FORMULA 8200™

AT-8202

ATM Uplink

USER'S GUIDE

FOR USE WITH THE
FORMULA 8200™
FAST ETHERNET WORKGROUP
SWITCH

PN 613-10686-00 Rev. A

Allied Telesyn

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Appendix A

Preface

This user's guide explains how to configure the AT-8202 ATM uplink port installed in the FORMULA 8200™ switch and optimize its available services.

Who Should Use This Guide

This guide is designed for you, the network administrator, to set up and operate the ATM uplink on the FORMULA 8200 switch. You must be familiar with ATM network administration.

This guide assumes that a FORMULA 8200 with an ATM uplink card is already installed and is operational in your network.

Note

Some configurations described in this guide require prior setups, such as VLAN creation. In such cases, this guide will refer you to the *FORMULA 8200 User's Guide* for related procedures.

How This Guide Is Organized

This guide consists of the following sections:

Chapter 1, **ATM Network Configuration**, provides a a list of features, initial configuration procedures, and overview of ATM services.

Chapter 2, **ATM Commands**, provides information on accessing the command line interface (CLI), how to enter commands, and command reference.

Appendix A, **ATM Acronyms and Terms**, provides a list of ATM-related acronyms and abbreviations and their descriptions

The **Index** at the back of this guide is according to subject matter.

For a definition of terms commonly used in Allied Telesyn technical publications, refer to the website glossary at **www.alliedtelesyn.com**.

Document Conventions Used in This Guide

This section describes the typographic conventions used in this guide.

Note

The command line interface (CLI) portion of the FORMULA 8200 is not case sensitive; however, this manual shows commands in uppercase letters. You may type your commands in either uppercase or lowercase, as shown in some of the examples.

Example	Meaning
`Local IP configuration`: The **ATM/CONFIG/CREATE** command is used to create an ATM service. Enter **CREATE/PTOP <ptop #>**. Press [Enter] to execute a command.	System prompts and messages are shown in COURIER font. Commands or other input the user must supply are shown in **BOLDFACE** capital letters. Text in angle brackets after a command indicates user-defined input must follow the command. For example, in place of **<ptop #>**, you type **2**. Keys named in text are shown enclosed in square brackets. ([Enter] is used to denote either the **Enter** or the **Return** key) When directed to enter a command, this guide implies that you type the required text and then press [ENTER].
Read Chapter 6 in the *User Guide*.	Book titles are shown in *italic* type.

Example	Meaning
To install the switch on a flat surface: 1. User action Results of user's action 2. User action	The Procedure icon denotes a series of numbered steps the user must perform. Each step may be followed by text that explains the result of the user action.

This guide uses the following symbols to highlight special messages:

Note

A note provides information of importance or special interest.

Caution

A caution provides information that will help you prevent **equipment failure or loss of data**.

Warning

A warning provides information that will help you prevent **injury or equipment damage**.

Related Documents

In addition to this user guide, refer also to the following related publications on the FORMULA 8200 switch:

- *FORMULA 8200 Installation Guide* for information on how to install and set up the switch
- *FORMULA 8200 User's Guide* for information about configuring, using, and monitoring the switch
- *AT-8202 and AT-8203 Uplink Installation Guide* for information on how to install the ATM or FDDI uplink card and the accelerator card
- *Software Release Notes* for the latest information about the product

These publications are distributed from Allied Telesyn's website at **www.alliedtelesyn.com/manuals.htm**.

Recommended Reading

The following documents provide additional information on the topics described in this guide:

Interconnections: Bridges and Routers, Radia Perlman (1992).

Troubleshooting TCP/IP, Mark Miller (1992).

Internetworking with TCP/IP, Douglas Comer (1991).

The ATM Forum's LAN Emulation Over ATM Specifications

For more information on obtaining ATM specifications, contact the ATM Forum by:

- Checking its website at **www.atmforum.com**
- Sending e-mail to **info@atmforum.com**

Note that some ATM publications and contributions may be available to ATM Forum members only.

Allied Telesyn's Software Library

The Software Library, a link to Allied Telesyn's FTP site, contains Allied Telesyn adapter drivers, system and management utilities, software updates, and ASCII documents.

Refer to the following information to access the FTP server:

Address: **ftp.alliedtelesyn.com** [lowercase letters]
Login: **anonymous** [lowercase letters]
Password: **your e-mail address** [requested by the server at login

Chapter 1
ATM Network Configuration

This chapter :

- Lists the key ATM features of the FORMULA 8200
- Shows how to configure the ATM port
- Shows how to set parameters for specific ATM functions you want to run (LEC, CIP, PTOP, or trunking)

The commands used in this section are also described in Chapter 2, **ATM Commands**.

Features

The ATM uplink card supports the following ATM key functions:

- Switched virtual circuit (SVC) and permanent virtual circuit (PVC) connections, including trunking
- ATM Forum's LAN Emulation Client (LEC) standard
- RFC 1577 Classical IP (CIP) and ARP over ATM
- ATM Forum's User Network Interface (UNI) 3.0 and 3.1 signaling standard
- ATM Forum's Interim Local Management Interface (ILMI) 1.0

Configuring the ATM Port

This section describes the first of a two-part process to configure the ATM network.

To configure an ATM port, use the **ATM/CONFIG/MODIFY/PORT** command to display screen similar to Figure 1-1.

```
/ATM/CONFIG/MODIFY >PORT

                        ATM Port Configuration


1. ATM PVC/SVC Mode (PVC Mode (a), SVC Mode (b)):   SVC Mode
2. Signaling Version (3.0(a), 3.1(b)):              Uni 3.0
3. ILMI Enable (Enable(a), Disable(b)):             Enable
4. ILMI Poll Enable (Enable(a), Disable(b)):        Disable
5. Scrambling Enable (Enable(a), Disable(b)):       Enable
6. Timing Mode (Loop(a), Local(b)):                 Local

Enter Selection, 0 to save the Modification or q to quit:
```

Figure 1-1 ATM Port Configuration Screen

Refer to Table 1-1 for a description of the port configuration parameters.

Table 1-1 ATM Port Configuration Parameters

Parameter	Description
PVC/SVC Mode	Whether this port is configured for permanent virtual circuit or switched virtual circuit mode
Signaling Version	The FORMULA 8200 supports UNI 3.0 or UNI 3.1. Set this value depending upon the UNI support on the ATM switch to which you have connected the FORMULA 8200. Reboot the switch when the setting signaling version changes. Default: UNI 3.0.
ILMI Enable	ILMI provides network management (NMS) between an end-user and a public or private network. ILMI functions for configuration, status, and control information about the physical and ATM layer parameters are available for the ATM interface. Options: Enable or disable Default: Enable

Table 1-1 ATM Port Configuration Parameters (Continued)

Parameter	Description
ILMI Poll Enable	ILMI variables may be polled using this parameter. Options: Enable or disable Default: Enable
Scrambling Enable	Bit randomization to increase security Options: Enable or disable Default: Enable
Timing Mode	Clocking is performed by the FORMULA 8200 (local) or by another switch on the network (loop). Options: Local or loop. Default: local

Now that you have configured an ATM port, you need to select a service for forwarding data traffic for the ATM end-system environment. This comprises the second part of your ATM network configuration process.

The FORMULA 8200 switch ATM uplink module supports the following ATM end-system services:

- Classical IP (see page 1-4)
- LAN emulation client (LEC) (see page 1-7)
- Point-to-point bridging (PTOP) (see page 1-12)

Configuring Classical IP Over ATM (CIP)

Current classical IP (CIP) over the ATM model allows direct connections only between nodes that are in the same logical IP subnet (LIS). IP datagrams must traverse through routers whenever they go outside IP subnet boundaries, even when the source and destinations reside in the same ATM cloud.

IP switching is a way of providing high throughput IP packet transfer over ATM while maintaining full compatibility with existing IP networks and applications. IP switching dynamically selects application traffic that is likely to have long sessions for IP switching, while using conventional IP routing for low bandwidth application data.

You can configure up to 16 CIP connections for every FORMULA 8200 switch.

Note

When using CIP, make sure that the ATM port is configured for SVC mode.

To configure CIP parameters for an ATM service, you need to perform the following procedures in sequence:

1. Create a VLAN with a valid IP address, using the command, **VLAN/CONFIG/VLAN #**. Refer to the *FORMULA 8200 User's Guide* for the procedures.
2. Create a CIP service.
3. Set the connection type.
4. Set the following values:
   - ❑ The VCI value if it is a PVC connection
   - ❑ The ARP server ATM address if it is an SVC connection
5. Define an IP address and subnet mask for this CIP service.

   The CIP's IP address must be on a different subnet than the VLAN's IP address.
6. Save the CIP configuration

To configure CIP services:

1. Use the **VLAN/SHOW/VLAN** command to verify that a valid IP address exists.

   The **VLAN/SHOW/VLAN** command displays the following information:

```
/VLAN/SHOW/VLAN

Virtual LAN Information:
VLAN    VLAN              IP Network   Admin    Operation   Port
ID      Description       Address      Status   Status      Membership
====    ==============    ==========   ======   =========   ==========
1       Default VLAN(#1   1.1.1.1      ENABLE   ACTIVE      1-16
```

2. Create the CIP service using the **ATM/CONFIG/CREATE/CIP <CIP Index>** command.

   The valid CIP index values are from 0-15.

   A sample screen is shown in Figure 1-2. Table 1-2 provides a description of each parameter.

```
/ATM/CONFIG/CREATE > CIP 7

CIP Configuration

1. CIP Index:                                                    7
2. IP Address:                                                   137.168.132.7
3. IP Subnet Mask:                                               255.255.255.0
4. Description (Optional):                                       CIP Test 7
5. Admin Status (ENABLE(a), DISABLE(b)):                         ENABLED
6. Connection Type (PVC(a), SVC(b)):                             SVC
7. VCI Value (Reqd if PVC):
8. Arp Server ATM Address (Reqd if SVC):
9. Mtu Size:                                                     9180
10. RIP mode (Active (a), Deaf (b), Silent (c), Inactive (d)):   0

Enter Selection, 0 to save the Modification or 'q' to Quit: 0
```

Figure 1-2 Configuring CIP

Table 1-2 CIP Configuration Parameters

Parameter	Description
CIP Index	Index of this CIP entity
IP Address	Takes the same IP network number and subnet number of the LIS (logical IP subnetwork)
IP Subnet Mask	Subnet mask for this LIS entity
Description	Optional text description of up to 31 characters
Admin Status	Administrative status. Options: Enable or disable Default: Enable
Connection Type	Connection type. Options: PVC or SVC Default: PVC
VCI Value	If the connection type is PVC, the virtual channel identifier value for this connection
Arp Server ATM Address	If the connection type is SVC, the ATM address of the ARP server
Mtu Size	Maximum transfer unit size for data transfer for this entity Default is 9180, as defined in RFC 1577, Section 5
RIP Mode	Routing internet protocol mode for this CIP entity Default: Silent

3. Enter **2** at the prompt to enable the IP address field:

```
Enter Selection, 0 to save the Modification or ‘q’ to Quit: 2
```

4. Enter the IP address.

   The IP address for this CIP service must exist on a different connected subnet other than the VLAN on the target switch.

5. Enter the subnet mask.
6. Enter the connection type (PVC or SVC).

   Enter **A** for PVC or **B** for SVC.

7. Define the VCI value if your Step 6 entry is PVC;

   or

   Enter the ARP server ATM address if your Step 6 entry is SVC.

8. Keep the default value for MTU size.
9. Set the RIP mode.
10. Enter **0** to save the configuration.

Note

To connect two switches for CIP service, you must configure the other switch with a similar configuration. Also, both subnets and VCIs must be identical on both switches. The CIP index, however, does not need to be the same on both switches.

Configuring the LAN Emulation Client (LEC)

You can configure the FORMULA 8200 switch as a LAN emulation client (LEC) within an emulated LAN (ELAN) environment. An LEC is a type of virtual port that performs data forwarding, address resolution, and other control functions over ATM when attached to a bridge group on the switch. The LEC provides the MAC-level emulated Ethernet IEEE 802.3 service interface to higher-level software. The LEC uses the ATM Forum-specified signaling and LAN emulation control protocols to establish switched virtual connections (SVCs) with other LECs across ATM.

For detailed information on the LEC, refer to the ATM Forum specification, *LAN Emulation Over ATM (v1.0).*

To configure LEC parameters for an ATM service, you will need to:

- ❑ Configure a LEC service
- ❑ Define a VLAN ID or number
- ❑ Set the port service for binding an ATM port

Note

Make sure that the ATM port is configured for SVC mode and that the ILMI is enabled.

