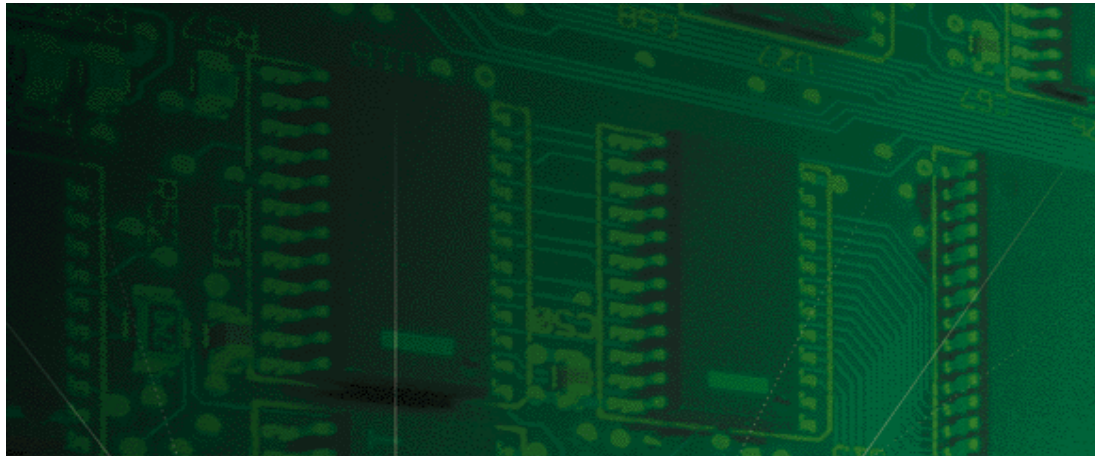# Dual DS3 Asynchronous Transfer Mode

3Com®

Network Interface Card
Product Reference

3Com ®

Dual DS3 Asynchronous Transfer Mode

Network Interface Card
Product Reference

CONTENTS

B TECHNICAL SPECIFICATIONS

ABOUT THIS REFERENCE

About This Reference provides an overview of this reference, tells where to look for specific information and how to contact 3Com, and lists reference conventions and product compatibility.

This reference describes how to configure the Dual DS3 Asynchronous Transfer Mode (ATM) Network Interface Card (NIC).

This reference is primarily intended for network engineers and system administrators who will install, update, and troubleshoot this product. This reference assumes a medium to high level knowledge of the ATM protocols and a general knowledge of networking and telecommunications.

Release notes are shipped with some products. If the information in the release notes differs from the information in this reference, follow the instructions in the release notes.

Finding Specific Information in This Reference

This table shows the location of specific information in this reference.

If you are looking for	Turn to
List of supported features	Chapter 1
DS3 interface configuration information	Chapter 2
Ethernet interface configuration information	Chapter 3

Document Conventions	These tables list conventions used throughout this guide.	

Icon	Notice Type	Description
	Information note	Information that contains important features or instructions.
	Caution	Information to alert you to potential damage to a program, system, or device.
	Warning	Information to alert you to potential personal injury or fatality. May also alert you to potential electrical hazard.
	ESD	Information to alert you to take proper grounding precautions before handling a product.

Convention	Description
Text represented as a `screen display`	`This typeface` represents displays that appear on your terminal screen, for example: `Netlogin:`
Text represented as **commands**	**This typeface** represents commands that you enter for example: **setenv TCMHOME directory** *This guide always gives the full form of a command in uppercase and lowercase letters. However, you can abbreviate commands by entering only the uppercase letters and the appropriate value. Commands are not case-sensitive.*
Text represented as **menu** or **sub-menu names**.	**This typeface** represents all menu and sub-menu names within procedures, for example: On the **File** menu, click **New**.

Product Compatibility	The Dual DS3 ATM NIC is compatible with the HiPer Access Router Card (HiPer ARC) Network Application Card (NAC).

