Bull

PCI Fibre Channel Adapters
Installation and Configuration Guide

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Hardware

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About This Book

This book provides information on how to install and configure a **PCI Fibre Channel Adapter** on a PCI platform running AIX Version 4.3 and subsequent versions. It also provides information about trouble shooting on the adapter.

Who Should Use This Book

This book is intended for the administrator in charge of the installation, configuration and trouble shooting of a PCI Fibre Channel Adapter. He should be familiar with the AIX installation procedures. See *AIX Installation Guide* for more information.

How to Use This Book

Overview of Contents

The manual is organized as follows:

- Introduction.

- Hardware Installation.

- Software Installation and Configuration.

- Updating Fibre Channel Microcode.

- User Diagnostics and Error Identifiers.

Highlighting

The following highlighting conventions are used in this book:

Bold   Identifies commands, subroutines, keywords, files, structures, directories, and other items whose names are predefined by the system. Also identifies simple words to which particular attention must be paid.

`Monospace`   Identifies examples of specific data values, examples of text similar to what you might see displayed, examples of portions of program code similar to what you might write as a programmer, messages from the system, or information you should actually type.

Ordering Publications

To order additional copies of this book, use CEDOC Order Ref. Number 86 A1 95HX.

Related Publications

Cabling Guide for Multiple Bus Systems 86 A1 70JX

Adapters for Multiple Bus Systems, 86 A1 27HX

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The following statement applies to this product. The statement for other products intended for use with this product appears in their accompanying manuals.

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LASER KLASSE 1
LUOKAN 1 LASERLAITE
APPAREIL A LASER DE CLASSE 1

TO IEC 825-1 (1993) + CENELEC HD 482 S1

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CE

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Der Aussteller der Konformitätserklärung ist die Bull Germany.

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Compliances – Product Safety

Standard	Country
CSA 22.2 No. 950	Canada.
UL 1950	U.S.A.
EN 60950	EC

Table of Contents

Chapter 1. Introduction

This Guide covers the installation and configuration of the Fibre Channel Adapters in PCI (Peripheral Component Interconnect) computers.

In addition to the board itself (hardware), you must also install device driver software for the operating system, so that programs can communicate with the board.

Components

Type	Adapter label	Designation	Description
LP6000	**B4-7**	PCI Fibre Channel Adapter	on page 1-3
LP7000	**B4-8**	PCI Enhanced Fibre Channel Adapter	on page 1-3
LP8000	**B4-A**	PCI 64 bits Copper Fibre Channel Adapter	on page 1-4
LP8000	**B4-B**	PCI 64 bits Optical Fibre Channel Adapter	on page 1-4
LP9002L	**B4-E**	PCI 64 bits 2Gbit/s Fibre Channel Adapter	on page 1-5

Software driver and diagnostics are provided on the Bull Enhancement CD–ROM.

Note: For information about cables, see "Fibre Channel PCI Adapter Links" in *Cabling Guide for Multiple Bus Systems* 86 A1 70JX*.

About the Fibre Channel Adapter

The Fibre Channel Adapter (PCI) is a high performance adapter allowing the connection of a PCI host computer to a Fibre Channel network.

Connection to the physical layer (FC–0) is accomplished through:

- The industry standard GLM (Gigabaud Link Module) which offers a DB9 copper connector for LP6000 (B4–7) and LP7000 (B4–8).

- An embedded DB9 copper connector for LP8000 copper model B4–A.

- An embedded dual–SC (SC2) optical connector for LP8000 optical model B4–B.

- An embedded dual–LC (LC2) optical connector for LP9002L optical model B4–E.

A MIA (Module Interface Adapter) can be used (plugged on a LP6000 or a LP7000 only) to convert the copper DB9 interface to an optical SC2 interface.

Note: It is forbidden to plug a MIA on a LP8000 adapter (B4–E) because the LP8000 adapter does not provide enough power on the DB9 connector to correctly power a MIA.

All these PCI adapters operate at 1Gbit/s. The LP9002L can operate at 2Gbit/s with speed autosensing.

The fibre–channel interface on the other side, is provided on most equipments by a GBIC (Giga Bit Interface Circuit), which offers a dual–SC (SC2) optical interface or a DB9 copper interface, both operating at 1Gbit/s.

For 2Gbit/s equipments, the optical interface is provided by a SFP (Small Form Factor Pluggeable Media), which can also operate at 1Gbit/s for backward compatibility, and offers a dual–LC (LC2) interface.

Mixed–plug cables (LC2 on one side, SC2 on the other side) are available for LC/SC interconnection.

No copper interface or cables are available to operate at 2Gbit/s.

When operated at 2Gbit/s (LP9002L), maximum fiber length is reduced from 500 meters to 300 meters.

The Fibre Channel Adapter (PCI) supports the three Fibre Channel topologies:

- Point to Point

- Arbitrated Loop

- Fabric

Fibre Channel Adapter Characteristics

The main supported characteristics are:

- Interface to the 32–bit PCI local bus (32–bit or 64–bit PCI local bus for B4-A, B4–B and B4-E adapters).
- Support PCI INTA (INTerrupt A).
- LP9002L: 66MHz PCI bus clock rate. Other models: 33 MHz PCI bus clock rate.

Environment Requirements

Electrical power source loading

> LP6000: 10 watts @ +5.0 VDC (with GLM, typical)
> LP7000: 12 watts @ +5.0 VDC (with GLM, typical)
> LP8000: 11 watts @ +5.0 VDC (typical)
> LP9002L: 8.5 watts @ +3.3 VDC (typical)

Environment

> Operating temperature : 0 to 45 °C (32 to 113°F)
> Storage temperature : –10 to 55 °C (14 to 131°F)
> Humidity : 5% to 95% (non–condensing)

PCI Fibre Channel Adapter (Type B4-7)
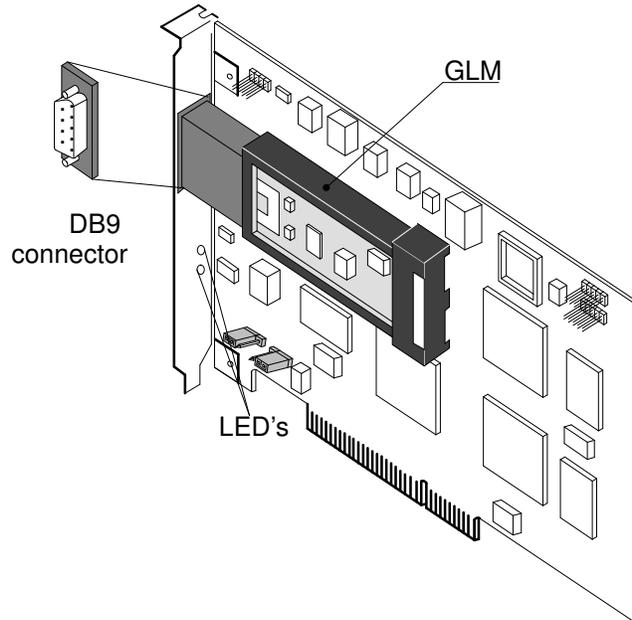
Figure 1.   PCI Fibre Channel Adapter (type B4-7)

PCI Enhanced Fibre Channel Adapter (Type B4-8)
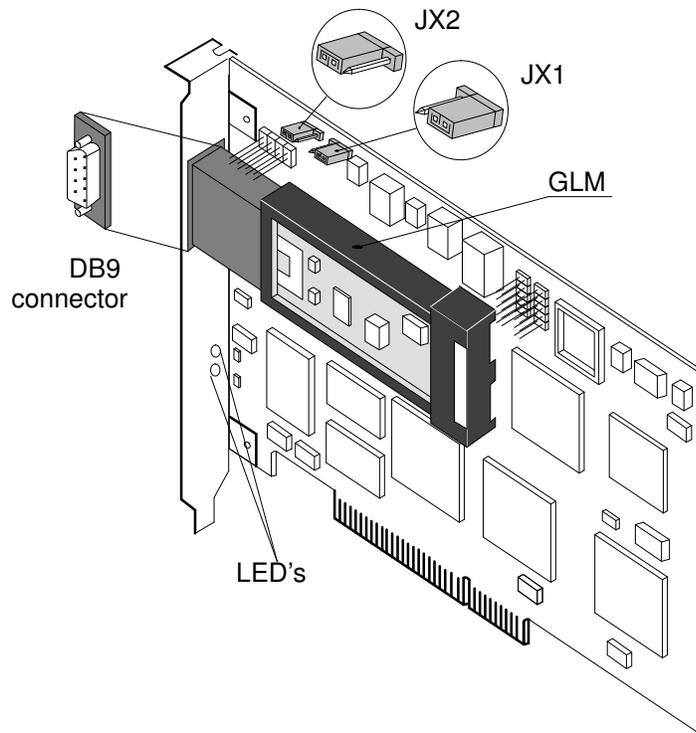
Figure 2.   PCI Enhanced Fibre Channel Adapter (type B4-8)

The jumpers JX1 and JX2 must be set as shown in figure 2.

