

# 25 Managing ATM Ports

ATM access, or uplink, ports allow switch traffic to connect to an ATM network. In typical configurations, LAN traffic from Ethernet devices is translated and switched out an ATM port to an ATM-based network.

You can configure several services on these ATM access ports to facilitate communication between the access port and an ATM switched port. These services include LAN Emulation, Classical IP, and Point-to-Point bridging. The configuration of these services is described in Chapter 27, “Configuring ATM Services.”

This chapter provides overview information and configuration instructions for ATM uplink sub-module ports. It focuses on the ATM layer configuration parameters. The following are OmniAccess 408 uplink sub-modules providing ATM access ports:

- OA-408-155-FM-T1/E1
- OA-408-155-FS-T1/E1
- OA-408-155-RFS-T1/E1
- OA-408-155-FSH-T1/E1
- OA-408-155-RFSH-T1/E1
- OA-408-DS3/E3

## ◆ Note ◆

The OmniAccess 408's front panel is divided into several areas labeled S1, S2, S3, etc. These areas relate to the conceptual division of the switch into several modules. S1 is the management module (referred to as the MPM), S2 is the uplink module (if the switch supports an uplink module), and S3, S4, etc. are the device connection (i.e., Ethernet port) modules.

As a result, ATM uplink ports, when they exist, will always be in slot 2 in an OmniAccess 408 switch.

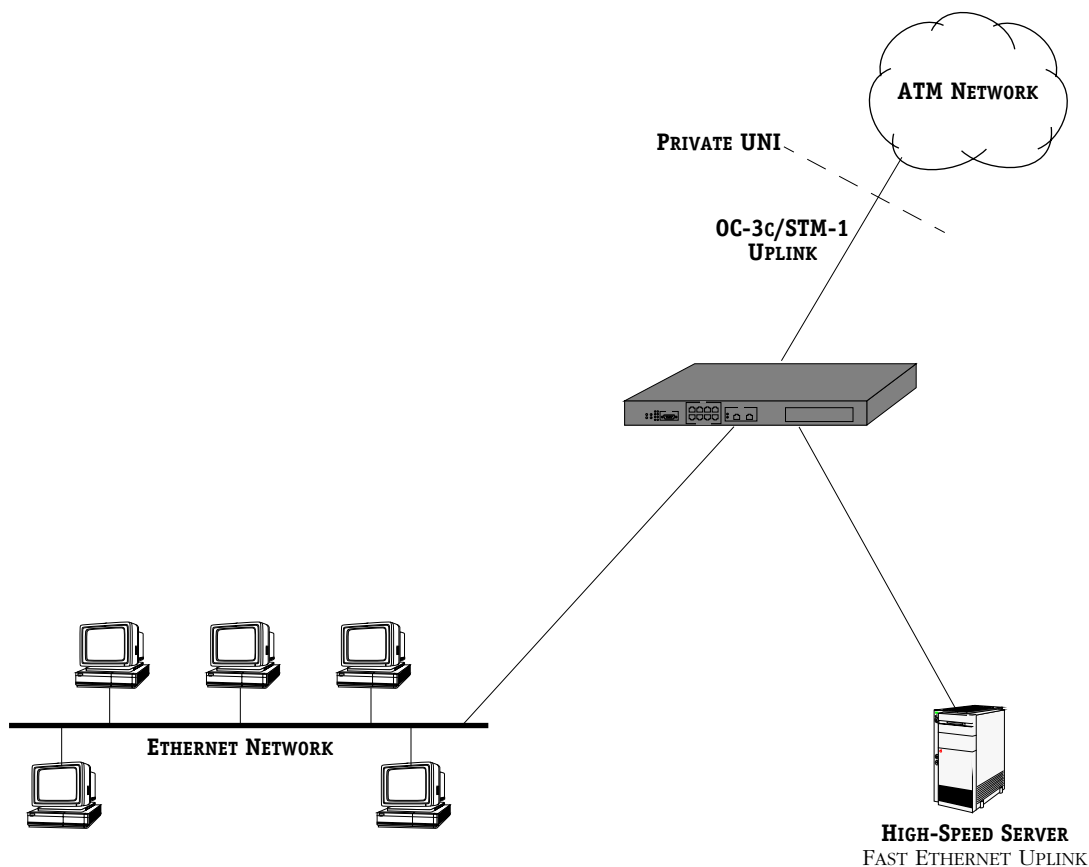
## LAN Switch With ATM Uplinks

The OmniAccess 408 can switch frames from LAN interfaces, such as Ethernet, to an ATM-based network. It supports ATM uplink connections that are compatible with User-to-Network (UNI) versions 3.1 and 3.0 to provide comprehensive LAN-to-ATM internetworking. These ATM uplink connections provide connectivity to a native ATM network.

Typically you will configure services on ATM access ports in order to bridge LAN traffic (i.e., Ethernet) onto the ATM network. LAN traffic enters the OmniAccess 408 through an Ethernet port and exits through an ATM access, or uplink, port. It is on such an access port that you configure one of several ATM services.

These services include Point-to-Point Bridging (PTOP), Classical IP, Trunking, and VLAN clusters. ATM services are configured through the **cas** command. The **cas** command and all ATM service types are described in detail in Chapter 27.

The network in the illustration below shows an OmniAccess 408 switching traffic for Ethernet, Fast Ethernet, and ATM uplink interfaces. It serves as a LAN switch while having an OC-3 uplink to the ATM network.



**OmniAccess 408 as a LAN-to-ATM Internetworking Device**

## The ATM Menu

User Interface commands for configuring and monitoring ATM uplink ports are in the ATM menu, shown below. To view the ATM Menu, type **atm** at any prompt.

Command	ATM Management Menu
vap	View the list of ATM ports configurations
map	Modify an ATM port configuration
vvc	View virtual channel connections
cvc	Create a virtual channel connection
mvc	Modify a virtual channel connection
dvc	Delete a virtual channel connection
vva	View virtual atm addresses
cva	Create a virtual atm address
mva	Modify a virtual atm address
dva	Delete a virtual atm address
vlat	View ATM LANE LE_ARP table
vat	View ATM CIP Arp Table
aat	Add static ATM Arp entry for CIP
dat	Delete static ATM Arp entry for CIP
vss	View ATM Service statistics
vls	View atm layer statistics table
vlrs	View atm layer rx error statistics table
vlts	View atm layer tx error statistics table
vcs	View atm connection statistics table
vcrs	View atm connection rx error statistics table
vcts	View atm connection tx error statistics table
vbwg	View the bandwidth group table
mbwg	Modify the bandwidth group table
vgptovc	View group to VC mapping table (Scaling)
<div> <div>Main</div> <div>File</div> <div>Summary</div> <div>VLAN</div> <div>Networking</div> </div> <div> <div>Interface</div> <div>Security</div> <div>System</div> <div>Services</div> <div>Help</div> </div>	

Several commands apply to the ATM service commands that can be set up on ATM access ports. These commands include those for Classical IP (**vat**, **aat**, **dat**), LAN Emulation (**vlat**), and the **vss** command. These commands are described in Chapter 27, “Configuring ATM Services.”

### ◆ Note ◆

The **vgptovc** command is only supported on the OmniSwitch FCSM II module.

# Modifying an ATM Access Port Configuration

Use the **map** command to alter ATM access port configuration settings. Ports are configured with default settings until you modify them using the **map** command. To use this command, enter **map** followed by the slot and port number ATM port you want to modify. For example, to change settings for port 1 in slot 2, you would enter:

**map 2/1**

A screen similar to the following displays:

### Slot 2 Port 1 Configuration

1) Description (30 chars max)	: ATM PORT
2) Conn Type { PVC(1), SVC(2)}	: SVC
30) Sig version { 3.0(1) 3.1(2) }	: 3.0
31) Signaling VCI (0..1023)	: 5
32) ILMI Enable {(False(1),True(2))}	: True
33) ESI (12 hex-chars)	: 0020da79efbf
34) ILMI VCI (0..1023)	: 16
35) ILMI Polling {(Off(1),On(2))}	: Off
3) Max VCCs (1-1023)	: 1023
4) Max VCI bits (1..10)	: 10
5) UNI Type	: Private
6) Tx SAR Buffer Size (4096-131072)	: 16384
7) Rx SAR Buffer Size (4096-131072)	: 16384
8) Tx Frame Buffer Size (1800-16384)	: 4600
9) Rx Frame Buffer Size (1800-16384)	: 4600

Enter (option=value/save/cancel) : cancel

You change a value in the field by entering the line number for the value, an equal sign (=), and then the new value for the variable. For example, to change the **Description** field variable to read "Switch Uplink Port," you would enter a 1 (the line number for **Description**), an equal sign, and then the new description as follows:

**1=Switch Uplink Port**

The variables in the **map** command screen are explained in the following sections.

