Bull DPX/20

FDDI Adapters
Installation and Configuration Guide

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Installation and Configuration Guide

Hardware

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About This Book

This manual (when used with your system unit documentation) will help you to install Fiber Distributed Data Interface (FDDI) Adapters in Micro Channel Architecture (MCA) bus and Peripheral Component Interconnect (PCI) bus computers.

There are three types of FDDI Adapters:

- UTP Single Ring Adapter (B2-P for MCA, B5–3 for PCI).
- Fiber Single Ring Adapter (B2-R for MCA, B5–4 for PCI).
- Fiber Dual Ring Adapter (B2-S for MCA, B5–5 for PCI).

Who Should Use This Book

This book is written for the technician who is to install the adapter and configure the system.

Overview

The manual is organized as follows:

- Chapter 1: Introducing FDDI Adapters.
- Chapter 2: Hardware Installation.
- Chapter 3: Software Installation and Configuration.
- Chapter 4: User Diagnostics and Error Identifiers.
- Appendix A: Synchronous and Asynchronous Services
- Appendix B: Connections to Your Network

Related Publications

Cabling Guide, 86 A1 87AQ.

AIX and Related Products Documentation Overview, 86 A2 71WE.

Electronic Emission Notices

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for Class B digital devices, pursuant to Part 15 of the FCC Rules. Operation is subject to the following conditions:

1. this device may not cause harmful interference,
2. this device must accept any interference received, including interference that may cause undesired operation.

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If interference problems do occur, please consult the system equipment owner's manual for suggestions. Some of these suggestions include relocation of the computer system away from the television or radio or placing the computer AC power connection on a different circuit or outlet.

Changes or modifications to this equipment not expressly approved by Bull could result in non-FCC compliance, and void the user's authority to operate this equipment.

This product was tested and certified with a shielded cable/unshielded cable; depending on the availability of the port, therefore, an appropriate cable is to be used.

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This digital apparatus does not exceed the Class B limits for radio noise for digital apparatus as set out in the interference–causing equipment standard entitled: "Digital Apparatus", ICES–003 of the Department of Communications.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe B prescrites dans la norme sur le matériel brouilleur : "Appareils numériques", NMB–003 édictée par le ministère des Communications.

BMPT Vfg 243/1991

Hiermit wird bescheingt, dass {die FDDI UDP Single und FDDI Fiber Single/Dual adapters} in Übereinstimmung mit dem Bestimmung der BMPT-AmtsblVfg 243/1991 funk-entstört ist. Der vorschriftsmässige Betrieb mancher Geräte (Z.B. Messender) kann allerdings gewissen Einschrankungen unterliegen. Beachten Sie deshalb die Hinweise in der Bedienungsanleitung.

Dem Zentralamt für Zulassungen in Fernmeldewesen wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf die Einhaltung der Bestimmungen eingeraumt.

EN55022 (CISPR-22) – Class B

This device has been tested and found to meet the Class B limits of EN55022 (CISPR-22).

この装置は，第二種情報装置（住宅地域又はその隣接した地域において使用されるべき情報装置）で住宅地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）基準に適合しております。
しかし，本装置をラジオ，テレビジョン受信機に近接してご使用になると，受信障害の原因となることがあります。
取扱説明書に従って正しい取り扱いをして下さい。

VCCI–2

The following is a summary of the VCCI Japanese statement in the box above.

This equipment is in the 2nd Class category (information equipment to be used in a residential area or in an adjacent area thereto) 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 such residential area.
When used near a radio or TV receiver, it may become the cause of radio interference.
Read the instructions for correct handling.

Compliances – Product Safety

Standard	Country	Authorization
CSA 22.2 No. 950	Canada	Underwriters Laboratories, Inc. – Recognized
UL 1950	U.S.A.	Underwriters Laboratories, Inc. – Recognized
EN 60950	EC	TÜV Rheinland – Bauart Geprüft

Table of Contents

List of Figures

Chapter 1. Introducing FDDI Adapters

This Installation Guide covers the installation and configuration of FDDI Adapters in MCA and PCI bus computers.

Types of FDDI Adapters

There are three types of FDDI Adapters:

- UTP Single Ring Adapter (Type B2-P for MCA and B5–3 for PCI).
- Fiber Single Ring Adapter (Type B2-R for MCA and B5–4 for PCI).
- Fiber Dual Ring Adapter (Type B2-S for MCA and B5–5 for PCI).

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

Marketing Identifier	Identification Number		Designation
DCCG077–0000	Board Documentation	76729472–001 86 A1 53GX	FDDI UTP Single Ring Adapter (B2-P MCA)
DCCG075–0000	Board Documentation	76729470–001 86 A1 53GX	FDDI Fiber Single Ring Adapter (B2-R MCA)
DCCG076–0000	Board Documentation	76729471–001 86 A1 53GX	FDDI Fiber Dual Ring Adapter (B2-S MCA)
DCCG084–0x00	Board Documentation	76729563–001 86 A1 53GX	FDDI UTP Single Ring Adapter (B5-3 PCI)
DCCG082–0x00	Board Documentation	76729561–001 86 A1 53GX	FDDI Fiber Single Ring Adapter (B5-4 PCI)
DCCG083–0x00	Board Documentation	76729562–001 86 A1 53GX	FDDI Fiber Dual Ring Adapter (B5-5 PCI)

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

Note: For more information about cables, see **Connections from LAN Adapters**, on page B-1, and **LAN Adapters** in *Bull DPX/20 Cabling Guide.*

About the FDDI UTP Single Ring Adapter

The FDDI UTP Single Ring (Type B2-P for MCA Adapters and B5-3 for PCI Adapters) are fitted with an Unshielded Twisted Pair/TP–PMD (MLT 3) connector which offers cost–effective integration of MicroChannel and PCI Platforms into the fast 100 Mbps FDDI network.

The boards comply with ANSI TP–PMD Revision 2.1 (MTL–3). Its RJ–45 connector provides for attachment of 100 ohm UTP category 5 cables.

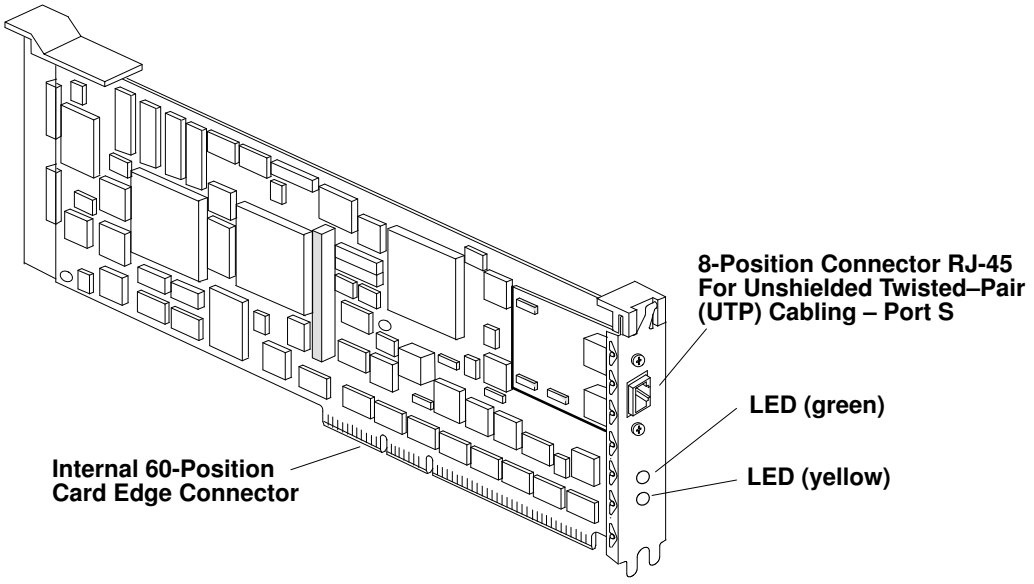


Figure 1. FDDI UTP Single Ring Adapter (Type B2-P MCA).

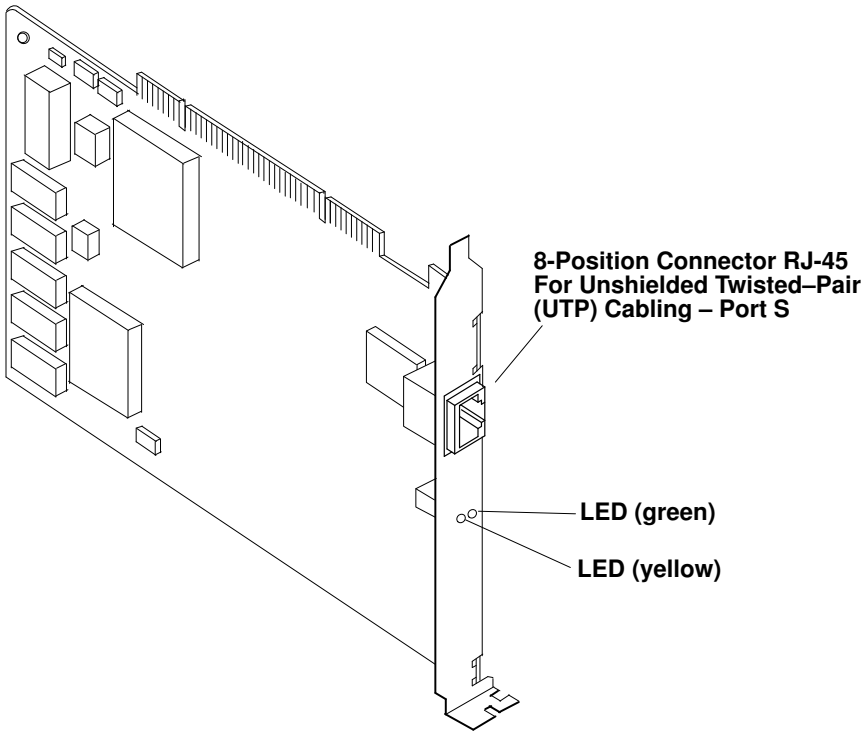


Figure 2. FDDI UTP Single Ring Adapter (Type B5-3 PCI).

