GIGAswitch/FDDI System

AGL Reference Guide

Part Number: EK–GAGL2–MG. B01

This guide describes the configuration, and management of the ATM GIGAswitch/FDDI Linecard (AGL-2 and AGL-2+). This guide is to be used along with the GIGAswitch/FDDI System Manager's Guide, part number EK-GGMGA-MG, GIGAswitch/FDDI Installation and Service Guide, part number EK-GGSVA-IN and ATM Modular PHY Cards Guide, part number EK-DAGGM-IN.

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Preface

Digital Equipment Corporation's ATM GIGAswitch/FDDI Linecard (hereafter referred to as AGL) allows high-performance GIGAswitch/FDDI-based LANs to communicate via:

- High-performance wide area links
- ATM networks

The AGL-2 and its successor, the AGL-2+, provide similar functionality. This manual will use AGL when referring to properties common to both implementations. AGL-2 or AGL-2+ will be used when describing features specific to one or the other.

Audience

This manual is written for network managers who are using the AGL in a GIGAswitch/FDDI system.

Structure

This manual consists of the following chapters and appendixes:

- Chapter 1 provides an introduction.
- Chapter 2 describes applications.
- Chapter 3 describes system configuration.
- Appendix A provides examples of managing Virtual Channel Connections.
- Appendix B describes packet flow.
- Appendix C contains the a listing of management information base (MIB) objects.
- Appendix D provides fault indications.
- Appendix E provides troubleshooting procedures.
- Appendix F describes firmware upgrade using Polycenter NETview.
- Glossary provides ATM related terms used in the AGL documentation.

A postpaid Reader's Comments form is located at the back of this manual. If you have any comments about this manual, please complete and return this form.

Additional Resources

Additional information is available in the following document.

- *ATM Modular PHY Cards,* EK-DAGGM-IN.

Conventions Used in This Guide

Italics	Indicates complete book title or MIB object
{ }	Indicates MIB object identifier

1
Introduction

Overview

The AGL linecard provides two switch ports that carry high-performance FDDI bridged traffic over the following network transmission services:

- SONET STS-3c / SDH STM-1 (155 Mb/s)

- Clear channel T3 and C-bit parity T3 (44 Mb/s)

- Clear channel E3 and C-bit parity E3 (34 Mb/s) (AGL-2+ only)

- Local and public ATM via above protocols

This adds a wide variety of connectivity options for the GIGAswitch/FDDI System. Figure 1–1 shows an example of the type of topology that is supported by GIGAswitch/FDDI Systems with AGL and FGL linecards.

Figure 1–1 Example Network Topology Enabled by the AGL Linecard
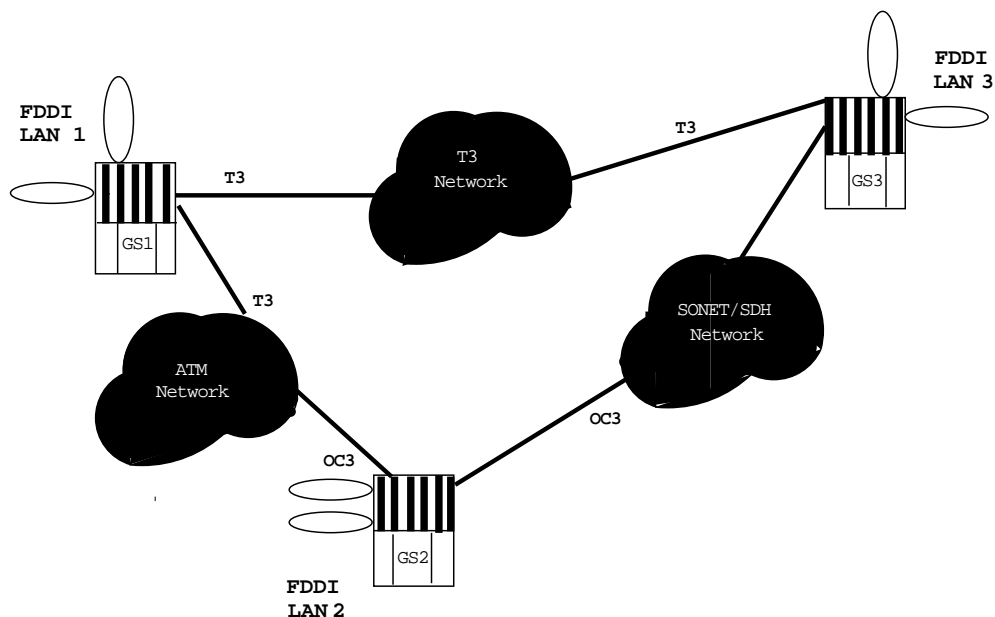
Modular Physical Layer Design