## 1) Description

A description of this port, up to 30 alphanumeric characters long. This identifier will be used in displays for other software commands.

## 2) Conn Type

Indicates whether connections established on this port will be Permanent Virtual Circuits (PVCs) or Switched Virtual Circuits (SVCs). You create PVCs through the **cvc** command, which is described in *Creating a Virtual Channel Connection* on page 25-7. PVC information is stored in flash memory on the switch; if you restart the switch, the PVC would be restored.

Switched Virtual Circuits, or SVCs, are learned by the OmniAccess 408 through communication with the ATM attached devices. SVCs are built up and taken down based on demands for virtual connections by ATM end devices. If an SVC connection is lost or the switch is restarted, then the circuit is lost and the source device must request the connection again.

The type of connection you choose can affect the type of ATM services you can set up on a port. For example, LANE requires SVC connections, and VLAN clusters requires PVC connections.

Enter a **1** to select PVC, or enter a **2** to select an SVC.

**SVC Configuration Options.** If you select SVC, you will see an additional menu of options. The items in this menu are described as follows:

### 30) Sig Version

The version of the User-to-Network Interface (UNI) used on this port. The OmniAccess 408 is compliant with ATM Forum UNI specifications versions 3.0 and 3.1. You select which version your ATM network supports. (The signalling version you are using must match the signalling version being used on the network.)

#### ◆ Important Note ◆

If you change the **Signaling Ver** from UNI 3.0 to UNI 3.1 (or vice versa), then you *must* reboot the switch.

### 31) Signalling VCI

The Virtual Channel Identifier (VCI) used for signalling. For ATM access ports, this VCI is typically set to 5.

### 32) ILMI Enable

Indicates whether you want to enable Integrated Local Management Interface (ILMI). Normally ILMI should be enabled. The only reasons not to enable ILMI are if the ATM network switch does not support ILMI or if the ATM network switch is unable to register the network prefix with the OmniAccess 408 in a timely manner. The disadvantage of disabling ILMI is that the ATM network switch needs to have a static route configuration to map the ATM address of the OmniAccess 408 port to its port configuration. In this case, you will need to enter the full ATM address instead of just the End Station Identifier (ESI).

### 33) ESI

The 6-byte End Station Identifier (ESI) for this port. This value, which functions like a MAC address for this port, is used by the ATM switch to identify this particular ATM access port.

### 34) ILMI VCI

The Virtual Channel Identifier (VCI) that will be reserved for ILMI management signaling on this port. For ATM access ports, this VCI is typically set to 16.

### 35) *ILMI Polling*

The ILMI status messages sent out at regular intervals (about every 3-5 seconds) from this port. If you want to enable ILMI polling, select the **On** option. If you want to disable ILMI polling, select the **Off** option. The default value for **ILMI Polling** is **Off**.

### 3) **Max VCCs**

The maximum number of Virtual Channel Connections (VCCs) allowed on this port. This parameter is not configurable and will always read **1023**. Each port can support up to 1023 virtual connections. You configure these VCCs through the **cvc** command.

### 4) **Max VCI Bits**

The maximum number of bits that can be used for Virtual Channel Identifiers (VCIs) created on this port. This parameter is not configurable and will always read **10** (i.e., these ports support up to 10 bits per Virtual Path). The maximum number of Virtual Channels is  $2^n - 1$  where  $n$  is the maximum VCI bits.

### 5) **UNI Type**

Specifies the type of User-to-Network Interface (UNI) that this port supports. ATM supports both Private and Public UNI connections, but typically Private is used for ATM uplink, or access, connections to an ATM switch. Only **Private** is supported on this port.

### 6) **Tx SAR Buffer Size** and 7) **Rx SAR Buffer Size**

The size of the segmentation cell buffer (**Tx SAR Buffer Size**) and the reassembly cell buffer (**Rx SAR Buffer Size**) on this UNI. These buffers comprise the entire Segmentation and Reassembly (SAR) buffer for this ATM access port. The size is fixed at 131,072 bytes.

#### ◆ **Important Note** ◆

You *cannot* configure these fields on an OmniAccess 408 ATM access module.

### 8) **Tx Frame Buffer Size**

The size of the transmit frame buffer, or the maximum size of packets that can be transmitted from ATM to the switch. This value can range from 1800 to 131,072 bytes, but must be less than or equal to the **Tx SAR Buffer Size**. This value should be greater than or equal to the **Tx Maximum Frame Size** (set through the **cvc** command) of all connections on this port.

### 9) **Rx Frame Buffer Size**

The size of the receive frame buffer on this UNI, or the maximum size of packets that can be received from the switch. This value can range from 1800 to 131,072 bytes, but must be less than or equal to the **Rx SAR Buffer Size** and should be greater than or equal to the **Rx Maximum Frame Size** (set through the **cvc** command) of all connections on this port.

## Creating a Virtual Channel Connection

The **cvc** command allows you to create a Permanent Virtual Circuit (PVC) for a physical port and logical VCI that you specify. These PVCs are used mainly by ATM services, which are described in Chapter 27. The commands for setting up ATM services (**cas** and **mas**) also create these PVCs, so use of the **cvc** command before configuring ATM services is not required.

To begin setting up a permanent virtual circuit, enter **cvc** followed by the slot number, a slash (/), and the port number where you want to set up the virtual circuit. After the slot and port number, leave a space, then specify the Virtual Channel Identifier (VCI). For example, the following command specifies a virtual circuit with a VCI of 100 on the first port in slot 2:

```
cvc 2/1 100
```

The initial message will be followed by a screen of options similar to the following:

### Slot 2 Port 1 Connection VCI 100 Configuration

Available bandwidth: Tx=353208 Rx=353208

```
1) Description (30 chars max)                : Connection 200
2) Requested Tx QoS Class { Unspecified(0) }  : Unspecified
3) Requested TX Best Effort { False (1), True (2) } : True
4) Requested Tx Traffic Descriptor { NoCLPNoSCR(2) } : NoCLP NoSCR
   20) Peak Cell Rate (cells/sec) for CLP=0+1      : 353208
5) Requested Rx QoS Class { Unspecified(0) }    : Unspecified
6) Requested RX Best Effort { False (1), True (2) } : True
7) Requested Rx Traffic Descriptor { NoCLPNoSCR(2) } : NoCLP NoSCR
   30) Peak Cell Rate (cells/sec) for CLP=0+1      : 353208
```

More y/n? (y) :

This portion of the **cvc** screen shows “requested” parameters. These are the values for parameters that you would ideally like to meet on this virtual circuit. These values, such as the Peak Cell Rate (PCR), may not always be possible to meet depending upon traffic patterns. Therefore, you can also specify “acceptable” values for each of these parameters. You will see the acceptable parameters after you enter press **<Enter>** at the **More y/n?** prompt.

```
8) Acceptable Tx QoS Class { Unspecified(0) }    : Unspecified
9) Acceptable TX Best Effort { False (1), True (2) } : True
10) Acceptable Tx Traffic Descriptor { NoCLPNoSCR(2) } : NoCLP NoSCR
   40) Peak Cell Rate (cells/sec) for CLP=0+1      : 12200
11) Acceptable Rx QoS Class { Unspecified(0) }    : Unspecified
12) Acceptable RX Best Effort { False (1), True (2) } : True
13) Acceptable Rx Traffic Descriptor { NoCLPNoSCR(2) } : NoCLP NoSCR
   50) Peak Cell Rate (cells/sec) for CLP=0+1      : 12200
14) Tx Maximum Frame Size                        : 4520
15) Rx Maximum Frame Size                        : 4520
```

Enter (option=value/save/cancel) :

The values you enter for the fields on the bottom half of the **cvc** screen represent what you consider acceptable. The hardware will make its best attempt to meet your requested parameters first. If it can not meet these requirements, it will attempt to meet your acceptable requirements. If it also cannot meet your acceptable requirements, then the VCC will not be operational. However, if you do not enter acceptable values, then the hardware will send traffic at the best possible rate below your requested rate.