PCI 64–bits Copper Fibre Channel Adapter (Type B4-A)
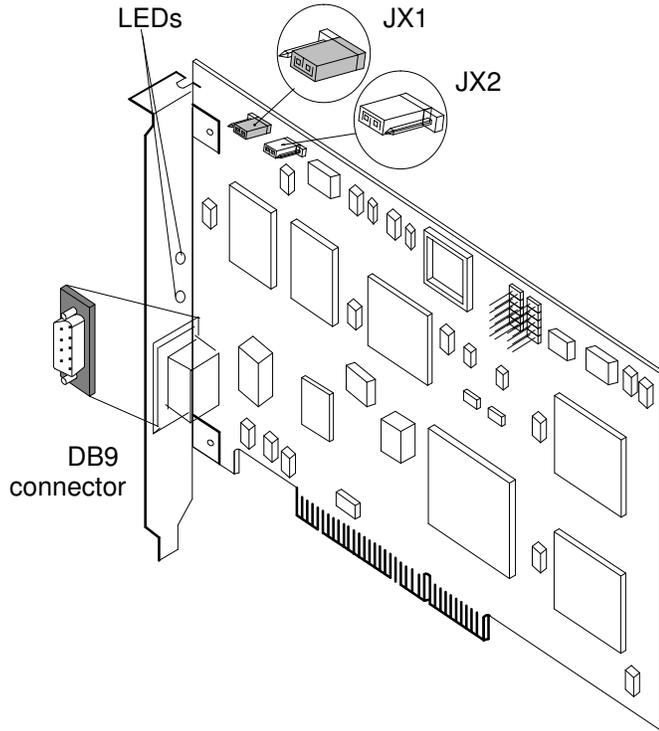
Figure 3.   PCI 64–bits Copper Fibre Channel Adapter (type B4-A)

The jumpers JX1 and JX2 must be set as shown in figure 3.

PCI 64–bits Optical Fibre Channel Adapter (Type B4-B)
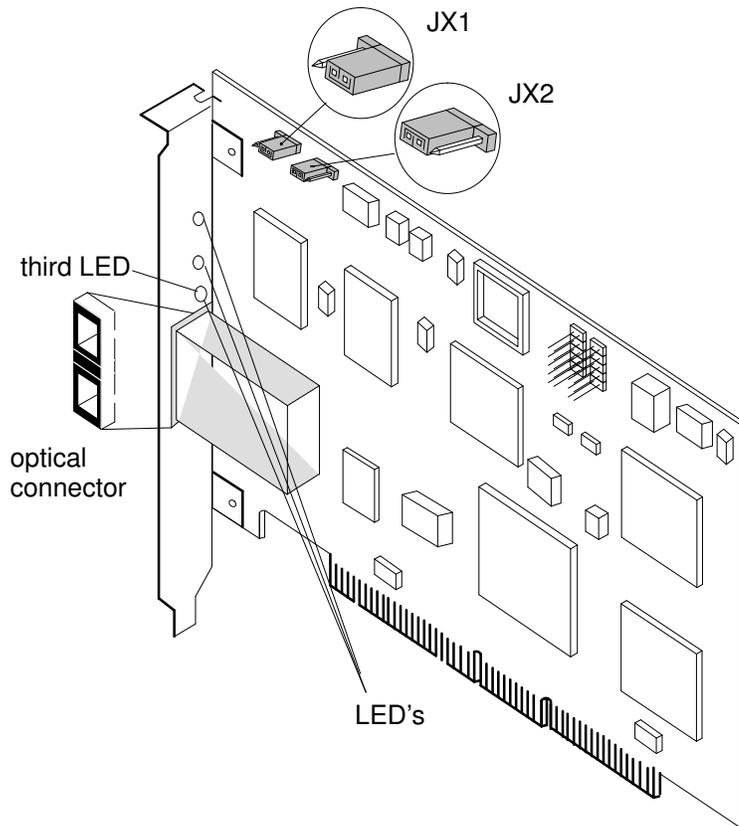
Figure 4.   PCI 64–bits Optical Fibre Channel Adapter (type B4-B)

The jumpers JX1 and JX2 must be set as shown in figure 4.

PCI 64–bits 2Gbit/s Fibre Channel Adapter (Type B4-E)
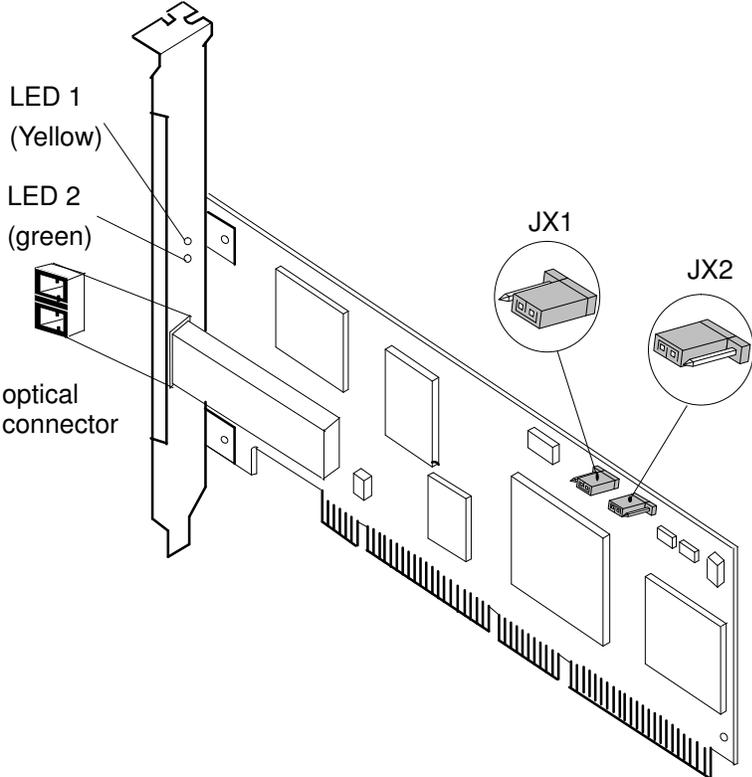
Figure 5.   PCI 64–bits 2 Gbit/s Optical Fibre Channel Adapter (type B4-E)

The jumpers JX1 and JX2 must be set as shown in figure 5.