Contacting 3Com   Call the appropriate toll free number listed below for technical support.

i   *For European countries that do not have a toll free number listed, call +31 30 602 9900.*

Country	Toll Free Number	Country	Toll Free Number
Austria	06 607468	**Netherlands**	0800 0227788
Belgium	0800 71429	**Norway**	800 11376
Canada	1800 2318770	**Poland**	00800 3111206
Denmark	800 17309	**Portugal**	0800 831416
Finland	0800 113153	**South Africa**	0800 995014
France	0800 917959	**Spain**	900 983125
Germany	0800 1821502	**Sweden**	020 795482
Hungary	00800 12813	**Switzerland**	0800 553072
Ireland	1800 553117	**UK**	0800 966197
Israel	0800 9453794	**United States**	1800 2318770
Italy	1678 79489	***All Other Locations*** *(Outside Europe)*	1847 7976600

Refer to the Total Control Hub Documentation CD-ROM for more information regarding product warranty.

i   *For information about Customer Service, including support, training, code releases and updates, contracts, and documentation, visit our website at **http://totalservice.3com.com***

1
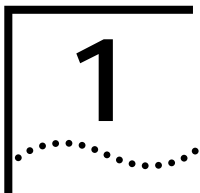
OVERVIEW

This chapter contains an overview of supported features.

Supported Features

The Dual DS3 Asynchronous Transfer Mode (ATM) Network Interface Card (NIC) works in conjunction with firmware running on the HiPer Access Router Card (HiPer ARC) to provide a high speed ATM output pipe on the 3Com Total Control Enterprise Network Hub.

The ATM NIC supports:

- Dual DS3 interfaces for cascading multiple chassis
- Single auto-sensing 10/100Base-TX Ethernet interface
- Various standards for routing local area network (LAN) traffic over an ATM network including:
    - RFC-1483—Multiprotocol encapsulation
    - RFC-1577—Classical Internet Protocol (IP) and Address Resolution Protocol (ARP)
- Configuration via the HiPer ARC's command line interface (CLI)

2

DS3 INTERFACE CONFIGURATION

This chapter provides Dual DS3 Asynchronous Transfer Mode (ATM) Network Interface Card (NIC) configuring instructions for:

- Multiprotocol encapsulation over ATM (RFC-1483)
- Classical Internet Protocol (IP) and Address Resolution Protocol (ARP) over ATM (RFC-1577)
- DS3 physical interface configuration
- Cascading multiple ATM NICs
- Configuring for public or non-Interim Link Management Interface (ILMI) ATM switches

This guide covers the HiPer Access Router Card (HiPer ARC) command line interface (CLI) ATM NIC configuration options. Refer to the HiPer ARC documentation set for additional configuration information.

Configuring for RFC-1483

RFC-1483 allows the encapsulation of IP, IPX, and AppleTalk protocols over an ATM network.

The ATM NIC supports only IP protocol encapsulation.

To configure the ATM NIC to support RFC-1483 compliant networks:

1 Access the HiPer ARC's CLI via a terminal emulation program running on a personal computer (PC) or terminal connected to the NIC's console port. A successful connection displays the following prompt:

HiPer>>

2 At the prompt, enter:

```
add [network type] network [network name] address [network
address] frame atm1483 interface [atmnet:1]
```

Variable	Description
network type	The type of network to be supported: IP
network name	An arbitrary name for the network to allow easy recognition and configuration on the HiPer ARC
network address	The IP host address for the ATM span interface
atmnet:1	Since this release allows only the Span A port to be configured for independent use, only the atmnet:1 logical interface is available

3 Press **Enter** to execute the command.

Configuring for Multiple Subnets

To configure multiple subnets for the same DS3 interface, repeat the previous procedures for configuring an RFC-1483 compliant network supplying a different network name and address on the command line.

Configuring RFC-1483 PVCs

To configure Permanent Virtual Circuits (PVCs) for configured RFC-1483 compliant networks:

The ATM NIC supports up to 512 Virtual Circuits (VCs) (both PVCs and Switched Virtual Circuits (SVCs)) total.