You can configure up to 16 LAN emulation clients (LECs).

To configure an ATM LEC service:

1. Verify that a valid IP address exists by using the **VLAN/SHOW/VLAN** command.

   The **VLAN/SHOW/VLAN** command displays the following information:

```
/VLAN/SHOW/VLAN

Virtual LAN Information:
VLAN    VLAN                IP Network   Admin     Operation   Port
ID      Description         Address      Status    Status      Membership
====    ===========         ==========   ======    =========   ==========
1       Default VLAN(#1     1.1.1.1      ENABLE    ACTIVE      1-16
```

Note

If an IP address does not exist for this VLAN, enter an IP address for the FORMULA 8200 using the **VLAN/CONFIG/VLAN #** command. Refer to the *FORMULA 8200 User's Guide* for details.

2. Create the LEC service using the **ATM/CONFIG/CREATE/LEC <LEC Number>** command.

   The LEC Configuration information is shown in the following screen. Table 1-3 provides a description of the parameters on the LEC Configuration screen.

```
/ATM/CONFIG/CREATE > LEC 1

LEC Configuration

1. LEC Number:                                    1
2. LEC Description (Optional):
3. ELAN Name (applicable only in AUTO mode):
4. Use LEC Config Server ATM (Yes(a), No(b)):     Yes
5. LEC Config Server ATM Address (Option 5a):      0x47009900000000
00000000000000a03e00000100
6. Control Time-out (in seconds):                 10
7. Max. Unknown Frame Count:                      1
8. Max. Unknown Frame Time (in seconds):          1
9. VCC Time-out(in seconds):                      1200
10. Max. Retry Count:                             1
11. Ageing Time (in seconds):                     300
12. Expected LE-ARP Resp Time (in seconds):       30
13. Flush Time-out (in seconds):                  4

Enter Selection, 0 to save the Modification or 'q' to Quit: 0
```

Table 1-3 LEC Configuration Parameters

Parameter	Description
LEC Number	The LEC index for this LEC Range: 0-31
LEC Description (Optional)	Optional text description of up to 31 characters
ELAN Name	The name of the ELAN of which this LEC is a member (AUTO mode only)
Use LEC Config Server ATM	Configuration mode Options: Yes or No
LEC Config Server ATM Address	If the configuration mode is Yes, the ATM address of the LECS. If the configuration mode is No, the ATM address of the LAN emulation server (LES)
Control Time-out	Join request timeout Range: 10 – 300 seconds
Max. Unknown Frame Count	Maximum unknown frame count Range: 1 – 10. Default: 1
Max. Unknown Frame Time	Maximum unknown frame time Range: 1 – 60 seconds Default: 1 second
VCC Time-out	VCC entry aging timer. Default: 1200 second
Max. Retry Count	Maximum retries for LE ARP entry Range: 0 – 2
Ageing Time	LE ARP entry aging Range: 10 – 300 seconds
Expected LE-ARP Resp Time	Expected LE ARP response time Range: 1 – 30 seconds
Flush Time-out	Flush request timeout Range: 1 – 4 seconds

3. Bind the port service to the LEC by entering:

   PORTSERV/CONFIG/CREATE 34

Note

The value, 34, is the ATM uplink's port number designation. This port number is fixed; you cannot change it.

The screen displays the following information:

```
/PORTSERV/CONFIG/CREATE 34

Select an ATM Service to bind
1. ATM/LEC
2. ATM/PTOP
3. ATM/TRUNK
Enter an ATM service selection>

Select a VLAN to attach the service

Virtual LAN Information:
VLAN    VLAN                IP Network   Admin     Operation   Port
ID      Description         Address      Status    Status      Membership
====    ===========         ==========   ======    =========   ==========
1       Default VLAN(#1     1.1.1.1      ENABLE    ACTIVE      1-16
```

Table 1-4 provides a description of the parameters associated with binding a port service to a LEC.

Table 1-4 Bind Parameters for LEC Configuration

Parameter	Description
Select ATM service to bind: 1) ATM/LEC 2) ATM PTOP 3) ATM/TRUNK	 Bind LAN emulation client to ATM service. Bind point to point to ATM service. Bind trunking service to ATM service.
Enter an ATM Service selection	Indicate ATM service selection
Enter a LEC selection (c to cancel)	Indicate a LEC selection
Port service description (PS for LEC 1)	Port service selection (default)
Port service 1 is created for physical port 34	Report information only
Port service 1 is bound with ATMLEC 1	Report information only
Updating system/VLAN configuration	Report information only

4. Enter a number for the ATM service to bind.

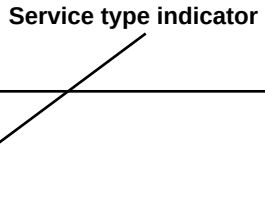
5. Enter **1** for VLAN ID 1.

```
Enter VLAN selection (c to cancel): >1
Select ATM Service to bind

1) ATM/LEC
2) ATM/PTOP
3) ATM/TRUNK
```

6. Enter **1** for ATM/LEC.

```
Enter ATM service selection: >1

LEC #     STATE               BIND                NAME
=====     ================    ================    ==============
1         Inactive--------    Unbound---------    FORELAN1

Enter a LEC selection (c to cancel): .1
Port Service Description (PS for LEC 1) : LEC test
Port service 1 is created for physical port 34
Port service 1 is bound with ATMLEC 1
Updating system/VLAN configuration...
```

7. Use the **ATM/SHOW/LEC <LEC Number>** command to verify that the LEC service has been created.
8. Verify that the LEC service is bound by using the **PORTSERV/SHOW/PORTSERV 34** command.




```
/PORTSERV/SHOW/ >PORTSERV 34

Phyport  Phyport   Phyport   PortServ   PortServ     Admin    Operation   VLAN
ID       Type      Number    Type/ID    Description  Status   Status      Number
====     =======   =======   ========   ===========  ======   =========   ======

34       ATMOC3     1        ATMLEC/1   1 test       ENABLE   ACTIVE      1
```

The LEC service has been successfully configured on the switch.

Configuring Point-to-Point (PTOP)

PTOP bridging enables setup between two or more parties to share a virtual channel connection (VCC) using either a permanent virtual connection (PVC) or a switched virtual connection (SVC). This feature supports up to 16 PTOP connections. Only one VLAN and one VCI at a time can participate in a PTOP configuration.

To configure PTOP parameters for an ATM service, you need to:

- Set the PTOP instance ID.
- Set the VCI value.
- Set the port service for binding an ATM port.

A VLAN with a valid IP address must exist prior to configuring PTOP.

To configure PTOP:

Note

Values shown are for example purposes only; replace with values that apply to your own configuration.

1. Verify the existence of the VLAN you plan to configure by using the **VLAN/SHOW/VLAN** command.

```
/VLAN/SHOW >VLAN

Virtual LAN Information:
VLAN    VLAN                IP Network   Admin     Operation   Port
ID      Description         Address      Status    Status      Membership
====    ===============     ==========   =======   =======     ==========
1       Default VLAN(#1     1.1.1.1      ENABLE    ACTIVE      1-16
```

Note

If the VLAN does not exist, create it using the **VLAN/CONFIG/VLAN #** command.

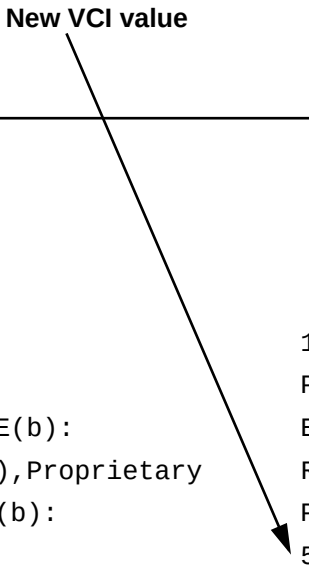
2. Create the PTOP services using the **ATM/CONFIG/CREATE/ PTOP <PTOP Instance ID>** command.

```
/ATM/CONFIG/CREATE >PTOP 1

PTOP Configuration

1. PTOP Index:                                    1
2. PTOP Description (Optional):                   PTOP Instance 1
3. Admin Status(ENABLE(a),DISABLE(b):             ENABLED
4. Encapsulation Type:(RFC1483(a),Proprietary     RFC1483
5. Connection Type (PVC(a), (SVC(b):              PVC
6. VCI value (Reqd if PVC):
7. Destination ATM Address (reqd if SVC):

Enter Selection, 0 to save the Modification or 'q' to Quit: 0
```

Note

You must enter a VCI value when configuring a PVC connection type. Additionally, make sure the PVC number is identical on all FORMULA 8200 switches.

3. Enter **6** for VCI value configuration at the prompt.
4. Enter **501** as the VCI value when prompted.




```
/Enter VCI value: 501

PTOP Configuration

1. PTOP Index:                                    1
2. PTOP Description (Optional):                   PTOP Instance 1
3. Admin Status(ENABLE(a),DISABLE(b):             ENABLED
4. Encapsulation Type:(RFC1483(a),Proprietary     RFC1483
5. Connection Type (PVC(a), (SVC(b):              PVC
6. VCI value (Reqd if PVC):                       501
7. Destination ATM Address (reqd if SVC):

Enter Selection, 0 to save the Modification or 'q' to Quit: 0
```

VCI values can range from 32 to 1023 (0-31 are reserved by ATM Forum). A PTOP configuration can accept only one VCI.

5. Enter **0** to save the selection.

```
Enter Selection, 0 to save the Modification or 'q' to Quit: 0

Updating ATM configuration...
```

6. Bind the port service to PTOP using the/**PORTSERV/CONFIG/CREATE** command.

Note

Use the value of 34 for binding port service to PTOP for ATM.

```
/PORTSERV/CONFIG >CREATE 34
Select ATM Service to bind

1) ATM/LEC
2) ATM/PTOP
3) ATM/TRUNK


Enter an ATM service selection >2
Select a VLAN to attach the service


Virtual LAN Information:
VLAN    VLAN                IP Network   Admin     Operation   Port
ID      Description         Address      Status    Status      Membership
====    ============        ==========   ========  =======     ==========
1       Default VLAN(#1     1.1.1.1      ENABLE    ACTIVE      1-16
```

7. Enter **1** as the VLAN number to attach to the service.

```
Enter a VLAN selection (c to cancel)> 1


PTOP#     VCC                 BIND                StatePort Service#
=====     ===========         ==============      ====================
0         502                 Bound------         1
1         501                 Unbound----         -


Enter a ATM/PTOP selection (c to cancel)>
```

8. Enter **1** as the ATM/PTOP selection:

```
Enter a ATM/PTOP selection (c to cancel)> 1
```

9. Enter a port service description (optional) or press [ENTER] to see the following messages:

```
Port Service Description (PS of ATM/PTOP 1) PTOP test:

Port service 2 is created for physical port 34
Port service 2 is bound with ATMPTOP 1
Updating system/VLAN configuration....
```

10. Verify that PTOP services have been created by using the **ATM/SHOW/PTOP <PTOP Instance ID>** command.

```
/ATM/SHOW >PTOP 1

     PT-PT 1 Display
PTOP Index:                                  1
Description:                                 PTOP Instance 1
Admin Status:                                ENABLED
Encapsulation Type:                          RFC1483
Connection Type:                             PVC
VCI Value:                                   501
Dest ATM Address:
```

11. Verify that PTOP services are bound by using the **PORTSERV/SHOW/PORTSERV 34** command.

```
/PORTSERV/SHOW >PORTSERV 34

Phyport  Phyport   Phyport  PortServ    PortServ     Admin     Operation  VLAN
ID       Type      Number   Type/ID     Description  Status    Status     Number
===      ========  =======  ==========  ===========  ======    ========   ======
34       ATMOC3    1        ATMPTOP/1   PTOP test     ENABLE   ACTIVE     1
```

You have successfully configured PTOP on this switch. See Chapter 2, **ATM Commands**, for other PTOP commands.

Configuring Trunking

Trunking allows VLANs to be extended across multiple switches. Trunk ports encapsulate the bridged frames within a proprietary frame. The proprietary frame includes information required to reproduce the frame on the opposite end of the trunk and to maintain VLAN separation.

Without trunking service, different groups of VLANs must use two separate virtual circuits (VCs) across an ATM interface. With trunking, different groups of VLANs can share the same ATM VC, as shown in Figure 1-3.

