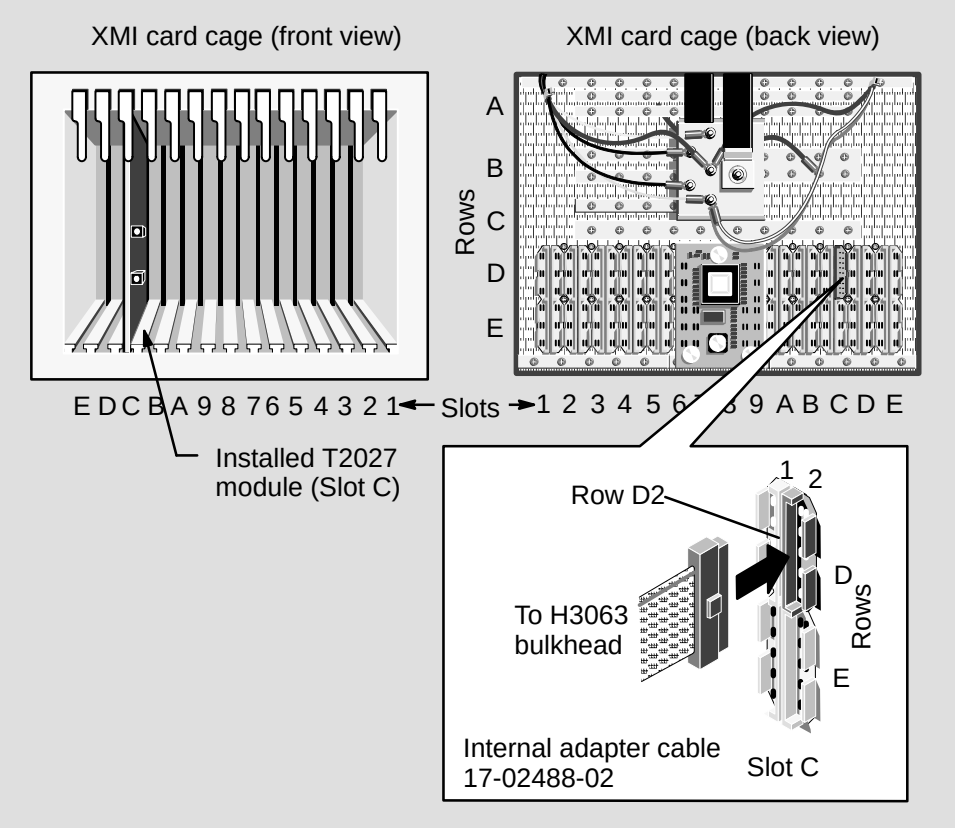
4. VAX 6000 series cabinets are designed with hinged I/O bulkheads for easy access to the XMI card cage. Remove the six screws securing the system cabinet's I/O bulkhead (see Figure 5–17). Pull it down to the open position (the system cabinet bulkhead is hinged).

Figure 5–17: Opening the System Cabinet Bulkhead



5. Locate the XMI backplane at the back of the XMI card cage (see example in Figure 5–18).
6. Note and record the position of the XMI backplane that the *faulty* internal adapter cable is connected to.
7. Disconnect the faulty internal adapter cable from the XMI backplane.

Figure 5–18: XMI Backplane Example



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8. If you are replacing the internal adapter cable in a VAX 6000 series system, go to Section 5.3.4.1.
9. If you are replacing the internal adapter cable in a VAX 9000 series system, go to Section 5.3.4.2

5.3.4.1 VAX 6000 Series Cabinets

There are two I/O bulkheads on VAX 6000 series cabinets. The replacement procedure you will follow depends on the I/O bulkhead location the internal adapter cable is routed to:

- I/O bulkhead A

  If you are replacing the internal adapter cable in I/O bulkhead A, go to the section titled, Replacing in I/O bulkhead A.

  (I/O bulkhead A is hinged and can be opened for access to the XMI card cage, cable installation, and cable management.)

- I/O bulkhead B

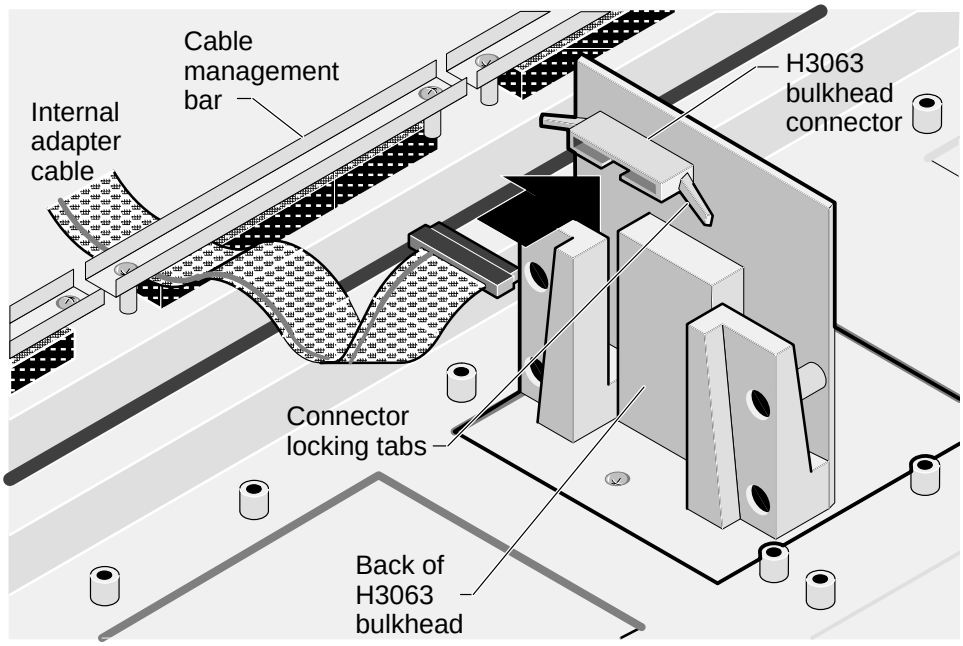
  If you are replacing the internal adapter cable in I/O bulkhead B, go to the section titled, Replacing in I/O bulkhead B.

  (I/O bulkhead B cannot be opened and requires a slight variation to the replacement steps as described in the following procedures.)

Replacing in I/O Bulkhead A

1. Remove the cable management bar located behind the H3063 bulkhead. Set the cable management bar aside for now.
2. Disconnect the *faulty* internal adapter cable from the H3063 bulkhead connector by releasing the connector locking tabs (see Figure 5–19). Remove the faulty internal adapter cable.

Figure 5–19: Disconnecting the Internal Adapter Cable



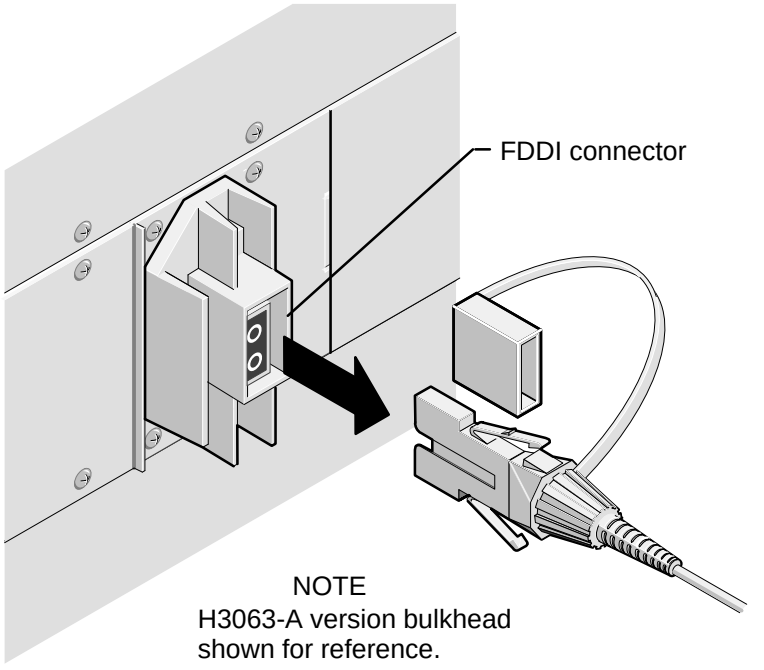
3. Connect one end of the *replacement* internal adapter cable to the XMI backplane connector at the same location the faulty internal adapter cable was connected to. Note that the cable plug and backplane connector are keyed (see Figure 5–18).
4. Connect the other end of the *replacement* internal adapter cable to the H3063 bulkhead connector and secure it with the connector locking tabs (see Figure 5–19).

5. Place the internal adapter cable into the cable guide behind the H3063 bulkhead. Replace the cable management bar over the cable(s) and fasten it securely. Be sure sufficient slack in the cable allows opening and closing the system cabinet's I/O bulkhead without binding the internal adapter cable.
6. Close the system cabinet I/O bulkhead and fasten it with the six Phillips-head screws.
7. Remove the ESD ground strap from your wrist and return it to the pouch on the system cabinet.
8. Close the back door of the system cabinet.
9. Go to Chapter 3 (Section 3.3) to verify the new installation.