For example, if you enter a requested Tx (transmit) Peak Cell Rate (PCR) of 150000 cells/second, then the OSASM will make its best attempt to meet this rate. If the module cannot support that rate, then software will find the best possible rate below 150000 cells/second. If you did not enter any acceptable parameters, then the software might, as an example, find that traffic could be sent at 75000 cells/second on this VCC, and traffic would be transmitted at this rate. However, if you had entered an *acceptable* PCR of 100000 cells/second, the software would find that it could not meet this requirement and the VCC would not be operational.

### 1) Description: (30 chars max)

A textual description for this virtual circuit. The description may be up to 30 characters long. This description will be used in displays for other software commands to identify this virtual circuit.

### 2) Requested Tx QoS Class

The Quality of Service (QoS) for cells transmitted (from source to destination) on this virtual circuit. For ATM uplink connections to an ATM switch only the **Unspecified** QoS is supported. This QoS transmits data on a best effort basis; bandwidth is not guaranteed, but as much data as possible will be transmitted as long as bandwidth is available.

### 3) Requested Tx Best Effort

This field indicates whether you want this port to transmit traffic on a “best effort” basis or to use a Peak Cell Rate (PCR) parameter to transmit traffic. If you select True (option 2), then the port will transmit traffic if any bandwidth is available on the port. If you select False (option 1), then the Peak Cell Rate (PCR) parameter will be used to transmit traffic on this VCC. You enter a PCR value in line 20 of this screen. If data cannot be sent at the PCR you specify, then no data will be sent on the VCC.

### 4) Requested Tx Traffic Descriptor

The traffic descriptor to be used. The traffic descriptor determines which traffic parameters you specify. Only the **NoCLPNoSCR** traffic descriptor is supported. **NoCLPNoSCR** requires you to enter the Peak Cell Rate (PCR) on line 20. However, if you select **True** on line 3 (**Requested Tx Best Effort**), then the PCR will not be used to determine traffic flow, and traffic will be transmitted on a best effort basis.

#### 20) Peak Cell Rate (cells/sec) for CLP=0+1

This value is only relevant if you enter **False** on line 3, **Requested Tx Best Effort**. In this field you specify the Peak Cell Rate (PCR), in cells per second, allowed for traffic transmitted on this VCC. The PCR is the fastest cell rate allowed on the connection. When using Peak Cell Rate, the bandwidth of an ATM uplink port can be partitioned among multiple connections each with a dedicated bandwidth. The ATM driver calculates the best rate nearest to the requested rate that the ATM hardware can support. This rate is shown using the **vvc** command. The CLP=0+1 in this field means that both high priority (CLP=0) and low priority (CLP=1) cells will be checked for PCR. CLP is an acronym for “Cell Loss Priority.”



### 5) Requested Rx Qos Class

The Quality of Service (QoS) for cells received (from destination to source) on this virtual circuit. For ATM uplink connections to an ATM switch only the **Unspecified** QoS is supported. This QoS receives data on a best effort basis; bandwidth is not guaranteed, but as much data as possible will be received as long as bandwidth is available.

### 6) Requested Rx Best Effort

This field indicates whether you want this port to receive traffic on a “best effort” basis or to use a Peak Cell Rate (PCR) parameter. If you select True (option **2**), then the port will receive traffic if any bandwidth is available on the port. If you select False (option **1**), then the PCR parameter will be used. You enter a PCR value in line 20 of this screen. If data cannot be received at the PCR you specify, then this VCC will not be operational.

### 7) Requested RX Traffic Descriptor

The traffic descriptor to be used. Only the **NoCLPNoSCR** traffic descriptor is supported. **NoCLP-NoSCR** requires you to enter the Peak Cell Rate (PCR) on line 20. However, if you select **True** on line 6 (**Requested Rx Best Effort**), then the PCR will not be used to determine traffic flow, and traffic will be received on a best effort basis.

#### **30) Peak Cell Rate (cells/sec) for CLP=0+1**

This value is only relevant if you enter **False** on line 6, **Requested Rx Best Effort**. In this field you specify the Peak Cell Rate (PCR), in cells per second, allowed for traffic received on this VCC. The PCR is the fastest cell rate allowed on the connection. When using PCR, the bandwidth of an ATM uplink port can be partitioned among multiple connections each with dedicated bandwidth. The ATM driver calculates the best rate nearest to the requested rate that the ATM hardware can support. This rate is shown using the **vvv** command. The CLP=0+1 in this field means that both high priority (CLP=0) and low priority (CLP=1) cells will be checked for PCR.

### 8)Acceptable Tx QoS Class — 13)Acceptable Rx Traffic Descriptor

Definitions for fields 8 through 14, 40, and 50 are similar to those for fields 2 through 7, 20, and 30, respectively. The parameters are the same except these values specify your minimum acceptable thresholds. You do not have to enter any parameters for fields 8 through 13. However, if you do, the ATM software will use them to determine whether traffic can be sent on this VCC. If software determines your acceptable values cannot be met, then the VCC will not be operational.

### 14) Tx Maximum Frame Size

The maximum frame size for traffic transmitted on this connection. Frames are composed of ATM cells. You specify the largest possible frame size, in bytes, in the field. If a frame exceeds this size, it will be discarded and counted as an error in statistics tables. The value in this field must be greater than zero (0), but less than the **Tx Frame Buffer Size**, which is specified through the **map** command.

### 15) Rx Maximum Frame Size

The maximum frame size for traffic received on this connection. Frames are composed of ATM cells. You specify the largest possible frame size, in bytes, in the field. If a frame exceeds this size it will be discarded and counted as an error in statistics tables. The value in this field must be greater than zero (0), but less than the **Rx Frame Buffer Size**, which is specified through the **map** command.

# Modifying a Virtual Channel Connection

You can modify any parameters for a virtual circuit that you previously configured. The **mvc** command enables you to modify a virtual circuit. It uses the same screens and allows you to change the same parameters as the **cvc** command.

To begin modifying a virtual circuit, enter **mvc** followed by the slot number, a slash (/), and the port number for the virtual circuit. After the slot and port number, leave a space, then specify the Virtual Channel Identifier (VCI). For example, the following command modifies a virtual circuit with a VCI of 100 on the first port in slot 2:

**mvc 2/1 100**

For more information on the **mvc** screens and parameters, see *Creating a Virtual Channel Connection* on page 25-7.

## Deleting a Virtual Channel Connection

To delete a virtual channel connection enter **dvc** followed by the slot number where the circuit was set up, the physical port number for the circuit, and the VCI of the circuit. For example, if wanted to delete virtual channel 100 on port 1 in slot 2, you would enter:

**dvc 2/1 100**

Note that there is a space between the slot/port specification and the VCI specification. After you specify to delete a circuit, you will receive a message asking you to confirm the deletion:

**Remove ATM Slot 2 Port 1 Connection 100 (n)? :**

Stop the deletion by pressing **<Enter>** or entering **N** at this prompt. A message similar to the following displays:

**ATM Slot 2 Port 1 Connection 100 not removed**

Confirm the deletion by entering a **Y** at the confirmation prompt. The VPI or VCI will be removed and a message similar to the following displays:

**Removing ATM Slot 2 Port 1 Connection 100, please wait...**

**ATM Slot 2 Port 1 Connection 100 removed**

# Creating a Virtual ATM Address

The **cva** command allows you to create a virtual ATM address in this switch. To create an ATM address, enter **cva** followed by the a 40-character ATM address.

The following command creates the address **1234342525675845624198645276452354672456**

```
cva 1234342525675845624198645276452354672456
```

and displays a screen similar to the following:

**Connection Address 1234342525675845624198645276452354672456 Configuration**

<b>1) Description (30 chars max)</b>	<b>: Address 2</b>
<b>2) Requested Tx QoS Class { Unspecified(0) }</b>	<b>: Unspecified</b>
<b>3) Requested TX Best Effort { False (1), True (2) }</b>	<b>: True</b>
<b>4) Requested Tx Traffic Descriptor { NoCLPNoSCR(2) }</b>	<b>: NoCLP NoSCR</b>
<b>20) Peak Cell Rate (cells/sec) for CLP=0+1</b>	<b>: 353208</b>
<b>5) Requested Rx QoS Class { Unspecified(0) }</b>	<b>: Unspecified</b>
<b>6) Requested RX Best Effort { False (1), True (2) }</b>	<b>: True</b>
<b>7) Requested Rx Traffic Descriptor { NoCLPNoSCR(2) }</b>	<b>: NoCLP NoSCR</b>
<b>30) Peak Cell Rate (cells/sec) for CLP=0+1</b>	<b>: 353208</b>
<b>14) Tx Maximum Frame Size</b>	<b>: 4520</b>
<b>15) Rx Maximum Frame Size</b>	<b>: 4520</b>

**Enter (option=value/save/cancel) :**

The options in this screen are the same as those used in the **cvc** command. Refer to the section, *Creating a Virtual Channel Connection* on page 25-7 for a description of these parameters.