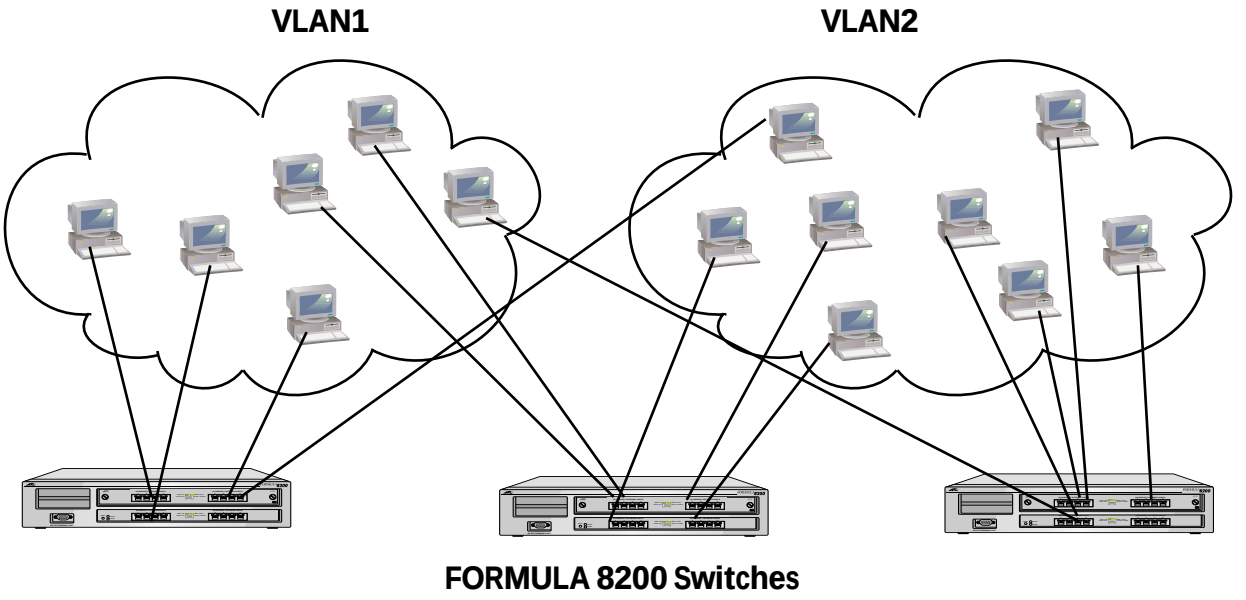


Figure 1-3 Trunking Service Example

Note

For ATM interfaces, a trunking service and a PTOP service can run simultaneously on the same VLAN.

To create trunking service:

Note

Values shown are for example purposes only; replace with values that apply to your own configuration.

1. Verify the existence of the VLANs you wish to configure with trunking by using the **VLAN/SHOW/VLAN** command.

```
/VLAN/SHOW >VLAN

Virtual LAN Information:
VLAN    VLAN              IP Network      Admin     Operation  Port
ID      Description       Address         Status    Status     Membership
====    ==============    ==========      =======   =======    ==========
1       Default VLAN(#1   192.48.127.31   ENABLE    ACTIVE     1-8
2       VLAN 2            1.1.1.1         ENABLE    ACTIVE     9-16
```

2. Create the trunking service using the **ATM/CONFIG/CREATE/TRUNK** command. Valid trunk index values range from 0 through 15.

```
/ATM/CONFIG/CREATE >trunk 1

     TRUNK Configuration
1. TRUNK Index:                              1
2. Description (Optional):                   TRUNK Instance 1
3. Admin Status (ENABLE(a), DISABLE(b)):     ENABLED
4. Connection Type (PVC(a), SVC(b)):         PVC
5. VCI Value (Reqd if PVC):
6. Destination ATM Address (Reqd if SVC):

Enter Selection, 0 to save the Modification or 'q' to Quit:
```

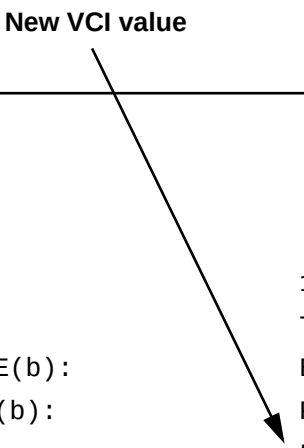
3. Enter **5** at the prompt for VCI value configuration.

Note

You must enter a VCI value when configuring a PVC connection type. Additionally, make sure the PVC number is identical on all FORMULA 8200 switches. This must be a different value from the PTOP.

```
Enter Selection, 0 to save the Modification or 'q' to Quit: 5
```

4. Enter the VCI value when prompted:




```
Enter VCI value: 502
TRUNK Configuration

1. TRUNK Index:                                    1
2. Description (Optional):                         TRUNK Instance 1
3. Admin Status(ENABLE(a),DISABLE(b):              ENABLED
4. Connection Type (PVC(a), (SVC(b):               PVC
5. VCI value (Reqd if PVC):                        502
6. Destination ATM Address (reqd if SVC):

Enter Selection, 0 to save the Modification or ‘q’ to Quit: 0
```

5. Enter **0** to save the selection.

```
Enter Selection, 0 to save the Modification or 'q' to Quit: 0

Updating ATM configuration...
```

6. Bind the port service for trunking by using the **/PORTSERV/CONFIG/CREATE** command.

Note

Use the value of 34 for binding port service to trunk for ATM.

```
/PORTSERV/CONFIG >CREATE 34
Select ATM Service to bind

1) ATM/LEC
2) ATM/PTOP
3) ATM/TRUNK

Enter an ATM service selection >
```

7. Enter **3** to select ATM/Trunk.
8. Enter the VLAN numbers you want to configure for trunking:

```
Enter an ATM service selection >3

Virtual LAN Information:

VLAN   VLAN              IP Network     Admin    Operation  Port
ID     Description       Address        Status   Status     Membership
====   ==============    ==========     =======  =======    ==========
1      Default VLAN(#1   192.48.127.31  ENABLE   ACTIVE     1-8
2      VLAN 2            1.1.1.1        ENABLE   ACTIVE     9-16

Enter VLAN(s) number to configure (1..32) (<vlan#>,<vlan#-vlan#>)
 :1,2
```

9. Enter the ATM/Trunk selection.

```
Enter a ATM/TRUNK selection (c to cancel)>1
Select a ATM/TRUNK service to bind

TRUNK#    VCC                Bind State          Port Service#
=====     ===                ==========          =============
1         501                Unbound             ------

Enter a ATM/TRUNK selection (c to cancel)>1
```

10. Enter a port service description (optional), or press [ENTER]:

```
Port Service Description (PS of ATM/TRUNK 1) :
Port service 1 is created for physical port 34
Port service 1 is bound with ATMTRUNK 1

Updating system/VLAN configuration....
```

11. Verify that trunking services have been created by using the **ATM/SHOW/TRUNK** command.

```
/ATM/SHOW >trunk
TRUNK    TRUNK                      PVC/    VC          ATM
ID       Description                SVC     Value       Address
===      ========================   ====    ======      =========
1        TRUNK Instance 1           PVC     502
```

You have successfully configured trunking.

Where to Go Next

After completing the procedures in this chapter, you are done with basic ATM network configuration. You may refer to the next chapter for a full description of the FORMULA 8200's ATM commands.

For troubleshooting information, refer to the *FORMULA 8200 User's Guide* available from Allied Telesyn's website at **www.alliedtelesyn.com**.

Chapter 2

ATM Commands

This chapter contains the ATM command set for the FORMULA 8200 with ATM uplink. Each command is explained, and any applicable arguments and related commands are shown.

How Commands are Organized

FORMULA 8200 switch commands are arranged in a hierarchy of menus. The main menu contains a list of commands. Many of these commands, in turn, have commands or *submenus* under them.

To display the main menu, type **?** at the prompt. The following display appears:

```
== MAIN MENU ==
?            ALIAS        ALLCMD
[ATM]        [BOOT]       [CONSOLE]
[ELOG]       [ETHERNET]   EXIT
[FDDI]       [FILE]       [INET]
LOOKUP       [MODE]       [PORTSERV]
REBOOT       [SNMP]       [SYSTEM]
[TFTP]       TOP          UP
[VBRIDGE]    [VLAN]       [TRACE]
/ >
```

Entering Commands

Enter commands by typing selections from each successive menu, then pressing the Enter key. You can also enter the entire command at the prompt or you can use an alias; both methods are described in the section, **Command Formats**.

Use of Square Brackets [ ]

Some commands in the main menu have square brackets around them to indicate that the command requires additional parameters. When you enter one of these commands, a submenu appears that lists the available parameters.

Note

Do not enter the brackets when you enter the command.

Use of Angle Brackets <>

This guide sometimes directs you to enter a command with a variable that is specific to your environment, such as IP or ATM addresses. The variables you must supply are enclosed in angle brackets.

For example, to configure a gateway address, enter:

```
/INET/CONFIG/ROUTE/ADD <default router address>
```

where <default router address> can be in the format, 123.123.123.123.

Note

Do not enter the brackets when you enter the command.

Command Formats

The software allows you to enter commands in three ways:

- By using the complete command
- By using a shortcut
- By using an alias

Separating Command Words

When you enter any command, separate the command words with a slash (/). For example:

```
/ATM/SHOW/CIP
```

You may also separate commands with spaces.

Shortcuts

Use a shortcut by typing the first few characters needed to distinguish the command from others that start with the same letters, such as:

/AT/SH/CIP

The shortcut works unless your shortened version is ambiguous, which results in an error message.

Aliases

An alias is an abbreviated command that can be accessed from anywhere in the command line interface. For example, the following alias is equivalent to the **ATM/SHOW/CIP** command:

vcip

Aliases are listed with each command description throughout the rest of this chapter.

Moving Through the Menus

Use the following commands to navigate the menu structure (Figure 2-1):

- **UP** returns to the previous menu
- **TOP** returns to the main menu
- **?** displays the commands that are available at your current level

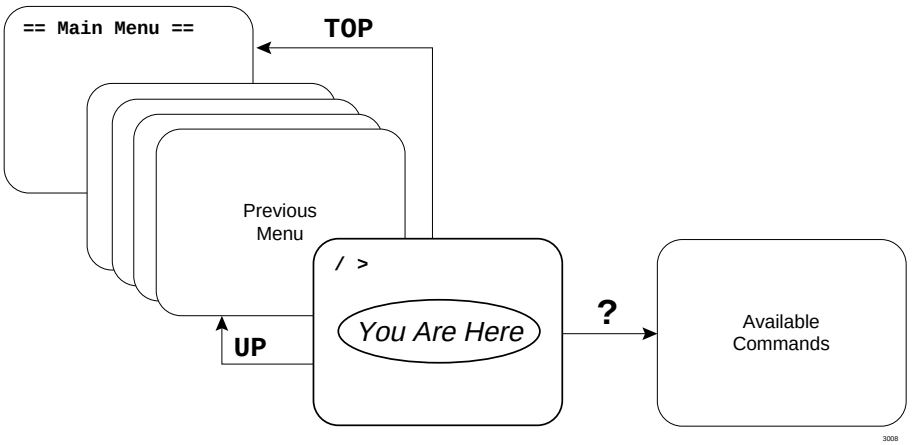


Figure 2-1 Navigating the Menus

Command Edit Mode

The command interface provides a history mechanism similar to the UNIX K-shell history facility, which allows you to automatically display and edit previously typed commands. This feature may help to save time when entering frequently used commands.

Entering and Exiting Edit Mode

Press [Escape] to invoke edit mode. Once you are in edit mode, your keystrokes no longer display the characters you type. Instead they invoke the edit mode commands listed in Table 2-1.

Press [Enter] to execute the command that you have edited.

Edit Mode Commands

Table 2-1 lists commonly used edit commands. There are other advanced commands available, however, only the most common are listed here. If you are familiar with the UNIX K-shell history facility, most of the same commands may be used in the FORMULA 8200 switch command line interface.

Table 2-1 Edit Mode Commands

Command	Action
k	Display the previous command backward in history. Continue pressing k to scroll through the last 20 commands.
j	Display the next command forward in history. Continue pressing **j** to scroll forward.
l or **[Spacebar]**	Go right one character.
h	Go left one character.
dd	Delete entire line.
i	Insert (characters typed after you press **i** are inserted from the cursor forward.) Press **[Escape]** to return to edit mode.
x	Delete a character from cursor forward.
/**<sample>**	Search for string sample backward in history.
?<sample>	Search for string sample forward in history.
0 (zero)	Go to beginning of line.
cw	Change word (deletes the word your cursor is on and lets you type a new one).