Replacing in I/O Bulkhead B

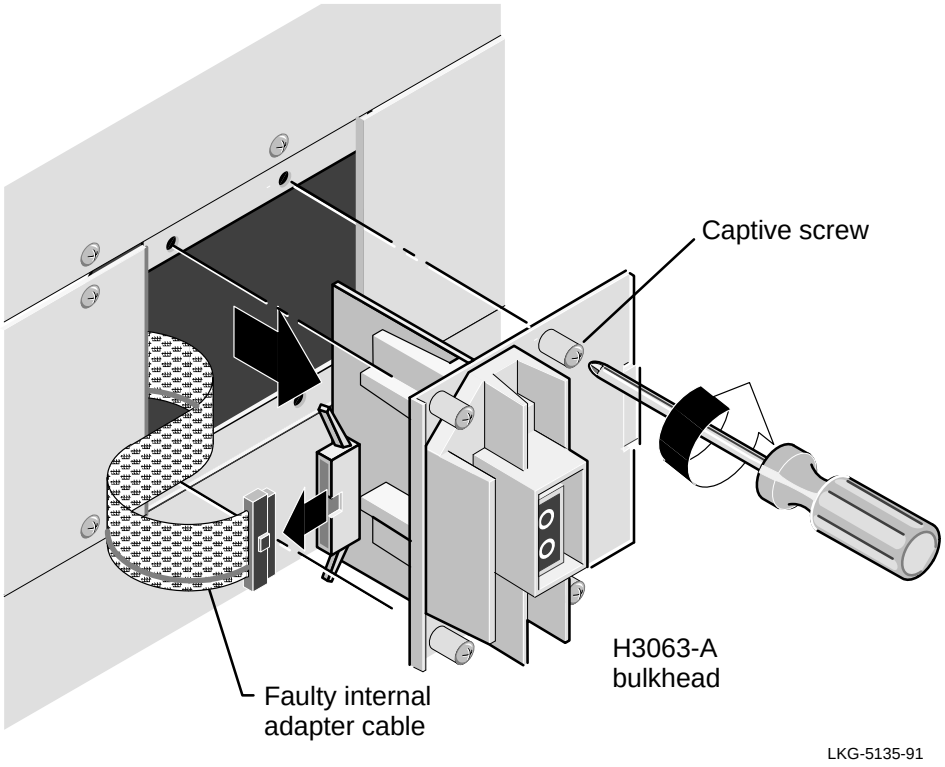
1. Locate the H3063 bulkhead that the faulty internal adapter cable is connected to.
2. Press and release the locking clips on the FDDI cable plug, then disconnect the FDDI cable plug from the FDDI connector (see Figure 5–20).

Figure 5–20: Disconnecting the FDDI Cable Plug



3. Loosen the four captive screws on the front of the H3063 bulkhead and *partially* remove it from the cabinet's I/O bulkhead (see Figure 5–21).
4. Release the connector locking tabs and disconnect the *faulty* internal adapter cable from the H3063 bulkhead connector (see Figure 5–21).

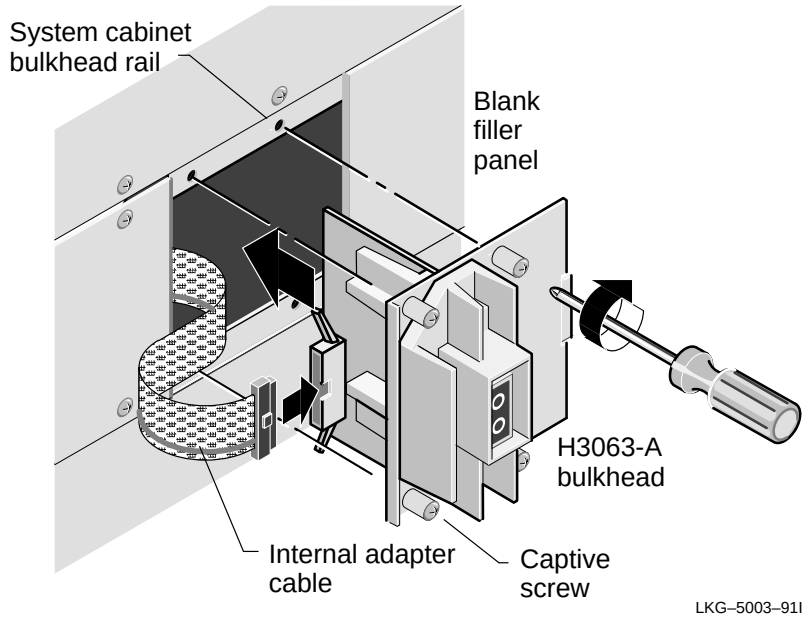
Figure 5–21: H3063-A Cable Removal



5. Get the *replacement* internal adapter cable. Attach the replacement internal adapter cable to the H3063 bulkhead connector by aligning the key slots (on plug and connector) and secure it with the connector locking tabs (see Figure 5–22).

6. Carefully position the H3063 bulkhead (with internal adapter cable attached) over the open slot on the I/O bulkhead and secure it with the four captive screws (see Figure 5–22).

Figure 5–22: H3063-A Cable Connection



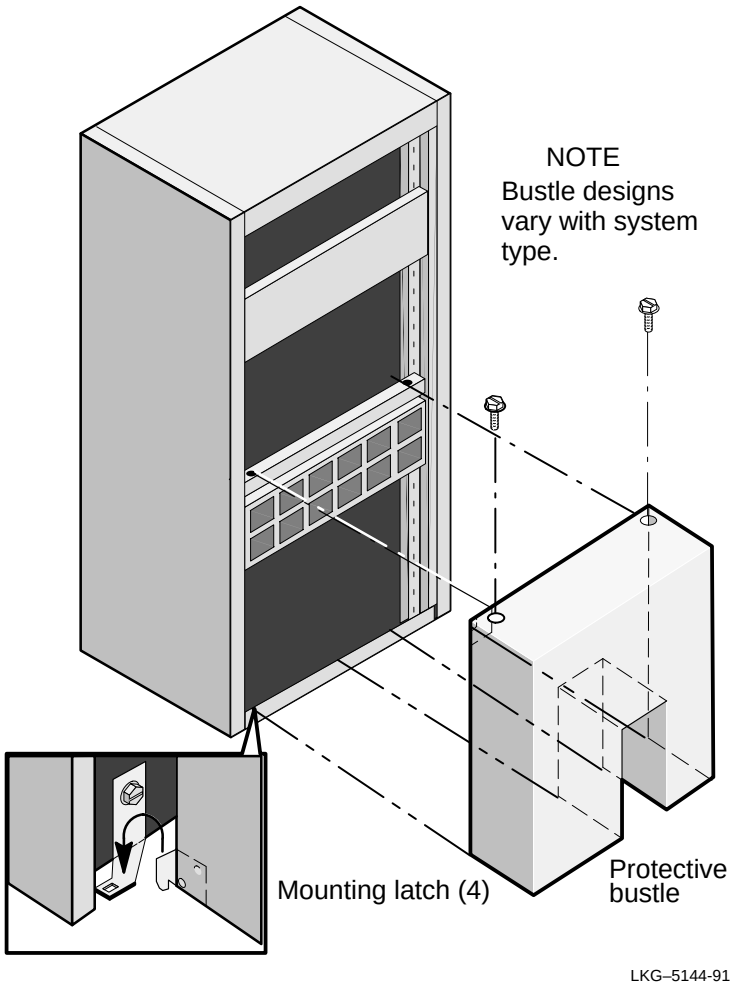
7. Connect the other end of the *replacement* internal adapter cable to the XMI backplane connector at the same location the faulty internal adapter cable was connected to. Note that the cable plug and backplane connector are keyed (see Figure 5–18).
8. Reinstall the FDDI cable plug into the H3063 bulkhead's FDDI connector, ensuring that the locking clips on the side of the plug snap into the locked position (see Figure 5–20).
9. Remove the ESD ground strap from your wrist and return it to the pocket on the system cabinet door.
10. Close the back door of the system cabinet.
11. Go to Chapter 3 (Section 3.3) to verify the new installation.

5.3.4.2 VAX 9000 Series Cabinets

Replacing the internal adapter cable in VAX 9000 series cabinets requires removing the protective bustle installed over the I/O cabinet's external cabling prior to accessing the H3063 bulkhead and cabling.