UTP Single Ring Adapter Characteristics

The main characteristics are:

- Data Streaming support
- Low cost RJ–45 connector
- MLT–3 interoperability
- Up to 100 m between nodes
- Fully software configurable
- SMT 7.3
- Suitable for multimedia applications (support of synchronous mode – see Appendix A).

Environment Requirements and Compliance

Electrical power source loading

+5V DC @ 2A
+12v DC @ 50mA.

Environment

Operating (Ambient) temperature:
+10 to 40 °C
Storage temperature:
–20 to 60 °C
Operating humidity:
30% to 80% (non–condensing)
Storage humidity:
10% to 90% (non–condensing)

About the FDDI Fiber Single Ring and Dual Ring Adapters

The FDDI Fiber Single Ring (Type B2-R for MCA Adapter), see Figure 3, and the FDDI Fiber Dual Ring (Type B2-S for MCA Adapter, see Figure 4, use a MIC fiber optic cabling connection to integrate fiber optic/Micro Channel systems with the 16/32–bit MicroChannel bus architecture via a FDDI concentrator into 100Mbps FDDI fiber optic network.

The FDDI Fiber Single Ring (Type B5-4 for PCI Adapter), see Figure 5, and the FDDI Fiber Dual Ring (Type B5-5 for PCI Adapter), see Figure 6, use a SC fiber optic cabling connection.

The boards comply with ANSI standard X3T9.5. The FDDI Fiber Dual Ring Adapter allows a station integration in the dual FDDI Ring.

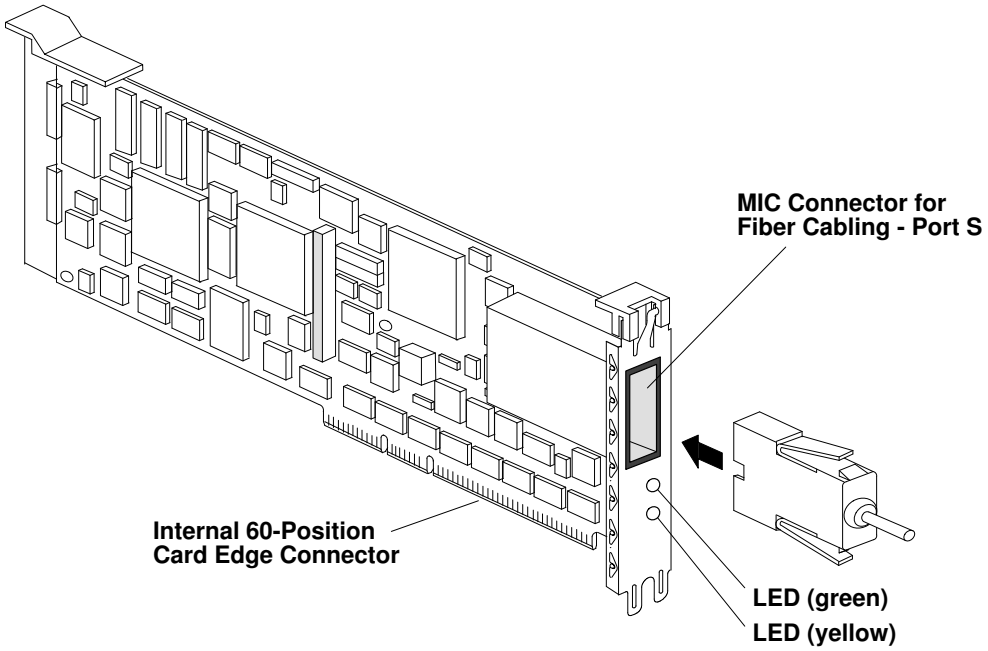


Figure 3. FDDI Fiber Single Ring (Type B2-R MCA Adapter).

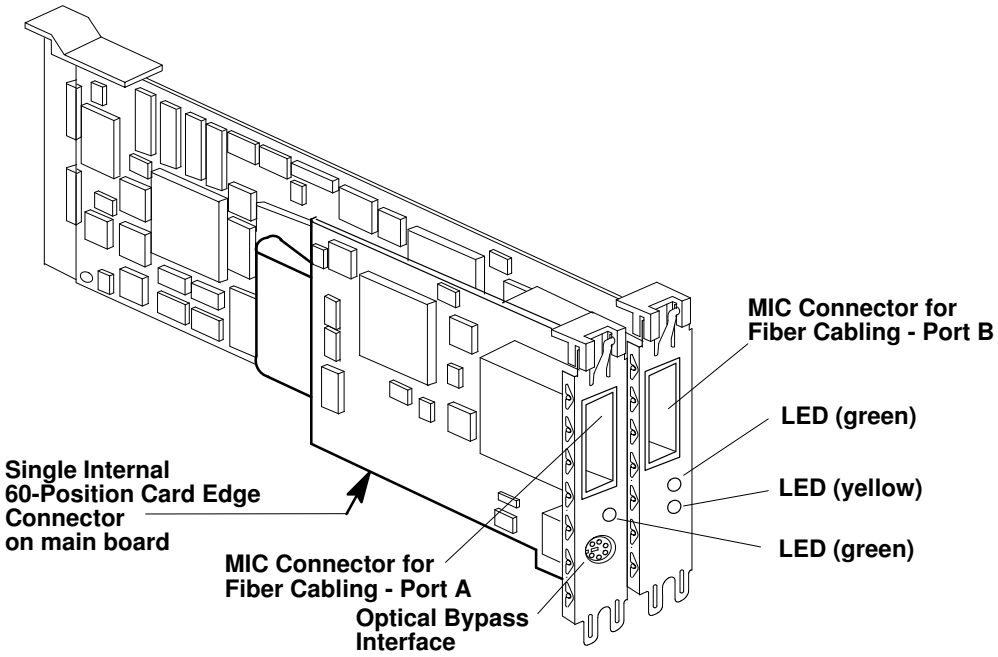


Figure 4. FDDI Fiber Dual Ring (Type B2-S MCA Adapter).

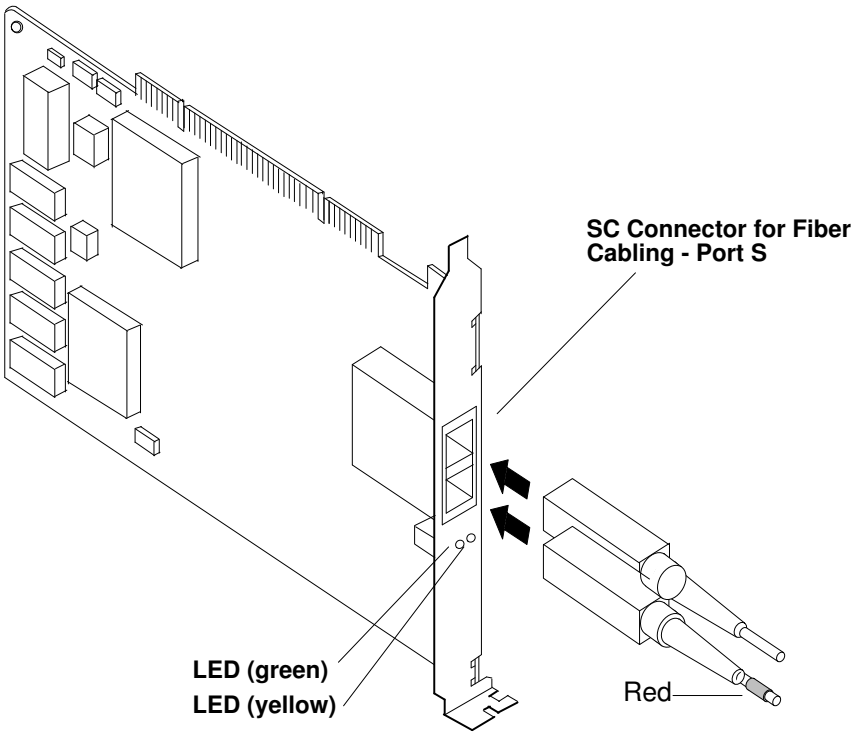


Figure 5. FDDI Fiber Single Ring (Type B5-4 PCI Adapter).