ATM Command Descriptions

When you enter the ATM command from the main menu, the following display appears:

```
== ATM MENU ==
[CONFIG]      [SHOW]      [STATS]
[TEST]
```

Each command and its alias is described in the remainder of this chapter. Figure 2-2 provides a command tree for each ATM command; aliases are listed in parameters.

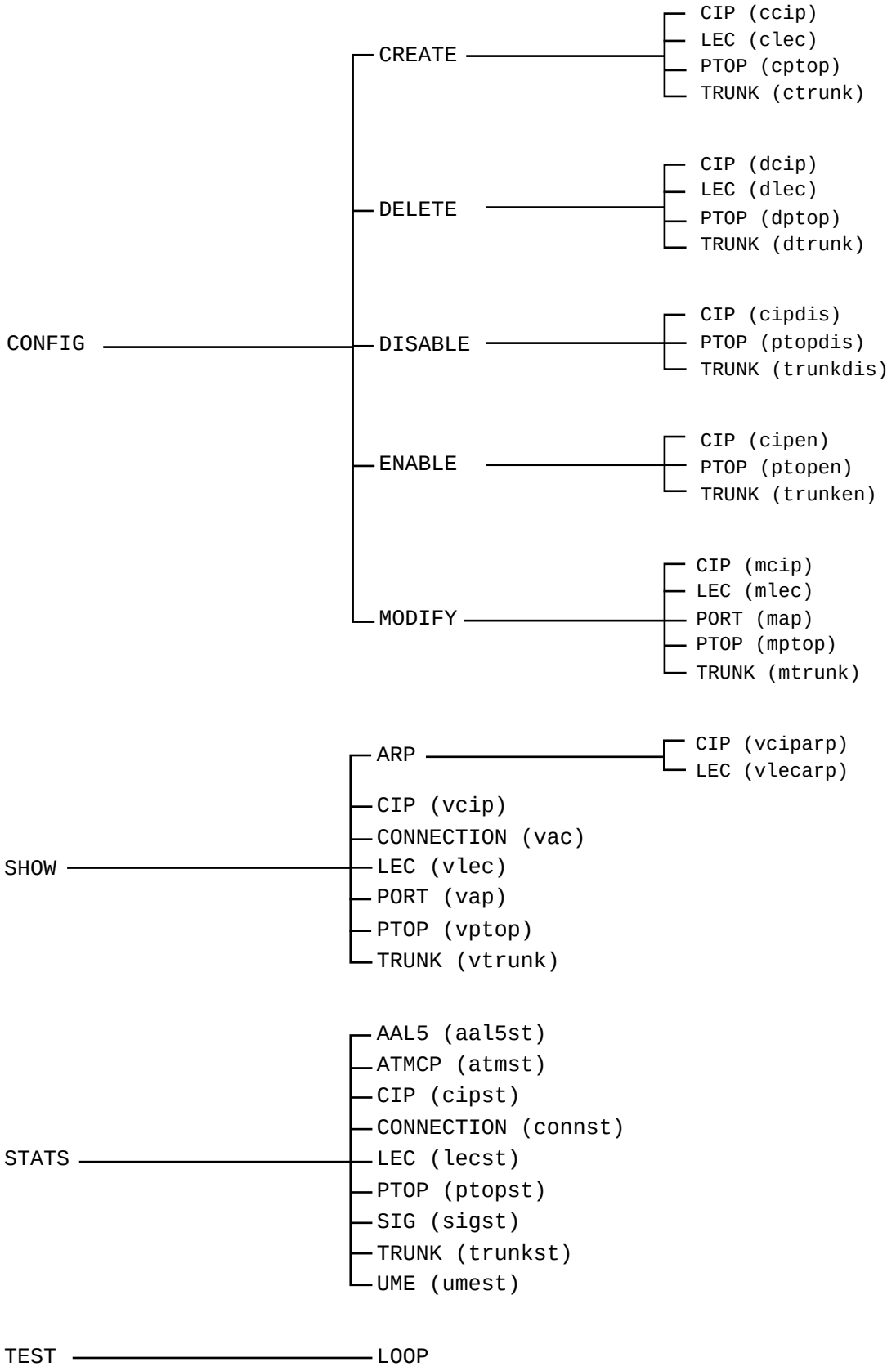


Figure 2-2 ATM CLI Command Tree

ATM/CONFIG/CREATE Commands

Syntax and (alias)

ATM/CONFIG/CREATE/CIP <CIP INDEX> (ccip)
ATM/CONFIG/CREATE/LEC (clec)
ATM/CONFIG/CREATE/PTOP (cptop)
ATM/CONFIG/CREATE/TRUNK (ctrunk)

Description

The **ATM/CONFIG/CREATE** command allow you to configure available services. See the command examples in this section for a brief description of these services. Refer also to Chapter 1 for a complete overview of how these services function and interact.

ATM/CONFIG/CREATE/CIP <CIP Index> Example

This command allows you to create a CIP entity, as described in Chapter 1, **Configuring Classical IP Over ATM (CIP)**. If a CIP entity of that index already exists, the screen displays the error message, `Duplicate Entry`.

To connect two switches for CIP service, you must configure the other switch with a similar configuration. Also, both subnets and VCIs must be identical on both switches. The CIP index, however, does not need to be the same on both switches.

A sample display of the command **ATM/CONFIG/CREATE/CIP <CIP Index>** is shown below. The parameters are described in Table 2-2:

```
/ATM/CONFIG/CREATE >CIP 7

CIP Configuration
1. CIP Index:                                        7
2. IP Address:                                       137.168.132.7
3. IP Subnet Mask:                                   255.255.255.0
4. Description (Optional):                           CIP Test 7
5. Admin Status (ENABLE(a), DISABLE(b)):             ENABLED
6. Connection Type (PVC(a), SVC(b)):                 SVC
7. VCI List (Add to List (a)):
8. Arp Server ATM Address (Reqd if SVC):             0x47000580ffe1000000f21514950
0204815149500
9. Mtu Size:                                         9180
10. IP RIP mode (Active (a), Deaf (b), Silent (c), Inactive (d)):  Silent

Enter Selection, 0 to save the Modification or 'q' to Quit: 0
```

Table 2-2 ATM/CONFIG/CREATE/CIP Parameters

Parameter	Description
CIP Index	The unique value assigned to this CIP entity Range: 0-15
IP Address	A mandatory entry, this takes the same IP network number and subnet number of the logical IP subnet (LIS).
IP Subnet Mask	A mandatory entry, this is the subnet mask for this LIS entity.
Description	Optional text description, up to 31 characters long
Admin Status	Determines whether the administrator can update the parameters Options: Enable or Disable Default: Enable
Connection Type	Specifies the CIP service If set to PVC, you must have at least one entry in the VCI list. If set to SVC, you must enter an ATM address in the Arp Server ATM Address field (item 8 on the screen). Options: PVC or SVC Default: PVC
VCI List	The value for the virtual channel identifier for PVC connections only Disabled if SVC is entered in the Connection Type field (item 6 on the screen) Accepts one VCI entry only Range: 32-1023 Default: 32 Additional options: A to add or B to delete the value from the VCI list

Table 2-2 ATM/CONFIG/CREATE/CIP Parameters (Continued)

Parameter	Description
Arp Server ATM Address	The ATM address of the ARP server; not used for PVC connections but mandatory if the connection type is SVC
Mtu Size	Maximum transfer unit size for data transfer for this entity Default is 9180 as defined in RFC 1577.
IP RIP Mode	Routing information protocol mode for this CIP entity Options: Active, Silent, Deaf, Inactive

To associate a CIP entity with an SVC:

1. Enter option 6b for an SVC connection type.

   6=b

2. Enter

   7=<ARP server's ATM address>

   This entry must be in 20-octet hex format, and this parameter is mandatory for a CIP entity over SVC.

Note

Any connections for the CIP over SVC are possible only after the FORMULA 8200 switch has completed the ATM address registration with the ATM switch.

To associate a CIP entity with a PVC:

1. Enter option 6a for PVC connection type.

   6=a

2. Enter option 7a to add a value to the VCI list.

   7=a

   The system prompts you for a VCI value:

```
Enter VCI value to be added to the VCI list:
```

3. Enter a unique VCI value, i.e., it does not correspond to an existing connection.

For example, enter **34** to see the following screen:

```
CIP Configuration
1. CIP Index:                                    7
2. IP Address:                                   137.168.132.7
3. IP Subnet Mask:                               255.255.255.0
4. Description (Optional):                       CIP Test 7
5. Admin Status (ENABLE(a), DISABLE(b)):         ENABLED
6. Connection Type (PVC(a), SVC(b)):             PVC
7. VCI List:                                     34
         (Add VCI to List (a)
         Delete VCI From list (b))
8. Arp Server ATM Address (Reqd if SVC):
9. Mtu Size:                                     9180
10. IP RIP mode (Active (a), Deaf (b), Silent (c), Inactive (d)): Silent

Enter Selection, 0 to save the Modification or 'q' to Quit: 0
```

The screen adds a new option, 7b, to allow the deletion of the VCI value from the list at a later time.

ATM/CONFIG/CREATE/LEC <LEC Number> Example

This command allows the user to create an LEC, where <LEC Number> indicates the unique LEC index. If an LEC of that index already exists, the screen displays the error message, `LEC <LEC Number> already exists`.

A sample display of **ATM/CONFIG/CREATE/LEC <LEC Number>** is shown below, and parameters are described in Table 2-3.

```
/ATM/CONFIG/CREATE >LEC 1

LEC Configuration
1. LEC Number:                                          1
2. LEC Description (Optional):
3. ELAN Name(applicable only in AUTO mode):
4. Use LEC Config Server(Yes(a), No(b)):                Yes
5. LEC Config Server ATM Address(Option 5a):            0x47007900000000
00000000000000a03e00000100
6. Control Time-out (in seconds):                       10
7. Max. Unknown Frame Count:                            1
8. Max. Unknown Frame Time(in seconds):                 1
9. VCC Time-out(in seconds):                            1200
10. Max. Retry Count:                                   1
11. Ageing Time (in seconds):                           300
12. Expected LE-ARP Resp Time (in seconds):             30
13. Flush Time-out (in seconds):                        4

Enter Selection, 0 to save the Modification or 'q' to Quit: 0
```

Table 2-3 ATM/CONFIG/CREATE/LEC Parameters

Parameter	Description
LEC Number	The unique index for this LEC Range: 0-31
LEC Description	Optional text description of up to 31 characters
ELAN Name	The name of the ELAN of which this LEC is a member (AUTO mode only)
Use LEC Config Server	Configuration mode Options: Yes or No Default: No
LEC Config Server ATM Address	If the Configuration mode is Yes, the ATM address of the LECS If the Configuration mode is No, the ATM address of the LAN emulation server (LES)
Control Time-out	Maximum amount of time for a LEC's join request to remain unanswered, after which the LANE entity holding the request frame discards it Range: 10 – 300 seconds

Table 2-3 ATM/CONFIG/CREATE/LEC Parameters (Continued)

Parameter	Description
Max. Unknown Frame Count	Maximum number of unknown frames a LEC can send to the broadcast and unknown server (BUS) for a given unicast LAN destination Range: 1 – 10 Default: 1
Max. Unknown Frame Time	Works in conjunction with Max. Unknown Frame Count where a LEC sends no more than the maximum unknown frames within the time specified Range: 1 – 60 seconds Default: 1 second
VCC Time-out	The amount of time a LEC can maintain an unused data direct VCC, beyond which the LEC must release the VCC Default: 1200 seconds
Max. Retry Count	Maximum retries for LE ARP entry a LEC can send after the first try Range: 0 – 2
Ageing Time	The maximum amount of time the LEC can maintain an unverified LE ARP entry in its cache Range: 10 – 300 seconds
Expected LE-ARP Resp Time	Maximum amount of time a LEC can expect a response to LE ARP requests regarding retries and verifications Range: 1 – 30 seconds
Flush Time-out	Time limit for a LEC to wait to receive a response after sending a flush request, beyond which the LEC initiates a recovery action Range: 1 – 4 seconds

ATM/CONFIG/CREATE/PTOP <PTOP Number> Example

This command allows the user to create a PTOP connection, where <PTOP Number> indicates the unique PTOP index. A sample display of **ATM/CONFIG/CREATE/PTOP <PTOP Number>** is shown below, and parameters are described in Table 2-4.

```
/ATM/CONFIG/CREATE >ptop 7

     PTOP Configuration
1. PTOP Index:                                          7
2. Description (Optional):                              PTOP Instance 7
3. Admin Status (ENABLE(a), DISABLE(b)):                ENABLED
4. Encapsulation Type (RFC1483(a), Proprietary(b)):     RFC1483
5. Connection Type (PVC(a), SVC(b)):                    PVC
6. VCI Value (Reqd if PVC):
7. Destination ATM Address (Reqd if SVC):

Enter Selection, 0 to save the Modification or 'q' to Quit: 0
```

Table 2-4 ATM/CONFIG/CREATE/PTOP Parameters

Parameter	Description
PTOP Index	The unique value assigned to the PTOP entry
Description (Optional)	Optional text description of up to 32 characters
Admin Status	Determines whether the administrator can update the parameters Range: Enable or Disable Default = Enable
Encapsulation Type	Indicates the encapsulation format for this PTOP entry Range: RFC1483 or Proprietary Only RFC1483 is accepted at this time. Default = RFC1483
Connection Type	Specifies the CIP service If set to PVC, you must have at least one entry in the VCI list. If set to SVC, you must enter an address in the Destination ATM Address field (item 7 on the screen). Range: PVC or SVC Default = PVC
VCI Value (Reqd if PVC)	The virtual channel identifier; for PVC connections only Disabled if SVC is selected in the Connection Type field (item 5 on the screen) Accepts one VCI entry only Range: 32-1023 Default: 32
Destination ATM Address (Reqd if SVC)	The ATM address of the ARP server for the logical IP subnet to which this CIP is connected Required when SVC is selected as the Connection Type (item 5 on the screen).