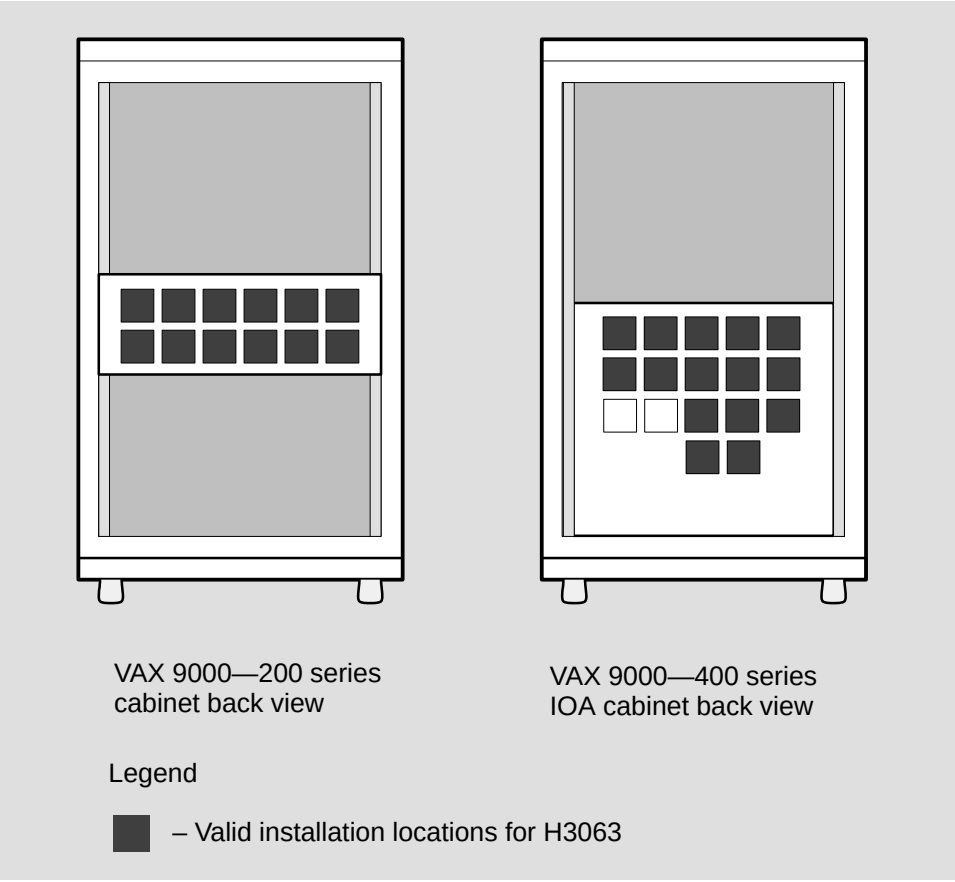
1. Remove the protective bustle installed over the I/O cabinet's external cabling (see Figure 5–23).

Figure 5–23: Removing the VAX 9000 Series Protective Bustle



2. Locate the system cabinet's I/O bulkhead (see Figure 5–24).

Figure 5–24: VAX 9000 Series System Cabinet I/O Bulkhead Locations



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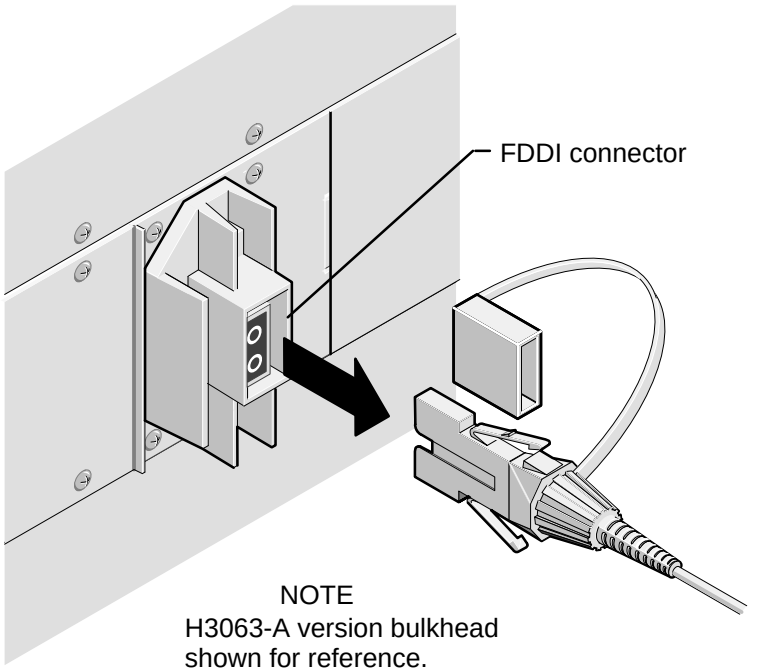
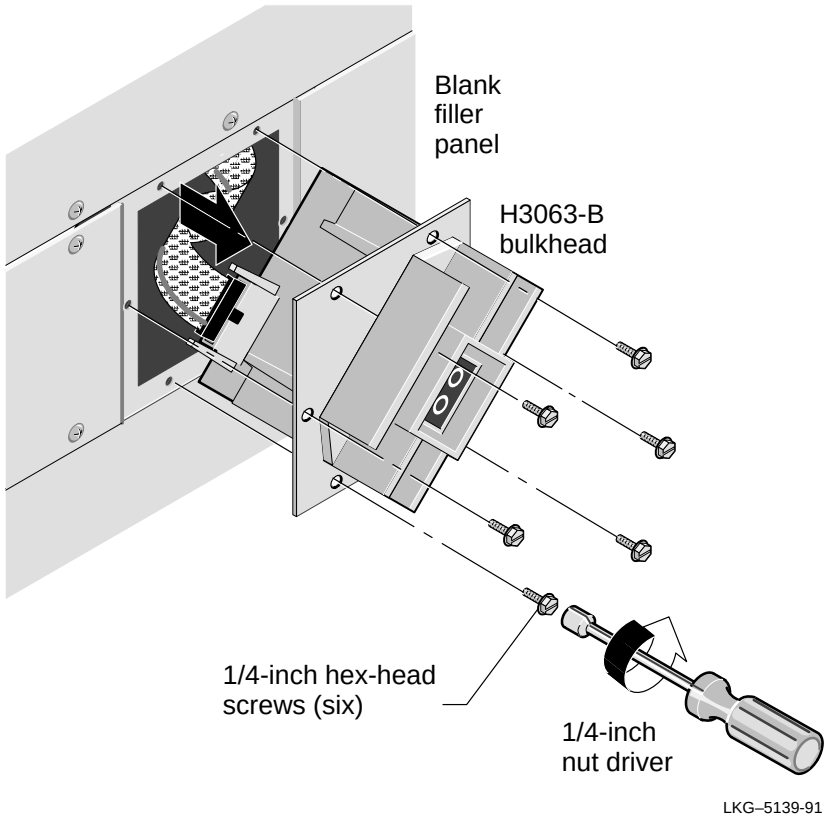
3. Locate the H3063 bulkhead that the faulty internal adapter cable is connected to.
4. Press and release the locking clips on the FDDI cable plug, then disconnect the FDDI cable plug from the FDDI connector (see Figure 5–25).

Figure 5–25: Disconnecting the FDDI Cable Plug



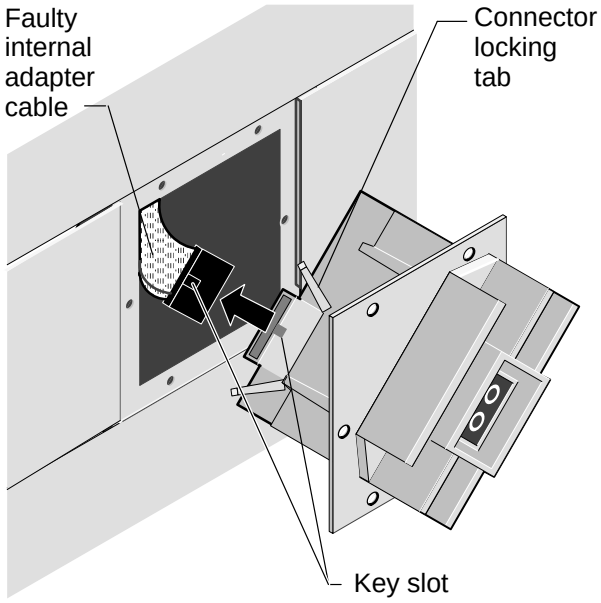
5. Using a 1/4-inch nut driver, remove the six hex-head screws securing the H3063 bulkhead and partially remove it from the cabinet's I/O bulkhead (see Figure 5–26).

Figure 5–26: Accessing the Internal Adapter Cable



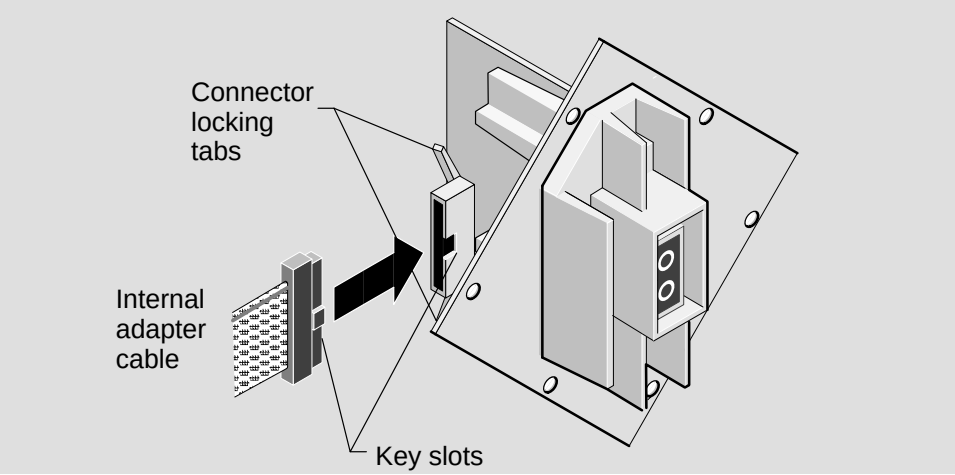
6. Release the connector locking tabs and disconnect the *faulty* internal adapter cable from the H3063 bulkhead connector (see Figure 5–27).