Once you have set up values in these fields you should enter **save** and press <Enter>. The ATM address will then be created with the values you entered and the following message will display:

**Creating address connection, please wait...**

An index number will be assigned to this address. This index number is useful. It allows you to refer to this address using other commands without typing in the entire 40-byte address. You can see the index number assigned to the address using the **vva** command, which provides information on all configured virtual ATM addresses in the switch. The **vva** command is described in *Viewing Virtual ATM Addresses* on page 25-20.

## Modifying Virtual ATM Addresses

You can modify parameters for a virtual ATM address that you previously configured through the **mva** command. The **mva** command uses the same screens and allows you to change the same parameters as the **cva** command.

To begin modifying an ATM address, enter **mva** followed by the index number assigned to the ATM address. You can view the index numbers for ATM addresses through the **vva** command, which is described in *Viewing Virtual ATM Addresses* on page 25-20. For example, you would enter the command

mva 2

to modify the virtual ATM address with an index number of 2. You can also enter the entire ATM address after the **mva** command if you prefer.

For more information on the **mva** parameters, see *Creating a Virtual Channel Connection* on page 25-7. Once you have set up values you should enter **save** and press **<Enter>**.

## Deleting a Virtual ATM Address

To delete an ATM virtual address enter **dva** followed by the index number of the address you want to delete. You can obtain the index number for an address through the **vva** command, which is described in *Viewing Virtual ATM Addresses* on page 25-20. For example, to delete the virtual ATM address with an index number of 4, you would enter:

dva 4

After you specify to delete an address, you will receive a message asking you to confirm the deletion:

**Remove Address 4 (n)? :**

Stop the deletion by pressing **<Enter>** or entering **N** at this prompt. A message similar to the following displays:

**address xxxxxxxxxxxxxxxxxxxxxxxxaaaaaaaaabbbbbbbbbb not deleted**

Confirm the deletion by entering a **Y** at the confirmation prompt. The address will be removed and a message similar to the following displays:

address index 4 removed

## Viewing ATM Port Configuration Information

The **vap** command allows you to view basic information on an ATM access port. To view ATM access port configuration information, enter **vap** at a system prompt. The following is a sample display.

ATM Port Table											
Slot	Port	ATM Port Description				Conn Type	Tran Type	Media Type	UNI Type	Max VCC VCI bits	
2	1	ATM PORT				SVC	--	--	Pri	1023 10	
Slot	Port	Loopback Cfg		Tx Clk Source							
2	1	NoLoop		LocalTiming							
Slot	Port	ATM Network Prefix				End System Identifier	Sig Ver	Sig VCI	ILMI Enable	ILMI VCI	ILMI Poll
2	1	3903488001bc90000101dbd400				0020da98e910	3.0	5	True	16	Off
Status											
=====											
Slot	Port	Sscop Up				Sscop Down			Up	Dn	Status
2	1	WED SEP 29 10:03:37 1999				WED SEP 29 10:03 :32 1999			2	1	Up
Slot	Port	Ilmi Up				Ilmi Down			Up	Dn	Status
2	1	WED SEP 29 10:03:30 1999				-----			1	0	Up
Slot	Port	Phy Up				Phy Down			Up	Dn	Status
2	1	WED SEP 29 10:02:11 1999				-----			1	0	Enb (SVC)
Slot	Port	Tx SegSz	Rx SegSz	Tx Buff Sz	Rx Buff Sz						
2	1	16384	16384	4600	4600						
Slot	Port	Primary	ATM HSM3 Secondary	Redundant FailOver	Port Status Reason of Last Failover						
2	1	Active	Inactive	0							

**Description**, **Conn Type** (Connection type). These fields are described earlier in *Modifying an ATM Access Port Configuration* on page 25-4.

**Tran Type**. The transmission, or connection, type. Possible transmission types are **STS3c** (OC-3), **STS12c** (OC-12), **DS3**, **E3**, and **--** (unknown type).

**Media Type**. The physical connector type used on this port. Possible types in this column are **Multi** (multimode fiber), **Single** (single mode fiber), **STP** (shielded twisted pair), **UTP** (unshielded twisted pair), **Coax** (coaxial cable), and **UNKN** (unknown connector).

**UNI Typ** (UNI type), **Max VCC**, **VCI Bits** (maximum VCI bits). These fields are described in *Modifying an ATM Access Port Configuration* on page 25-4.

**Loopback Cfg**. The loopback configuration for this port.

<b>NoLoop</b>	No loopback occurs between receive and transmission paths.
<b>DiagLoop</b>	Interface transmission path is connected to receive path at the connectors. The port receives its own transmission rather than the signal coming over the cable.

**LineLoop** The interface receive path is looped to the transmission path at the connectors. The signal on the receive connector is not passed into the UNI and processed.

**Tx Clk Source** (timing mode). This field is described in *Modifying an ATM Access Port Configuration* on page 25-4.

**ATM Network Prefix.** The network prefix portion of the ATM address.

**End Station Identifier.** The end station identifier (ESI) portion of the ATM address.

The following column headings fall under the table heading labeled **Status**.

**SSCOP.** The current state of the Service-Specific Connection Oriented Protocol (SSCOP). SSCOP operates on the ATM control plane and is a peer-to-peer protocol that helps set up connections and provides a reliable transport mechanism for signaling. The **Sscop Up** and **Sscop Down** columns will indicate the last time SSCOP last came up and went down, respectively. The **Up** and **Dn** (down) columns will indicate the number of times SSCOP came up and went down, respectively. The SSCOP **Status** column will indicate Up or Down. This value will always indicate **Dn** (down) if the Connection Type configured on this port is PVC.

**ILMI.** The Integrated Local Management Interface (ILMI) enabled on this port. The **Ilmi Up** and **Ilmi Down** columns will indicate the last time ILMI last came up and went down, respectively. The **Up** and **Dn** (down) columns will indicate the number of times ILMI came up and went down, respectively. The ILMI **Status** column will indicate Up or Down. This value will always indicate **Down** if the Connection Type configured on this port is PVC.

**PHY.** The operational status of the port. The **Phy Up** and **Phy Down** columns will indicate the last time PHY last came up and went down, respectively. The **Up** and **Dn** (down) columns will indicate the number of times PHY came up and went down, respectively. The PHY **Status** column will indicate whether the port is **Enabled** or **Disabled** and provides information on upper service layers. The port will be enabled if the port is connected on this end and the far end. If there is a disconnection at either end, then the operational status will be **Disabled**. Possible values are as follows:

<b>Enb (PVC)</b>	Port is enabled to support PVCs.
<b>Enb (SVC)</b>	Port is enabled to support SVCs.
<b>Enb (CTL)</b>	Port is enabled to pass control signals.
<b>Dis (R)</b>	The receive is disabled on this port.
<b>Dis (T/R)</b>	Both the transmit and receive are disabled.
<b>Dis (T)</b>	Disabled transmit on this port.

**Sig Ver**, **Sig VCI**, **ILMI Enable**, **ILMI VCI**, **ILMI Poll**, **Tx Seg Sz** (transmit SAR buffer size), **Rx Seg Sz** (receive SAR buffer size), **Tx Buff Sz** (transmit frame buffer size), **Rx Buff Sz** (receive frame buffer size). These fields are described in *Modifying an ATM Access Port Configuration* on page 25-4.

The column headings under the table heading labeled **ATM HSM3 Redundant Port Status** display only if you have an OSASM2 with a redundant port

**Primary.** Indicates whether the primary port is active or inactive. If the primary port experiences a failover (activating the secondary port), it will remain inactive and will re-activate only when both its failover has been repaired *and* the secondary port experiences a failover

**Secondary.** Indicates whether the secondary port is active or inactive. If it is active, the primary port has experienced a failover.