ATM/CONFIG/CREATE/TRUNK <Trunk Number> Example

This command allows you to configure the trunking feature. A sample display of **ATM/CONFIG/CREATE/TRUNK <Trunk Number>** is shown below, and parameters are described in Table 2-5.

```
/ATM/CONFIG/CREATE >trunk 7

     TRUNK Configuration
1. TRUNK Index:                                    7
2. Description (Optional):                         TRUNK Instance 7
3. Admin Status (ENABLE(a), DISABLE(b)):           ENABLED
4. Connection Type (PVC(a), SVC(b)):               PVC
5. VCI Value (Reqd if PVC):
6. Destination ATM Address (Reqd if SVC):

Enter Selection, 0 to save the Modification or 'q' to Quit: 0
```

Table 2-5 ATM/CONFIG/CREATE/TRUNK Parameters

Parameter	Description
TRUNK Index	The unique value assigned to this trunking entry
Description	This optional text description can be up to 32 characters long
Admin Status	Determines whether the administrator can update the parameters Range: Enable or Disable Default = Enable
Connection Type	Specifies the CIP service If set to PVC, you must have at least one entry in the VCI list. If set to SVC, you must enter an address in the Destination ATM Address field (item 6 on the screen). Range: PVC or SVC Default: PVC
VCI Value (Reqd if PVC)	The virtual channel identifier; for PVC connections only Disabled if SVC is selected in the Connection Type field (item 4 on the screen) Accepts one VCI entry only Range: 32-1023 Default: 32
Destination ATM Address (Reqd if SVC)	The ATM address of the other end point of the connection Required when SVC is selected as the Connection Type (item 4 on the screen)

ATM/CONFIG/DELETE Commands

Syntax and (alias)

ATM/CONFIG/DELETE/CIP (dcip)
ATM/CONFIG/DELETE/LEC (dlec)
ATM/CONFIG/DELETE/PTOP (dptop)
ATM/CONFIG/DELETE/TRUNK (dtrunk)

Description

The **ATM/CONFIG/DELETE** commands allow you to delete services that you have created using the **ATM/CONFIG/CREATE** command. See the command examples for a brief description of these services.

ATM/CONFIG/DELETE/CIP <CIP Index> Example

This command deletes a CIP entity (a member of an LIS), where <CIP Index> is the indicated index. If a CIP entity of that index does not exist, the screen displays the error message, `No Such CIP`.

All open virtual channel connections associated with that CIP entity will be released first and their resources released. The CIP entity will then be detached from the IP protocol before releasing all the resources allocated for this CIP entity.

The display for **ATM/CONFIG/DELETE/CIP <CIP Index>** is only an update message:

```
/ATM/CONFIG/DELETE >cip 2
Updating ATM configuration ...
```

ATM/CONFIG/DELETE/LEC <LEC Number> Example

This command deletes a LEC (LAN emulation client), where <LEC Number> is the LEC index. If a LEC of that index does not exist, the screen displays the error message, `Invalid LEC Number`. A sample display of **ATM/CONFIG/DELETE/LEC <LEC Number>** is shown in the following screen:

```
/ATM/CONFIG/DELETE >LEC 7

Updating ATM configuration ...
```

If the LEC is bound to a port service, the software removes the binding, releases all the virtual connections for that LEC, releases all resources, and then deletes the LAN emulation client entry.

ATM/CONFIG/DELETE/PTOP <PTOP Number> Example

This command deletes a PTOP entry. The display for **ATM/CONFIG/DELETE/PTOP <PTOP Number>** is only an update message:

```
>/ATM/CONFIG/DELETE>ptop 1
Updating ATM configuration ...
```

ATM/CONFIG/DELETE/TRUNK <Trunk Number> Example

This command deletes a specific trunking entry. The display for **ATM/CONFIG/DISABLE/TRUNK <Trunk Number>** is only an update message:

```
/ATM/CONFIG/DELETE >TRUNK 1
Updating ATM configuration ...
```

ATM/CONFIG/DISABLE and ENABLE Commands

Syntax and (alias)

ATM/CONFIG/DISABLE/CIP (cpidis)
ATM/CONFIG/DISABLE/PTOP (ptopdis)
ATM/CONFIG/DISABLE/TRUNK (trunkdis)
ATM/CONFIG/ENABLE/CIP (cipen)
ATM/CONFIG/ENABLE/PTOP (ptopen)
ATM/CONFIG/ENABLE/TRUNK (trunken)

Description

The **ATM/CONFIG/DISABLE** and **ATM/CONFIG/ENABLE** commands allow you to disable and enable services that you have created (via the **ATM/CONFIG/CREATE** command). See the command examples for a brief description of these services.

ATM/CONFIG/DISABLE/CIP <CIP Index> Example

This command disables a currently enabled CIP entity (a member of a logical IP subnet, or LIS) for the indicated index. The display for **ATM/CONFIG/DISABLE/CIP <CIP Index>** is only an update message:

```
/ATM/CONFIG/DISABLE >CIP 2
Updating ATM configuration ...
```

ATM/CONFIG/DISABLE/PTOP Example

This command disables a currently enabled PTOP entry. The display for **ATM/CONFIG/DISABLE/PTOP <PTOP Number>** is only an update message:

```
/ATM/CONFIG/DISABLE >PTOP 0
Updating ATM configuration ...
```

ATM/CONFIG/DISABLE/TRUNK Example

This command disables a currently enabled trunk entry, but does not delete it. The display for **ATM/CONFIG/DISABLE/TRUNK <TRUNK Number>** is only an update message:

```
/ATM/CONFIG/DISABLE >TRUNK 1
Updating ATM configuration ...
```

ATM/CONFIG/ENABLE/CIP <CIP Index> Example

This command enables a currently disabled CIP entity, but does not delete it. The display for **ATM/CONFIG/ENABLE/CIP <CIP Index>** is only an update message:

```
/ATM/CONFIG/ENABLE >CIP 2
Updating ATM configuration ...
```

ATM/CONFIG/ENABLE/PTOP Example

This command enables a currently disabled PTOP entry. The display for **ATM/CONFIG/ENABLE/PTOP <PTOP Number>** is only an update message:

```
/ATM/CONFIG/ENABLE >PTOP 0
Updating ATM configuration ...
```

ATM/CONFIG/ENABLE/TRUNK Example

This command enables a currently disabled trunk entry. The display for **ATM/CONFIG/ENABLE/TRUNK <TRUNK Number>** is only an update message:

```
/ATM/CONFIG/ENABLE >TRUNK 1
Updating ATM configuration ...
```

ATM/CONFIG/MODIFY Commands

Syntax and (alias)

ATM/CONFIG/MODIFY/CIP (mcip)
ATM/CONFIG/MODIFY/LEC (mlec)
ATM/CONFIG/MODIFY/PORT (map)
ATM/CONFIG/MODIFY/PTOP (mptop)
ATM/CONFIG/MODIFY/TRUNK (mtrunk)

Description

The **ATM/CONFIG/MODIFY** commands allow you to modify services that you have created (via the **ATM/CONFIG/CREATE** command). See the command examples for a brief description of these services.

ATM/CONFIG/MODIFY/CIP <CIP Index> Example

This command allows you to modify a CIP entity (a member of an LIS) using <CIP Index>. If that index does not exist, the screen displays the error message, `No Such CIP`. This command displays the same screen as the **ATM/CONFIG/CREATE/CIP <CIP Index>** command.

You can modify some of the parameters of the CIP entity while the CIP is in service, and without affecting the open connections associated with that CIP. However, you cannot modify certain parameters such as the IP address, subnet mask, etc. without taking the CIP entity out of service. Under these conditions, use **ATM/DELETE/CIP** followed by **ATM/CREATE/CIP** in place of **ATM/MODIFY/CIP**.

ATM/CONFIG/MODIFY/LEC <LEC Number> Example

This command allows you to modify a LEC as specified by <LEC Number>. If that index does not already exist, the screen displays the error message, `LEC <LEC Number> does not exist`. This command displays the same screen as **ATM/CONFIG/CREATE/LEC <LEC Number>**.

ATM/CONFIG/MODIFY/PORT Example

The ATM port is configured with certain default parameters. This command changes some of the default settings to suit a specific network configuration. A sample display of **ATM/CONFIG/MODIFY/PORT** is shown below, and parameters are described in Table 2-6.

```
/ATM/CONFIG/MODIFY >PORT

     Atm Port Configuration
1. ATM PVC/SVC Mode (PVC mode (a), SVC mode (b)):     SVC mode
2. Signaling Version (3.0(a), 3.1(b)):                Uni 3.0
3. ILMI Enable (Enable(a), Disable(b)):               Enable
4. ILMI Poll Enable (Enable(a), Disable(b)):          Disable
5. Scrambling Enable (Enable(a), Disable(b)):         Enable
6. Timing Mode (Loop(a), Local(b)):                   Local
7. Port ATM Address

Enter Selection, 0 to save the Modification or 'q' to Quit: 0
```

Table 2-6 ATM/CONFIG/MODIFY/PORT Parameters

Parameter	Description
ATM PVC/SVC mode	Whether this service provides a permanent virtual circuit or switched virtual circuit
Signaling Version (If SVC)	Currently the FORMULA 8200 switch supports UNI 3.0 or UNI 3.1. Set this value depending upon the user-to-network (UNI) support on the ATM switch to which you have connected the FORMULA 8200. Reset the switch when the setting for signaling version changes. Default: UNI 3.0
ILMI Enable (If SVC)	Address registration between an ATM end system and an ATM switch across the UNI Options: Enable or disable Default: Enable
ILMI Poll Enable (If SVC)	Polling feature for checking address registrations between an ATM end system and an ATM switch across the UNI Options: Enable or disable Default: Disable
Scrambling Enable	Bit randomization of cells to increase security Options: Enable or disable Default: Enable
Timing Mode	Timing mode for either the internal (local) or external (loop) clock Options: Local or loop Default: Local
Port ATM Address	The ATM address for this port

ATM/CONFIG/MODIFY/PTOP <PTOP Number> Example

This command allows you to modify the configuration parameters of the PTOP entry using <PTOP Number>. This command displays the same screen as the **ATM/CONFIG/CREATE/PTOP <PTOP Number>** command.

ATM/CONFIG/MODIFY/TRUNK Example

This command allows you to modify the configuration parameters of the trunking entry using <Trunk Number>. This command displays the same screen as the **ATM/CONFIG/CREATE/Trunk <Trunk Number>** command.

ATM/SHOW Commands

Syntax and (alias)

ATM/SHOW/ARP/CIP (vciparp)
ATM/SHOW/ARP/LEC (vlecarp)
ATM/SHOW/CIP (vcip)
ATM/SHOW/CONNECTION (vac)
ATM/SHOW/LEC (vlec)
ATM/SHOW/PORT (vap)
ATM/SHOW/PTOP (vptop)
ATM/SHOW/TRUNK (vtrunk)

Description

The **ATM/SHOW** commands allow you to display various ATM states and settings. See the command examples for a brief description of each use of the **ATM/SHOW** command.