Figure 5–27: Disconnecting the Internal Adapter Cable



7. Get the *replacement* internal adapter cable. Attach the replacement internal adapter cable to the H3063 bulkhead connector by aligning the key slots (on plug and connector) and secure it with the connector locking tabs (see Figure 5–28).

Figure 5–28: H3063-B Cable Connection



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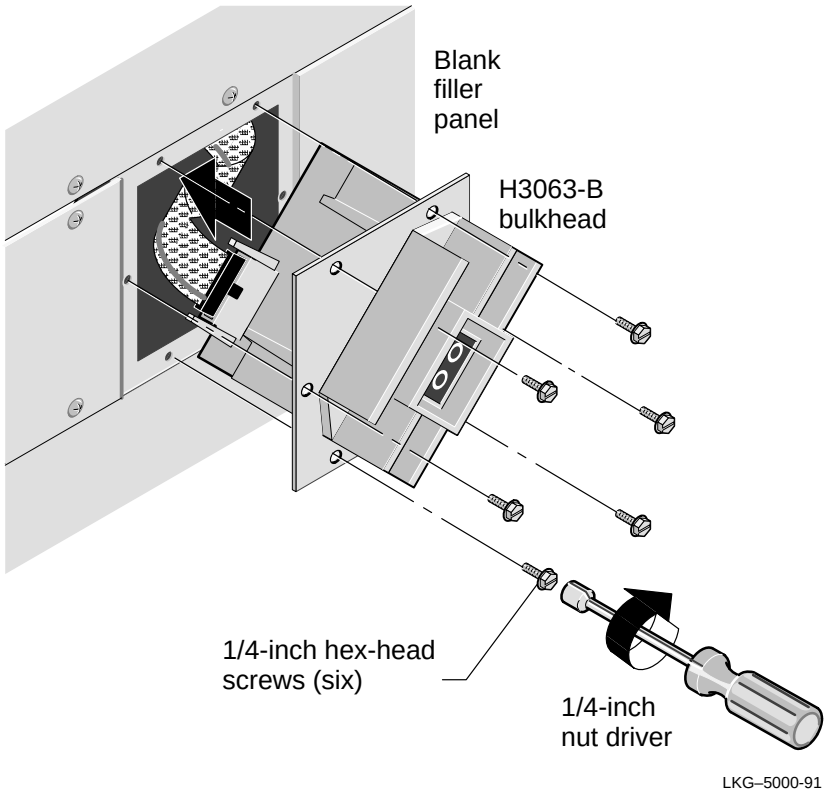
8. Carefully position the H3063 bulkhead (with internal adapter cable attached) over the open slot on the I/O bulkhead. Using a 1/4-inch nut driver, reinstall the six hex-head screws removed previously (see Figure 5–29).

Figure 5–29: H3063-B Bulkhead Installation



9. Connect the other end of the *replacement* internal adapter cable to the XMI backplane connector where the faulty internal adapter cable was connected. Note that the cable plug and backplane connector are keyed (see Figure 5–18).
10. Reinstall the FDDI cable plug into the H3063 bulkhead's FDDI connector, ensuring that the locking clips on the side of the plug snap into the locked position (see Figure 5–25).
11. Remove the ESD ground strap from your wrist and return it to the pocket on the system cabinet door.

1. Reinstall the protective bustle over the I/O cabinet's external cabling (see Figure 5–23).
2. Close the back door of the system cabinet.
3. Go to Chapter 3 (Section 3.3) to verify the new installation.

A

Line Counter Description

This appendix describes the DEMFA line counters. Table A–1 lists the counters and describes their functions.

Table A–1: DEMFA Line Counters Descriptions

Name	Description
Seconds Since Last Zeroed	The number of seconds that have elapsed since the counters were last zeroed.
Data Blocks Received	The total number of data blocks received.
Multicast Blocks Received	The total number of multicast blocks received.
Receive Failure	The number of times an error caused an incoming frame to be lost.
Bytes Received	The number of octets successfully received in frames of type LLC, Implementer, Reserved, or SMT. The MAC envelope is not included in this count.
Multicast Bytes Received	The number of octets successfully received in multicast frames of type LLC, Implementer, Reserved, or SMT. The MAC envelope is not included in this count.
Data Overrun	The number of times an incoming frame was lost because the hardware was unable to keep up with the data rate.
Data Blocks Sent	The total number of data blocks sent.
Multicast Blocks Sent	The total number of multicast blocks sent.

Table A–1 (Cont.): DEMFA Line Counters Descriptions

Name	Description
Bytes Sent	The number of octets successfully transmitted in frames of type LLC, Implementer, Reserved, or SMT. The MAC envelope is not included in this count.
Multicast Bytes Sent	The number of octets successfully transmitted in multicast frames of type LLC, Implementer, Reserved, or SMT. The MAC envelope is not included in this count.
Send Failure	The number of times an error caused termination of a frame transmission.
Unrecognized Frame Destination	The number of times a frame was received but discarded because there was no portal enabled for it. Applies only to frames received for the physical address.
System Buffer Unavailable	The number of times a frame was discarded because no System buffer was available.
User Buffer Unavailable	The number of times a frame was discarded because no User buffer was available.
MAC Frame Count	The ANSI MAC counter Frame_Ct. The total number of frames seen by this Link, other than tokens.
MAC Error Count	The ANSI MAC counter Error_Ct. The total number of times the MAC chip changed the E indicator in a frame from R to S.
MAC Lost Count	The ANSI MAC counter Lost_Ct. The total number of times a frame (other than token) was improperly terminated.
Ring Initializations Initiated	The number of times a ring initialization was initiated by this link.
Ring Initializations Received	The number of times a ring initialization was initiated by some other link.
Ring Beacons Initiated	The number of Ring Beacons initiated by the device.
Duplicate Address Test Failures	The number of times the Duplicate Address Test failed, that is, detected that the Link Address was a duplicate.

Table A–1 (Cont.): DEMFA Line Counters Descriptions

Name	Description
Duplicate Tokens Received	The number of times the MAC detected a duplicate token, either via the duplicate token detection algorithm or by receiving a token while already holding one.
Ring Purge Errors	The number of times the Ring Purger received a token while still in the ring purge state.
FCI Strip Errors	The number of times a Frame Content Independent Strip operation was terminated by receipt of a token.
Traces Received	The number of times the ECM state machine for this station entered the Trace state due to a received Trace signal.
Directed Beacons Received	The number of times the Link detected the Directed Beacon process.
Elasticity Buffer Errors	The number of times the Elasticity Buffer function in the PHY had an overflow or underflow.
LCT Rejects	The number of times a connection of this PHY Port was rejected due to failure of the Link Confidence Test at either end of the physical connection.
LEM Rejects	The number of times an active connection on the PHY Port was disconnected due to rejection by the Link Error Monitor at this end of the physical connection, or by expiration of the Noise timer (TNE).
Link Errors	The total number of *raw* Link Error input events seen by the Link Error Monitor.
Connections Completed	The number of times the PHY Port entered the In Use state, having completed the initialization process.

B

Using the System Error Log Formatter

This appendix describes the use of the Error Log Formatter (ERF) for checking system error log entries.

B.1 Troubleshooting DEMFA Using the ERF

The System Error Logger can be used as a troubleshooting tool as follows:

- Examing the latest entries to determine if DEMFA errors have been detected
- Examining individual errors that pertain to DEMFA

Section B.1.1 and Section B.1.2 explain how to examine the error log entries.

B.1.1 Examining the Latest Error Log Entries

Use the following commands:

```
$ SET DEF SYS$SYSROOT:[SYSERR]  Return
```

```
$ ANALYZE/ERROR_LOG/SINCE=10-MAY-1991:10:00  Return
```

The previous command displays all errors that occurred after 10:00 AM on 10-MAY-1991. All error log entries will be displayed.

B.1.2 Examining a Single Error Log Entry

Use the following commands:

```
$ SET DEF SYS$SYSROOT:[SYSERR] Return

$ ANALYZE/ERROR_LOG/ENTRY=(S:223,E:223) Return
```

The previous command displays only error log entry (number) 223 as shown in Example B–1.