Fibre Channel Cables

MIA

Fiber Optical cable SC2

Copper duplex cable (DB9)

Fiber Optical cable SC2

Fiber Optical cable LC2

LC2 or SC2 equipment
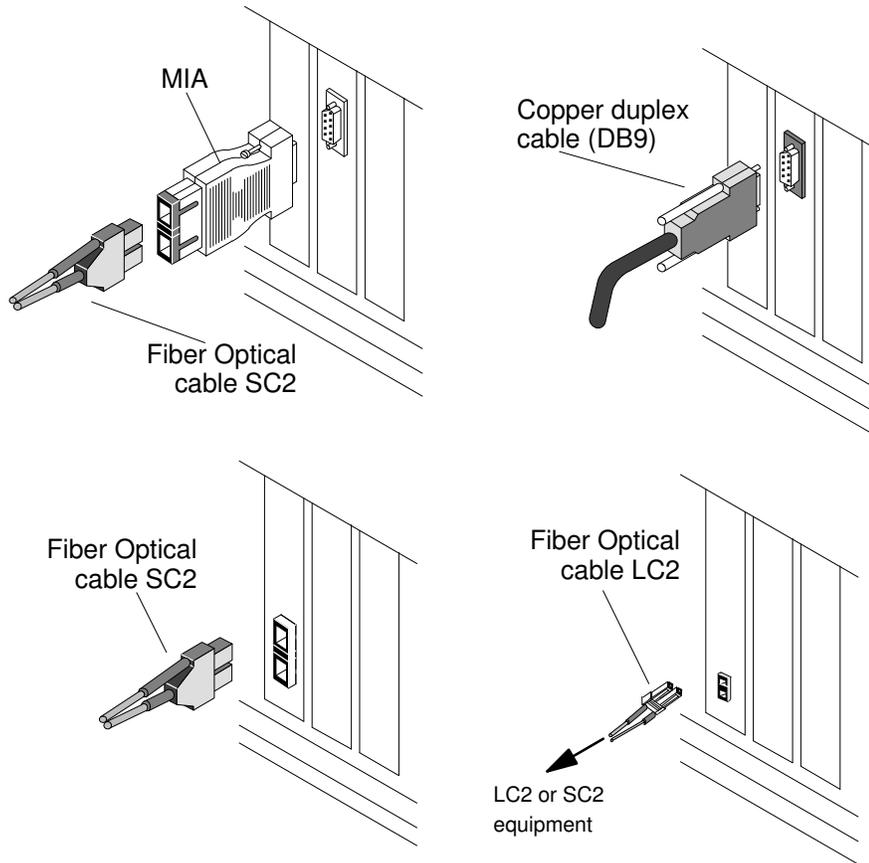
Figure 6.   Fibre Channel cables

Note: For more information about cables, see "Fibre Channel PCI Adapter Links" in *Cabling Guide for Multiple Bus Systems* 86 A1 70JX.

Chapter 2. Installing and Configuring the Fibre Channel PCI Adapters

Overview

This chapter describes how to install and configure a Fibre Channel Board. De-installation and de-configuration are also described.

The sequence of the first two sections must be respected.

- How to Prepare Installation, on page 2-2

- How to Install and Configure the Adapter, on page 2-3

    - hardware installation and cable connection

    - system reconfiguration and configuration of the adapter

- How to De-install and De-configure the Adapter, on page 2-12

How to Prepare for the Installation

1. Check your delivery:

   Verify the hardware components:

   – the Fibre Channel Adapter

   – the cable, according to the type of connection used:

      – A copper cable or MIA + SC2 optical cable for LP6000 (B4–6) / LP7000 (B4–7).

      – A copper cable only for LP8000 copper model B4–A.

      – An SC2 optical cable for LP8000 copper model B4–B.

      – A LC2/LC2 optical cable, or a LC2/SC2 optical cable for LP9002L model B4–E.

   Warning: PCI 64–bits Copper Fibre Channel Adapter (B4-A) does not support MIA.

   Note: The references for the wrap plugs needed for running the loopback tests are described on page 5-2. They are not part of the standard delivery.

2. Define in which slot to install the Fibre Channel Adapter. Refer to the hardware documentation for your system.

3. Memory size Requirement

   At least 64Mb to use 1 to 4 fibre channel adapters, and at least 128 Mb to use more than 4 adapters.

   Depending on the other PCI adapters, memory requirements could be greater.

How to Install and Configure the Adapter

Install the Licensed Program Product (LPP) on your system:

Recommendation

The following packages conflict with the **devices.pci.df1001fx** packages, which results in some difficulty when using SMIT fibre channel adapter device menus:

```
devices.common.IBM.fc.rte      4.3.2.0 COMMITTED Common IBM FC Software
devices.pci.df1000f7.com       4.3.2.0 COMMITTED Common PCI FC Adapter Device
                                                  Software
devices.pci.df1000f7.diag      4.3.2.0 COMMITTED PCI FC Adapter Device
                                                  Diagnostics
devices.pci.df1000f7.rte       4.3.2.0 COMMITTED PCI FC Adapter Device
                                                  Software

devices.common.IBM.fc.rte      5.1.0.0 for AIX COMMITTED Common IBM FC
                                                  Software
devices.pci.df1000fx.com       5.1.0.0 for AIX COMMITTED Common PCI FC Adapter
                                                  Device Software
devices.pci.df1000fx.diag      5.1.0.0 for AIX COMMITTED PCI FC Adapter Device
                                                  Diagnostics
devices.pci.df1000fx.rte       5.1.0.0 for AIX COMMITTED PCI FC Adapter Device
                                                  Software
```

x = 7, 8 or 9

If the above packages are present, you are recommended to de-install them, so you can more easily use the SMIT Fibre Channel adapter device menus. Note that, because these packages are not designed for the adapter devices installed on your system, you can de-install them without any adverse impact.

You can use the **smit remove** command to de-install these packages.

Note: Installing both software and hardware is only necessary when you are installing an FC adapter add–on card.

Installation

The software part is composed of three LPPs, delivered either on the Bull Enhancement CD, or on the Bull Add–ons for AIX CD:

- – `devices.pci.df10e51a`

- – `devices.pci.df1001f7`

- – `devices.pci.df1001f8`

- – `devices.pci.df1001f9`

The 1.3.3.x version is designed for AIX 4.3.x and the 1.4.x.x versions are designed for AIX 5.1

1. If you are installing the 1.3.3.x or later version, install the package and then go to step 3 of this procedure.

2. Before installing the 1.2.12.x version, you must do the following:

- • Stop IP

  `ifconfig fe(x) detach`

- • Stop disks applications

- • Perform, for each Fibre Channel adapter, the following command:

  `rmdev -Rl fchan(i)`

If this command fails, perform the tasks described below:

– Unmount disks

```
umount filesystem                    for mounted file systems
varyoffvg -s volumegroup             for all the corresponding Volume Groups
```

– if ATF is installed, remove the `atf` objects:

```
rmdev -Rl atf(i)
```

– if Navisphere is running, stop it:

```
rc.navi stop
```

– Restart the `rmdev -Rl fchan(i)` command for each Fibre Channel adapter.

3. There is no specific action to upgrade 1.2.12.x version to 1.3.3.x version: just install the new packages, then reboot your system.

4. Use the **SMIT** interface (or **installp** command) to install the LPP on your system. Logged as **root** user, type:

```
smit install_latest
```

If you are not familiar with the AIX installation procedure, refer to the *AIX Installation Guide* for more information.

5. Check the software installation with the **lslpp** command.

Install the Adapter in the System

Refer to the system documentation for the procedure for installing an adapter.

• Power off your machine.

• Remove the front cover, side cover or rear cover, according to your system to access the planar.
  If necessary, refer to the corresponding Installation Guide.

• Remove the rear cover in order to remove the cache, if any, in front of the slot where you choose to install the Fibre Channel Board.

• Plug the board in the chosen slot and secure it by screwing in the connector at the rear of the planar. Put the cover back in its place.

• Power on your machine.

• Check the status.

The devices corresponding to the boards (fchan0, fchan1, ...), the remote Fibre Channel Ports (fcp0,1), and the network interfaces (fe0, fe1, ...) are automatically created at boot time.

Check that fchan and fcp are available, using the **lsdev** command.

```
lsdev -Cc adapter
lsdev -Cc driver
lsdev -Cc if (network interfaces)
```

Note: Disks connected to Fibre Channel adapters are not bootable.

Connect the Attachment Cables

Connect the cables corresponding to the Fibre Channel Adapter. Refer to the following figures for cabling characteristics. For more information about cabling, refer to:

• DAS3500 Installation and Service Guide for Rackmount Models 86 A1 47JX.

• DAS3500 Installation and Service Guide for Deskside Models 86 A1 48JX.

• DAS4500 Series Deskside Models Installation and Service Guide 86 A1 01EF.

• DAS4500 Series Rackmount Models Installation and Service Guide 86 A1 02EF.

- DAS4700 Hardware Reference 86 A1 70EF.
- DAS5300 Series Rackmount Models Installation and Service Guide 86 A1 24KX.
- DAS5300 Series Deskside Models Installation and Service Guide 86 A1 25KX.
- DAS5700 Series DPE Deskside Models Installation and Service Guide 86 A1 44KX.
- DAS5700 & DAE 5000 Series DAE Deskside Models Installation and Service Guide 86 A1 46KX.
- DAS5700 Series DPE Rackmount Models Installation and Service Guide 86 A1 43KX.
- DAS5700 & DAE 5000 Series DAE Rackmount Models Installation and Service Guide 86 A1 45KX.
- SYMMETRIX Fibre Channel Product Guide.