**FailOver.** The total number of failovers that has occurred.

**Reason of Last Failover.** A brief explanation of the most recent failover. Port failovers occur, for example, when there is a physical disconnection. The following is an example of a **Reason of Last Failover** message: **SgnlLoss Cell Loss**.

### Viewing SSCOP, ILMI, and PHY

You can view general and detailed Service-Specific Connection Oriented Protocol (SSCOP), Integrated Local Management protocol (ILMI), and Physical information on an OSASM submodule. The **vap** command is used to provide this information.

To view SSCOP, ILMI, and PHY information on an OSASM submodule, you enter the **vap** command along with the following parameters:

**vap sip**

where **s** indicates SSCOP, **i** indicates ILMI, and **p** indicates PHY. This command displays a screen similar to the following:

ATM Port Table											
Slot	Port	ATM Port Description				Conn Type	Tran Type	Media Type	UNI Typ	Max VCI VCC bits	
2	1	ATM PORT				SVC	--	--	Pri	1023 10	
Slot	Port	Loopback Cfg		Tx Clk Source							
2	1	NoLoop		LocalTiming							
Slot	Port	ATM Network Prefix				End Identifier	System Ver	Sig VCI	ILMI Enable	ILMI VCI Poll	
2	1	3903488001bc90000101dbd400				0020da98e910	3.0	5	True	16 Off	
Status											
Slot	Port	Sscop Up				Sscop Down			Up	Dn	Status
2	1	WED SEP 29 10:03:37 1999				WED SEP 29 10:03:32 1999			2	1	Up
Slot	Port	Ilmi Up				Ilmi Down			Up	Dn	Status
2	1	WED SEP 29 10:03:30 1999				-----			1	0	Up
Slot	Port	Phy Up				Phy Down			Up	Dn	Status
2	1	WED SEP 29 10:01:46 1999				-----			1	0	Enb (CTL)
Slot	Port	Phy Up				Phy Down			Up	Dn	Status
2	1	WED SEP 29 10:02:25 1999				-----			1	0	Enb (PVC)
Slot	Port	Tx SegSz	Rx Seg Sz	Tx Buff Sz	Rx Buff Sz						
2	1	16384	16384	4600	4600						
Slot	Port	Primary	ATM HSM3 Secondary	Redundant FailOver	Port Status Reason of Last Failover						
2	1	Active	Inactive	0							

Additionally, you may enter the parameters for SSCOP, ILMI, and PHY in any order and combination. For example, if you wanted to view only the ILMI and PHY, you enter the **vap** command along with the respective parameters as follows:

**vap ip**

or

**vap pi**



This command displays a screen similar to the following:

ATM Port Table									
Status									
Slot	Port	Ilmi Up			Ilmi Down		Up	Dn	Status
2	1	WED SEP 29 10:03:30 1999			-----		1	0	Up
Slot	Port	Phy Up			Phy Down		Up	Dn	Status
2	1	WED SEP 29 10:02:11 1999			-----		1	0	Enb (SVC)
Slot	Port	Tx SegSz	Rx Seg Sz	Tx Buff Sz	Rx Buff Sz				
2	1	16384	16384	4600	4600				
Slot	Port	Primary	ATM HSM3 Secondary	Redundant FailOver	Port Status Reason of Last Failover				
2	1	Active	Inactive	0					

Descriptions of the columns included in the two displays above are described earlier in *Modifying an ATM Access Port Configuration* on page 25-4.

## Viewing Virtual Channel Connections

The **vvc** command provides information on all VCIs associated with a given ATM access port. The following is sample of the output from a **vvc** display for ATM access ports.

ATM Connections							
Slot	Port	VPI	VCI	Connection Description	Conn Type	Circuit Type	Operational Status
====	====	===	====	=====	=====	=====	=====
2	1	0	5	Connection 5	VCC	PVC	LocalUp
End2endUnknown							
2	1	0	16	Connection 16	VCC	PVC	LocalUp
End2endUnknown							
Slot	Port	VPI	VCI	Up Time	Down Time	Tx Max Frame Sz	Rx Max Frame Sz
====	====	===	====	=====	=====	=====	=====
2	1	0	5	THU MAY 02 00:21:00		4600	4600
2	1	0	16	THU MAY 02 00:14:00		4600	4600

Actual Tx Traffic Information							
Slot	Port	VPI	VCI	Tx Traffic Descrip Type	Peak Cell Rate	Tx QoS	Best Effort
====	====	===	====	=====	=====	=====	=====
2	1	0	5	NoCLP NoSCR	0	Uns	True
2	1	0	16	NoCLP NoSCR	0	Uns	True

Actual Rx Traffic Information							
Slot	Port	VPI	VCI	Rx Traffic Descrip Type	Peak Cell Rate	Rx QoS	Best Effort
====	====	===	====	=====	=====	=====	=====
2	1	0	5	NoCLP NoSCR	0	Uns	True
2	1	0	16	NoCLP NoSCR	0	Uns	True

**VPI.** The virtual path identifier for this virtual channel. This virtual path defaults to **0** for ATM access connections.

**VCI.** The virtual channel identifier for this virtual channel. For PVCs, this value is specified during the virtual channel creation procedure via the **vvc** command. Some commonly used VCI are 5 (for signalling) and 16 (for ILMI).

**Connection Description.** A textual description of up to 30 characters for this virtual connection. Entered through the **vvc** command.

**Connection Type.** Indicates whether this connection is a virtual path or a virtual channel. All ATM access connections, or uplink connections, are virtual channels. Therefore, this column will always display as **VCC** (Virtual Channel Connection).

**Circuit Type.** The circuit type is configured with the **map** command. All circuit types on a single ATM port will be the same. The circuit type can be either **PVC** (Permanent Virtual Circuit) or **SVC** (Switched Virtual Circuit).

**Operational Status.** The current operational status of this virtual connection. This status will display as one of the following:

<b>Unknown</b>	The switch cannot tell if either the local or remote end of this connection is operational.
<b>End2endUp</b>	Remote end is operational. This value displays only if the end-to-end status of this connection is known.
<b>End2endDown</b>	Remote end is not operational. This value displays only if the end-to-end status of this connection is known.
<b>LocalUp, End2endUnknown</b>	Only local information is known. The local end of the connection is operational, but the switch cannot tell if the remote end is up or down.
<b>LocalDown</b>	Only local information is known. The local end of the connection is not operational.

◆ **Note** ◆

PVCs will always have an operational status in which the remote end status is unknown (i.e., **LocalUp,End2endUnknown** or **LocalDown**).

**Up Time.** The time and date when this virtual channel became active.

**Down Time.** The time and date when this virtual channel became inactive.

**TX Max Frame Sz** and **Rx Max Frame Sz.** Descriptions for these variables are provided in the section, *Creating a Virtual Channel Connection* on page 25-7.

Traffic information is supplied for Transmit (Tx) and Receive (Rx) traffic. These variables are **Tx/Rx Traffic Descrip Type**, **Peak Cell Rate**, **Tx/Rx QoS**, and **Best Effort**. Descriptions for these variables are provided in the section, *Creating a Virtual Channel Connection* on page 25-7.

## Viewing Virtual ATM Addresses

The **vva** command allows you to view information on all ATM addresses in an OmniAccess 408. The **vva** display provides information on all end system addresses associated with a given ATM uplink port. The following is sample of the output from a **vva** display.

ATM Addresses							
Addr Indx	ATM Address					Description	
1	1234567890987654321234567890987654321234					Address 1	
2	1234342525675845624198645276452354672486					Address 2	

Addr Indx	VPI	VCI	Conn Type	VC Type	TxMax SDU	Rx Max SDU	Arp Server
1	0	0000	VCC	SVC	4520	4520	False
2	0	0000	VCC	SVC	4520	4520	False

Requested Tx Traffic Information					
Addr Indx	Tx Traffic Descriptor Type		Peak Rate	Tx QoS	Best Effort
1	NoCLP	NoSCR	353208	Uns	True
2	NoCLP	NoSCR	353208	Uns	True

Requested Rx Traffic Information					
Addr Indx	Rx Traffic Descriptor Type		Peak Rate	Rx QoS	Best Effort
1	NoCLP	NoSCR	353208	Uns	True
2	NoCLP	NoSCR	353208	Uns	True

Acceptable Tx Traffic Information					
Addr Indx	Tx Traffic Descriptor Type		Peak Rate	Tx QoS	Best Effort
1	NoCLP	NoSCR	12200	Uns	True
2	NoCLP	NoSCR	12200	Uns	True

Acceptable Rx Traffic Information					
Addr Indx	Rx Traffic Descriptor Type		Peak Rate	Rx QoS	Best Effort
1	NoCLP	NoSCR	12200	Uns	True
2	NoCLP	NoSCR	12200	Uns	True

**Addr Indx.** An index that you can use to identify ATM addresses in this display. The index numbers are consistent throughout the rows in this display.