Example B–1: Examining a Single Error Log Entry

```
$ ANALYZE/ERROR_LOG/ENTRY=(S:223,E:223) DEMFA7_ERRLOG.SYS
Error Log Report Generator
Version V5.4
     ******************************    ENTRY                       223.
******************************
 ERROR SEQUENCE 10.                                LOGGED ON:        SID
0A000004
 DATE/TIME  9-MAY-1991 14:31:25.15                                SYS_TYPE
02310001
 SYSTEM UPTIME: 0 DAYS 01:09:53
 SCS NODE: DEMFA7                                                 VAX/VMS
X5.4-3

 DEVICE ATTENTION  KA62  CPU FW REV# 5.  CONSOLE FW REV# 3.1
                   XMI NODE # 1.

 DEMFA SUB-SYSTEM, DEMFA7$FXA0:
 ERROR TYPE CODE #8.,   ERROR SUBTYPE CODE #35.

       XDEV REG        80090823
                                      DEVICE TYPE = 0823(X)
                                      FIRMWARE REV = 09(X)
                                      HARDWARE REV = 80(X)
       PORT STATUS REG 001B210D
                                      HALTED STATE
                                      LED STATE = 04(X)
                                      WATCHDOG TIMEOUT ERROR
       XPUD            80000018
       RESET COUNT         0000
       FIRMWARE REV          00
       ERROR REASON          00
       TIME STAMP  000000000000
                                      0. HRS, 0. MINS, 0. SECS
       WRITE COUNT         0000

       UCB$B_ERTCNT          09
                                      9. RETRIES REMAINING
       UCB$B_ERTMAX          80
                                      128. RETRIES ALLOWABLE
       UCB$L_CHAR      0C442000
                                      NETWORK
                                      AVAILABLE
                                      ERROR LOGGING
                                      CAPABLE OF INPUT
                                      CAPABLE OF OUTPUT
       UCB$W_STS           2010
                                      ONLINE
       UCB$W_ERRCNT        0001
                                      1. ERRORS THIS UNIT
```

C

Using the System Dump Analyzer

This appendix describes how to invoke the System Dump Analyzer (SDA) from a system account and lists SDA commands that are used to troubleshoot the DEMFA.

IMPORTANT

This appendix is for use by Digital Field Service personnel only. The System Dump Analyzer (SDA), described in the following sections, is intended for Digital Field Service personnel to use as an interim tool and is subject to change without notice.

C.1 Setting Up to Use SDA

You must perform three tasks before using the SDA to troubleshoot the DEMFA:

1. Invoke SDA from the sys$system account.
2. Define the LSB (LAN Station Block) symbol to be the DEMFA's Auxiliary Structure address.
3. Read in the FX driver symbol definitions file into the SDA.

NOTE

If the FXSYM.STB file is not installed, you can still use SDA to read the status, counters, and attributes (described in Section C.2.4).

Sections C.1.1 through C.1.3 describe how to perform these tasks.

C.1.1 Invoking SDA from the Sys$system Account

All of the information relevant to the DEMFA's parameters is stored in the sys$system account. SDA is invoked from that account.

To invoke SDA, do the following:

1. Type the following at the DCL $ prompt:

```
$ SET DEFAULT SYS$SYSTEM
```
Return

2. Then, from the sys$system account, type:

```
$ ANALYZE/SYSTEM
```
Return

SDA displays the following (see Example C–1):

Example C–1: SDA Introduction display

```
VAX/VMS System analyzer
SDA>
```

C.1.2 Defining the LAN Station Block Symbol

1. Type the following at the SDA prompt:

```
SDA>SHOW DEVICE FX Return
```

The First of a series of screens is displayed (see Example C–2).

Example C–2: AUX Address Screen 1

```
I/O data structures
-------------------
                                          DDB list
                                          --------
            Address    Controller     ACP       Driver      DPT   DPT size
            -------    ----------     ---       ------      ---   --------
           808EA570    FXA                     FXDRIVER   804199E0  8B60

    Press RETURN for more.
SDA>
```

2. Press Return to display the next screen (see Example C–3).
3. Record the value given in the Aux. struct. field (see the highlighted area in Example C–3).
4. Type the following at the SDA prompt:

```
SDA>DEFINE LSB 804228C0 Return
```

Where:
804228C0 is the value given in the Aux. struct. field (from Example C–3).

Example C–3: AUX Address Screen 2

```
I/O data structures
-------------------
Controller: FXA
---------------

                      --- Device Data Block (DDB) 808EA570 ---

Driver name         FXDRIVER   Alloc. class          0   DDT address    80419B24
                               SB address     801F01E0
                               UCB address    80414900

               ---  Primary Channel Request Block (CRB) 803F7E30 ---

Reference count        2    Wait queue         empty    Aux. struct.    804228C0
IDB address     80909360    Unit init.      80419BE2    Int. service    8041A4F5
ADP address     809092F0                                Ctrl. init.     80419BDC
Unit start rout.8041D01D

    Press RETURN for more.
SDA>
```

C.1.3 Reading In the FX Driver Symbols into the SDA

Type the following at the SDA prompt:

```
SDA> READ FXSYM.STB Return
%SDA-I-READSYM, reading symbol table SYS$SYSROOT
:[SYSMGR]FXSYM.STB;1
```

If the FXSYM.STB file is not in the sys$system account directory, SDA displays the following error message:

```
SDA> READ FXSYM.STB
%SDA-W-OPENIN, error opening FXSYM.STB as input
%RMS-W-FNF, file not found
```

NOTE

If the FXSYM.STB file is not installed, you can still use SDA to read the status, counters, and attributes (described in Section C.2.4).

The FXSYM.STB file is available to Digital Customer Service personnel only.

C.2 Accessing Information

SDA can help you determine the cause of the problem by providing access to the following categories of information:

- Hardware/Firmware revision status
- Port Data Block contents
- Port Status Command Data Block contents
- Status, counters, and attributes

The following sections describe how to use SDA commands to access these categories.

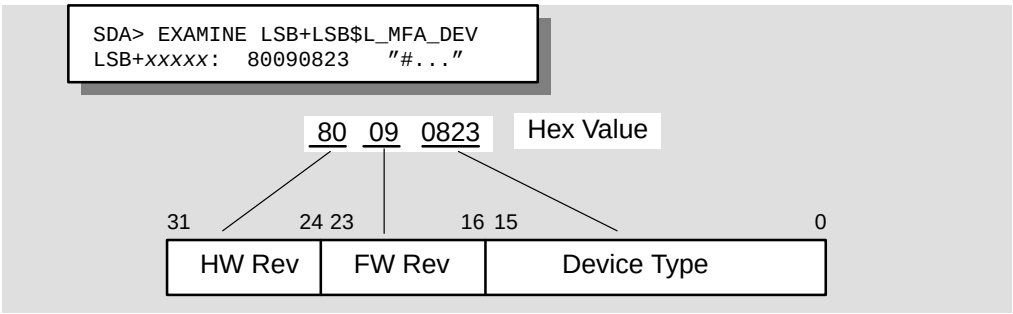
C.2.1 Accessing Hardware/Firmware Revision Status

To access the Device Register, type the following command at the SDA prompt:

```
SDA> EXAMINE LSB+LSB$L_MFA_DEV  Return
LSB+xxxxx: 80090823   "#..."
```

SDA's response is described in Example C–4:

Example C–4: Interpreting Hardware/Firmware Revision



C.2.2 Accessing Port Data Block Contents

To access the contents of the Port Data Block, proceed as follows:

1. Type the following commands at the SDA prompt:

```
SDA> EXAMINE LSB+LSB$L_MFA_PARAM  Return
LSB+XXXXX: 801F1E00   ".... "

SDA> DEFINE PARAM 801F1E00  Return
```

2. Typing the following command invokes SDA to display the contents of the Port Data Block (the display contents are *partially shown* in Example C–5):

```
SDA> FORMAT PARAM/TYPE=PARAM  Return
```

Example C–5: Example of Port Data Block Contents

```
VAX/VMS X5.4-4PX -- System Dump Analysis
24-APR-1991 12:38:46.96                                  Page 1

                                                  Table of Contents
                                                  -----------------


802CB400   PARAM$L_OPCODE                  00000002
802CB404   PARAM$L_VERSION                 00000101
802CB408   PARAM$Q_MLA                     08002B1A
802CB40C                                   0000BD00
802CB410   PARAM$L_T_MAX                   00000000
802CB414   PARAM$L_T_REQ                   00000000
802CB418   PARAM$L_TVX                     00000000
802CB41C   PARAM$L_LEM                     00000000
802CB420   PARAM$Q_BVC                     00000000
```

Table C–1 provides a description of the PARAM fields listed in the Port Data Block.