The AGL linecard employs a modular physical layer design. Different physical layer daughter cards can be inserted into each AGL port.

The choice of physical layer daughter cards available for the AGL-2 are:

- SONET STS-3c / SDH STM-1

    Multi-Mode Fiber
    Single-Mode Fiber

- T3 Coaxial

The AGL-2+ lincard accepts physical layer daughter cards, called modPHYs. The following modPHY daughter cards are available for the AGL-2+ linecard:

- SONET STS-3c / SDH STM-1

    Multi-Mode Fiber
    Single-Mode Fiber
    Unshielded Twisted Pair (category 5 UTP)

- T3 Coaxial
- E3 Coaxial

_____ **Note** _____

The modPHYs used with AGL-2+ can be installed without removing the module from the chassis. **However they should not be installed while the module is powered on**

_____

For more information on the use and installation of modPHY cards refer to *ATM Modular PHY Cards*, part number EK-DAGGM-IN.

Bridged FDDI Traffic

FDDI traffic is bridged across the E3, T3, SONET / SDH, or ATM networks, according to the rules of IEEE 802.1d bridging protocol. The operation of bridging in the AGL is identical to the FGL operation. In Figure 1-1, the spanning tree algorithm automatically places one of the ports connecting the GIGAswitch /FDDI Systems in backup to prevent a forwarding loop.

AGL encapsulates FDDI packets using "RFC 1483 VC Multiplexing of FDDI Bridge Protocol" over ATM AAL5. The packets are broken into 53-byte ATM cells, which are inserted into the E3, T3 or SONET/SDH frame payload, and transmitted on the physical link. The destination node then extracts the cells from the transmission frame payload and reassembles AAL5 frames. The original FDDI packets are then extracted from the AAL5 frames. This standards-based method of transmission was chosen to allow interoperabilty with third-party equipment.

The use of ATM protocols for framing purposes is transparent to the operation of the E3, T3 or SONET / SDH transmission. Therefore, the AGL allows the use of clear-channel E3, T3 or OC-3 leased-line services that are available from public carriers, without any requirement for an ATM service. Of course, if an ATM service is available the AGL linecard is compatible with that as well.

Summary of AGL Features

- Bridges between FDDI-based LANs via:

  SONET at up to 207K packets/sec full duplex per port
  T3 at up to 104K packets/sec full duplex per port
  E3 at up to 80K packets/sec full duplex per port

- Modular PHY daughter cards reduces cost of migrating to faster speed or different media

- Traffic shaper can be used to control peak and average output per circuit

- Optional PLCP for T3 - to optimize performance when PLCP is not required

Standards Compliance

The AGL linecard and its physical layer daughter cards and modPHYs comply with the following standards:

DS3 (T3)

- ANSI T1.102 - 1987

- ANSI T1.107 - 1988, ANSI T1.107a - 1989

- Bellcore TR-TSY-000449

- Bellcore TR-TSY-000009

- AT&T PUB 54014

SONET STS-3c

- Bellcore TA-NWT-000253

- ANSI T1.105 -1991

SDH STM-1

- CCITT G.707

- CCITT G.708

- CCITT G.709

ATM

- ATM Forum, *ATM User-Network Interface Specification, Version 3.0,* September 1993
- CCITT I.432, *B-ISDN User-Network Interface—Physical Interface Specification*
- RFC 1483, *VC-based Multiplexing of Bridged FDDI Frames*