ATM/SHOW/ARP/CIP <CIP Index> Example

This command displays the entries in the ARP table of the CIP entity. The ARP entity contains the resolution of the IP addresses to ATM addresses at which the destination is accessible. A sample display of **ATM/SHOW/ARP/CIP <CIP Index>** is shown below, and parameters are described in Table 2-7.

```
/ATM/SHOW/ARP >CIP 5

                              CIP 5 ARP Table Display

IndexIP Address      ATM Address                                    VCI  Expiry Time
=========================================================================================
0    137.168.132.20  0x47000580ffe1000000f2151495002048151495 00 57   -1 Seconds
```

Table 2-7 ATM/SHOW/ARP/CIP Parameters

Parameter	Description
Index	A unique identifier for each entry Range: 1-31
IP Address	IP address of the destination
ATM Address	The ATM Address at which the destination is accessible
VCI	VCI value of the connection over which the destination is accessible
Expiry Time	Expiration time of this ARP entry

ATM/SHOW/ARP/LEC <LEC Number> Example

This command displays all the entries in the ARP table of the LEC by <LEC Number>. If an LEC entity of that index does not exist, the screen displays the error message, `LEC <LEC Number> does not exist`. A sample display of **ATM/SHOW/ARP/LEC <LEC Number>** is shown below, and parameters are described in Table 2-8.

```
/ATM/SHOW/ARP >LEC 1

Index  State       MAC Address      ATM Address                                      VCI Expiry Time
=================================================================================================
0      Valid Entry [0:20:48:10:14:4a] 0x47000580ffe1000000f21514950020481014 4a00   68  290 seconds
```

Table 2-8 ATM/SHOW/ARP/LEC Parameters

Parameter	Description
Index	A unique identifier for each entry Range: 1-31
State	Operation status
MAC Address	MAC address of the destination
ATM Address	The ATM address at which the destination is accessible
VCI	VCI value of the connection over which the destination is accessible
Expiry Time	Expiration time of the ARP entry

ATM/SHOW/CIP Example

This command displays a summary of all existing CIP entities. A sample display of **ATM/SHOW/CIP** is shown below, and parameters are described in Table 2-9.

```
/ATM/SHOW >CIP
CIP CIP         IP Network    PVC/ VCI    Server
ID  Description Address       SVC  Value  ATM Address
=== =========== ==========    ==== =====  ========================================
1   CIP Test 1  137.168.132.9 SVC   -     0x47000580ffe1000000f21514950020481514950 0
2   CIP Test 2  200.2.2.2     PVC  400
```

Table 2-9 ATM/SHOW/CIP Parameters

Parameter	Description
CIP ID	A unique identifier for each entry Range: 1-31
CIP Description	A user-defined textual description for this CIP entity
IP Network Address	IP address associated with this CIP
PVC/SVC	Whether this CIP is configured for permanent virtual circuit or switched virtual circuit operation
VCI Value	If PVC, the VCI value of the connection identifier
Server ATM Address	If SVC, the ATM Address of the ARP server

ATM/SHOW/CIP <CIP Index> Example

This command is a variant of **ATM/SHOW/CIP**, and specifies an optional CIP index. It displays all the configured parameters of the indicated CIP entity, if such an entity exists. If there is no CIP entity for that index, the screen displays the error message, `No Such CIP`. A sample display of **ATM/SHOW/CIP <CIP Index>** is shown below, and parameters are described in Table 2-10.

```
/ATM/SHOW >CIP 7

                          CIP 7 Display
CIP Index:                7
CIP Name:                 CIP7
Description:              CIP Test 7
IP Address:               137.168.132.7
IP Subnet Mask:           255.255.255.0
Admin Status:             ENABLED
Connection Type:          SVC
Server ATM Address:       0x47000580ffe1000000f21514950020481514950 0
Mtu Size:                 9180
RIP Mode:                 Silent
Protocol State:           Active
ARP Server VCC:           57
Data VCC Connections:     69, 70
```

Table 2-10 ATM/SHOW/CIP <CIP Index> Parameters

Parameter	Description
CIP Index	Index of this CIP entity
CIP Name	A default name for this entity
Description	Optional text description of up to 31 characters
IP Address	Takes the same IP network number and subnet number of the LIS (logical IP subnetwork)
IP Subnet Mask	Subnet mask for this LIS entity
Admin Status	Administrative status Options: Enable or disable
Connection Type	Connection type Options: PVC or SVC
Server ATM Address	If the connection type is SVC, the ATM address of the ARP server
Mtu Size	Maximum transfer unit size for data transfer for this entity Default: 9180, as defined in RFC 1577
RIP Mode	Routing internet protocol mode for this CIP entity Default: Silent
Protocol State	Operational state of the CIP Active indicates that the connection to ARP server is up (only displayed if administrative status is enabled and connection type is PVC) Options: Active, inactive, connect request sent, unknown
ARP Server VCC	VCI value of the connection to ARP server (only displayed if administrative status is enabled and connection type is PVC)
Data VCC Connections	Shows the list of VCI values of the data connections to destinations, if any (only displayed if administrative status is enabled, connection type is PVC, and there are data connections to other CIP entities)

ATM/SHOW/CONNECTION Example

This command displays a summary of all open ATM virtual channel connections. A sample display of **ATM/SHOW/CONNECTION** is shown below, and parameters are described in Table 2-11.

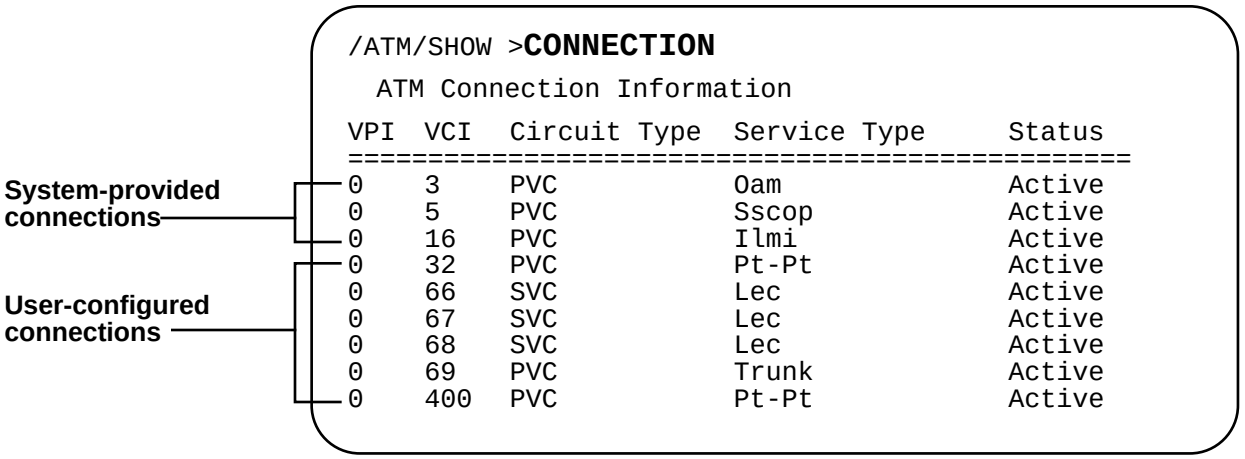


Table 2-11 ATM/SHOW/CONNECTION Parameters

Parameter	Description
VPI	Virtual path identifier for this connection (this is always 0)
VCI	Virtual channel identifier for this connection
Circuit Type	Circuit type Options: PVC or SVC
Service Type	Application for which this connection carries data
Status	Connection status

ATM/SHOW/CONNECTION <VCI> Example

This command is a variant of **ATM/SHOW/CONNECTION**, and specifies an optional VCI value. It displays the relevant parameters of a specific virtual channel connection indicated by the VCI value. If the indicated VCI connection does not exist, the screen displays the error message, `Connection entry for VCI <VCI> does not exist`. A sample display of **ATM/SHOW/CONNECTION <VCI>** is shown below, and parameters are described in Table 2-12.

```
/ATM/SHOW >CONNECTION 70
  Virtual Connection Configuration for VCI 70
Circuit Type:                                          SVC
Service Type:                                          Cip
Status:                                                Active
Connection Up For:                                     249 Seconds
Requested Tx. Qos Class(Choices: a - e):               Unspecified
Requested Tx. BestEffort((a) = TRUE, (b) = FALSE):     True
Requested Tx. Peak Cell Rate (cells/sec)               353208
Requested Rx. Qos Class(Choices: a - e):               Unspecified
Requested Rx. BestEffort((a) = TRUE, (b) = FALSE):     True
Requested Rx. Peak Cell Rate (cells/sec)               353208
```

Table 2-12 ATM/SHOW/CONNECTION <VCI> Parameters

Parameter	Description
Circuit Type	PVC or SVC
Service Type	The kind of service provided over this connection (examples: ILMI, signaling, CIP, LEC)
Status	Operational status of this connection
Connection Up For	How long this connection has been up
Requested Tx. Qos Class	QOS class for transmit for this connection
Requested Tx. BestEffort	Whether the connection is setup for best effort for transmit False=Connection is disabled if peak cell rate cannot be supported with available bandwidth. True=Connection uses available bandwidth.
Requested Tx. Peak Cell Rate	The peak cell rate in cells per second for this connection in the transmit direction
Requested Rx. Qos Class	QOS class for receive for this connection
Requested Rx. BestEffort	Whether the connection is set up for best effort for receive False=Connection is disabled if peak cell rate cannot be supported with available bandwidth. True=Connection uses available bandwidth.
Requested Rx. Peak Cell Rate	The peak cell rate in cells per second for this connection in the receive direction

ATM/SHOW/LEC <LEC Number> Example

This command is a variant of **ATM/SHOW/LEC**, in which the user enters an optional LEC index. It displays detailed configuration and status parameters for that particular LEC, as shown below. If an LEC for that index does not exist, the screen displays the error message, `LEC <LEC Number> does not exist`. A sample display of **ATM/SHOW/LEC <LEC Number>** is shown below, and parameters are described in Table 2-13.

```
/ATM/SHOW >LEC 1
                  LEC Configuration/Status Information

LEC Number:                                    1
Description
ELAN Name:                                     defaultp
LEC ID:                                        0
Use LEC Config Server:                         Yes
LEC Config Server ATM Address:                 0x47000580ffe1000000
f215149500204815149501
Protocol State:                                Active
Topology Change State:                         Clear
Control Direct VCC:                            60
Control Distribute VCC:                        61
Multicast Send VCC:                            62
Multicast Forward VCC:                         63
Control Time-out (in seconds):                 120
Max. Unknown Frame Count:                      1
Max. Unknown Frame Time(in seconds):           1
VCC Time-out(in seconds):                      1200
Max. Retry Count:                              1
Ageing Time (in seconds):                      300
Expected LE-ARP Resp Time (in seconds):        1
Flush Time-out (in seconds):                   4
```

Table 2-13 ATM/SHOW/LEC <LEC Number> Parameters

Parameter	Description
LEC Number	The index number for this LEC
Description	A user-defined description for this LEC (optional)
ELAN Name	The ELAN to which this LEC belongs
LEC ID	The user-defined unique ID number for this LEC
Use LEC Config Server	The configuration mode for this LEC
LEC Config Server ATM Address	The ATM address of the server used by this LEC, if the configuration mode is Yes
Protocol State	Operational state of the LEC Options: - Active - Inactive - Sent connect request for control direct VCC - Sent connect response for control direct VCC - Sent connect request for multicast send VCC - Sent connect req and resp for mcast send VCC and fwd VCC - Received connect confirm for multicast forward VCC - Waiting for multicast forward connect ind - Sent connect response for multicast forward VCC - Sent ARP request for BUS - Sent configuration request - Sent join request - Sent connect request for cfg direct - VCC unknown
Topology Change State	Change in topology state
Control Direct VCC	VCI value of the control direct VC to LES
Control Distribute VCC	VCI value of the control distribute VC from LE server.
Multicast Send VCC	VCI value of the multicast send VC to BUS
Multicast Forward VCC	VCI value of the multicast forward VC from BUS
Control Time-out	Join request timeout Range: 10 – 300 seconds
Max. Unknown Frame Count	Maximum unknown frame count Range: 1 – 10 Default: 1
Max. Unknown Frame Time	Range: 1 – 60 seconds Default: 1 second
VCC Time-out	VCC entry aging timer Default: 1200 seconds
Max. Retry Count	Maximum retries for LE ARP entry Range: 0 – 2

Table 2-13 ATM/SHOW/LEC <LEC Number> Parameters (Continued)

Parameter	Description
Ageing Time	LE ARP entry aging Range: 10 – 300 seconds
Expected LE-ARP Resp Time	Expected LE ARP response time Range: 1 – 30 seconds
Flush Time-out	Flush request timeout Range: 1 – 4 seconds

ATM/SHOW/PORT Example

This command displays all relevant configuration and default settings of the ATM port (network interface card) and the configured parameters associated with the ATM signaling stack in the FORMULA 8200. A sample display of **ATM/SHOW/PORT** is shown below, and parameters are described in Table 2-14.

```
/ATM/SHOW >PORT
                          ATM Port Information

Transmission Type:       STS3c
Media Type:              MMF
Max VCI:                 1024
Num VCI Bits:            10
Operational Status:      Up
Timing Mode:             Local
Payload Scramble:        Enabled
Line State:              Up
Diagnostic Loop State:   Disabled
Line Loop State:         Disabled
ESI:                     [0:0:d1:0:9:a5]
Adapter Ram Size:        524288
                         ATM Signaling Information
Port ATM Address:        0x47000580ffe1000000f21514950000d100084200
ATM PVC/SVC Mode:        SVC Mode
Signaling Version:       Uni 3.0
Signaling VCI:           5
ILMI Enabled:            True
ILMI VCI:                16
ILMI Polling:            Disabled
Signaling Status:        Up
ILMI Status:             Up
```

.