Table C–1: Port Data Block — PARAM Field Description

Field Name	Description
PARAM$L_OPCODE	Command Opcode = 2
PARAM$L_VERSION	Datalink Architecture Version
PARAM$Q_MLA	Physical Address
PARAM$L_T_MAX	Maximum Token Rotation Time

Table C–1 (Cont.): Port Data Block — PARAM Field Description

Field Name	Description
PARAM$L_T_REQ	Requested Token Rotation Time
PARAM$L_TVX	Valid Transmission Time
PARAM$L_LEM	Link Error Monitor Threshold Value
PARAM$Q_BVC	Boot Verification Code
PARAM$L_MAX_USER	Maximum Number of Users
PARAM$L_MAX_ADR	Maximum Total Address
PARAM$L_MODE<1:0>	Loopback Mode: 0 – No Loopback 1 – External Loopback 2 – Loopback between CDC chips 3 – Reserved
PARAM$L_MODE<2:0>	Boot Enable Flag
PARAM$W_UPD_TIM	Time to Update Counters
PARAM$W_REST_TOK_TMO	Restart Token Timeout Timer
PARAM$Q_LAST_ZER	Time Since Last Init
PARAM$Q_BYTS_RCVD	Bytes Received
PARAM$Q_BYTS_SENT	Bytes Sent
PARAM$Q_FRMS_RCVD	Frames Received
PARAM$Q_FRMS_SENT	Frames Sent
PARAM$Q_MCA_BYTS_RCVD	Multicast Bytes Received
PARAM$Q_MCA_BYTS_SENT	Multicast Bytes Sent
PARAM$Q_MCA_FRMS_RCVD	Multicast Frames Received
PARAM$Q_MCA_FRMS_SENT	Multicast Frames Sent
PARAM$Q_XMT_UNDRUN	Transmit Underrun
PARAM$Q_XMT_RNGFAIL	Transmit Ring Failure
PARAM$Q_RCV_CRC_ERR	Receive CRC Error
PARAM$Q_RCV_FSTS_ERR	Receive Frame Status Error
PARAM$Q_RCV_ALIGN_ERR	Receive Alignment Error

Table C–1 (Cont.): Port Data Block — PARAM Field Description

Field Name	Description
PARAM$Q_RCV_TOO_LONG	Receive Frame Too Long
PARAM$Q_RCV_PHA_UFD	Unrecognized Frame Destination
PARAM$Q_RCV_MCA_UFD	Unrecognized Multicast Frame Destination
PARAM$Q_RCV_OVERRUN	Receive Overrun
PARAM$Q_SBU	Link Buffer Unavailable
PARAM$Q_UBU	User Buffer Unavailable
PARAM$Q_RCV_FRM_CNT	Received Frame Count
PARAM$Q_ERR_CNT	Error Count
PARAM$Q_LOST_CNT	Lost Count
PARAM$Q_RNG_INIT_LOCAL	Ring Initialization – Local
PARAM$Q_RNG_INIT_REMOTE	Ring Initialization – Other Station
PARAM$Q_DUPADDR_FAIL	Duplicate Address Test Failed
PARAM$Q_DUP_TOKEN	Duplicate Token Detected
PARAM$Q_PURG_ERR	Ring Purge Errors
PARAM$Q_BRIG_STRIP	Bridge Strip Errors
PARAM$Q_PC_TRACE_INIT	PC Traces Initiated
PARAM$Q_LINK_ST_FAIL	Link Self Test Failures
PARAM$Q_LEM_REJECTS	Link Error Monitor Rejects
PARAM$Q_LEM_LINK_ERR	Link Error Monitor Link Errors
PARAM$Q_LCT_REJECTS	Link Confidence Test Rejects
PARAM$Q_TNE_EXP_REJECTS	Rejects due to Noise Timer Expiring
PARAM$Q_EBUFF_ERR	Elasticity Buffer Errors
PARAM$Q_CONN_COMP	Connections Completed
PARAM$Q_TRACE_RCVD	PC Trace Messages Received
PARAM$Q_BEACONS_INIT	Directed Beacons Initiated
PARAM$Q_TOKEN_CNT	Token Count

C.2.3 Accessing the Port Status Command Data Block

To access the contents of the Port Status Command Data Block, proceed as follows:

1. Type the following commands at the SDA prompt:

```
SDA> EXAMINE LSB+LSB$L_MFA_STATUS  Return
LSB+XXXXX: 801F1C00   "...."

SDA> DEFINE STATUS 801F1C00  Return
```

2. Typing the following command invokes SDA to display the contents of the Port Status Command Data Block (the display contents are *partially shown* in Example C–6):

```
SDA> FORMAT STATUS/TYPE=STATUS  Return
```

Example C–6: Example of Port Status Command Data Block Contents

```
VAX/VMS X5.4-4PX -- System Dump Analysis
1-MAY-1991 13:09:13.05                        Page 1

                                                   Table of Contents
                                                   -----------------




8213DC00   STATUS$L_OPCODE                  00000003
8213DC04   STATUS$Q_LAST_RESET              01312D00
8213DC08                                    00000000
8213DC0C                                    00989680
8213DC10                                    10000000
8213DC14   STATUS$L_VERSION                 00000101
8213DC18   STATUS$Q_MLA                     1A2B0008
8213DC1C                                    DF1500BD
8213DC20   STATUS$L_T_MAX                   00210000
8213DC24   STATUS$L_T_NEG                   0000C400
8213DC28   STATUS$L_TVX                     00008000
8213DC2C   STATUS$L_LEM                     00000008
```

Table C–2 provides a description of the STATUS fields listed in the Port Status Command Data Block.

Table C–2: Port Status Command Data Block — Status Field Description

Field Name	Description
STATUS$L_OPCODE	Command Opcode = 3
STATUS$Q_LAST_RESET	Time since counters reset
STATUS$L_VERSION	Datalink Architecture Version Supported
STATUS$Q_MLA	Physical Address
STATUS$L_T_MAX	Maximum Token Rotation Time
STATUS$L_T_NEG	Negotiated Token Rotation Time
STATUS$L_TVX	Valid Transmission Time
STATUS$L_LEM	Link Error Monitor Threshold
STATUS$Q_UN_ADDR	Upstream Neighbor Address
STATUS$Q_BVC	Boot Verification Code
STATUS$L_NUM_PHA	Current Destination Filter Address
STATUS$L_NUM_USER	Current Number of Users Defined
STATUS$L_NUM_MCA	Current Multicast Addresses defined
STATUS$L_MAX_USER	Maximum Number of Users
STATUS$L_MAX_ADR	Maximum Total Addresses
STATUS$L_PHY_STATE	State of the Physical Link 1 – Broken 2 – Off Ready 3 – Waiting 4 – Starting 5 – Failed 6 – Watch 7 – Use
STATUS$L_PORT_TYPE	Port Type of the Adapter
STATUS$L_SER_NUM	Module Serial Number
STATUS$L_FLAGS<0>	Enable Boot Messages
STATUS$L_FLAGS<3:1>	FDDI Link State: 1 – Off Ready 3 – On Ring Init 4 – On Ring Run 2 – Off Fault Recovery 5 – Broken

Table C2 (Cont.): Port Status Command Data Block — Status Field Description

Field Name	Description
STATUS$L_FLAGS<5:4>	Duplicate Address Test Results: 1 – Success 2 – Duplicate 0 – Unknown
STATUS$L_FLAGS<7:6>	Ring Purger State: 3 – Purger 2 – Non-purger 1 – Candidate-purger
STATUS$L_FLAGS<10>	Ring Purger Enable Bit — If set, this link will participate in the Ring Purger Election.
STATUS$L_NBR_PHY_TYP	Neighbor PHY Type
STATUS$W_RTT	Restricted Token Timeout
STATUS$W_MIN_SMT_VER	Minimum SMT Version ID
STATUS$W_SMT_VER	SMT Version ID
STATUS$W_MAX_SMT_VER	Maximum SMT Version ID
STATUS$L_RER	Ring Fault Reason: 0 – No Error 5 – Ring Init Initiated 6 – Ring Init Received 7 – Ring Beaconing Initiated 8 – Duplicate Address Detected 9 – Duplicate Token Detected 10 – Ring Purge Error 11 – FCI Strip Error 12 – Ring Op Oscillation 13 – Directed Beacon Received 14 – PC Trace Initiated 15 – PC Trace Received
STATUS$L_RNG_LAT	Current Ring Latency
STATUS$L_PHY_TYP	PHY Type
STATUS$L_PMD_TYP	PMD Type
STATUS$L_NBR_PHY_TYP	Neighbor PHY Type
STATUS$L_LINK_ERR_EST	LEM estimate of the Current Error Rate
STATUS$B_REJ_RSN	Reject Reason

C.2.4 Accessing Status, Counters, and Attributes

To access information about DEMFA's status, counters, and attributes, type the following command at the SDA prompt:

```
SDA> SHOW LAN/FULL/DEVICE=FX
```
Return

SDA responds with the following screen display (see Example C–7):

Example C–7: Status, Counters, and Attributes Display

```
LAN Data Structures
-------------------
             -- LAN Information Summary 10-MAY-1991 08:48:05 --

LAN flags:  0002 LAN_init

LAN module version                 1    First SVAPTE                85502058
LAN address                80422540    Number of PTEs                     4
Number of stations                 2    SVA of pages                801F2C00
First LSB address          804228C0


    Press RETURN for more.
SDA>
```

As you scroll through the screen displays (by pressing Return at the SDA prompt), you can extract and apply the data to help analyze problems that can occur in the network environment.

The following SDA screen examples (see Example C–8) highlight specific areas that can be useful to you. Each illustration is an example of the actual sequence of screens that appear as you press Return from the initial (first) screen. These screen examples were created from an actual device running in a lab environment so your data will be different than shown here, although the format will be the same.