Point to Point Topology
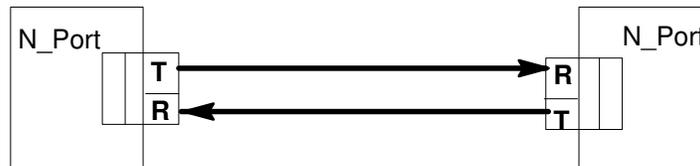
An N_Port resides at a node, and can be either a source or destination for data.
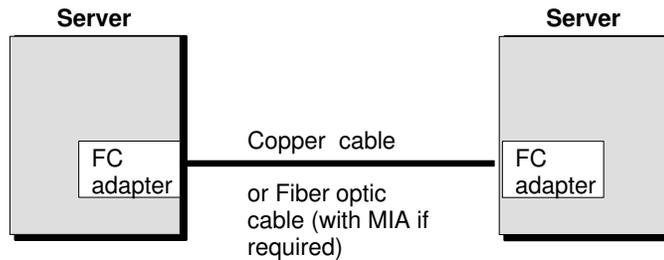
Figure 7.   Point to point topology
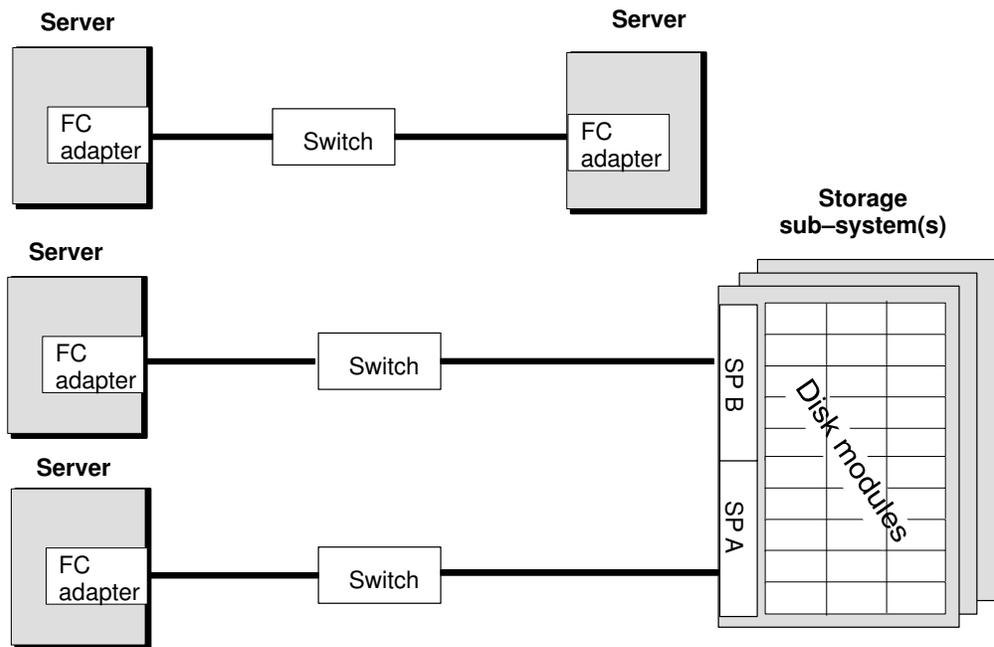
Figure 8.   Point to point topology with switch

Arbitrated Loop Topology

L_Port

Server

FC adapter

FC adapter

SP B

SP A

Disk modules

Storage
sub–system(s)
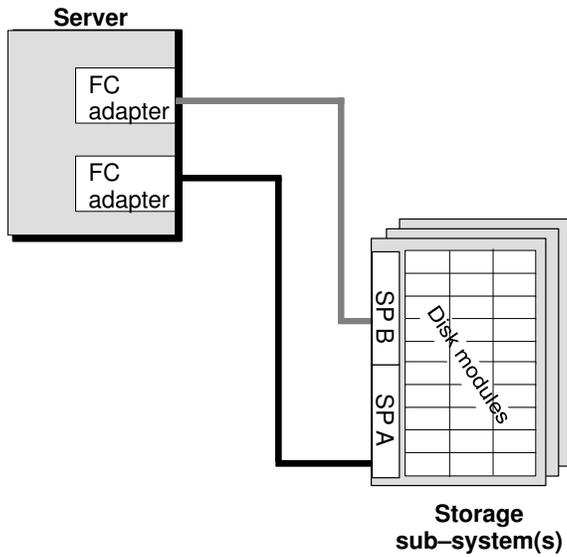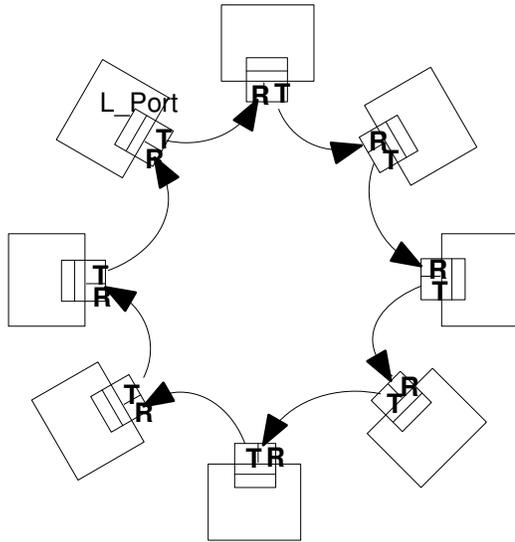
Figure 9. Loop topology without Hub
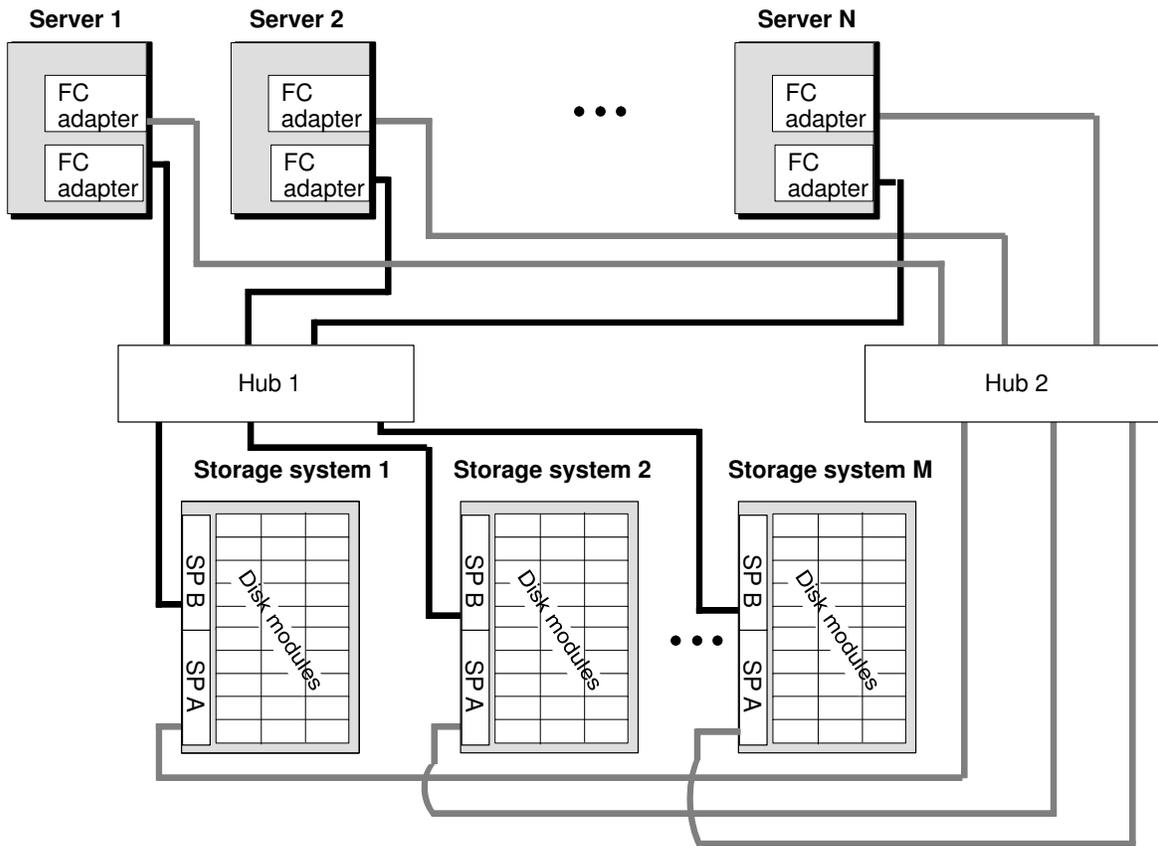
Copper cables
or Fiber optic cables