1 Access the HiPer ARC's CLI via a terminal emulation program running on the PC or terminal connected to the NIC's console port. A successful connection displays the following prompt:

```
HiPer>>
```

2 At the prompt, enter:

```
add atm1483 pvc [pvc name] address [network address] network
[network name] interface [atmaal:1] vpi [0-255] vci
[32-65535] peak [32-65535]
```

Variable	Description
pvc name	An arbitrary name for the Permanent Virtual Circuit (PVC) to allow easy recognition and configuration on the HiPer ARC
network address	The IP host address for the other end of the PVC (for example, a router)
network name	The name of the network for which the PVC is being specified
atmaal:1	Since this release allows only the Span A port to be configured for independent use, only the atmaal:1 logical interface is available; if an interface is not specified, it will default to atmaal:1
0–255	A value representing the Virtual Path Identifier (VPI) for this PVC; if no VPI value is specified, the value defaults to 0
32–65535	The value representing the Virtual Channel Identifier (VCI) for this PVC
32–65535	The peak bandwidth for this PVC in kilobits/second; if no peak value is specified, the value defaults to 0 which represents a bandwidth of 1/10 of the interface speed

3 Press **Enter** to execute the command.

4 At the prompt, enter:

```
save all
```

This step saves any configuration changes to the HiPer ARC's NVRAM. Any changes that are not saved will be lost when the HiPer ARC reboots.

5 Press **Enter** to execute the command.

Configuring for RFC-1577

RFC-1577 allows classical IP and ARP over an ATM network.

To configure the ATM NIC to support RFC-1577 compliant networks:

1 Access the HiPer ARC's CLI via a terminal emulation program running on the PC or terminal connected to the NIC's console port. A successful connection displays the following prompt:

```
HiPer>>
```

2 At the prompt, enter:

```
add [network type] network [network name] address [network
address] frame atm1577 interface [atmnet:1]
```

Variable	Description
network type	The type of network to be supported (which is IP)
network name	An arbitrary name for the network to allow easy recognition and configuration on the HiPer ARC
network address	The IP or host address for the ATM span interface
atmnet:1	Since this release allows only the Span A port to be configured for independent use, only the atmnet:1 logical interface is available

3 Press **Enter** to execute the command.

4 At the prompt, enter:

```
save all
```

This step saves any configuration changes to the HiPer ARC's NVRAM. Any changes that are not saved will be lost when the HiPer ARC reboots.

5 Press **Enter** to execute the command.

Configuring for Multiple Subnets   To configure multiple subnets for the same DS3 interface, repeat the previous procedures for configuring an RFC-1577 compliant network supplying a different network name and address on the command line.

Configuring RFC-1577 PVCs   To configure Permanent Virtual Circuits (PVCs) for RFC-1577 compliant networks:

The ATM NIC supports up to 512 Virtual Circuits (VCs) (both PVCs and Switched Virtual Circuits (SVCs)) total.

1 Access the HiPer ARC's CLI via a terminal emulation program running on the PC or terminal connected to the NIC's console port. A successful connection displays the following prompt:

```
HiPer>>
```

2 At the prompt, enter:

```
add atm1577 pvc [pvc name] network [network name] interface
[atmaal:1] vpi [0-255] vci [32-65535] peak [32-65535]
```

Variable	Description
pvc name	An arbitrary name for the Permanent Virtual Circuit (PVC) for easy recognition and configuration on the HiPer ARC
network name	The name of the network for which the PVC is being specified
atmaal:1	Since this release allows only the Span A port to be configured for independent use, only the atmaal:1 logical interface is available; if an interface is not specified, it will default to atmaal:1
0–255	A value representing the Virtual Path Identifier (VPI) for this PVC; if no VPI value is specified, the value defaults to 0
32–65535	The value representing the Virtual Channel Identifier (VCI) for this PVC
32–65535	The peak bandwidth for this PVC in Kbps; if no peak value is specified, the value defaults to 0 which represents a bandwidth of 1/10 of the interface speed

3 Press **Enter** to execute the command.

4 At the prompt, enter:

```
save all
```

*This step saves any configuration changes to the HiPer ARC's NVRAM.
Any changes that are not saved will be lost when the HiPer ARC reboots.*

5 Press **Enter** to execute the command.

**Configuring RFC-1577
ATM ARP Servers**

To configure an ATM ARP (Address Resolution Protocol) Server for
RFC-1577 compliant networks:

1 Access the HiPer ARC's CLI via a terminal emulation program running on
the PC or terminal connected to the NIC's console port. A successful
connection displays the following prompt:

```
HiPer>>
```