Example C–8: Status, Counters, and Attributes Display Examples

```
LAN Data Structures
-------------------
          -- LAN CSMACD Network Management 10-MAY-1991 08:48:05 --

Creation time                   None    Times created                    0
Deletion time                   None    Times deleted                    0
Module EAB                  00000000    Latest EIB                00000000
Port EAB                    00000000
Station EAB                 00000000

           -- LAN FDDI Network Management 10-MAY-1991 08:48:05 --

Creation time                   None    Times created                    0
Deletion time                   None    Times deleted                    0
Module EAB                  00000000    Latest EIB                00000000
Port EAB                    00000000
Station EAB                 00000000
Link EAB                    00000000
PHY port EAB                00000000


    Press RETURN for more.
SDA>
```

Example C–8 (Cont.): Status, Counters, and Attributes Display Examples

```
LAN Data Structures
-------------------
          -- FXA Device Information 10-MAY-1991 08:48:07 --

LSB address                 804228C0    Active unit count                  1
LAN version        00000001 05050026    Driver version     00000002 05050010
LAN code address            8041CEDB    Driver code address          80419B24
Device name                 FX_DEMFA    Device type                        43
Device version     00000000 00000000    DLL type                         FDDI

Data chaining                     ON    All multicast state               OFF
Controller mode               NORMAL    Promiscuous mode                  OFF
CRC generation mode               ON    Hardware mode                    0000
Physical address   AA-00-04-00-89-FE    Hardware address   08-00-2B-1C-0D-B0

Flags:  0000                            Characteristics: 0001 Devctr
Status: 0013 Inited,Run,Timer

DAT stage                   00000000    DAT xmt status     00000021 00210001
DAT number started                 2    DAT xmt complete      9-MAY 10:03:22
DAT number failed                  0    DAT rcv found                  None


    Press RETURN for more.
SDA>
```

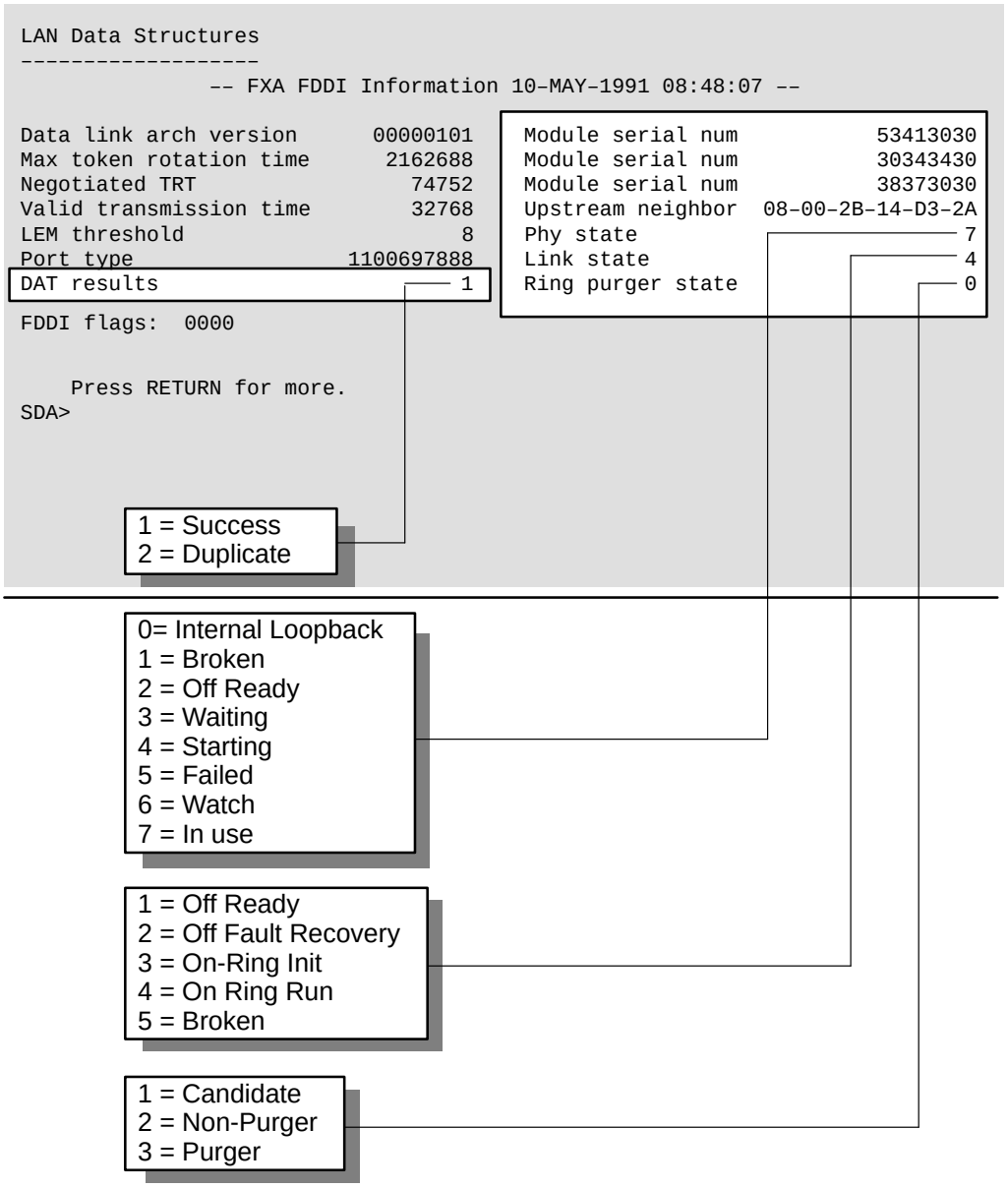
Example C–8 (Cont.): Status, Counters, and Attributes Display Examples

```
LAN Data Structures
-------------------
          -- FXA Device Information (cont) 10-MAY-1991 08:48:07 --

Creation time                   None    Create count                        0
Deletion time                   None    Enable count                        0
Enabled time                    None    Fatal error count                   0
Disabled time                   None    Excessive collisons                 0

Last receive          10-MAY 08:48:04   Last fatal error                 None
Last transmit         10-MAY 08:47:57   Prev fatal error                 None
Last fork sched       10-MAY 08:48:04   Last exc collision               None
Last fork time        10-MAY 08:48:04

Rcv buffers owned by device       31    System buffer quota                 0
Xmt entries owned by device        0    Device dependent longword    00000000
Xmt entries owned by host          0    # restarts pending                  0

NMgmt advised buffer count         0    Events logged                       0
EIB address                 00000000    NMgmt assigned adr 00-00-00-00-00-00
LPB address                 00000000


    Press RETURN for more.
SDA>
```

Example C–8 (Cont.): Status, Counters, and Attributes Display Examples

```
LAN Data Structures
-------------------
               -- FXA FDDI Information 10-MAY-1991 08:48:07 --

Control hold queue      804229C8  Status:  Valid, empty
Control request queue   804229D0  Status:  Valid, empty
Control pending queue   804229D8  Status:  Valid, empty
Transmit request queue  804229C0  Status:  Valid, empty
Transmit pending queue  804229E0  Status:  Valid, empty
Receive buffer queue    804229E8  Status:  Valid, 1 element
Receive pending queue   804229F0  Status:  Valid, 31 elements
Post process queue      804229F8  Status:  Valid, empty
Delay queue             80422A00  Status:  Valid, empty
Auto restart queue      80422A08  Status:  Valid, empty
Netwrk mgmt hold queue  80422A10  Status:  Valid, empty

        -- FXA Multicast Address Information 10-MAY-1991 08:48:07 --

None


    Press RETURN for more.
SDA>
```

Example C–8 (Cont.): Status, Counters, and Attributes Display Examples



Example C–8 (Cont.): Status, Counters, and Attributes Display Examples

```
LAN Data Structures
-------------------
                 -- FXA Unit Summary 10-MAY-1991 08:48:14 --

UCB     UCB Addr  Fmt   Value           Client     State
---     --------  ---   -----           ------  -----------
FXA0    80414900
FXA1    8045A530  Eth   60-03           DECNET  0017 Strtn,Len,Uniq,Strtd

    Press RETURN for more.
SDA>
```

Example C–8 (Cont.): Status, Counters, and Attributes Display Examples

```
LAN Data Structures
-------------------
             -- FXA Counters Information 10-MAY-1991 08:48:15 --

Seconds since zeroed           94304    Station failures                0
Octets received              6471378    Octets sent                2410376
PDUs received                  60785    PDUs sent                    32907
Mcast octets received        4566561    Mcast octets sent           905924
Mcast PDUs received            40202    Mcast PDUs sent              13368
Unrec indiv dest PDUs              0    PDUs sent, deferred              0
Unrec mcast dest PDUs              0    PDUs sent, one coll              0
Data overruns                      0    PDUs sent, mul coll              0
Unavail station buffs              0    Excessive collisions             0
Unavail user buffers               0    Carrier check failure            0
Frame check errors                 0    Short circuit failure            0
Alignment errors                   0    Open circuit failure             0
Frames too long                    0    Transmits too long               0
Rcv data length error              0    Late collisions                  0
802E PDUs received                 0    Coll detect chk fail             0
802 PDUs received                  0    Send data length err             0
Eth PDUs received              25780    Frame size errors                0


    Press RETURN for more.
SDA>
```