Figure 10. Loop topology with Hub (not supported at 2 Gbit/s)
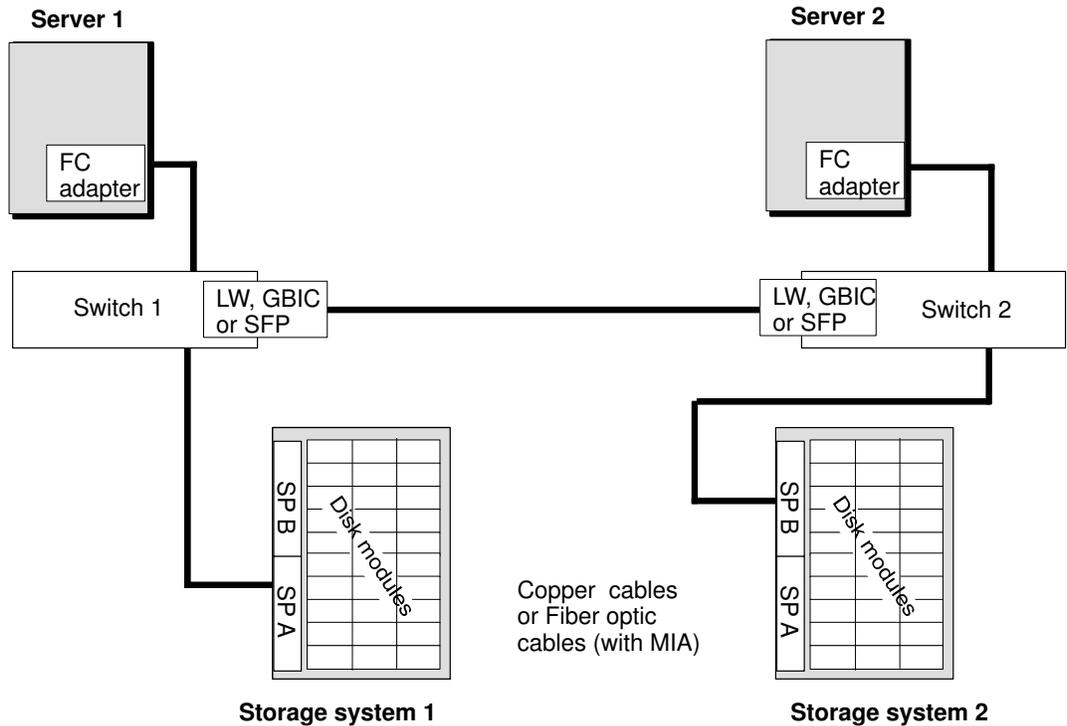
Figure 11. Switch topology with Link Optical Extender

2 GBit/s adapter Connection (B4–E)

A 2 Gbit/s LP9002L adapter (model B4–E) can also operate at 1 Gbit/s in exactly the same configurations as the LP8000 optical model (B4–B).

For these kind of links, you need a "LC2 to SC2" optical cable (MI FOCF003–M0xx: Optical Fibre Multi–Mode (SW) SC–LC Cable xx meters).

This cable allows the connection of a 2 Bbit/s equipment (LC2 connector) to a 1 Gbit/s equipment (SC2 connector), at 1 Gbit/s speed.

The LP9002L adapter model B4–E only operates at 2Gbit/s when directly connected to another 2 Gbit/s equipment with a physical point–to–point link (i.e. directly connected to a LC2 port on a subsystem or to a LC2 port on a 2 Gbit/s–capable Fibre–Channel switch).

Note: No Fibre–Channel loop topology can operate at 2 Gbit/s yet.

Configuring the Adapter

1. List the Adapters

Before configuring the adapter, you can check that the **fchan<i>** devices corresponding to the board you have just installed were automatically created when you switched on your machine. They should be in the 'Available' state.

To configure the fast path, run '**smit fe**' and select the following function:

–> 'List All Fibre Channel Adapter'

```
                          Adapter
 Move cursor to desired item and press Enter.

        List All fibre Channel Adapters
        Change / Show Characteristics of a Fibre Channel Adapter
        Generate an Error Report
        Trace an FC Adapter
```

When the '**List All Fibre Channel Adapter**' function is selected, the SMIT screen is:

```
                      COMMAND STATUS

Before command completion, additional instructions may appear below.


fchan0  Available     04-01     PCI Fibre Channel Adapter


F1=Help          F2=Refresh      F3=Cancel        F6=Command
F8=Image         F9=Shell        F10=Exit         /=Find
n=Find Next
```

2. Configure the Adapter

You must now select and configure each port of the adapter, from the list displayed, by filling in the physical interface and the protocol adapter type you want to use on it.

Run 'smit fe' and select:

```
'Change/Show Characteristics of a Fibre Channel Adapter'
```

Example: Configuration of the board 'fchan0'

```
                Fibre Channel Adapter


Move Cursor to desired item and press Enter.



fchan0  Available 04-01   PCI Fibre Channel Adapter



F1=Help                 F2=Refresh                 F3=Cancel
F8=Image                F10=Exit                   Enter=Do
/=Find                  n=Find Next
```

3. Check the availability of the Adapters and the Remote Fibre Channel Ports

To check that **fchan<i>** and **fcp<i>** are available, use the lsdev command to see displays similar to the following:

```
#lsdev -Cc adapter | grep fchan

  fchan0  Available     04-01   PCI Fibre Channel Adapter
  fchan1  Available     04-04   PCI Fibre Channel Adapter

#lsdev -Cc driver | grep fcp

  fcp0       Available 04-01-01  Fibre Channel FCP Interface
  fcp1       Available 04-01-02  Fibre Channel FCP Interface
  fcp2       Available 04-04-01  Fibre Channel FCP Interface
  fcp3       Available 04-04-02  Fibre Channel FCP Interface
  fcp4       Available 04-04-03  Fibre Channel FCP Interface
```

The location code XX–YY–ZZ identifies the PCI bus (XX), the slot (YY), and ZZ is the number (base 36 coded) assigned to the disk subsystems.

Note: If the adapters are not displayed as 'Available', verify that you have performed the tasks as described hereafter.

```
#lsattr -El  fchan0
```

example for loop topology:

```
bus_intr_lvl    12         PCI Bus interrupt level             False
intr_priority   3          Interrupt priority                 False
bus_mem_addr    0xc0102000 PCI Bus memory address             False
bus_mem_addr_rg 0x800200   PCI Bus memory address             False
xmt_que_size    256        Transmit queue size                True
topology        loop       Fibre Channel topology             True
class           3          Fibre Channel class                True
network_on      yes        Network operations allowed         True
fcp_on          yes        FCP operations allowed             True
frame_512       no         Frame size limited to 512 bytes    True
num_iocbs       5000       Number of IOCBs to allocate        True
num_bufs        600        Number of ELS/IP buffers to alloc  True
fabric_timeout  0          Extra FCP timeout for fabrics       True
fcpclass        3          Fibre Channel FCP class of service True
loop_id         123        Loop id                            False
alpa            0x000004   Arbitrated Loop Physical Address   False
port_id         N/A        Port id                            False
port_name       0x200000601628025F      Port name            False
node_name       0x200000601628025F      Node name            False
```