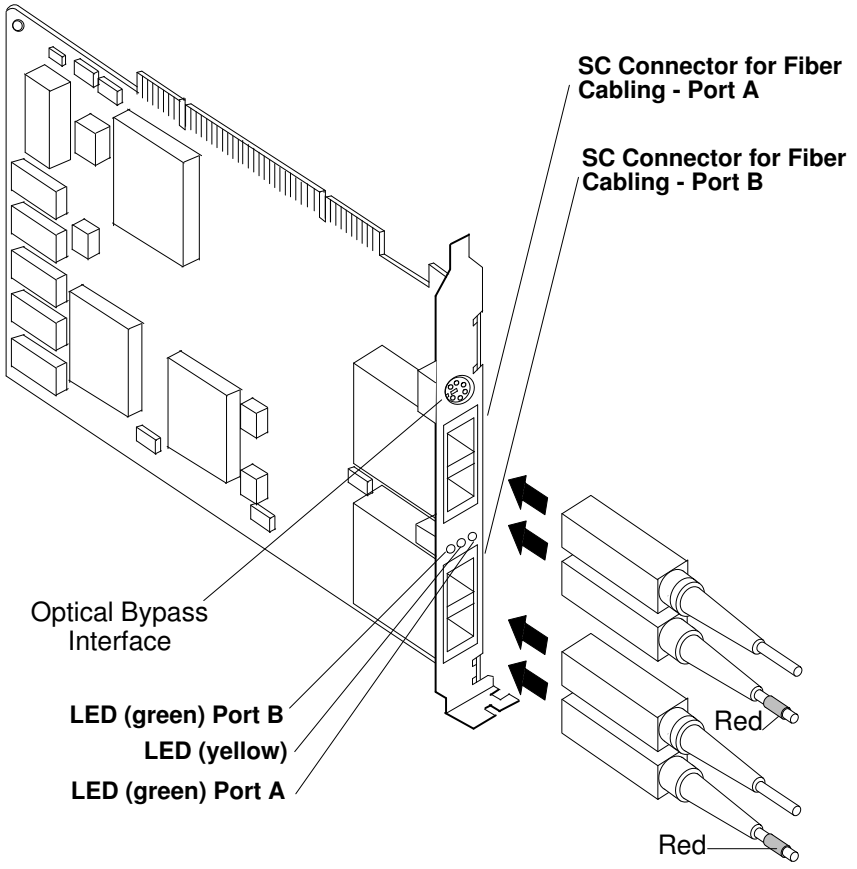


Figure 6. FDDI Fiber Dual Ring (Type B5-5 PCI Adapter).

Fiber Adapter Characteristics

The main characteristics are:

- Data Streaming support
- MIC connector for MCA, SC connector for PCI
- Up to 2 km between nodes
- Fully software configurable
- SMT 7.3
- Suitable for multimedia applications (support of synchronous mode – see Appendix A).
- Dual Ring Adapter: the Optical Bypass Interface provides the facility of optical isolation from the FDDI network while maintaining continuity of cabling connections.

Environment Requirements and Compliance

Electrical power source loading

+5V DC @ (2A for Single, 2.65A for Dual Adapters)
+12v DC @ 50mA.

Environment

Operating (Ambient) temperature:
+10 to 40 °C
Storage temperature:
–20 to 60 °C
Operating humidity:
30% to 80% (non–condensing)
Storage humidity:
10% to 90% (non–condensing)

Chapter 2. Hardware Installation

This section provides instructions for installing FDDI Adapters in MCA and PCI bus computers.

FDDI Adapters Installation

1. Turn off your computer's power and remove the cover (refer to your computer's manual for instructions on cover removal and option board installation and cautions).
2. Locate an available MCA or PCI slot in your computer and remove the external slot plate (you will need to loosen the thumbscrew to do this). Two adjacent slots are necessary for the MCA Fiber Dual Ring Adapter.
3. Plug the adapter into an MCA or PCI slot, making sure that the "fork" is in the position under the endplate thumbscrew.
   The MCA Fiber Dual Ring Adapter requires **two adjacent** slots, only one being used for the single connector.
   Tighten the thumbscrew (two, for the MCA Fiber Dual Ring Adapter).

   Warning: Connection of an Optical Bypass on the Dual Ring Board requires a reboot of the machine in order for the board to be detected.

4. Plug the connector into the board's endplate. Ensure that the locking clip is engaged.
5. Replace your computer's cover.
6. Reconnect the power cable to the system; then turn on the power.

Warning: FDDI adapters contain static–sensitive components. Always touch a grounded surface to discharge static electricity before handling the adapter.

Chapter 3. Software Installation and Configuration

This section provides instructions for installing and configuring the software supporting FDDI Adapters.

Delivery and Installation

Software Delivery

The FDDI Adapter package is part of the Bull Enhancement CD–ROM delivery. It contains the following LPP (Licensed Program Product):

For MCA Adapters

devices.mca.0083 necessary to support FDDI Adapter.

which contain two OPPs (Optional Program Product):

devices.mca.0083.rte driver, methods and specific utilities.

devices.mca.0083.diag diagnosis.

For PCI Adapters

devices.pci.48110040 necessary to support FDDI Adapter.

which contain two OPPs (Optional Program Product):

devices.pci.48110040.rte driver, methods and specific utilities.

devices.pci.48110040.diag diagnosis.

Note: In the event of a problem installing the FDDI Adapter package (MCA or PCI), check that the following OPP is installed:

devices.mca.8ef4.com

This OPP is part of the AIX CD–ROM delivery.

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 can identify the input device you are using.
5. Press F4 to display a list of input devices you can select.
6. Select the CD–ROM by moving the cursor to the appropriate media type and press 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 is seated properly. If the error message is present when the adapter is securely installed, 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.

Note: In the case of an FDDI Adapter upgrade, the previous release must first be de–installed using the command

for MCA

```
installp –u devices.mca.0083
```

for PCI

```
installp –u devices.pci.48110040
```

before using `smit cfgmgr`.

Installation Check

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

MCA example:

```
# lsdev –Cc adapter | grep fddi

fddi0 Available 00–07    FDDI Adapter
fddi1 Available 00–06    FDDI Adapter
```

PCI example:

```
# lsdev –Cc adapter | grep fddi

fddi0 Available 00–01    PCI FDDI Adapter (48110040)
```

Fiber Ring Adapter Driver – Operational States

Note: In the following table, the extender (Dual Ring) LED does not apply with a Single Ring adapter.

Dual Ring	Single Ring		Explanation
Green LED	**Green LED**	**Yellow LED**	
off	off	off	driver not loaded, adapter not operational
off	off	on	station management code is running, adapter is not connected to the network (for example, cable is disconnected).
off	on	off	Single Ring: adapter is ready for use (connected to network and operational). Dual ring: base adapter is operational in loopback mode.
on	off	off	Single Ring: driver not loaded, adapter not operational. Dual Ring: extender adapter is operational in loopback mode.
on	on	off	adapter is ready for use (connected to network and operational).

See **FDDI Fiber Dual Ring (Type B2-S) Adapter**, Figure 3, for physical location of LEDs.

Adapter Configuration

The following procedure allows you to configure an FDDI adapter.

Procedure

1. Enter the SMIT fast path:

   ```
   # smit fddi
   ```

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

2. Select **Adapter.**

The SMIT panel for this selection resembles the following figure.

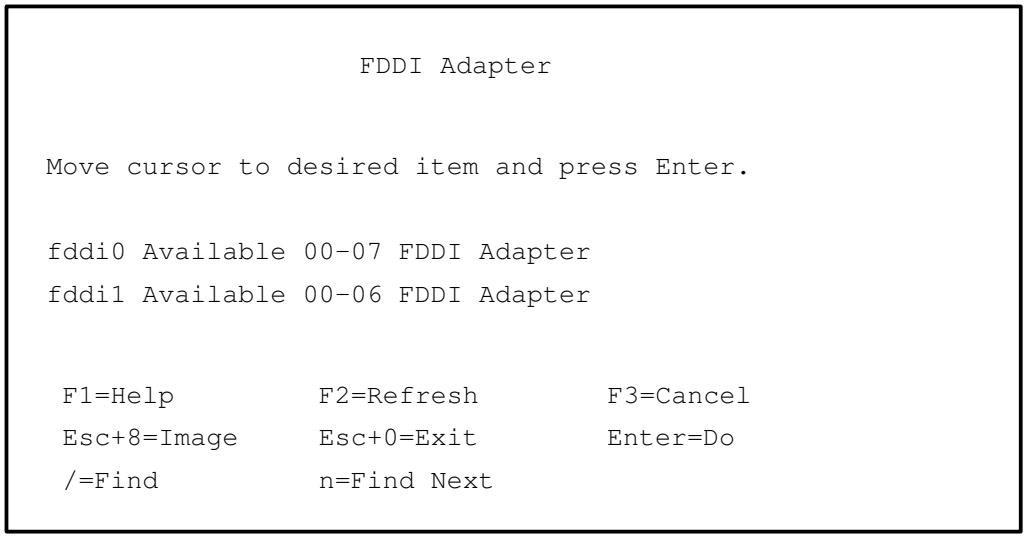
```
                        Adapter

Move cursor to desired item and press Enter.

List All FDDI Adapters
Change / Show Characteristics of an FDDI Adapter
Generate Error Report
Trace an FDDI Adapter
```

3. Select **Change/Show Characteristics of an FDDI Adapter**.

The SMIT panel for this selection resembles the following figure (MCA adapters).



4. Make a selection from the Available FDDI Adapters. If no adapters are displayed or if they are in Defined state, check the configuration and setup again.