Table 2-14 ATM/SHOW/PORT Parameters

Parameter	Description
Transmission Type	Synchronous transport signal 3C (STS-3c)
Media Type	Type of media (MMF—multimode fiber.)
Max VCC	The maximum number of VCCs that can be supported by the ATM NIC card in the FORMULA 8200 is 1024.
Num VCI Bits	The maximum number of VCI bits supported in the ATM NIC card in the FORMULA 8200 is 10.
Operational Status	Options: Up or down
Timing Mode	Clock source Options: Internal or loop (recovered from receive clock)
Payload Scramble	Whether payload is scrambled prior to transmission. Options: Enable (scrambled) or disable (not scrambled) Default: Enable
Line State	Up means the physical connection to the ATM port is valid. Frame Alarm means there is a problem with the physical connection.
Diagnostic Loop State	Loopback outgoing traffic at ATM physical layer
Line Loop State	Loopback incoming traffic at ATM physical layer
ESI	End station identifier; the MAC address of the ATM NIC card
Adapter Ram Size	SRAM available in the ATM NIC card
Port ATM Address	ATM address of the port
ATM PVC/SVC Mode	The type of connection for this port
Signaling Version	The user-to-network interface (UNI) version. Currently, the FORMULA 8200 switch supports UNI 3.0 or UNI 3.1. Set this value depending upon the UNI support on the ATM switch to which you have connected the FORMULA 8200. Default: UNI 3.0
Signaling VCI	The VCI value of the connection over which signaling messages are exchanged
ILMI Enabled	Address registration between an ATM end system and an ATM switch across the UNI Options: True (enabled) or false (disabled)
ILMI VCI	The VCI value of the connection over which ILMI messages are exchanged
ILMI Polling	Whether polling over ILMI is enabled Options: Enabled or disabled
Signaling Status	Operational status of signaling Options: Up or down
ILMI Status	Operational status of ILMI Options: Up or down

ATM/SHOW/PTOP Example

This command displays current configuration for any PTOP entries. A sample display of **ATM/SHOW/PTOP** is shown below, and parameters are described in Table 2-15.

```
/ATM/SHOW >ptop
PTOP    PTOP                PVC/     VCI         ATM
ID      Description         SVC      Value       Address
===     ================    ======   ======      ====================
0       PTOP Instance 0     PVC      500
```

Table 2-15 ATM/SHOW/PTOP Parameters

Parameter	Description
PTOP ID	The unique PTOP identifier.
PTOP Description	The user-defined description of this PTOP
PVC/SVC	The connection type
VCI Value	For PVC connections only, the virtual channel identifier.
ATM Address	For SVC connections only, the ATM address of the ARP server for the logical subnet to which this CIP is connected

ATM/SHOW/TRUNK Example

This command displays current configuration for any trunking entries. A sample display of **ATM/SHOW/TRUNK** is shown below, and parameters are described in Table 2-16.

```
/ATM/SHOW >trunk
TRUNK   TRUNK               PVC/     VCI         ATM
ID      Description         SVC      Value       Address
===     ================    =======  ======      ====================
0       PTOP Instance 0     PVC      500

1       TRUNK Instance 1    PVC      501
```

Table 2-16 ATM/SHOW/TRUNK Parameters

Parameter	Description
TRUNK ID	The unique trunking entry identifier
TRUNK Description	The user-defined description of this trunking entry
PVC/SVC	The connection type
VCI Value	For PVC connections only, the virtual channel identifier
ATM Address	The ATM address of the other end point of the connection. Required when SVC is the connection type

ATM/STATS Commands

Syntax and (alias)

ATM/STATS/AAL5 (aal5st)
ATM/SHOW/ATM (atmst)
ATM/STATS/CIP (cipst)
ATM/STATS/CONNECTION (connst)
ATM/STATS/LEC (lecst)
ATM/STATS/PTOP (ptopst)
ATM/STATS/SIG (sigst)
ATM/STATS/TRUNK (trunkst)
ATM/STATS/UME (umest

Description

The **ATM/STATS** commands allow you to display various ATM statistics. See the command examples for a brief description of each use of the **ATM/STATS** command.

ATM/STATS/AAL5 Example

This command displays the statistics collected at the AAL5 (SAR) (ATM adaptation layer (segmentation and reassembly)) layer of the ATM port in the FORMULA 8200. A sample display of **ATM/STATS/AAL5** is shown below, and parameters are described in Table 2-17.

```
/ATM/STATS >AAL5
AAL5 Layer Statistics
Rx Octets                          : 43440
Tx Octets                          : 44426
Rx Cells                           : 3505
Tx Cells                           : 3505
Rx SDUs                            : 3138
Rx SDU Discards                    : 0
Rx Errors                          : 0
Tx SDU                             : 3138
Tx SDU Discards                    : 0
Tx Errors                          : 0
SAR Timeouts                       : 0
CRC Errors                         : 0
Oversized SDUs                     : 0
```

Table 2-17 ATM/STATS/AALS Parameters

Parameter	Description
Rx Octets	Number of received octets
Tx Octets	Number of transmitted octets
Rx Cells	Number of received cells
Tx Octets	Number of transmitted octets
Rx SDUs	Number of received service data units
Rx SDU Discards	Number of received service data unit discards
Rx Errors	Number of received errors
Tx SDU	Number of transmitted service data units
Tx SDU Discards	Number of service data unit discards
Tx Errors	Number of transmit errors
SAR Timeouts	Number of segmentation and reassembly timeouts
CRC Errors	Number of cyclic redundancy check errors
Oversized SDUs	Number of oversized service data units
Tx SDU	Number of transmitted service data units

ATM/STATS/ATM Example

This command displays the statistics collected at the ATM layer of the ATM port. A sample display of **ATM/STATS/ATM** is shown below, and parameters are described in Table 2-18.

```
/ATM/STATS >ATM
ATM Layer Statistics
Rx Cells :                          3066
Tx Cells :                          3066
Dropped Cells :                     0
Invalid VCI Cells :                 3236
```

Table 2-18 ATM/STATS/ATM Parameters

Parameter	Description
Rx Cells	Number of received cells
Tx Cells	Number of transmitted cells
Dropped Cells	Number of dropped cells
Invalid VCI Cells	Number of invalid virtual circuit identifier cells

ATM/STATS/CIP <CIP Index> Example

This command displays the statistics collected at the CIP entity for the indicated index. If a CIP entity of that index does not exist, the screen displays the error message, `No such CIP`. A sample display of **ATM/STATS/CIP <CIP Index>** is shown below, and parameters are described in Table 2-19.

```
/ATM/STATS >CIP 1
                                CIP 1 Statistics

# Packets from Other LIS          : 0
# Tx ARP Requests                 : 4
# Tx ARP Responses                : 4
# Rx ARP Requests                 : 1
# Rx ARP Responses                : 1
# Tx InARP Requests               : 0
# Tx InARP Responses              : 5
# Rx InARP Requests               : 5
# Rx InARP Responses              : 0
# Tx Discarded Pkts               : 0
# Rx Discarded Pkts               : 0
```

Table 2-19 ATM/STATS/CIP <CIP Index> Parameters

Parameter	Description
# Packets from Other LIS	Number of packets from other logical IP subnets
# Tx ARP Requests	Number of transmitted Address Resolution Protocol requests
# Tx ARP Responses	Number of transmitted Address Resolution Protocol responses
# Rx ARP Requests	Number of received Address Resolution Protocol requests
# Rx ARP Responses	Number of received Address Resolution Protocol responses
# Tx InARP Requests	Number of transmitted inverse Address Resolution Protocol requests
# Tx InARP Responses	Number of transmitted inverse Address Resolution Protocol responses
# Rx InARP Requests	Number of received inverse Address Resolution Protocol request
# Rx InARP Responses	Number of received inverse Address Resolution Protocol responses
# Tx Discarded Pkts	Number of discarded packets on transmit
# Rx Discarded Pkts	Number of discarded packets on receive

ATM/STATS/CONNECTION and ATM/STATS/CONNECTION <VCI> Examples

This command displays connection statistics. If the command is followed by a VCI value, the connection statistics associated with that VCI value will be displayed. If not, the connection statistics of all open connections is displayed. A sample display of **ATM/STATS/CONNECTION** is shown below, and parameters are described in Table 2-20.

```
/ATM/STATS >CONNECTION 16
                          ATM Connection Statistics

VPI/VCI                                 : 0/16
Rx Octet                                : 18511
Tx Octet                                : 16139
Rx Cell                                 : 784
Tx Cell                                 : 784
Rx SDU                                  : 392
Rx SDU Discards                         : 0
Rx Errors                               : 0
Tx SDU                                  : 392
Tx SDU Discards                         : 0
Tx Errors                               : 0
SAR Timeouts                            : 0
CRC Errors                              : 0
Oversized SDUs                          : 0
```

.

Table 2-20 ATM/STATS/CONNECTION Parameters

Parameter	Description
VPI/VCI	Virtual path identifier/virtual connection identifier.
Rx Octet	Number of received octets
Tx Octet	Number of transmitted octets
Rx Cell	Number of received cells
Tx Cell	Number of transmitted cells
Rx SDU	Number of received service data units
Rx SDU Discards	Number of received service data unit discards
Rx Errors	Number of receive errors
Tx SDU	Number of transmitted service data units
Tx SDU Discards	Number of transmitted service data unit discards
Tx Errors	Number of transmit errors
SAR Timeouts	Number of segmentation and reassembly timeouts
CRC Errors	Number of cyclic redundancy check errors
Oversized SDUs	Number of oversized service data units

ATM/STATS/LEC <LEC Number> Example

This command displays the statistics collected at the LEC for the indicated index. Note the valid values for the LEC index are 0 through 31. If an LEC entity of that index does not exist, the screen displays the error message, `LEC <LEC Number> does not exist`. A sample display of **ATM/STATS/LEC <LEC Number>** is shown below, and parameters are described in Table 2-21.

```
/ATM/STATS >LEC 1

                                LEC 1 Statistics

# ARP Request Tx                    : 1
# ARP Response Tx                   : 0
# Total Control Packets Tx          : 4
# Unicast Packets Tx                : 0
# Broadcast Packets Tx              : 0
# Discarded Packets on Tx           : 0
# ARP Request Rx                    : 0
# ARP Response Rx                   : 1
# Total Control Packets Rx          : 38
# Unicast Packets Rx                : 0
# Broadcast Packets Rx              : 0
# Discarded Packets on Rx           : 66
```

Table 2-21 ATM/STATS/LEC <LEC Number> Parameters

Parameter	Description
# ARP Request Tx	Number of address resolution protocol requests transmitted
# ARP Response Tx	Number of address resolution protocol responses transmitted
# Total Control Packets Tx	Number of total control packets transmitted
# Unicast Packets Tx	Number of unicast packets transmitted
# Broadcast Packets Tx	Number of broadcast packets transmitted
# Discarded Packets on Tx	Number of discarded packets on transmit
# ARP Request Rx	Number of address resolution protocol requests received
# ARP Response Rx	Number of address resolution protocol responses received
# Total Control Packets Rx	Number of total control packets received
# Unicast Packets Rx	Number of unicast packets received
# Broadcast Packets Rx	Number of broadcast packets received
# Discarded Packets on Rx	Number of discarded packets on receive