example for switch topology:

```
bus_intr_lvl    12         PCI Bus interrupt level             False
intr_priority   3          Interrupt priority                 False
bus_mem_addr    0xc0102000 PCI Bus memory address             False
bus_mem_addr_rg 0x800200   PCI Bus memory address             False
xmt_que_size    256        Transmit queue size                True
topology        pt2pt      Fibre Channel topology             True
class           3          Fibre Channel class                True
network_on      yes        Network operations allowed         True
fcp_on          yes        FCP operations allowed             True
frame_512       no         Frame size limited to 512 bytes    True
num_iocbs       5000       Number of IOCBs to allocate        True
num_bufs        600        Number of ELS/IP buffers to alloc  True
fabric_timeout  0          Extra FCP timeout for fabrics       True
fcpclass        3          Fibre Channel FCP class of service True
loop_id         N/A        Loop id                            False
alpa            N/A        Arbitrated Loop Physical Address   False
port_id         0x011000   Port id                            False
port_name       0x200000601628025F      Port name            False
node_name       0x200000601628025F      Node name            False
```

```
#lsattr -El  fcp0
```

example for loop topology:

```
loop_id     0                    Loop id                       False
alpa        0xEF        Arbitrated Loop Physical Address  False
port_id     N/A                  Port id                       False
port_name   0x200000601628025F  Port name                    False
node_name   0x200000601628025F  Node name                    False
```

example for switch topology:

```
loop_id     N/A                  Loop id                       False
alpa        N/A         Arbitrated Loop Physical Address  False
port_id     0x011800             Port id                       False
port_name   0x200000601628025F  Port name                    False
node_name   0x200000601628025F  Node name                    False
```

Link topology autosensing

On AIX 5.1, the default value of the "topology" parameter for LP9002L adapter (model B4–E) is "both", i.e. loop or point–to–point autosensing.

When this "topology" parameter is set to "both", the PCI adapter and the facing equipment automatically negociate the correct topology.

By exception, when the PCI adapter is directly connected to an EMC's DAS subsystem, this negociation is unsuccesfull: in that case, the user must manually set the "topology" parameter to "loop".

For DAS, the value of Loop_id coded on the Storage Processor (SP) is 7–bit hexadecimal.

The following table shows the correspondance between the 8-bit AL_PA (hexadecimal) address and the 7-bit Loop ID (hexa and decimal) address.

8-bit AL_PA (Hex)	7-bit Loop ID (Hex)	(Decimal)	8-bit AL_PA (Hex)	7-bit Loop ID (Hex)	(Decimal)	8-bit AL_PA (Hex)	7-bit Loop ID (Hex)	(Decimal)
EF	00	0	A3	2B	43	4D	56	86
E8	01	1	9F	2C	44	4C	57	87
E4	02	2	9E	2D	45	4B	58	88
E2	03	3	9D	2E	46	4A	59	89
E1	04	4	9B	2F	47	49	5A	90
E0	05	5	98	30	48	47	5B	91
DC	06	6	97	31	49	46	5C	92
DA	07	7	90	32	50	45	5D	93
D9	08	8	8F	33	51	43	5E	94
D6	09	9	88	34	52	3C	5F	95
D5	0A	10	84	35	53	3A	60	96
D4	0B	11	82	36	54	39	61	97
D3	0C	12	81	37	55	36	62	98
D2	0D	13	80	38	56	35	63	99
D1	0E	14	7C	39	57	34	64	100
CE	0F	15	7A	3A	58	33	65	101
CD	10	16	79	3B	59	32	66	102
CC	11	17	76	3C	60	32	67	103
CB	12	18	75	3D	61	2E	68	104
CA	13	19	74	3E	62	2D	69	105
C9	14	20	73	3F	63	2C	6A	106
C7	15	21	72	40	64	2B	6B	107
C6	16	22	71	41	65	2A	6C	108
C5	17	23	6E	42	66	29	6D	109
C3	18	24	6D	43	67	27	6E	110
BC	19	25	6C	44	68	26	6F	111
BA	1A	26	6B	45	69	25	70	112
B9	1B	27	6A	46	70	23	71	113
B6	1C	28	69	47	71	1F	72	114
B5	1D	29	67	48	72	1E	73	115
B4	1E	30	66	49	73	1D	74	116
B3	1F	31	65	4A	74	1B	75	117
B2	20	32	63	4B	75	18	76	118
B1	21	33	5C	4C	76	17	77	119
AE	22	34	5A	4D	77	10	78	120
AD	23	35	59	4E	78	0F	79	121
AC	24	36	56	4F	79	08	7A	122
AB	25	37	55	50	80	04	7B	123
AA	26	38	54	51	81	02	7C	124
A9	27	39	53	52	82	01	7D	125
A7	28	40	52	53	83	00	7E	126
A6	29	41	51	54	84	_	7F	127
A5	2A	42	4E	55	85	_	_	_

Notes: 1 The 8-bit AL_PA is the low–order byte of the port ID.

2 7E and 7F are reserved values and you should not use them on FC equipment on which you can manually set them (for example, in the DAS subsystems).

How to De-install and De-configure the Adapter

How to De-install Software

If you no longer need to manage a Fibre Channel Adapter, you can de-install the corresponding software by using the **SMIT i**nterface.

Logged as **root** user, type:

```
smit install_remove
```

and select the 'Software names' from the list corresponding to the LPPs you had installed on your system (`devices.pci.df10e51a, devices.pci.df1001f7, devices.pci.df1001f8 and devices.pci.df1001f9`).

If you are not familiar with the AIX installation and de-installation procedures, refer to *AIX Installation Guide*.

How to De-configure the Adapter

If you want to remove your adapter, for instance to re-use the slot for another adapter, you must de-configure it to avoid device numbering conflict when configuring the new one. There is no SMIT submenu specific to this operation.

With no process using the adapter, log on as **root** and proceed as follows:

- stop IP and disks applications,
- run the `ifconfig fe(x) detach` command
- run the `rc.naviagent stop` command (if Navisphere is used),
- unmount file systems,
- run the `varyoffvg <volumegroup>` command
- run the `rmdev -Rl atf(x)` command (if atf is used),
- run the `rmdev -Rl fchan(x)` command,
- finally, check that the `fchan` objects are in the `defined` state.

Chapter 3. Software Installation and Configuration

You perform the procedure in this chapter only when the adapter is already plugged into the system.

Software Delivery

The Fibre Channel Adapter (PCI) packages are parts of the AIX delivery on ESCALA platforms. They contain the following LPPs:

1. `devices.pci.df10e51a`

`devices.pci.df10e51a.rte`	driver, methods and specific utilities.
`devices.pci.df10e51a.diag`	diagnostics.
`devices.pci.df10e51a.ucode`	firmware.

2. `devices.pci.df1001f7`

`devices.pci.df1001f7.rte`	specific utilities.
`devices.pci.df1001f7.diag`	diagnostics.
`devices.pci.df1001f7.ucode`	firmware.

3. `devices.pci.df1001f8`

`devices.pci.df1001f8.rte`	specific utilities.
`devices.pci.df1001f8.diag`	diagnostics.
`devices.pci.df1001f8.ucode`	firmware.

4. `devices.pci.df1001f9`

`devices.pci.df1001f9.rte`	specific utilities.
`devices.pci.df1001f9.diag`	diagnostics.
`devices.pci.df1001f9.ucode`	firmware.

Note: The `devices.pci.df10e51a` LPP is a prerequisite to `devices.pci.df1001f7`, `devices.pci.df1001f8` and `devices.pci.df1001f9` LPPs.

Software Installation

1. Turn the computer on.

2. Log in as **root**.

3. Insert the Bull Enhancement CD–ROM containing the device driver software into the CD–ROM drive.

4. Enter:

   `smit cfgmgr`

   and press Enter.

   The `Install/Configure Devices Added After IPL` screen is displayed. The "INPUT device/directory for software" option is highlighted. The cursor is positioned on the entry field where you will identify the input device you are using.

5. Press F4 to display a list of input devices you can select.

6. Select the device by moving the cursor to the appropriate media type and pressing Enter.

   The device or directory you selected is now displayed in the "INPUT device/directory for software" option on the `Install/Configure Devices Added After IPL` screen.

7. Press Enter to execute the software installation command.

The COMMAND STATUS screen is displayed. The status will change from Running to OK when the software installation is complete.