When the appropriate FDDI adapter is selected, a SMIT panel resembling the following figure will be displayed (PCI adapter):

```
         Change/Show Characteristics of an FDDI Adapter

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[TOP                                        [Entry Fields]
    Logical Name                                fddi0
    Description                                 PCI FDDI Adap. (4811)
    Status                                      Available
    Location                                    04-01
    Transmit Queue Size                         [30]                +#
    PCI Fix value                               [00000000]          +#
    TVX lower bound                             [2700]              +#
    MAX T-REQ                                   [165]               +#
    Enable Alternate MAC/SMT Address            no                  +
    Alternate MAC/SMT Address                   [400000000000]
    PMF password                                []
    USER Data                                   []
    SBA_Payload                                 [0]                 +#
    SBA_Overhead                                [50]                +#
    Max_TNEG                                    [25]                +#
    Min_Segm_Size                               [1]                 +#
    SBA_Category                                [0]                 +#
    Sync_Tx_Mode                                SPLIT               +
    SBA_Command                                 STOP                +
    SBA_Available                               [50]                +#
    Extended receive mbuf size                  no                  +
    Receive frame count                         [42]                +#
    Apply change to DATABASE only               no                  +

    F1=Help     F2=Refresh      F3=Cancel       F4=List
    F5=Reset    F6=Command      F7=Edit         F8=Image
    F9=Shell    F10=Exit        Enter=Do
```

Note: The following fields are no displayed in the MCA adapter SMIT menu:

- PCI Fix value,
- Extended receive mbuf size
- Receive frame count

SMIT Field Definitions for FDDI Adapter

The following is a summary of the FDDI attributes and values shown on the SMIT Change / Show Characteristics menu of an FDDI Adapter.

Note: Most of these attributes are advanced parameters which give access to FDDI SMT or configure the synchronous mode. It is recommended that only advanced users change the default values of parameters listed here.

SMT Parameters:

TVX lower bound
Max T–Req
PMF password
User Data.

Synchronous Mode Parameters:

SBA Payload
SBA Overhead
Max_TNEG
Min_Segm_Size
SBA_Category
Sync_Tx_Mode
SBA_Command
SBA_Available.

Description Provides a short text description of the adapter. The value of 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 and BB identifies both the I/O bus and slot containing the adapter.
A value of 00 for the AA field means that the adapter is located in the CPU drawer or system unit, depending on the type of system. Any other value for the AA field indicates that the adapter is located in an I/O expansion drawer, in which case, the value identifies the I/O bus and slot number in the CPU drawer that contains the asynchronous expansion adapter. The first digit identifies the I/O bus with 0 corresponding to the standard I/O bus and 1 corresponding to the optional I/O bus. The second digit identifies the slot on the indicated I/O bus.
The first digit of the BB field identifies the I/O bus containing the adapter. If the adapter is in the CPU drawer or system unit, this digit will be 0 for the standard I/O bus or 1 for the optional I/O bus. If the adapter is in an I/O expansion drawer, this digit is 0. The second digit identifies the slot number on the indicated I/O bus (or slot number in the I/O expansion drawer) which contains the adapter.
A location code of 00–00 is used to identify the standard I/O planar.

Examples:

00–05
Identifies an adapter in slot 5 of the standard I/O bus and is located in either the CPU drawer or system unit, depending on the type of system.

00–12
Identifies an adapter in slot 2 of the optional I/O bus and is located in the CPU drawer.

18–05
Identifies an adapter located in slot 5 of an I/O expansion drawer. The drawer is the one connected to the asynchronous expansion adapter located in slot 8 of the optional I/O bus in the CPU drawer.

Transmit Queue Size

Transmit Queue size: indicates the number of transmit requests (frames) that can be queued up by the device driver prior to being added to the adapters (hardware) transmit queue.

Valid values range from 3 to 250. The default value is 30.

PCI Fix Value

Not used.

TVX lower bound

Provides local write access to the TVX attribute, registered as fddiMAC 54 in the SMT Standard.

The attribute provides local control of the recovery time from transient ring errors. The value for TVX Lower Bound is specified in microseconds. The value range is 2500 µs ... 10000 µs. If a value outside the limits is specified, the upper/lower limit will be taken. If no value is specified, the default value 2700 µs is used.

MAX T–Req Provides local write access to the T–Req attribute, registered as fddiMAC 51 in the SMT Standard. T–REQ specifies the requested target rotation time (TTRT) for this station and directly affects ring utilization. The value for TReq is specified in milliseconds. The value range is 5 ms ... 165 ms. If a value outside the limits is specified, the upper/lower limit will be taken. If no value is specified, the default value 10 ms is used.

Enable Alternate MAC/SMT Address

Setting this attribute to the yes value indicates that the address of the adapter, as it appears on the LAN is the one specified by the Alternate MAC/SMT Address attribute. If you specify the no value, the unique adapter address written in a ROM on the adapter is used. The default value is no.

Alternate MAC/SMT Address

Allows the adapter unique address, as it appears on the LAN, to be changed. The value entered must be a FDDI address in canonical form of 12 hexadecimal digits (6 bytes) and have the group address bit set to 0 and the local address bit set to 1. The group address bit is the high order bit of the high order byte; the local address bit is the second highest order bit of the high order byte. The address must not be the same as any other FDDI address on the ring. This field has no effect unless the Enable Alternate MAC/SMT Address attribute is set to the yes value, in which case this field must be filled in. To change the Alternate MAC/SMT Address, enter 0x followed by the 12 digit address. All 12 hexadecimal digits must be entered. The valid values range from 0x400000000000 through 0x7fffffffffff. The default value is 0x400000000000.

PMF password If this attribute has a non-zero value, it defines the password that all remote PMF (Parameter Management Frame) requests must provide to change attributes within the adapter. The value for pmf_passwd is 8 ASCII characters long and not case sensitive since lower case letters will be converted to upper cases. Password protection can be disabled by setting this attribute to all zeros (default), or by not specifying a PMF Password.

USER Data This attribute provides local write access to the User Data parameter in the SMT MIB, registered as fddiSMT 17 in the SMT Standard. The User Data must be an ASCII string for compliance with the FDDI SMT Standard. It can be 32 bytes long and can contain any user data; for example station name, location, etc.

SBA_Payload This attribute defines the requested synchronous bandwidth for manual static allocations in synchronous units (SU). The synchronous unit is the number of bytes transmitted in 125 microseconds. Value range: 0 ... 1562 bytes per 125 microseconds. (1562 SU = 100 Mbits/sec). The correlation between a payload given in Mbits/sec and in Synchronous Units, as specified in the SMT ANSI Standard, is shown in the following table.

Mbits/ sec	1	2	3	4	5	10	15	20	25	30	35	40	45	50
Payload	16	32	47	63	79	157	235	313	391	469	547	625	704	782

The default value is zero – no synchronous bandwidth is used.
If a value outside the valid range is specified, the upper or lower limit will be taken.
You must define the amount of bandwidth in order to send synchronous frames. If the SbaPayLoad keyword is not specified, the SbaOverHead, MaxTNeg, MinSegmentSize and SbaCategory keywords have no effects.
The workstation supports either the static allocation mode (where the requested payload is specified by the SbaPayLoad keyword), or the dynamic allocation mode (where the required synchronous bandwidth is allocated directly by the multimedia application).
If you use a multimedia application which can allocate the bandwidth dynamically, do not specify a value for the SbaPayLoad keyword.

Conversion Formula

[Requested Payload (bytes/sec)] x 125E–6 = SbaPayLoad (SU)

Example:
if the required bandwidth is 1 MBit/sec (125,000 Bytes/sec), the value of the payload is

125,000 x 125E–6 = 15.625 (rounded up to 16 SU).

SBA_Overhead
This attribute defines the requested overhead for static allocations. The value range is 50 ... 5000 bytes. If a value outside the limits is specified, the upper/lower limit will be taken. The default value is 50 bytes.
Note: This attribute only has effect if the attribute SBA_Payload has a value greater than 0.

Max_TNEG This attribute defines the maximum token rotation delay which can be accepted by applications using synchronous bandwidth. The value range is 5 ... 165 ms. The default value is 25 ms. If a value outside the limits is specified, the upper/lower limit will be taken.
Note: This attribute only has an effect if the attribute SBA_Payload has a value greater than 0.
CAUTION: If a value lower than 20 ms is specified for the Max_TNEG attribute, the Max T–Req attribute should be set to the same value (Max T–Req = MaxTNeg). The synchronous payload request will be denied by the SBA if the value for the MaxTNeg attribute is lower than the current token rotation time.

Min_Segm_Size
This attribute defines the minimum synchronous segmentation size. This value corresponds to the amount of bytes to be transmitted per token opportunity. The value range is 1 ... 4478 bytes. The default value is 1. If a value outside the limits is specified, the upper/lower limit will be taken.
Note: This attribute only has an effect if the attribute SBA_Payload has a value greater than 0.

SBA_Category This attribute defines the session ID of the SBA_Category for the static allocation. The value range is 0 ...65535. The default value is 0. If a value outside the limits is specified, the upper/lower limit will be taken.
Note: This attribute only has an effect if the attribute SBA_Payload has a value greater than 0

Sync_Tx_Mode

This attribute defines the synchronous transmission mode. The default value is 'SPLIT', where only frames identified as synchronous frames are transmitted by the synchronous queue. The alternative value is 'ALL', where all LLC frames received from upper layers are transmitted via the synchronous queue.
Note: This attribute only has an effect if the ESS is able to allocate the required synchronous bandwidth from the SBA.

SBA_Command

This attribute is an SBA local action to start or stop the SBA application. Values may be 'START' or 'STOP'. The default value is 'STOP'.
Note: There should be only one active SBA application in the same segment.