2 At the prompt, enter:

```
add atm_arp_server [ARP server name] atm_address [atm
address] network [network name]
```

Variable	Description
ARP server name	An arbitrary name for the ARP server to allow easy recognition and configuration on the HiPer ARC
atm address	The address of the Network Service Access Point (NSAP) ATM ARP Server; it is a 20 digit Hex number separated by "." s
network name	The name of the network for which the ARP Server is being specified

3 Press **Enter** to execute the command.

4 At the prompt, enter:

```
save all
```

This step saves any configuration changes to the HiPer ARC's NVRAM. Any changes that are not saved will be lost when the HiPer ARC reboots.

5 Press **Enter** to execute the command.

Configuring Physical DS3 Interfaces

The ATM NIC's physical DS3 interfaces have several configurable options:

■ Payload scrambling

Prevents the transmission of large sequences of zeroes that could be interpreted as errors.

Enable this option only if your ATM switch supports the payload scrambling feature.

■ Line type

Selects the method by which data inside the ATM cells are formatted: C-bit, Clear Channel, or M-23. C-bit parity is the most commonly used format and is the default configuration.

■ Frame type

Selects the method by which the cells are formatted: ATM Direct Mapping (ADM) or the Physical Layer Convergence Protocol (PLCP). The default configuration is ADM.

■ Cable length

  Allows the ATM NIC to be configured for long-haul (the cable length between NIC and switch is 0–450 ft) or short-haul (DSX3, the cable length between the NIC and the switch is 0–225 ft).

■ Clock source

  Selects the timing source for the DS3 port. If the port is an independent port, configure the timing source as external (the timing source will be the ATM switch). If the port cascades additional NICs, configure the timing source as internal.

To configure the physical DS3 port:

1 Access the HiPer ARC's CLI via a terminal emulation program running on the PC or terminal connected to the NIC's console port. A successful connection displays the following prompt:

HiPer>>

2 At the prompt, enter:

set ATM interface [ds3:1 | ds3:2] payload_scrambling [scrambling] line_type [line type] frame_type [frame type] cable_length [cable length] clock_source [source]

Variable	Description
ds3:1 | ds3:2	The physical DS3 interface name: Span A corresponds to ds3:1 and Span B corresponds to DS3:2
scrambling	This variable can be configured as On or Off
line type	This variable can be configured to C-Bit, CCHAN (Clear Channel), or M23
frame type	This variable can be configured to ADM or PLCP
cable length	This variable can be configured for Long_Haul or Short_Haul
source	This variable can be set to Internal or External

3 Press **Enter** to execute the command.

4 At the prompt, enter:

save all

This step saves any configuration changes to the HiPer ARC's NVRAM. Any changes that are not saved will be lost when the HiPer ARC reboots.

5 Press **Enter** to execute the command.

Cascading Multiple ATM NICs

Configure cross-connections for VPIs and VCIs first if you have cascading multiple ATM NICs.

To configure the cross-connections:

1 Access the HiPer ARC's CLI via a terminal emulation program running on the PC or terminal connected to the NIC's console port. A successful connection displays the following prompt:

HiPer>>

2 At the prompt, enter:

add cross_connect [name] vci1 [vci1 value] vci2 [vci2 value] vpi1 [vpi1 value] vpi2 [vpi2 value] peak [peak value]

Variable	Description
name	An arbitrary name for the cross connection to allow for easy recognition and configuration on the HiPer ARC
vci1 value	The specific VCI for the PVC on Line A to be connected
vci2 value	The specific VCI for the PVC on Line B that the vci1 value will be connected to
vpi1 value	The specific VPI for the PVC on Line A to be connected
vpi2 value	The specific VPI for the PVC on Line B to which the vci1 value will be connected
peak value	The peak bandwidth for this PVC in Kbps; if no peak value is specified, the value defaults to 0 which represents a bandwidth of 1/10 of the interface speed

3 Press **Enter** to execute the command.

4 At the prompt, enter:

save all

This step saves any configuration changes to the HiPer ARC's NVRAM. Any changes that are not saved will be lost when the HiPer ARC reboots.