**ATM Address.** The ATM address for which QoS parameters were configured in the **cva** command.

**Description.** A textual description of up to 30 characters for this virtual connection. Entered through the **cva** command.

**VPI.** The virtual path identifier for this ATM address. This virtual path defaults to **0** for ATM access connections.

**VCI.** The virtual channel identifier for this ATM address. This value is specified during the virtual channel creation procedure via the **cva** command.

**Conn Type.** Connection Type. Indicates whether this connection is a virtual path or a virtual channel. All ATM access connections, or uplink connections, are virtual channels. Therefore, this column will always display as **VCC** (Virtual Channel Connection).

**VC Type.** The virtual channel type is configured with the **map** command. All circuit types for each ATM port will be the same. The circuit type can be either **PVC** (Permanent Virtual Circuit) or **SVC** (Switched Virtual Circuit).

**Tx Max SDU.** The maximum frame size for traffic transmitted on this connection. This value is configured via the **cva** command.

**Rx Max SDU.** The maximum frame size for traffic received on this connection. This value is configured via the **cva** command.

**Arp Server.** Indicates whether this address is an ARP server.

Traffic information is supplied for Transmit (Tx) and Receive (Rx) traffic. These variables are **Tx/Rx Traffic Descriptor Type**, **Peak Rate**, **Tx/Rx QoS**, and **Best Effort**. Descriptions for these variables are provided in the section, *Creating a Virtual Channel Connection* on page 25-7.

# Viewing the ATM Layer Statistics Table

The **vl**s command displays the ATM Layer Statistics Table. This table includes information at the ATM Service Data Unit (SDU), ATM cell, and octet level. Information for SDUs, which are composed of cells, are directly related to statistics for cells. When an SDU is counted, the cells in that SDU are counted and then added to the corresponding cell count.

The following is a sample **vl**s display:

ATM Layer Statistics							
Slot	Port	Rx SDUs	Tx SDUs	Rx Cells	Tx Cells	Rx Octets	Tx Octets
=====	=====	=====	=====	=====	=====	=====	=====
2	1	0	6716	0	15775	0	757200

**Rx SDUs.** The number of Service Data Units received on this port.

**Tx SDUs.** The number of Service Data Units transmitted on this port.

**Rx Cells.** The number of cells received on this port. The value is derived from the **Rx SDUs** statistic. Once an SDU is received on the port, the cells in the SDU are counted and added to this statistic.

**Tx Cells.** The number of cells transmitted on this port. The value is derived from the **Tx SDUs** statistic. Once an SDU is transmitted on the port, the cells in the SDU are counted and added to this statistic.

**Rx Octets.** The number of octets, or bytes, received in the form of SDUs on this port.

**Tx Octets.** The number of octets, or bytes, transmitted in the form of SDUs on this port.

## Viewing the ATM Layer Rx Error Statistics Table

The **vlrs** command displays the ATM Layer Rx (Receive) Error Statistics Table for each ATM access port. This table includes discard and error information at the ATM Service Data Unit (SDU), or frame, level and the ATM cell level.

Note that statistics for SDUs, which are composed of cells, are directly related to statistics for cells. When an SDU error or discard is counted, the cells in that SDU are counted and then added to the corresponding cell discard or error statistic for each port.

The following is a sample **vlrs** display:

ATM Layer Rx SDU Error Statistics

Slot	Port	Discards	Errors	Invalid Sz	No Buffers	Trash	CRC Errors
2	1	0	0	0	0	0	0

ATM Layer Rx Cell Error Statistics

Slot	Port	Discards	Errors	No Buffers	Trash	CRC Errors
2	1	0	0	0	0	0

**SDU Discards.** The number of Service Data Units (SDU), or frames, that have been discarded due to one of the following reasons: an invalid size error, CRC error, invalid format error, the frame was larger than the receive SAR buffer, or the frame was larger than the maximum size allowed on this port. Invalid size and CRC errors are also displayed in this table and described below. An invalid format error occurs when a frame is received in the wrong format. For example, a PTOP frame may be received that should be in 1483 format but instead is in Private encapsulation. The receive SAR buffer size (**Rx SAR Buffer Size**) is configured through the **map** command. The maximum frame size allowed on this port is configured through the **cvc** or **mvc** command.

**SDU Errors.** The number of Service Data Units that had one or more of the following errors: invalid size, invalid format, frame larger than SAR buffer size, CRC error, or the frame was larger than that allowed on this port. This error statistic will typically match the **SDU Discards** statistic.

**SDU Invalid Size.** The number of Service Data Units, or frames, received that are either larger than the receive frame buffer or had an AAL5 length mismatch. One cell in an SDU contains an AAL trailer that includes a length field; an AAL5 mismatch error occurs when that length field is incorrect. The receive frame buffer size (**Rx Frame Buffer Size**) is configured through the **map** command.

**SDU No Buffers.** The number of SDUs that were discarded because there was no room in the receive frame buffer. Note that the SDUs counted in this statistic are not included in the **Rx SDU Discards** or **Errors** statistics in the **vlrs** display. The receive frame buffer size (**Rx Frame Buffer Size**) may be configured through the **map** command.

**SDU Trash.** The number of Service Data Units that were discarded at the ATM physical layer. These SDUs were discarded by the Segmentation and Reassembly (SAR) due to a lack of reassembly buffer space. Note that the SDUs counted in this statistic are not included in the **Rx SDU Discards** or **Errors** statistics in the **vlrs** display.

**SDU CRC Errors.** The number of SDUs received with errors in the CRC (cyclical redundancy check) header. This error is counted in the **Rx SDU Discards** and **Errors** columns of the **vlrs** display.

**Cell Discards.** The total number of cells discarded as a result of SDU Discards. SDUs are discarded due to invalid size, CRC errors, invalid format, frame size larger than SAR buffer, or frame size larger than allowed on this port. For each SDU discarded, the number of cells within that SDU are counted and then added to this statistic.

**Cell Errors.** The total number of cells within SDUs that had one or more of the following errors: invalid size, invalid format, frame larger than SAR buffer size, CRC error, or the frame was larger than that allowed on this port. For each errored SDU, the number of cells within that SDU are counted and then added to this statistic.

**Cell No Buffers.** The total number of cells that were discarded because there was no room in the receive frame buffer. Note that the cells counted in this statistic are not included in the **Rx Cell Discards** or **Errors** statistics in the **vlrs** display.

**Cell Trash.** The total number of cells that were discarded at the ATM physical layer. These cells were discarded by the Segmentation and Reassembly (SAR) due to a lack of reassembly buffer space. Note that the cells counted in this statistic are not included in the **Rx Cell Discards** or **Errors** statistics in the **vlrs** display.

**Cell CRC Errors.** The number of cells received with errors in the CRC (cyclical redundancy check) header. This error is counted in the **Rx Cell Discards** and **Errors** columns of the **vlrs** display.



## Viewing the ATM Layer Tx Error Statistics Table

The **vlts** command displays the ATM Layer Tx (Transmit) Error Statistics Table for each port. This table includes discard and error information at the ATM Service Data Unit (SDU), or frame, level and the ATM cell level.

Note that statistics for SDUs, which are composed of cells, are directly related to statistics for cells. When an SDU error or discard is counted, the cells in that SDU are counted and then added to the corresponding cell discard or error statistic.

The following is a sample **vlts** display.

ATM Layer Tx Error Statistics						
Slot	Port	Tx SDU Discards	Tx SDU Errors	Tx SDU No Buffers	Tx Cell Discards	Tx Cell Errors
=====	=====	=====	=====	=====	=====	=====
2	1	0	0	0	0	0

**Tx SDU Discards.** The number of Service Data Units discarded because there was no room in the transmit SAR buffer or the SDU was larger than the transmit frame buffer. Transmit SAR buffer size (**Tx SAR Buffer Size**) and transmit frame buffer size (**Tx Frame Buffer Size**) are configured through the **map** command.