SBA_Available

This attribute defines the maximum synchronous bandwidth in percent available for the primary path. The value range is 0...100 percent. The default value is 50 percent (6.25 MBytes/s). If a value outside the limits is specified, the upper/lower limit will be taken.
Note: This value remains zero until the SBA application is enabled and active.

Extended receive mbuf size

Extended receive mbuf size: this parameter defines the type of mbuf allocation.If you specify 'yes' the receive mbufs will be allocated with a single cluster of more than 4 Kbyte size. Since the driver must preallocate a number of receive buffers typically 8 Kbyte mbufs will be allocated for each receive buffer. This can increase performance but will also consume mbufs of the contiguos memory pool. Due to the limited number of large mbufs the system may run out of mbufs. If you specify 'no' default allocation will be used. his means that receive frames are allocated as a chain of two 4 Kyte mbufs. This can decrease the receive performance but avoids that the system runs out of resources.
Please see also the 'Receive frame count' parameter."

Receive frame count

This parameter defines the number of receive buffers that will be allocated by the driver for receive operation. When the driver is initialized it will preallocate up to the given number of receive buffers. Also it will refill the receive buffer ring during receive operation. Depending on the receive mbuf size you can decrease or increase the amount of memory that is held in the driver's receive queue.
Please see also the 'Extended receive mbuf size' parameter."

Apply change to DATABASE only

Indicates whether or not the configuration changes being made should be applied only to the database or to both the database and the current device operation. For devices that are in use and cannot be changed this allows the database to be changed for the device so that the changes take effect the next time the system is rebooted. Possible values: 'yes' or 'no',

Chapter 4. User Diagnostics and Error Identifiers

This section explains how the diagnostic program and error identifiers are to be used.

User Diagnostics

The user diagnosis program, provided in the **diag** system, can be used to check or identify an adapter failure. It allows internal loopback tests (regular and advanced mode) and external loopback tests (advanced mode) to be run, using a wrap plug.

Using Regular Mode Diagnosis

Using SMIT, select the menu **# diag**

Choose the sub–menu **Diagnostic Routines**

then the sub–menu **System Verification**

and finally select the **fddi adapter**.

Using Advanced Mode Diagnosis

Using SMIT, select the menu **# diag**

Choose the sub–menu **Advanced Diagnostic Routines**

then the sub–menu **System Verification**

and finally select the **fddi adapter**.

Using Diagnostics Error Messages

If one of the following messages appears, check that the adapter is correctly plugged into the system bus. If the problem persists, replace the adapter.

859–201	Config register test failure
859–202	PROM check test failure
859–203	Timer and IRQ test failure
859–204	Adapter RAM check failure
859–205	ASIC test failure
859–206	High memory (ISA) test failure
859–207	DMA test failure
859–208	FORMAC register test failure
859–209	PLC1 (base board) test failure
859–210	PLC2 (extension board) test failure

If one of the following messages appears, check that the wrap plugs (if any) are correctly plugged. If problem persists, replace the adapter.

859–301	PLC1 (base board) FDDI external wrap failure
859–302	PLC2 (extension board) FDDI external wrap failure

If the following message appears, check the software installation.

859–400	Software

Traces

Start Traces

To start the traces, use either,

the trace command:

```
# trace -j 45d -a
```

or, the SMIT interface.

Using SMIT, select the menu **# smit trace**

Choose the sub–menu **Start Trace**

and finally select the **Additional event IDs to trace**

and give the **hook id**.

The trace hook identifier for the FDDI Adapter is 0x45d for reception and transmission, 0x45e for ioctl trace and 0x45f for error trace.

Stop Traces

To stop the traces, use either,

the trcstop command:

```
#trcstop
```

or, the SMIT interface.

Using SMIT, select the menu **# smit trace**

Choose the sub–menu **Stop Trace**.

How to Generate a Trace Report

To generate a trace report, use either,

the trcrpt command:

```
#trcrpt
```

or, the SMIT interface.

Using SMIT, select the menu **# smit trace**

Choose the sub–menu **Generate a Trace Report**

the screens allow the report to be customized.

Appendix A. Synchronous & Asynchronous Services

Types of Service

The FDDI standard defines two types of service: **synchronous** and **asynchronous**.

Asynchronous Service

The basic service provided by an FDDI adapter. It does not guarantee end–to–end delay and reserved bandwidth.

Synchronous Service

Used by applications requesting and requiring predictable response time.

A part of the available bandwidth of the FDDI ring capacity can be allocated for synchronous transmission. The corresponding traffic is given priority over asynchronous traffic, allowing workstations to have guaranteed access to the network through a process called **Bandwidth Allocation** Process.

Bandwidth Allocation is the process that controls the overall bandwidth allocation for one FDDI segment, as well as the recovery process due to potential over–allocation and to token rotation timer change. Two allocation modes presently exist: **Static mode** and **Dynamic mode**.

Static Mode

Mode where only one allocation is performed per workstation. This allocation takes into account all bandwidth requirements for the workstation. The Static Allocation mode is shown in Figure 7.

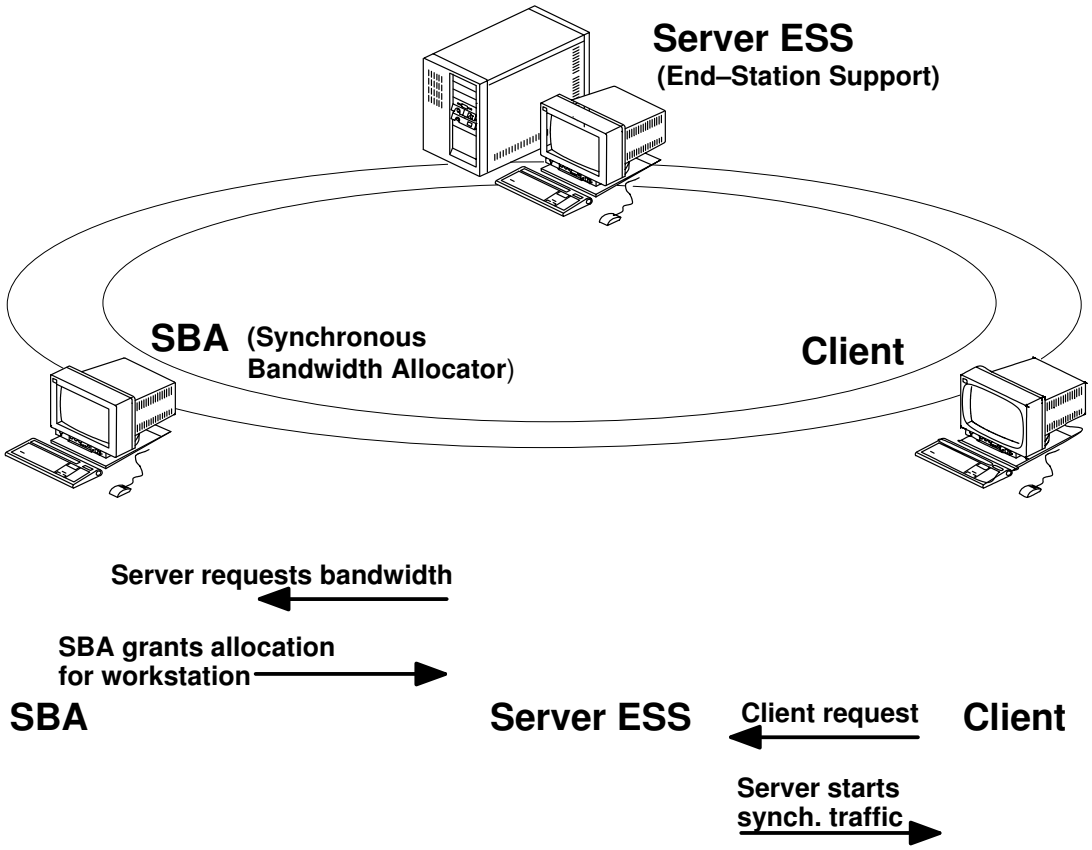


Figure 7. Static Allocation Mode.

Dynamic Mode

Mode where allocation is performed for each individual session (where a session is the requirement of a single application on a workstation). In this mode, several allocations can be performed on each workstation. The Dynamic Allocation mode is shown in Figure 8.