ATM/STATS/PTOP <PTOP Number> Example

This command displays statistics for a PTOP entry. A sample display of **ATM/STATS/PTOP <PTOP Number>** is shown below, and parameters are described in Table 2-22.

```
/ATM/STATS >ptop 0

                              PT-PT 0 Statistics

# Total Packets Tx                  : 61418
# Total Packets Rx                  : 0
# Tx Discarded Pkts                 : 0
# Rx Discarded Pkts                 : 0
```

Table 2-22 ATM/STATS/PTOP <PTOP Number> Parameters

Parameter	Description
# Total Packets Tx	Number of packets transmitted
# Total Packets Rx	Number of packets received
# Tx Discarded Pkts	Number of discarded transmit packets
# Rx Discarded Pkts	Number of discarded receive packets

ATM/STATS/SIG Example

This command displays the statistics collected at the SSCOP layer (service specific connection-oriented protocol). A sample display of **ATM/STATS/SIG** is shown below, and parameters are described in Table 2-23.

```
/ATM/STATS >SIG
                          Statistics Report for SSCOP

VPI/VCI                                 : 0/5
Switch                                  : 0
Total Rx PDUs                           : 3011
Discarded SDUs                          : 0
Rx Error PDUs                           : 0
Rx Discarded PDUs                       : 0
Total Tx PDUs                           : 3011
Tx Error PDUs                           : 0
Tx Discarded PDUs                       : 0
Rx InUse Buffer Count                   : 0
Rx Buffer In Use Gauge                  : 0
Tx InUse Buffer Count                   : 0
Tx Buffer In Use Gauge                  : 0
```

Table 2-23 ATM/STATS/SIG Parameters

Parameter	Description
VPI/VCI	Virtual path identifier/virtual connection identifier value of the connection over which the signaling messages are exchanged
Switch	The user network interface (UNI) version number. Current possible values are UNI 3.0 and UNI 3.1
Total Rx PDUs	Total number of packet data units received
Discarded SDUs	Total number of outgoing SDUs discarded
Rx Error PDUs	Total number of incoming packet data units that have reception errors
Rx Discarded PDUs	Total number of incomingpacket data units discarded
Total Tx PDUs	Total number of packet data units transmitted
Tx Error PDUs	Total number of outgoing packet data units with transmission errors
Tx Discarded PDUs	Total number of outgoing packet data units discarded
Rx InUse Buffer Count	Receive buffer in-use counter
Rx Buffer In Use Gauge	Receive buffer in-use gauge
Tx InUse Buffer Count	Transmit buffer in-use counter
Tx Buffer In Use Gauge	Transmit buffer in-use gauge

ATM/STATS/TRUNK <Trunk Number> Example

This command displays the statistics for a particular Trunking entry. A sample display of **ATM/STATS/TRUNK <Trunk Number>** is shown below, and parameters are described in Table 2-24.

```
/ATM/STATS >trunk 1
                              TRUNK 1 Statistics
# Total Packets Tx                  : 288
# Total Packets Rx                  : 0
# Tx Discarded Pkts                 : 0
# Rx Discarded Pkts                 : 0
```

Table 2-24 ATM/STATS/TRUNK <Trunk Number> Parameters

Parameter	Description
# Total Packets Tx	Number of packets transmitted
# Total Packets Rx	Number of packets received
# Tx Discarded Pkts	Number of discarded transmit packets
# Rx Discarded Pkts	Number of discarded receive packets

ATM/STATS/UME Example

This command displays the statistics collected at the UME (user management entity) layer that handles all the packet data units associated with the ILMI exchange between the peer entities across the UNI. A sample display of **ATM/STATS/UME** is shown below.

```
/ATM/STATS >UME
UME Datalink Statistics
# Received PDUs                     : 454
# Dropped Received PDUs             : 0
# Transmitted PDUs                  : 454
```

ATM/TEST Command

Syntax and (alias)

ATM/TEST/LOOP

Description

This command runs the Loop test. After setting the test parameters, enter 0 to save the parameters and run the test. After the test runs, test results are displayed, and the test is automatically disabled. A sample display of **ATM/TEST/LOOP** is shown below, and parameters are described in Table 2-25.

```
/ATM/TEST >loop
                        ATM Port Loop Enable/Disable
1. Loop Type(Choices a - d):      OAM F5 EndtoEnd Loop
2. Loop State:((a)-Enable, (b)-Disable):Enable
3. VCI Value (Required if OAM Loop): -1
Enter Selection, 0 to save the Modification or q to quit:
```

Table 2-25 ATM/TEST/LOOP Parameters

Parameter	Description
1. Loop Type	Specifies the elements that are tested Range: a) PHY Diagnostics Loop (See Figure 2-3) b) PHY Line Loop (See Figure 2-4) c) OAM F5 EndtoEnd Loop (See Figure 2-5) d) OAM F5 Segment Loop (See Figure 2-6) Default: a) OAM F5 EndtoEnd Loop
2. Loop State	Enables or disables the diagnostic loop Range: Enable or Disable Default: Enable
3. VCI Value	Required for the OAM loop type of test

The PHY Diagnostics Loop test runs internally to the switch and tests physical and receive functionality, as illustrated in Figure 2-3.

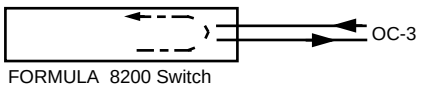


Figure 2-3 PHY Diagnostics Loop

The PHY Line Loop test runs from an external device transmitting to the switch, and loops signal back through the **physical layer**, as illustrated in Figure 2-4.

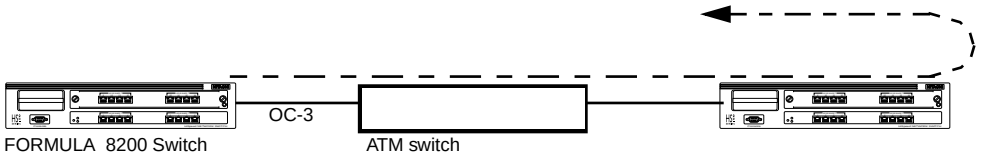


Figure 2-4 PHY Line Loop

OAM F5 EndtoEnd Loop Test

The OAM F5 EndtoEnd Loop tests line integrity through the **entire connection**, as illustrated in Figure 2-5.

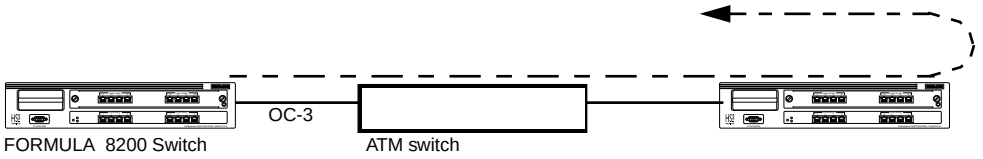


Figure 2-5 OAM F5 EndtoEnd Loop

The OAM F5 Segment Loop tests line integrity between the switch and the next device, as illustrated in Figure 2-6.

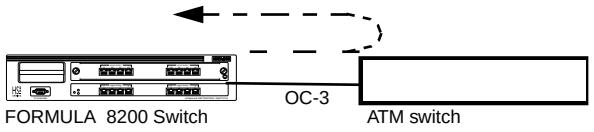


Figure 2-6 OAM F5 Segment Loop

Appendix A
ATM Acronyms and Terms

This appendix lists and defines ATM acronyms and terms used in this guide. For a more comprehensive list of ATM acronyms, visit the ATM Forum website at **www.atmforum.com**.

For other terms commonly used in Allied Telesyn publications, refer also to the glossary in Allied Telesyn's website at **www.alliedtelesyn.com**.

AAL (ATM adaptation layer)

The layer in the ATM model that provides the protocol between packet services and any ATM cell-oriented switching devices. The services primarily consist of segmentation and reassembly of data into multiple 48-byte cells.

Asynchronous

A method of transmission in which the time intervals between characters are not required to be equal and signals are sourced from independent clocks with different frequencies and phase relationships. Start and stop bits are added to coordinate character transfer.

ATM layer

The layer in the ATM model above the physical layer responsible for: cell multiplexing; virtual path identifier and virtual channel identifier translation; cell header generation and extraction; and generic flow control.

CIP (classical IP)

RFC 1577 specifies how to carry IP datagrams over the ATM network. It specifies the format of the ATM ARP requests and replies over the ATM AAL5 layer. It also defines the role and the protocol operation of the ATM ARP server, and the use of ATM ARP to resolve IP addresses from ATM addresses and ATM VCI values.

RFC 1483 allows the multiplexing of multiple families of PDUs over the same VCI, and the protocol is identified by prefixing the PDU by

	an IEEE 802.2 LLC header (called LLC encapsulation). Using CIP, you can configure hosts and routers within a closed logical IP subnet (LIS) with the same IP network/subnet number and address mask, and they communicate with other members of the same LIS over the ATM network. Hosts of different IP subnets must communicate via an IP router, even though they can communicate via a direct VC.
ELAN (emulated LAN)	Following the ATM Forum sub-working group LAN emulation specification, emulated LANs make connection-oriented ATM networks look like connectionless local area networks.
End point	On an ATM network, an end station, server, or internetworking device connected to the network. End points use either a user-to-network interface (UNI) for end stations or servers, or a network-to-network interface (NNI) for switch-to-switch connections.
IISP (interim inter-switch signaling protocol)	A standardized signaling protocol to enable switched virtual circuits (SVCs) between switches in a private ATM network using static routes. Based on UNI 3.1 with optional support for UNI 3.0.
ILMI (interim local management interface	Integrated Local Managment Interface: An ATM Forum defined interim specification for network management functions between an end user and a public or private network and between a public network and a private network. This is based on a limited subset of SNMP capabilities.
LANE (LAN emulation)	The method used by switching equipment to emulate the characteristics of shared-media LANs, standardized by the ATM Forum to allow transparent operation of existing LANs and protocols across ATM. Facilitates the operation of broadcast-oriented, connectionless networks and employes a server to resolve addresses between Ethernet and ATM systems. Allows for multicast services for supporting broadcast traffic when needed and MAC driver interfaces on ATM stations supporting existing protocols such as IP, APPN, NetBIOS, and IPX.
LEC (LAN emulation client)	One of the components of LAN emulation, the LEC is an Ethernet port in a virtual LAN that has its own ATM address. In LANE, ARP is used to translate and map the MAC addresses to ATM addresses. When an end station sends a MAC frame to an LEC, the LEC finds the ATM address of the destination with the help of the LAN emulation server (LES) and sets up an ATM virtual connection to the destination using SVC. The MAC traffic is then sent as an ALL5 PDU with an LLC encapsulation over the established virtual connection.

LECS (LAN emulation configuration server)	One of the components of LAN emulation, it is the service that maintains tables of virtual addresses. A given LEC can query this database for the address of the LAN emulation server (LES) with which the LEC needs to register.
LES (LAN emulation server)	One of the components of LAN emulation, this is the service that resolves MAC and ATM address mappings for LAN emulation clients.
MTU (maximum transmission unit)	The largest possible unit of data that can be transmitted on a given physical medium using a given protocol.
NNI (network-to-network interface)	An interface connecting private or public switches. A private NNI is between two private network switches within a building. A public NNI is between two public switching devices that create a WAN. The NNI specification can be applied in both switch-to-switch and network-to-network situations.
PVC (permanent virtual circuit)	A dedicated connection between DTE devices configured manually to be used for a single purpose. This is comparable to a leased line between communicating devices.
PTOP (point-to-point)	A communication link between two end objects or computer systems in a network of computers. A PTOP connection link or type requires a set up between two or more parties before end systems can communicate with each other.
RIP (routing information protocol)	A distance-vector protocol in the IP suite (used by IP and IPX network-layer protocols) that enables routers in the same autonomous system to exchange routing information by means of periodic updates. For RIP, the best path to a destination is the path with the fewest hops. RIP computes the distance as a metric, usually the number of hops from the network of origin to the destination.
SVC (switched virtual circuit)	On-demand connection between ATM or Frame Relay source and destination that lasts only for the duration of the transmission.
UNI (user-to-network interface)	Generic term to indicate interfaces to both public or private Frame Relay or ATM networks. Typically end point devices such as client workstations, client servers, or ATM routers. The current UNI specification describes the signaling protocols that let users set up connections between ATM devices in customers' equipment or public carrier equipment. The UNI specification includes support for SVCs.
VC (virtual circuit)	A network service that provides connection-oriented service regardless of underlying network structure.
VC (virtual channel)	A concept used to describe unidirectional transport of ATM cells associated by a common unique identifier value.

VCC (virtual channel connection)	The link set up between any source and destination in the ATM network.
VCI (virtual channel identifier)	Address or label contained in the ATM cell header to designate the virtual channel within the virtual path on the physical ATM link.

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