**Tx SDU Errors.** The number of Service Data Units that were received from the switch backplane in an invalid format.

**Tx SDU No Buffers.** The number of SDUs that were discarded because there was no room in the transmit frame buffer to dequeue and attempt to transmit frames. Note that the SDUs counted in this statistic are not included in the **Tx SDU Discards** statistic. The transmit frame buffer size (**Tx Frame Buffer Size**) is configured through the **map** command.

**Tx Cell Discards.** The total number of cells discarded as a result of SDU Discards. SDUs are discarded because there is no room in the transmit SAR buffer, or the SDU was larger than the transmit frame buffer. For each SDU discarded, the number of cells within that SDU are counted and then added to this statistic.

**Tx Cell Errors.** The total number of cells within SDUs that were received from the switch backplane in an invalid format.

**Tx Cell No Buffers.** The total number of cells within SDUs that were discarded because there was no room in the transmit frame buffer. Note that the cells counted in this statistic are not included in the **Tx Cell Discards** statistic.

## Viewing the ATM Connection Statistics Table

The **vcs** command displays the ATM Connection Statistics Table for each virtual channel. This table includes information at the ATM Service Data Unit (SDU), ATM cell, and octet level. Information for SDUs, which are composed of cells, are directly related to statistics for cells. When an SDU is counted, the cells in that SDU are counted and then added to the corresponding cell count.

### ◆ Note ◆

Information is displayed for a virtual channel only if that channel has been used for data transmission. If a virtual channel has been configured, but not used, then it will not be displayed by **vcs**.

The following is a sample **vcs** display:

ATM Connection Statistics

Slot	Port	VCI	Rx SDUs	Tx SDUs	Rx Cells	Tx Cells	Rx Octets	Tx Octets
2	1	100	0	6769	0	15892	0	762816
2	1	1002	0	349	0	1047	0	50256
2	1	1004	0	2445	0	2445	0	117360
2	1	1005	0	350	0	1050	0	50400
2	1	1007	0	2445	0	2445	0	117360
2	1	1008	350	350	1050	1050	50400	50400
2	1	1010	679	679	679	679	32592	32592
2	1	101	375	353	1142	1056	54816	50688
2	1	1013	679	681	679	681	32592	32688
2	1	1014	350	352	1050	1055	50400	50640
2	1	1016	681	682	681	682	32688	32736
2	1	1017	354	367	1058	1112	50784	53376
2	1	1019	679	679	679	679	32592	32592
2	1	1021	0	1052	0	2104	0	100992
2	1	1022	0	2452	0	2452	0	117696

**Slot.** The port's slot number.

**Port.** The number of the port.

**VCI.** The virtual channel identifier.

**Rx SDUs.** The number of Service Data Units received on this virtual channel.

**Tx SDUs.** The number of Service Data Units transmitted on this virtual channel.

**Rx Cells.** The number of cells received on this virtual channel. The value is derived from the **Rx SDUs** statistic. Once an SDU is received on the virtual channel, the cells in the SDU are counted and added to this statistic.

**Tx Cells.** The number of cells transmitted on this virtual channel. The value is derived from the **Tx SDUs** statistic. Once an SDU is transmitted on the virtual channel, the cells in the SDU are counted and added to this statistic.

**Rx Octets.** The number of octets, or bytes, received as SDUs on this virtual channel.

**Tx Octets.** The number of octets, or bytes, transmitted as SDUs on this virtual channel.

## Viewing the ATM Connection Rx Error Statistics Table

The **vcrs** command displays the ATM Connection Rx (Receive) Error Statistics Table on a virtual channel-by-virtual channel basis. This table includes discard and error information at the ATM Service Data Unit (SDU), or frame, level and the ATM cell level for each virtual channel.

Note that statistics for SDUs, which are composed of cells, are directly related to statistics for cells. When an SDU error or discard is counted, the cells in that SDU are counted and then added to the corresponding cell discard or error statistic.

The following is a sample **vcrs** display:

ATM Connection Rx SDU Error Statistics

Slot	Port	VCI	Discards	Errors	Invalid Sz	No Buffers	Trash	CRC Errors
2	1	100	0	0	0	0	0	0

ATM Connection Rx Cell Error Statistics

Slot	Port	VCI	Discards	Errors	No Buffers	Trash	CRC Errors
2	1	100	0	0	0	0	0

**Slot.** The port's slot number.

**Port.** The number of the port.

**VCI.** The virtual channel identifier.

**SDU Discards.** The number of Service Data Units (SDU), or frames, that have been discarded due to one of the following reasons: an invalid size error, CRC error, invalid format error, the frame was larger than the receive SAR buffer, or the frame was larger than the maximum size allowed on this virtual channel. Invalid size and CRC errors are also displayed in this table and described below. An invalid format error occurs when a frame is received in the wrong format. For example, a PTOF frame may be received that should be in 1483 format but instead is in Private encapsulation. The receive SAR buffer size (**Rx SAR Buffer Size**) is configured through the **map** command. The maximum frame size allowed on this virtual connection is configured through the **cvc** or **mvc** command.

**SDU Errors.** The number of Service Data Units that had one or more of the following errors: invalid size, invalid format, frame larger than SAR buffer size, CRC error, or the frame was larger than that allowed on this virtual channel. This Error statistic will typically match the **SDU Discards** statistic.

**SDU Invalid Size.** The number of Service Data Units, or frames, received that are either larger than the receive frame buffer or had an AAL5 length mismatch. One cell in an SDU contains an AAL trailer that includes a length field; an AAL5 mismatch error occurs when that length field is incorrect. The receive frame buffer size (**Rx Frame Buffer Size**) is configured through the **map** command.

**SDU No Buffers.** The number of SDUs that were discarded because there was no room in the receive frame buffer. Note that the SDUs counted in this statistic are not included in the **Rx SDU Discards** or **Errors** statistics in the **vcrs** display. The receive frame buffer size (**Rx Frame Buffer Size**) may be configured through the **map** command.

**SDU Trash.** The number of Service Data Units that were discarded at the ATM physical layer. These SDUs were discarded by the Segmentation and Reassembly (SAR) due to a lack of reassembly buffer space. Note that the SDUs counted in this statistic are not included in the **Rx SDU Discards** or **Errors** statistics in the **vcrs** display.

**SDU CRC Errors.** The number of SDUs received with errors in the CRC (cyclical redundancy check) header. This error is counted in the **Rx SDU Discards** and **Errors** columns of the **vcrs** display.

**Cell Discards.** The total number of cells discarded as a result of SDU discards. SDUs are discarded due to invalid size, CRC errors, invalid format, frame size larger than SAR buffer, or frame size larger than allowed on this virtual channel. For each SDU discarded, the number of cells within that SDU are counted and then added to this statistic.

**Cell Errors.** The total number of cells within SDUs that had one or more of the following errors: invalid size, invalid format, frame larger than SAR buffer size, CRC error, or the frame was larger than that allowed on this virtual channel. For each errored SDU, the number of cells within that SDU are counted and then added to this statistic.

**Cell No Buffers.** The total number of cells that were discarded because there was no room in the receive frame buffer. Note that the cells counted in this statistic are not included in the **Rx Cell Discards** or **Errors** statistics in the **vcrs** display.

**Cell Trash.** The total number of cells that were discarded at the ATM physical layer. These cells were discarded by the Segmentation and Reassembly (SAR) due to a lack of reassembly buffer space. Note that the cells counted in this statistic are not included in the **Rx Cell Discards** or **Errors** statistics in the **vcrs** display.

**Cell CRC Errors.** The number of cells received with errors in the CRC (cyclical redundancy check) header. This error is counted in the **Rx Cell Discards** and **Errors** columns of the **vcrs** display.

## Viewing the ATM Connection Tx Error Statistics Table

The **vcts** command displays the ATM Connection Tx (Transmit) Error Statistics Table on a virtual channel-by-virtual channel basis. This table includes discard and error information at the ATM Service Data Unit (SDU), or frame, level and the ATM cell level.

Note that statistics for SDUs, which are composed of cells, are directly related to statistics for cells. When an SDU error or discard is counted, the cells in that SDU are counted and then added to the corresponding cell discard or error statistic.