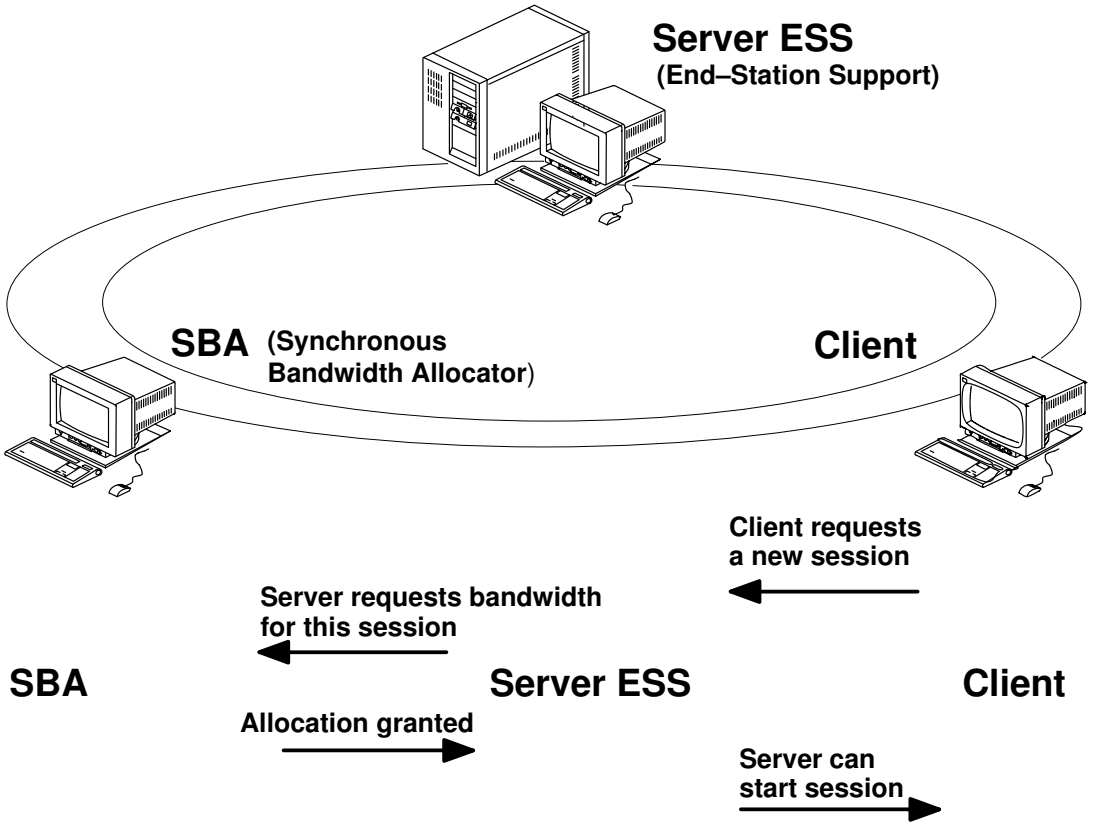


Figure 8. Dynamic Allocation Mode.

FDDI Synchronous Transmission

Two functions are provided to support synchronous transmission: Synchronous **End–Station Support** (ESS) and **Synchronous Bandwidth Allocator** (SBA).

End–Station Support refers to an FDDI workstation's ability to prioritize synchronous traffic over regular asynchronous traffic. Since this prioritization is done only while transmitting, ESS is used mainly by workstations requiring guaranteed access to the network.

Figures 7 and 8 show that prioritization is gated by the acceptance or refusal of the bandwidth allocation request sent to the SBA. This request is made upon ESS workstation boot time in static mode or before starting every new session in dynamic mode.

If SBA refuses an ESS allocation request, the ESS will use the asynchronous queue instead of using the synchronous queue to transmit its data. If this happens, the quality of service of the corresponding traffic is not guaranteed.

SBA / ESS Parameters

Overview

This section contains information about the adapter parameters which must be modified to configure the synchronous services. The parameters configure the operation of ESS and SBA functions. These functions are part of the device driver and are installed with it.

Note: If static mode is used and this workstation is configured to use synchronous transmission, the default value must be changed for the

– SbaCommand,
– SbaPayLoad.

Default values of the other parameters can also be changed. Only advanced users are recommended to do so. Otherwise, a system failure may result.

The two following tables give a summary of parameters required to configure SBA and ESS in **Static** mode and in **Dynamic** mode; they also list default values.

Static Mode

S B A		**E S S**	
Name	**Default Value**	**Name**	**Default Value**
SbaCommand	STOP	SbaPayLoad	0 (User MUST change it to get bandwidth)
SbaAvailable	50 Not Applicable if SbaCommand = STOP	SbaOverHead	50 Not Applicable (N/A) if SbaPayLoad = 0
		MaxTNeg	25 N/A if SbaPayLoad = 0
		MinSegmentSize	1 N/A if SbaPayLoad = 0
		SbaCategory	0 N/A if SbaPayLoad = 0
		SynchTxMode	SPLIT N/A if SbaPayLoad = 0

Dynamic Mode

S B A		**E S S**	
Name	**Default Value**	**Name**	**Default Value**
SbaCommand	STOP	SbaPayLoad	SbaPayLoad MUST be 0
SbaAvailable	50 Not Applicable if SbaCommand = STOP	SbaOverHead	Application will request all needed parameters from network Allocator
		MaxTNeg	
		MinSegmentSize	
		SbaCategory	
		SynchTxMode	SPLIT

Example of Configuration in Static Mode

For example in Figure 9, a server S1 has 6 clients C1...C6 with cards supporting video streams of 1.2 Mbps each. This means that the server has to support a payload of 6 x 1.2 Mbps = 7.2 Mbps. This is equivalent to 112.5 Synchronous Units (see **Conversion Formula**, on page 3-8). Setting SbaPayLoad to 120 ensures sufficient server bandwidth to guarantee quality of service for all video streams. Each client needs overall 2 Synchronous Units to send synchronous request frames to the server.

Note: If there is synchronous traffic on the FDDI ring, the fairness of the FDDI's asynchronous media access control is disturbed. This means the asynchronous stations in the ring have to delay their transmit requests. Therefore, it is necessary to also supply the clients with some synchronous bandwidth to guarantee the synchronous data transfer within a stable time slot. The time slot value is 2 * TNeg.

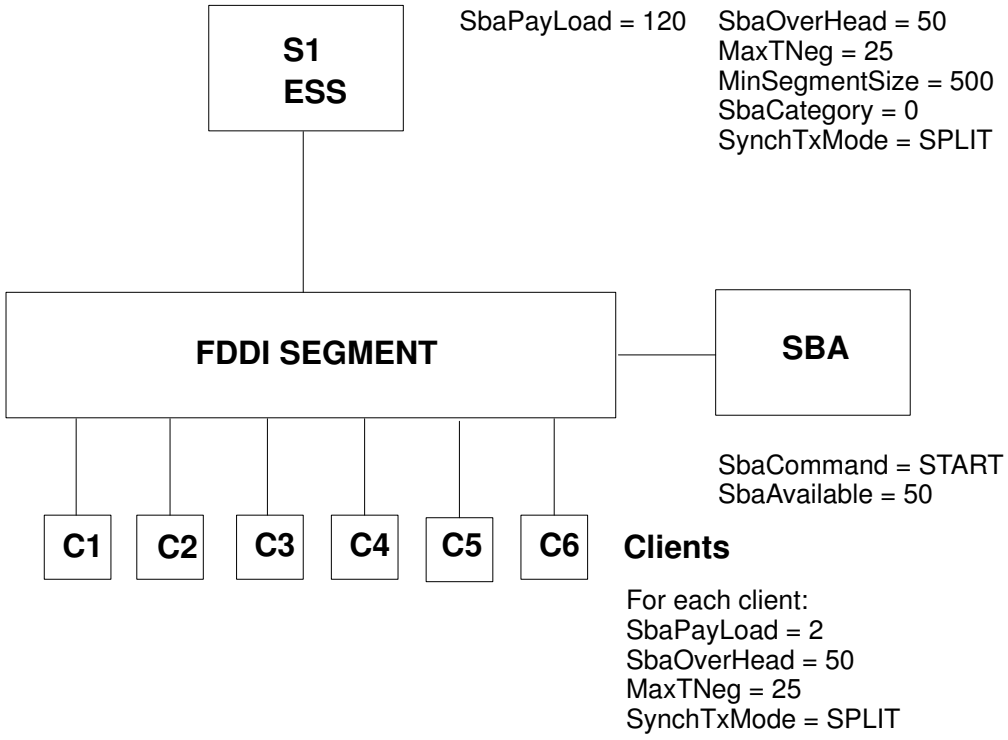


Figure 9. Static Mode Configuration – Example.

Appendix B. Connections to Your Network

Connections Overview

The SAS adapter supports single attachment to a concentrator.

The DAS adapter supports either dual attachment to the main ring path or dual homing to one or two FDDI concentrators.

A typical example of an FDDI network organization is shown in Figure 10.