5 Press **Enter** to execute the command.

Configuring for Public or Non-ILMI Switches

If the ATM switch to which you are connecting is a public switch, or the private switch being used does not support Interim Link Interface Management (ILMI) address registration, configure the ATM address to use when establishing RFC-1577 SVCs on a network.

To configure the address:

1 Access the HiPer ARC's CLI via a terminal emulation program running on the PC or terminal connected to the NIC's console port. A successful connection displays the following prompt:

HiPer>>

2 At the prompt, enter:

set atm_address network [network name] address [address]

Variable	Description
network name	This is the name of the network for which the address is being specified
address	This is the NSAP address (for the local network as configured on your switch) to be used for SVCs on this network; it is a 20 digit Hex number separated by " . " s

3 Press **Enter** to execute the command.

4 At the prompt, enter:

save all

This step saves any configuration changes to the HiPer ARC's NVRAM. Any changes that are not saved will be lost when the HiPer ARC reboots.

5 Press **Enter** to execute the command.

3

CONFIGURING THE ETHERNET INTERFACE

This chapter provides instructions for configuring the Dual DS3 Asynchronous Transfer Mode (ATM) Network Interface Card (NIC) Ethernet interface for:

- Configuring the Ethernet interface for the first time
- Re-configuring the Ethernet interface

Configuring the Ethernet Interface for the First Time

The first time the HiPer Access Router Card (HiPer ARC) Network Application Card (NAC) running the ATM firmware is powered up, a program called QuickSetup begins on the NAC's command line interface (CLI). This program automatically configures network management, Ethernet network, and system identification variables based upon your input.

To perform QuickSetup:

1 Connect a personal computer (PC) or terminal to the NIC's console port and launch a terminal emulation program. Refer to *Chapter 2: DS3 Interface Configuration* for connection information.

2 Install the HiPer ARC NAC according to the documentation set.

Once the HiPer ARC boots, the QuickSetup program runs on the CLI.

3 Choose one of the following two configuration options:

- Basic configuration used in conjunction with the Windows-based Access Router Manager software.
- Simple configuration done entirely through the QuickSetup program.

4 Respond to each of the QuickSetup prompts. An explanation is provided with every prompt to simplify the configuration process.

Once you have made and accepted all necessary configurations, the information is stored to NVRAM and the NAC reboots.

Reconfiguring the Ethernet Interface	To reconfigure the Ethernet network information:

1 Access the HiPer ARC's CLI via a terminal emulation program running on the PC or terminal connected to the NIC's console port. A successful connection displays the following prompt:
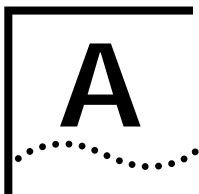
HiPer>>

2 At the prompt, enter:

reconfigure ip network <network name> address <ip address/subnet mask> frame <frame type> interface <interface name>

Variable	Description
network name	The name previously assigned to the network to allow for easy recognition and configuration on the HiPer ARC
ip address/subnet mask	The IP address/Subnet mask to be assigned to the Ethernet port
frame type	The new frame type to for the Ethernet interface; the options are: Ethernet II or SNAP
interface name	The Ethernet interface name: eth:1

3 Press **Enter** to execute the command.

A

TROUBLE CLEARING

Trouble Clearing   This section provides information on using the HiPer Access Router Card (HiPer ARC) Network Application Card (NAC) light emitting diodes (LEDs) and command line interface (CLI) to clear problems experienced during the installation or operation of the Dual DS3 Asynchronous Transfer Mode (ATM) Network Interface Card (NIC).

Using the HiPer ARC's LEDs   The tri-colored LEDs on the front panel of the HiPer ARC NAC help trouble clear various conditions ranging from NIC operational status to line conditions. The following table lists the possible LED color codes and the conditions they represent.