Example C–8 (Cont.): Status, Counters, and Attributes Display Examples

```
LAN Data Structures
-------------------
          -- FXA FDDI Counters Information 10-MAY-1991 08:48:15 --

Transmit underrun                   0    Dup tokens detected                0
Transmit failure                    0    Ring purge errors                  0
Frame status error                  0    FCI strip errors                   0
Frame length error                  0    Traces initiated                   0
MAC frame count            7756386129    Traces received                    0
MAC error count                     0    Directed beacons rcvd              0
MAC lost count                      1    Elasticity buffer err              0
Ring inits initiated                0    LCT rejects                        0
Ring inits received                11    LEM rejects                        1
Ring beacon initiated               0    Link errors                       40
Dup add test failures               0    Connections completed              8

    Press RETURN for more.
SDA>
```

Example C–8 (Cont.): Status, Counters, and Attributes Display Examples

```
LAN Data Structures
-------------------
        -- FXA Internal Counters Information 10-MAY-1991 08:48:15 --

Internal counters address   80423A94    Internal counters size            58
Number of ports                    0    Global page transmits              0
No work transmits                  0    SVAPTE/BOFF transmits              0
Bad PTE transmits                  0    Buffer_Adr transmits               0

Fatal error count                  0    RDL errors                         0
Transmit timeouts                  0    Last fatal error                None
Restart failures                   0    Prev fatal error                None
Power failures                     0    Last error CSR              00000000
Hardware errors                    0    Fatal error code                None
Control timeouts                   0    Prev fatal error                None

Loopback sent                      0    Loopback failures                  0
System ID sent                     0    System ID failures                 0
ReqCounters sent                   0    ReqCounters failures               0


    Press RETURN for more.
SDA>
```

Example C–8 (Cont.): Status, Counters, and Attributes Display Examples

```
LAN Data Structures
-------------------
          -- FXA0 Template Unit Information 10-MAY-1991 08:48:20 --

LSB address                 804228C0    VCIB address                 00000000
Packet format               Ethernet    Error count                         0
Device buffer size              1500    LAN medium                       FDDI
Maximum buffer size             1500    Eth protocol type               00-00
Hardware buffer quota             32    802E protocol ID      00-00-00-00-00
Receive buffer quota               0    802.2 SAP                         00
Allow prom client                 ON    802.2 Group SAPs         00,00,00,00
Promiscuous mode                 OFF    Maximum header size                 0
802.2 service                    OFF    Hardware address   08-00-2B-1C-0D-B0
Data chaining                    OFF    Physical address   FF-FF-FF-FF-FF-FF
Padding mode                      ON    Can change address               OFF
Automatic restart                OFF    Access mode                EXCLUSIVE
CRC generation mode               ON    Controller mode               NORMAL
Maintenance state                 ON    Rcv buffs to queue                 1
P2 parameters               00000000    Starter's PID               00000000
All multicast mode               OFF    Creator's PID               00000000
Rcv buffer quota                   0    LSB size                        4628


    Press RETURN for more.
SDA>
```

Example C–8 (Cont.): Status, Counters, and Attributes Display Examples

```
LAN Data Structures
-------------------
       -- FXA1 60-03 (DECNET) Unit Information 10-MAY-1991 08:48:22 --

LSB address                 804228C0    VCIB address               00000000
Packet format               Ethernet    Error count                       0
Device buffer size              1500    LAN medium                     FDDI
Maximum buffer size             4468    Eth protocol type             60-03
Hardware buffer quota             32    802E protocol ID      00-00-00-60-03
Receive buffer quota           14992    802.2 SAP                         00
Allow prom client                ON    802.2 Group SAPs         00,00,00,00
Promiscuous mode                OFF    Maximum header size               26
802.2 service                   OFF    Hardware address   08-00-2B-1C-0D-B0
Data chaining                   OFF    Physical address   AA-00-04-00-89-FE
Padding mode                     ON    Can change address              OFF
Automatic restart               OFF    Access mode                EXCLUSIVE
CRC generation mode              ON    Controller mode               NORMAL
Maintenance state                ON    Rcv buffs to queue                10
P2 parameters               00374395    Starter's PID              00010010
All multicast mode              OFF    Creator's PID              00010010
Rcv buffer quota               14992    LSB size                       4628

    Press RETURN for more.
SDA>
```

Example C–8 (Cont.): Status, Counters, and Attributes Display Examples

```
LAN Data Structures
-------------------
     -- FXA1 60-03 (DECNET) Counters & Misc Info 10-MAY-1991 08:48:22 --

Last receive                      None    Last transmit        10-MAY 08:48:12
Octets received                4328984    Octets sent                   741010
PDUs received                    25771    PDUs sent                      11093
Mcast octets received                0    Mcast octets sent                  0
Mcast PDUs received                  0    Mcast PDUs sent                    0
Unavail user buffer                  0    Last start attempt              None
Last start done       9-MAY 10:03:23      Last start failed               None
                                          Share UCB total quota              0

Receive IRP queue       8045A6F4  Status:  Valid, 1 element
Shared users queue      8045A6E4  Status:  Valid, empty
Receive pending queue   8045A6EC  Status:  Valid, empty

    -- FXA1 60-03 (DECNET) Multicast Address Info 10-MAY-1991 08:48:22 --

Multicast address table, embedded:
  AB-00-00-04-00-00
SDA> EXIT

$
```

D

Related Documents

This appendix lists additional documents that provide related information about the DEC FDDIcontroller 400. Ordering information for these documents is provided at the back of this manual.

- *A Primer to FDDI: Fiber Distributed Data Interface* (Order No. EC-H0750-42)

  Describes and summarizes Digital's implementation of FDDI as its second-generation LAN technology. It also describes the features, topologies, and all of the components comprising the FDDI product set.

- *FDDI System Level Description* (Order No. EK-DFSLD-SD)

  Describes Digital's Fiber Distributed Data Interface (FDDI), how it works, and the role of the individual FDDI components. This guide also discusses Digital's approach to network management and the facilities provided by network management software.

- *DECconcentrator 500 Installation* (Order No. EK-DEFCN-IN)

  Explains how to install a DECconcentrator 500 unit and how to check its installation and operational status.

- *DECconcentrator 500 Problem Solving* (Order No. EK-DEFCN-PS)

  Explains how to troubleshoot and service the DECconcentrator 500 unit. Includes a product overview, problem-solving methods, and replacement procedures for field-replaceable units (FRUs).

- *DECbridge 500/600 Series Installation and Upgrade* (Order No. EK-DEFEB-IN)

  Explains how to install and verify the DECbridge 500/600 series units and how to upgrade from one model to another.

- *DECconnect System Fiber Optic Planning and Configuration* (Order No. EK-DECSY-FP)

  Provides an overview of Digital's structured wiring network along with guidelines for planning, configuring, and designing fiber optic subsystems within the network.

- *DECconnect System Fiber Optic Installation* (Order No. EK-DECSY-FI)

  Contains guidelines for installing fiber optic cables and passive equipment in a DECconnect System fiber optic structured-wiring network, along with test procedures for certifying the installation.

- *DECconnect System Planning and Configuration* (Order No. EK-DECSY-CG)

  Contains planning requirements and guidelines for configuring DECconnect System networks and other networks that use DECconnect System products.

- *DECconnect System Facilities Cabling Installation* (Order No. EK-DECSY-FC)

  Provides procedures for properly installing Ethernet coaxial cables, twisted-pair cables, andThinWire cables within a DECconnect System site.

- *DECelms Use* (Order No. AA-PAK2A-TE)

  Describes how to use DECelms (Extended LAN Management Software) to configure, manage, and monitor the DECconcentrator 500, DECbridge 500, and other Digital LAN Bridge units.

- *DECelms Reference* (Order No. AA-PBWBA-TE)

  Lists and describes the DECelms commands.

- *DECelms Installation* (Order No. AA-PAK1A-TE)

  Explains how to install and verify DECelms on a VMS system.

- *Bridge and Extended LAN Reference* (Order No. EK-DEBAM-HR)

  Describes how bridges are used to create extended local area networks (LANs). Includes information on LAN interconnections, overall bridge operation, spanning tree, bridge management, and possible solutions to bridge-related problems in a network.

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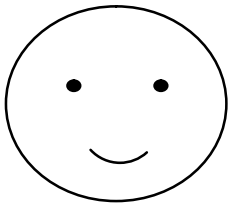
The FDDI Reg card (shown on the following page) is the one used for the DEC FDDIcontroller 400 product, and as such, displays the product name for this specific product. Please note that, when you use the template for your product, you need to customize it to reflect your product name and order number (at the top of the sheet and at the mid section of the sheet also). Do not change any other section of the sheet without consulting with editing (Bill Dubie is a nice guy to talk to).



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FDDI Product Group

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