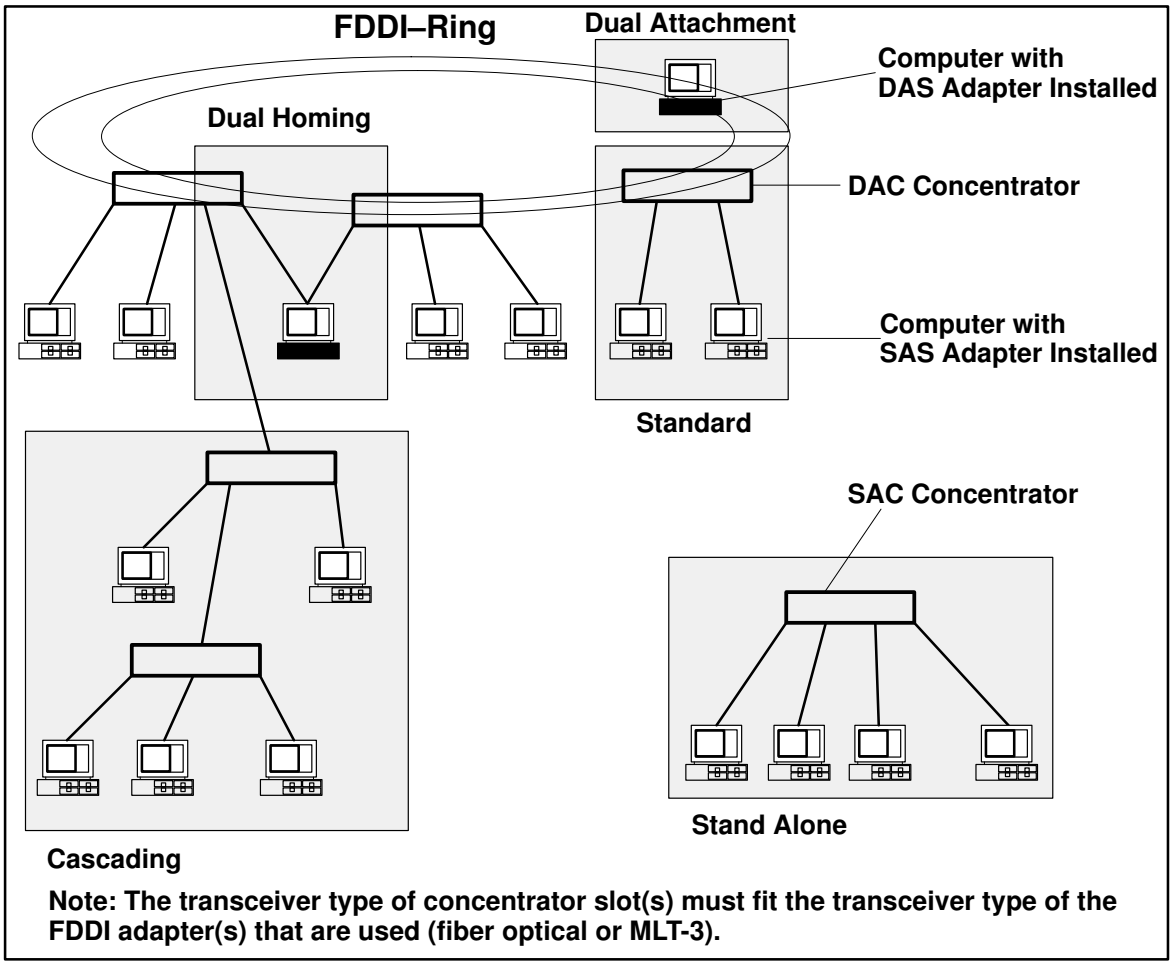


Figure 10. Example of an FDDI Network.

Connection Types

There are three basic connection types that can be mixed and matched in the same network:

- Dual attachment to the dual ring
- Single attachment to a concentrator
- Dual homing.

Dual Attachment to the Dual Ring

Class A devices can be connected directly to the FDDI dual ring. A device connected to both rings is called ”dual attached”. Since each ring has a transmit and receive line, there are two transmit paths out of and two receive paths into the dual attached device (DAS or DAC in Figure 10). Because of redundant data paths, dual attachment offers fault tolerance.

Single Attachment to a Concentrator

Class B devices connect point to point to a concentrator. This connection type is called ”single attached”. For single attached devices, the concentrator acts as the central hub.

When SASs are connected to a single concentrator, the concentrator is said to be non–attach or stand alone. In this situation, the dual ring is collapsed into the concentrator.

Both SASs and SACs can be single attached.

Dual Homing

This is a connection type for a Class A device where it connects to two different concentrators. The connection to one concentrator is the primary connect and is active; the connection to the other concentrator is for backup purposes and inactive. Since each connection to the concentrator has a send and a receive path, there are two transmit paths out of and two receive paths into the dual home device. Because of redundant data paths, dual attachment offers fault tolerance.

Both DASs and DACs can be dual homed.

When concentrators are connected to other concentrators building a tree below the dual ring, it is called ”cascading”. Cascading applies to both single attached and dual homed concentrators off the dual ring.

Port Types (A, B, M and S)

The ports on the various FDDI devices are given logical designations. There are four port types in FDDI: A, B, M (Master) and S (Slave), as shown in Figure 11.

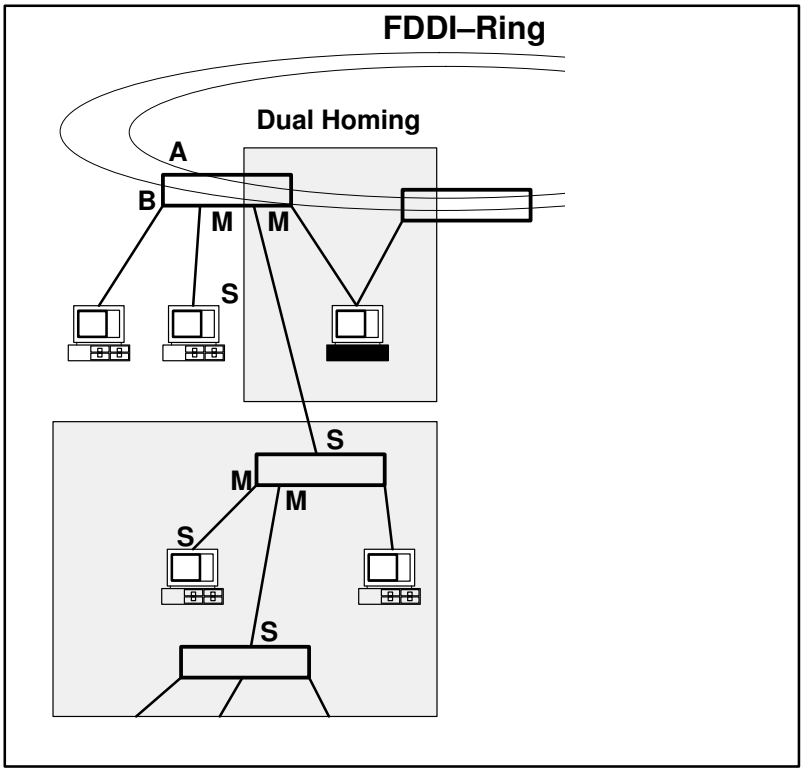


Figure 11. FDDI Port Types.

Device Type	**Ports** (quantity)
DAS	A & B (1 each)
DAC	A & B (1 each) M (1 or more)
SAC	S (1) M (1 or more)
SAS	S (1)
Stand Alone Concentrator	M (multiple)

Port Usage

Dual Attached Connection

For a Class A device on the dual ring, the A port connects to the B port of the upstream neighbor and the B port connects to the A port of the downstream neighbor. This ”daisy chaining” of devices continues around the ring.

For dual attached devices on the dual ring, the function of A and B ports is described in the following table.

Dual Attached Device Port	Function
A	Primary Ring In Secondary Ring Out
B	Primary Ring Out Secondary Ring In

Single Attached Connection

On single attached devices, the S (Slave) port connects to an M (Master) port on the concentrator.

Dual Homed Connection

For dual homed Class A devices, the A port connects to an M port on one concentrator and the B port connects to an M port on another concentrator.

For dual homed devices, the function of A and B ports is described in the following table.

Dual Homed Device Port	Function
A	Secondary Connection
B	Primary Connection

Type of Connectors

Two types of connectors are used for FDDI Adapters:

- UTP (copper) connector
- Fiber ring connectors.

UTP Connector

UTP Single Ring Connector

Unshielded twisted pair port pinouts for port types A, B, M (Master) and S (Slave).

The UTP Single Ring Adapter uses standard RJ-45 connectors and receptacles. The table below summarizes the port pinouts.

RJ-45 Contact	Signal
1	Transmit (Tx+)
2	Transmit (Tx–)
7	Receive (Rx+)
8	Receive (Rx–)

Note: Category 5 UTP cables for FDDI require 1 ↔ 7 and 2 ↔ 8 crossovers.

RJ-45 Loopback Plug

Part No. 90713001–001

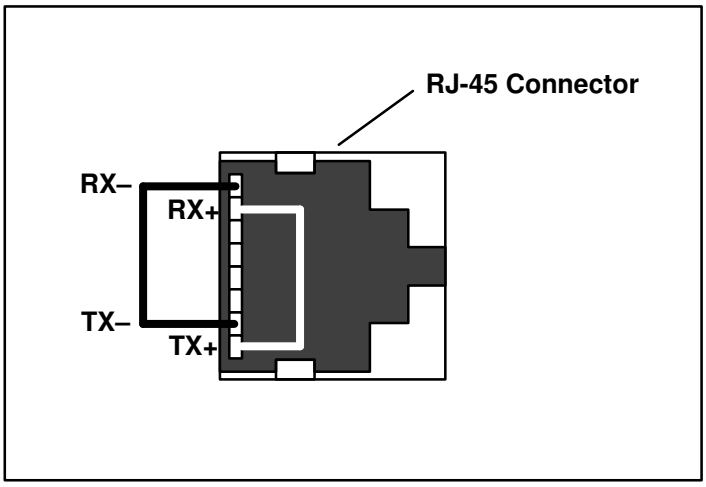


Figure 12. RJ-45 Pinout Showing Loopback.

RJ-45 Cable

M.I. CBLG159–1900

Part No. 90720001–001

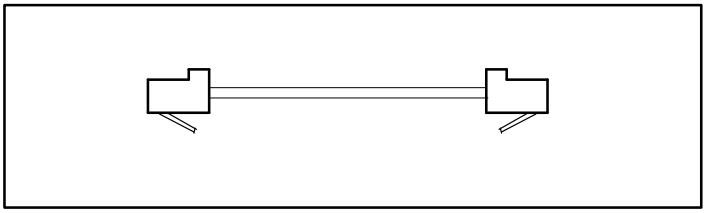


Figure 13. RJ-45 Cable.