Note: If an error message is displayed on the COMMAND STATUS screen, verify that the adapter card is seated properly. If the card is secure, refer to the documentation that came with your computer for information on running hardware diagnostics.

8. Remove the installation media from the drive.

9. Press F10 to exit SMIT.

10. At the prompt, enter:

```
shutdown -Fr
```

and press Enter.

This will shut down and reboot your system. This is a necessary final step in the installation process. AIX will configure your adapter card automatically when the system reboots. No additional procedures are required.

You can check the successful installation with the **lsdev** command, which lists the adapters installed on the system.

For instance:

#lsdev –C | grep fchan

Adapter Configuration

The following procedure allows you to configure a Fibre Channel Adapter.

Procedure

To change a parameter of an adapter, the adapter must be in a "Defined" state, else the following message appears:

```
Method error (/usr/lib/methods/chggen_rspc):
        0514-029 Cannot perform the requested function because a
        child device of the specified device is not in a correct
        state.
```

1. Put the adapter in "Defined" state (see "How to De–configure the adapter", on page 2-12).

2. Enter the SMIT fast path:

```
smit fe
```

Note: Depending on your environment, you access SMIT in ASCII mode or AIXwindows mode. The following steps apply to both interfaces.
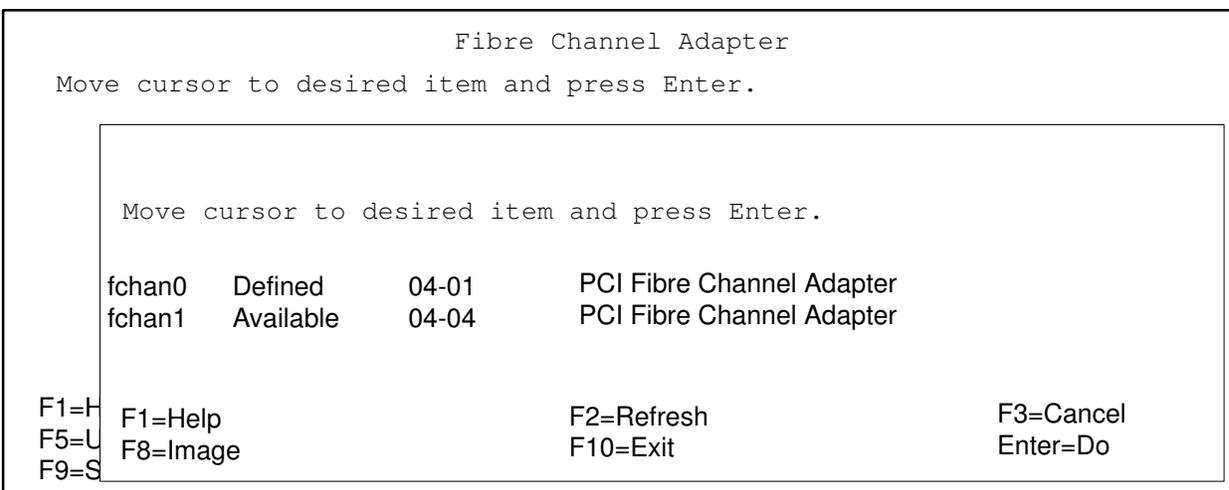
3. Select **Adapter.**

The SMIT panel for this selection resembles the following figure.

```
                        Adapter
 Move cursor to desired item and press Enter.


        List All Fibre Channel Adapters
        Change / Show Characteristics of a Fibre Channel Adapter
        Generate an Error Report
        Trace an FC Adapter
```

4. Select **Change/Show Characteristics of a Fibre Channel Adapter**.

The SMIT panel for this selection resembles the following figure.

```
                        Fibre Channel Adapter
   Move cursor to desired item and press Enter.

   ┌──────────────────────────────────────────────────────────────────┐
   │                                                                    │
   │   Move cursor to desired item and press Enter.                     │
   │                                                                    │
   │   fchan0     Defined       04-01      PCI Fibre Channel Adapter     │
   │   fchan1     Available     04-04      PCI Fibre Channel Adapter     │
   │                                                                    │
   │                                                                    │
 F1=H │  F1=Help                    F2=Refresh              F3=Cancel     │
 F5=U │  F8=Image                   F10=Exit                Enter=Do      │
 F9=S │                                                                  │
   └──────────────────────────────────────────────────────────────────┘
```

5. Make a selection from the "Defined" Fibre Channel Adapter.

When the appropriate Fibre Channel Adapter is selected, a SMIT panel resembling the following figure will be displayed:

```
          Change / Show Characteristics of a Fibre Channel Adapter
Type or select values in entry fields.
Press Enter AFTER making all the desired changes.

                            [Entry Fields]

 Fibre Channel Adapter                          fchan0
 Description                                     PCI Fibre Channel Adapter>
 Status                                          Defined
 Location                                        04–01
 Driver TRANSMIT queue size                      [256]                    +#
 Link Topology identifier                        [loop]                   +#
 Xmit class identifier                           [3]                      +#
 Network Driver enabled                          [yes]                    +#
 SCSI driver enabled                             [yes]                    +#
 512 byte Fibre Channel frame size               [no]                     +#
 Number of IOCB buffers to allocate              [5000]                   +#
 Number of data buffers to allocate              [600]                    +#
 Extra FCP timeout for fabrics                   [0]                      +
 fcp Class Identifier                            [3]                      +#
 Apply change to DATABASE only                    no                      +


 F1=Help          F2=Refresh          F3=CancelF          F4=List
 F5=Undo          F6=Command          7=Edit              F8=Image
 F9=Shell         F10=Exit            Enter=Do
```

6. `cfgmgr`

7. `varyonvg` volume groups

8. `mount` filesystems

SMIT Field Definitions for Fibre Channel Adapter

The following is a summary of the Fibre Channel Attributes and values shown on the SMIT Change / Show Characteristics of a Fibre Channel Adapter.

Fibre Channel Adapter

Identifies the logical name of the adapter. This field cannot be changed.

Description

Provides a short description of the adapter. This field cannot be changed.

Status

Indicates the current status of the adapter. Possible values are available, indicating that the adapter is configured in the system and ready to use, and defined, indicating that the adapter is defined to the system but not configured.

Location

The location code for an adapter consists of two pairs of digits with the format AA–BB where AA identifies the location code of the drawer containing the adapter card and BB identifies both the I/O bus and slot containing the card.

Driver TRANSMIT queue size   [256]

This is the number of outstanding transmit packets the driver can support.
Values: 128, 256, 512, 768, and 1024.

Link Topology identifier   [loop]*

Fibre Channel nodes may be connected in two topologies:
pt2pt, loop, and both (autodetect).

* see "Link topology autosensing" page 2-11.

Xmit class identifier   [3]

Three classes of service are defined for the transfer of Fibre Channel Sequences:
Class 1: "Dedicated Connection"; a virtual "pipe" is created between the two N_Ports, dedicated to the transfer.
Class 2: "Multiplexed"; each frame finds a route to the destination, delivery or non–delivery is acknowledged.
Class 3: "Datagram"; same as Class 2, but there is no acknowledgement of delivery or non–delivery.
Values: 2 or 3.

Network Driver enabled   [yes]

yes for LAN operations. Otherwise **no**.

SCSI driver enabled   [yes]

 yes for SCSI operations. Otherwise **no**.

512 byte Fibre Channel frame size   [no]

Number of IOCB buffers to allocate   [5000]

This applies to SCSI Operation. Values range from 200 to 10,000. You must increase the value when you get an ERRLOG = out of resource

Number of data buffers to allocate   [600]

 This applies to Network Operation. Values range from 20 to 2,000.

Extra FCP timeout for fabrics   [0]

Extra fcp timeout for fabric (time in second)

fcp Class Identifier   [3]

This applies only to the fcp command.
Three classes of service are defined for the transfer of Fibre Channel Sequences:
Class 1: "Dedicated Connection"; a virtual "pipe" is created between the two N_Ports, dedicated to the transfer.
Class 2: "Multiplexed"; each frame finds a route to the destination, delivery or non–delivery is acknowledged.
Class 3: "Datagram"; same as Class 2, but there is no acknowledgement of delivery or non–delivery.
Values: 2 or 3.