The following is a sample **vcts** display.

ATM Connection Tx Error Statistics

Slot	Port	VCI	Tx SDU Discards	Tx SDU Errors	Tx SDU No Buffers	Tx Cell Discards	Tx Cell Errors	Tx Cell No Buffers
2	1	100	0	0	0	0	0	0
2	1	1002	0	0	0	0	0	0
2	1	1004	0	0	0	0	0	0
2	1	1005	0	0	0	0	0	0
2	1	1007	0	0	0	0	0	0
2	1	1008	0	0	0	0	0	0
2	1	1010	0	0	0	0	0	0
2	1	1011	0	0	0	0	0	0
2	1	1013	0	0	0	0	0	0
2	1	1014	0	0	0	0	0	0
2	1	1016	0	0	0	0	0	0
2	1	1017	0	0	0	0	0	0
2	1	1019	0	0	0	0	0	0
2	1	1021	0	0	0	0	0	0
2	1	1022	0	0	0	0	0	0

**Slot.** The port's slot number.

**Port.** The number of the port.

**VCI.** The virtual channel identifier.

**Tx SDU Discards.** The number of Service Data Units discarded because there was no room in the transmit SAR buffer or the SDU was larger than the transmit frame buffer. Transmit SAR buffer size (**Tx SAR Buffer Size**) and transmit frame buffer size (**Tx Frame Buffer Size**) are configured through the **map** command.

**Tx SDU Errors.** The number of Service Data Units that were received from the switch backplane in an invalid format.

**Tx SDU No Buffers.** The number of SDUs that were discarded because there was no room in the transmit frame buffer to dequeue and attempt to transmit frames. Note that the SDUs counted in this statistic are not included in the **Tx SDU Discards** statistic. The transmit frame buffer size (**Tx Frame Buffer Size**) is configured through the **map** command.

**Tx Cell Discards.** The total number of cells discarded as a result of SDU Discards. SDUs are discarded because there is no room in the transmit SAR buffer, or the SDU was larger than the transmit frame buffer. For each SDU discarded, the number of cells within that SDU are counted and then added to this statistic.

**Tx Cell Errors.** The total number of cells within SDUs that were received from the switch backplane in an invalid format.

**Tx Cell No Buffers.** The total number of cells within SDUs that were discarded because there was no room in the transmit frame buffer. Note that the cells counted in this statistic are not

**Viewing the ATM Connection Tx Error Statistics Table**

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included in the **Tx Cell Discards** statistic.

## Traffic Shaping

OmniAccess 408 ATM ports allow you to configure several traffic parameters. These parameters include the Peak Cell Rate (PCR), Sustaining Cell Rate (SCR), and Maximum Burst Size (MBS). Traffic shaping using these parameters takes place on data that is exiting (i.e., transmitted out) a switch port.

You can divide ATM ports into discrete “bandwidth groups” to which you can assign unique PCR, SCR, and MBS values. This feature is referred to as “traffic shaping.”

On each ATM port you can configure up to eight (8) bandwidth groups. A bandwidth group is a reserved amount of bandwidth on the port. Bandwidth groups are ordered by priority, with bandwidth group 1 having the highest priority and bandwidth group 8 the lowest.

Bandwidth groups are associated with ATM services. When you configure any ATM service on a port through the **cas** command, you are prompted for the bandwidth group to which the service will be associated. By default a service will be associated with bandwidth group 1. ATM services are described in Chapter 27.

## Configuring Traffic Shaping

The **mbwg** command allows you to configure the transmit traffic parameters on an ATM port. The syntax for this command is as follows:

```
mbwg <slot>/<port> <bandwidth group number>
```

For example if you wanted to set up bandwidth group 1 on Port 1 in slot 2 you would enter

```
mbwg 2/1 1
```

Follow these steps to set up traffic parameters on an OSASM port:

1. Enter **mbwg** followed by the slot number, a slash (/), the OSASM port number and then the bandwidth group for which you want to configure parameters. A screen similar to the following displays:

```
The following service numbers use the current Traffic Descriptors
Changing any of the traffic descriptor values would result in
toggling status of the following service numbers...
1
```

```
Bandwidth allocation: Slot 2, Port 1, Bwgid=1
```

```
Tx Traffic parameters
1) Best Effort {False (1), True (2) } : TRUE
```

```
Enter (option=value/save/cancel):
```

2. Enter **1=1** at the **Enter (option=value/save/cancel):** prompt to configure traffic parameters. If you enter **1=2**, then traffic will be transmitted on this bandwidth group on a “best effort” basis and you will not be able to configure traffic parameters. A screen similar to the following displays:

**Bandwidth allocation: Slot 2, Port 1, Bwgid=1**

**Tx Traffic parameters**

1) Best Effort {False (1), True (2)} : FALSE  
11) Peak Cell Rate (PCR kbps) : 50  
12) Sustained Cell rate (SCR kbps) : 50  
13) Maximum Burst Size (MBS cells) : 5

**Enter (option=value/save/cancel):**

You change a value in a field by entering the line number for the value, an equal sign (=), and then the new value for the variable. For example, to change the **Peak Cell Rate** field to **2000** you would enter an **11** (the line number for **Peak Cell Rate**), an equal sign, and then the new value as follows:

**11=2000**

This specification would provide 2 Megabits of bandwidth on this channel.

### **11) Peak Cell Rate (PCR kbps)**

The maximum number of kilobits per second allowed on this bandwidth group. The PCR is specified for all types of ATM traffic.

### **12) Sustained Cell Rate (SCR kbps)**

The maximum *average* cell rate (in kilobits per second) allowed for traffic on this bandwidth group. The SCR is always less than or equal to the Peak Cell Rate. The SCR is not specified for Constant Bit Rate (CBR) traffic as this traffic requires a steady data flow at all times. For CBR traffic, the PCR is equal to the SCR. In the event that the PCR cannot be satisfied due to other configured channels, this channel should at least support the bandwidth you configure here for the SCR.

### **13) Maximum Burst Size (MBS cells)**

The maximum number of cells that can be sent in a burst at the Peak Cell Rate. The MBS is not specified for CBR traffic. CBR traffic is constant and continuous, not bursty.

**◆ Note ◆**

If most of the traffic in a bandwidth group consists of very small packets (i.e., 64 bytes), then the actual speed achieved will be less than the values you configure for PCR, SCR, and MBS.



## Viewing Traffic Shaping Parameters

The **vbwg** command allows you to view the traffic descriptor parameters for one or more ATM ports. When you enter

**vbwg**

a screen similar to the following displays:

Slot	Port	Bwg	Best Effort	PCR (kbps)	SCR (kbps)	MBS (cells)	Dependent Active Service Numbers
2	1	1	True	----	----	----	1
2	1	2	False	20000	20000	200	2
2	1	3	False	20000	20000	300	3
2	1	4	False	20000	20000	400	4
2	1	5	False	20000	20000	500	5
2	1	6	False	20000	20000	600	6
2	1	7	False	20000	20000	700	7
2	1	8	False	20000	20000	800	8

**Slot.** For OmniAccess 408 switches, slot 2 will always be displayed.

**Port.** The port on slot 2 for which information is supplied.

**Bwg.** The bandwidth group. You can configure up to eight bandwidth groups on each ATM port through the **mbwg** command. Bandwidth groups are ranked by priority with bandwidth group 1 having the highest priority and bandwidth group 8 having the lowest.

**Best Effort.** Indicates whether or not traffic will be transmitted from this port on a “best effort” basis. When set to **False**, data transmission will be based on the traffic descriptor parameters—PCR, SCR, and MBS—specified through the **mbwg** command. When set to **True**, traffic is transferred on a “Best Effort” basis.

**PCR (kbps).** The Peak Cell Rate, which is the maximum number of kilobits per second allowed on this bandwidth group.

**SCR (kbps).** The Sustained Cell Rate, which is the maximum average cell rate (in kilobits per second) allowed for traffic in this bandwidth group. The SCR is always less than or equal to the Peak Cell Rate.

**MBS (cells).** The Maximum Burst Size, which is the maximum number of cells that can be sent in a burst at the Peak Cell Rate.

**Dependent Active Service Numbers.** The number for the active ATM service to which this bandwidth group belongs. A bandwidth group is assigned to a service through the **cas** command. Only services that are currently active are displayed.