LAN TX	LAN RX	WAN TX	WAN RX	STAT 1	STAT 2	STAT 3	LED Condition/Correction
N/A	N/A	None	None	None	None	None	*Loss of TE power to NIC*
N/A	N/A	N/A	N/A	Green	Green	Green	*NIC is fully operational*
N/A	N/A	N/A	N/A	Green	Amber/ Green	Amber/ Green	*RAI error received*
N/A	N/A	N/A	N/A	None	None/ Green	None/ Green	*Loss of signal*
N/A	N/A	N/A	N/A	None	Red/ Green	Red/ Green	*Loss of frame*
N/A	N/A	N/A	N/A	Amber	Amber/ Green	Amber/ Green	*AIS error received*
N/A	N/A	N/A	N/A	Amber	Red/ Green	Red/ Green	*RAI and CRC errors received*
N/A	N/A	N/A	N/A	Amber	Amber	Amber	*NIC power up (transient)*
None/ Green	None/ Green	N/A	N/A	N/A	N/A	N/A	*LAN connection up*
None	None	N/A	N/A	N/A	N/A	N/A	*LAN connection down*

Using the HiPer ARC's CLI The HiPer ARC's CLI is a useful tool in clearing problems with the NIC's interfaces.

To view the operational and administrative status of the various interfaces, type the following command at the command prompt:

`list interface`

Issuing the command provides information on the following interfaces:

- **ds3:1 and ds3:2**

    The physical DS3 interface.

- **eth:1**

    The physical Ethernet interface.
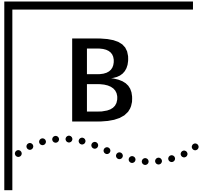
- **slot:<slot number>/mod:<modem number>**

    A listing of available modem channels on a per-slot basis in the Total Control chassis.

- **atmaal:1 and atmaal:2**

    The ATM Adaptation layers that conforms data to AAL-5.

- **atmcell:1 and atmcell:2**

    The ATM layers that organize data into 53-byte cells for ATM ports 1 and 2.

B TECHNICAL SPECIFICATIONS

Certification

EMI/RFI	■	FCC 15A
	■	EN55022 A
Safety	■	UL 1950
	■	C-UL
	■	EN 60950
	■	JATE

Regulatory Compliance Statements

United States

FCC Part 15 Compliance Statement

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

Interface Specifications

Console Port

Electrical Specification:	RS-232-C (EIA/TIA-232-E standard)
Connector:	RJ-45, 8 position modular jack
Configuration:	Data Terminal Equipment (DTE)
Transmission Method:	Unbalanced RS-232
Transmission Rate:	115,200 bps maximum

Line A and Line B DS3 Ports

Electrical Specification:	DS3/DSX3 interface
Connectors:	BNC coaxial connectors; one transmit (TX) and one receive (RX)
Transmission Media:	75 ohm (nominal impedance) coaxial cable
Cable Distance:	DS3 ■ 0–450 ft (137.16 m) DSX3 ■ 0–225 ft (68.58 m)
Timing Source:	User selectable between: ■ Internal ■ Network
Specifications:	■ ANSI T1.102 ■ T1.404 ■ T1.107 ■ T1.107a ■ GR-499-CORE
Framing:	■ C-bit Parity or Clear Channel ■ ATM Physical layer Convergence Protocol (PLCP) [Optional]
Line Coding:	Binary Eight Zero Code Supression (B8ZS)

Ethernet 10Base-T/100Base-TX Ports

Data Transfer Rate:	10/100 Mbps auto-negotiated
Connector:	8-position modular jack, Stewart 88-360808 or equivalent
Accessing Scheme:	Carrier Sense Multiple Access with Collision Detection (CSMA/CD)
Topology:	Star-wired hub using multiport repeater
Maximum Nodes:	Limited only by repeater
Transmission Medium:	Unshielded Twisted Pair (UTP) Category 3 or Category 5 for 10Base-T applications, Category 5 for 100Base-TX
Network Lobe Distance:	100 m (328 ft) suggested maximum. Longer cabling can be used at the expense of reduced receiver squelch levels.

Current Draw

+5.2 vDC @ 2.0 A typical maximum

Typical Maximum refers to the maximum current draw under most typical configurations.

Environment

Shipping and Storage

Temperature:	-25 to 75° C, -13 to 167° F
Relative Humidity:	0 to 100%, Non-condensing

Operating

Temperature:	0 to 40° C, 32 to 104° F
Relative Humidity:	0 to 95%, Non-condensing

Physical Dimensions

	Inches	Centimeters
Length:	5.30	13.46
Width:	0.79	2.00
Height:	6.90	17.53

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