Apply change to DATABASE only   no

Chapter 4. Updating Fibre Channel Microcode

Updating Fibre Channel Microcode

Note: From release 1.3.3.4 of the df10e51a.rte LPP, the download of the microcode is automatic if the microcode on the board is older than the one in the LPP. From older version releases, proceed as follows:

Before downloading the new microcode, the disks and drivers must be removed.

1. Check that the following LPPs are present, entering the command:

```
lslpp –l devices.pci.df10*

devices.pci.df1001fx.diag    COMMITTED  Fibre Channel SCSI LAN I/O
                             Controller Diagnostics
devices.pci.df1001fx.ucode   COMMITTED  Fibre Channel SCSI LAN
devices.pci.df10e51a.diag    COMMITTED  Fibre Channel SCSI LAN I/O
devices.pci.df10e51a.ucode   COMMITTED  Fibre Channel SCSI LAN
```

   x = 7 for B4–8 model, 8 for B4–A and B4–B models, 9 for B4–E model.

2. Put the adapter in "Defined" state (see "How to De–configure the adapter", on page 2-12).

3. Install the new microcode, using the **diag** command.

    Note: This step must be done for each Fibre Channel adapter.

   Follow the instructions. In particular, **unplug all the fibre channel cables**.

   ```
   diag
   ```

   Perform the following tasks:

   In the first screen "DIAGNOSTIC OPERATING INSTRUCTIONS" type 'Enter'.

   In the "FUNCTION SELECTION" screen, select 'Task Selection' and type 'Enter'.

   In the "TASKS SELECTION LIST" screen, select 'Download Microcode" and type 'Enter'.

   In the "RESOURCE SELECTION LIST" screen, select 'fchan0", type Enter'. Then press 'F7' to start the download.

    Wait for following message to be displayed at the end of download:

   ```
   The microcode download has completed successfully
   ```

4. Configure the adapters

   Reconnect all the unplugged fibre channel cables. For the new firmware to take effect, you should perform the system's shutdown procedure as indicated in the diagnostic procedure, otherwise perform:

   `cfgmgr` to configure adapter

   `importvg`

   `varyonvg volumegroup`

   `mount filesystem.`

5. Check the new microcode level, using the following command:

```
lscfg -vl fchan0
```

a. For a Type B4-8 Adapter the output is similar to the following:

```
DEVICE            LOCATION          DESCRIPTION

fchan0            04-01             PCI Fibre Channel Adapter

Network Address                     0000C920A569
EC Level                            BIU 4
Part Number                         76730259-001
Displayable Message                 Fibre Channel Host Adapter
Loadable Microcode Level            2212000
Diagnostic Level                    1132000
Manufacturer                        EMULEX
Device Specific. (Z1)               ENDEC 3001506d
Device Specific. (Z2)               SM 10020193
```

b. For a Type B4-A or B4-B Adapter the output is similar to the following:

```
DEVICE            LOCATION          DESCRIPTION

fchan1            04-02             PCI Fibre Channel Adapter

Network Address                     0000C920EBFE
EC Level                            DRAGONFLY 2
Part Number                         LP8000
Displayable Message                 Fibre Channel Host Adapter
Loadable Microcode Level            3205804
Diagnostic Level                    1202000
Manufacturer                        EMULEX
```

c. For a Type B4-E Adapter the output is similar to the following:

```
DEVICE            LOCATION          DESCRIPTION

fchan1            2D-08             PCI Fibre Channel Adapter

Network Address                     0000C92721A6
EC Level                            CENTAUR 2
Part Number                         LP9000
Displayable Message                 Fibre Channel Host Adapter
Loadable Microcode Level            3824101
Diagnostic Level                    1014100
Manufacturer                        EMULEX
Device Specific.(YL)                U0.1-P1-I9/Q1
```

Chapter 5. Diagnostics and Error Identifiers

Power On Self Test and LEDs

When power is applied, the host adapter begins a Power On Self Test (POST), to verify internal operation prior to loading operational software.

Green and yellow LEDs are observed through the host adapter mounting bracket. The green LED indicates power functions and yellow indicates port activity. One of the LEDs will be blinking all the time during normal operations.

A third LED is present on type B4-B adapter with embedded optical interfaces, and indicates that a signal is being received by the port (see figure 4 on page 1-4).

POST conditions and results are summerized in this table.

| Green LED	Yellow LED	State
OFF	OFF	Wake-up failure (dead board)
OFF	ON	POST failure (dead board)
OFF	Slow blink (1 Hz)	Wake-up failure (dead board)
OFF	Fast blink (4 Hz)	Failure in POST (dead board)
OFF	Flashing (irregular)	POST processing in progress
ON	OFF	Failure while functioning
ON	ON	Failure while functioning
ON	Slow blink (1 Hz)	Normal – link up for all adapters except B4–E Normal – 1 Gb link rate for B4–E
ON	Fast blink (4 Hz)	Normal – updating firmware or driver initializing for all adapters except B4–E Normal – 2 Gb link rate for B4–E
Blink	OFF	Normal – link down or not yet started

User Diagnostics

The user diagnostic program, provided by the **smit diag** command, must be used to check or identify a failure of the board. It allows the user to run internal loopback tests at DEC chip level.
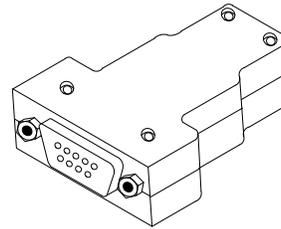
Internal loopback test is used to verify that the internal logic operations function correctly.

In loopback mode, the chip takes frames from the transmit list and loops them to the receive list.
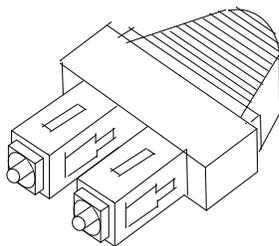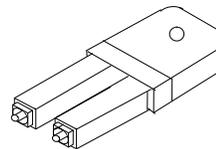
Wrap Plugs
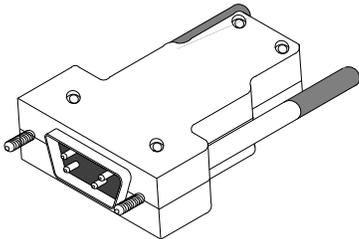
Male D–Sub connector
plugged in the adapter

Female D–Sub connector plugged in the DB9 copper cable

connector plugged
in the (B4–B) optical
adapter

connector plugged
in the (B4–E) optical
adapter

Traces

The trace hook identifiers for the Fibre Channel Adapter (PCI) are:

- 0x047   for transmit/receive events
- 0x048   for error events

Starting the traces

- the **trace** command:

  ```
  #trace –a –j "047 048"
  ```

- the smit interface:

  #smit trace and choose the sub–menu "Start Trace"

  select the ADDITIONAL event IDs to trace

  give the hook ID.

Stopping the traces

- the **trcstop** command:

  ```
  #trcstop
  ```

- the smit interface:

  #smit trace and choose the sub–menu "Stop Trace"

Generating a trace report

- the **trcrpt** command

  ```
  #trcrpt
  ```

- the smit interface

  `#smit trace` and choose the sub–menu "Generate a Trace Report" which allows you to customize your report.

Error Identifier

Label	Description	Action
FC_CHG_ALPA	The ALPA of the node has been changed.	Check ALPA settings.
FC_CMD_TMO	Command Time–out.	If this appens often, check the Fibre Channel Network (cable, adapter, Loop Initialization Protocol, ...).
FC_HDW_ERR	Hardware failure.	Adapter or microcode problem. Check the Fibre Channel Network.
FC_FMW_ERR	Firmware failure.	Reconfigure the adapter and check the Fibre Channel Network.
FC_SFW_ERR	Driver failure.	Check that no Loop Initialization Protocol occurs often.
FC_RESOURCE_ERR	No resource available for the driver.	If FCP traffic, increase the number of IOCB. If IP traffic, increase the number of ELS/IP buffer. Check memory size.
FC_UP_INFO	FC link–up.	Just information.
FC_DOWN_INFO	FC link down.	Just information.
FC_RSCN_INFO	RSCN frame received from a fabric.	Just information.

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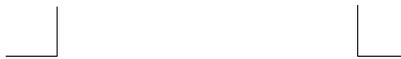**Bull**

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