Fiber Ring Connectors

MIC Fiber Loopback Plug (MCA adapters)

Part No. 92F9003

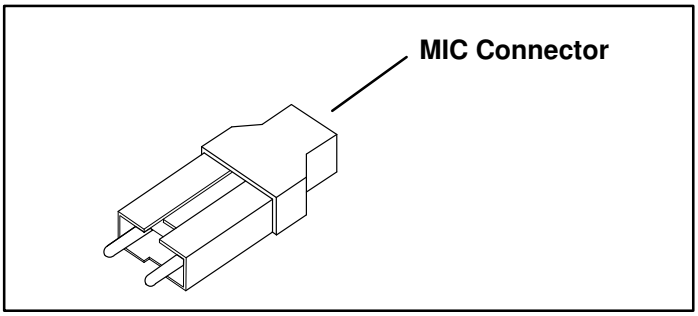


Figure 14. MIC Fiber Loopback Plug.

SC Fiber Loopback Plug (PCI adapters)

Part No. 16G5609

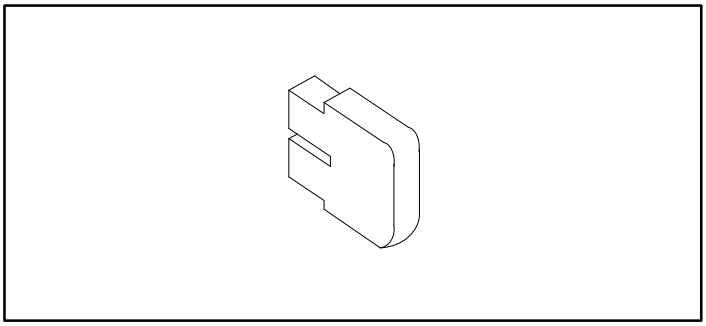


Figure 15. SC Fiber Loopback Plug.

Fiber Cable

Part No. CBLR065-210E

MIC/MIC Length 7.00 meters (Bull Express).

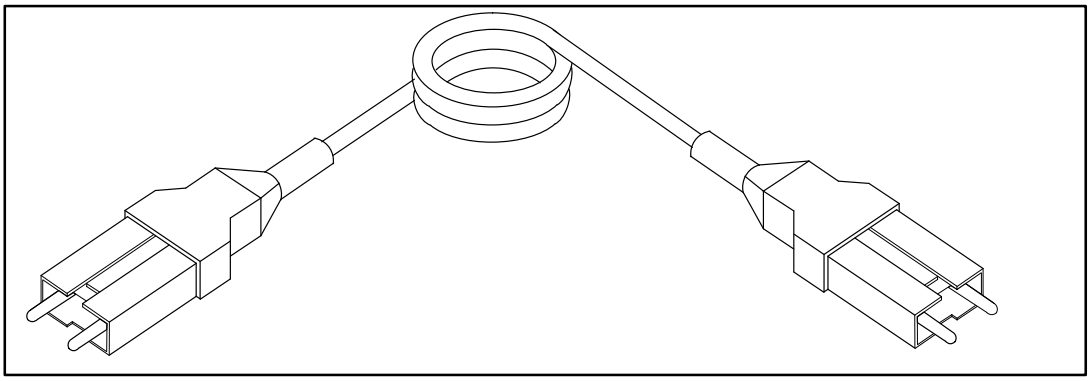


Figure 16. MIC/MIC Fiber Cable.

Part No. CBLG171-2000

MIC/SC Length 7.00 meters (Bull Express).

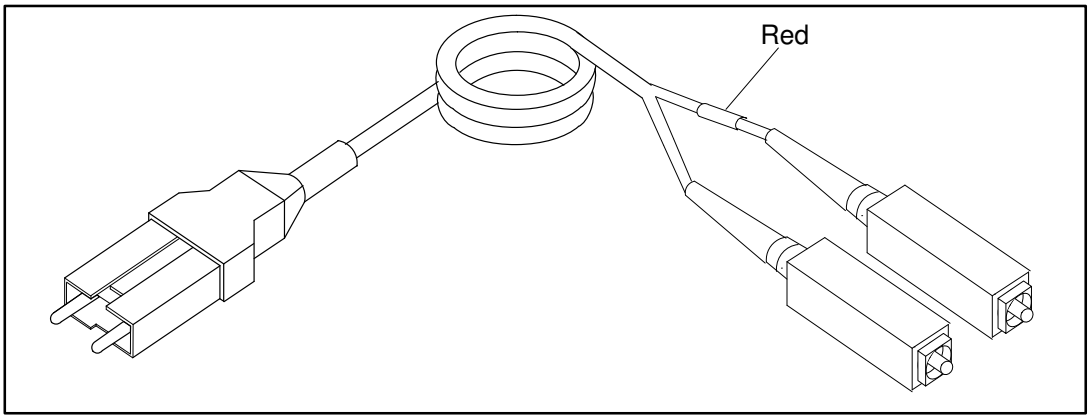


Figure 17. MIC/SC Fiber Cable.

Part No. CBLG170-2000

SC/SC Length 7.00 meters (Bull Express).

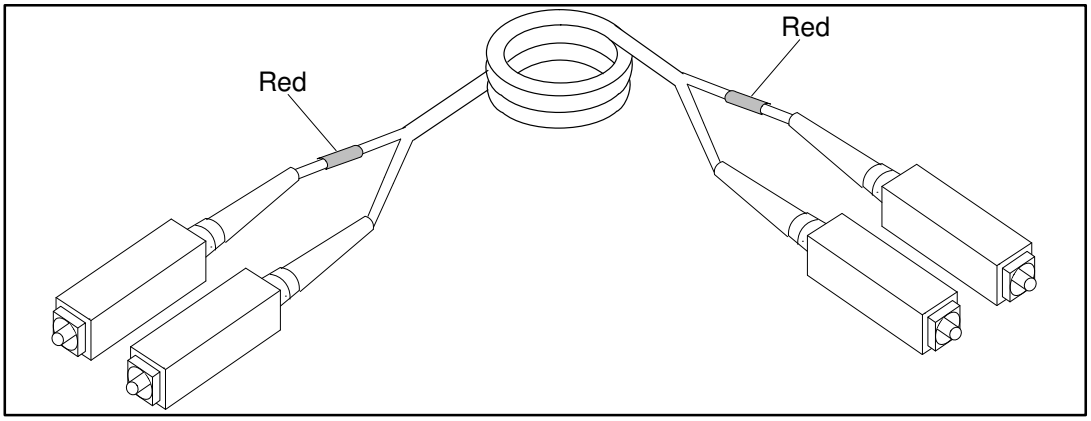
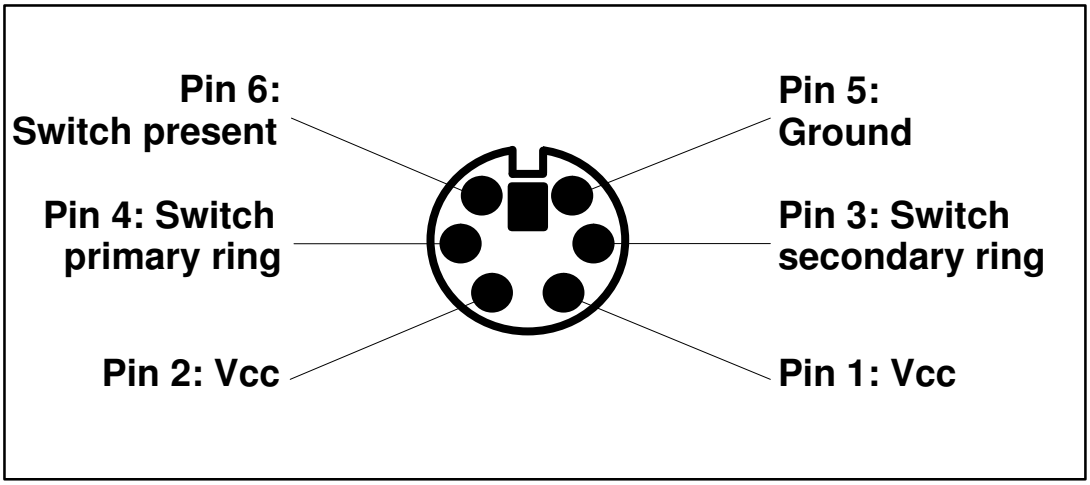


Figure 18. SC/SC Fiber Cable.

Optical Bypass Interface



See also **FDDI Adapters Installation**, Step 3 Note, on page 2-1.

Figure 19. Optical Bypass Interface.

Glossary

This glossary contains abbreviations, key–words and phrases that can be found in this document.

AC
Alternating Current

ANSI
American National Standards Institute

DAC
Dual Attachment Concentrator

DAS
Dual Attachment Station

ESS
End Station Support

FDDI
Fiber Distributed Data Interface

IPL
Initial Program Load

LLC
Logical Link Control

MAC
Media Access Control

MCA
Micro Channel Architecture

MIB
Management Information Base

MIC
Media Interface Connector

PCI
Peripheral Component Interconnect

PMF
Parameter Management Frame

SAC
Stand Alone Concentrator

SAS
Single Attachment Station

SBA
Synchronous Bandwidth Allocator

SMT
Station Management

SU
Synchronous Units

TTRT
Target Rotation Time

UTP
Unshielded Twisted Pair

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