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Applications

FDDI Bridging Over T3 (DS3)

T3 is a point-to-point 44.736 Mb/s (DS3) digital transmission technology. A variety of public carriers use this technology to offer a leased-line service to interconnect remote networks. The AGL with a T3 (DS3) PHY card allows you to use such a service for transmitting bridged FDDI traffic. You can also use T3 links in private applications for connecting remote GIGAswitch/FDDI Systems.

For each end of a T3 link, a T3 physical layer daughter card and a single port on an AGL linecard are required. Both ports on the AGL linecard can be populated with T3 PHY cards. A typical T3 configuration is shown in Figure 2–1.

Figure 2–1 Example of a T3 Network Topology Enabled by the AGL Linecard
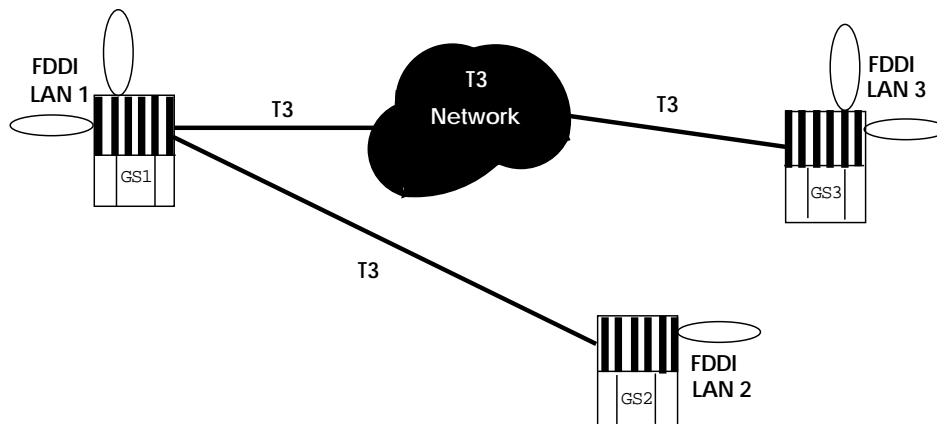
T3 Links

The T3 links can be a private cable plant or a public carrier service, for example, AT&T's ACCUNET T45 non-subrated service. The recommended cable type that should be used is 75-ohm coaxial WE728A or RG59B. The maximum length of cable supported is 450 feet (137 meters). The AGL T3 port provides a line buildout facility for cable lengths shorter than 225 feet (68.58 meters).

T3 Network Cloud

In Figure 2–1, the T3 network cloud may be composed of multiple cross-connects and regenerators. The AGL can be synchronized to the T3 network by using the loop-timing option in the PHY card. FDDI traffic is bridged over the T3 links according to the rules of the IEEE 802.1d bridging protocol. Therefore, FDDI LAN1, FDDI LAN2, and FDDI LAN3 form one extended-LAN.

See Chapter 3 for details on changing configuration parameters related to the T3 port.

FDDI Bridging Over SONET STS–3c/SDH STM-1 (OC–3)

SONET STS–3c is a point-to-point 155.52 Mb/s digital transmission technology that has been defined by ANSI and Bellcore. SDH STM–1 is the equivalent technology defined by ITU. The AGL linecard with SONET STS–3c / SDH STM–1 PHY card complies with ANSI, Bellcore and ITU standards. Therefore you can use this transmission technology for connecting remote sites via a public-carrier service or via a privately installed cable plant.

Two SONET PHY card options are available for AGL–2:

- Multi-mode fiber OC–3 — maximum distance of .93 miles (1.5Km)

- Single-mode fiber OC–3 — maximum distance of 15.54 miles (25Km)

Three modPHY options are available for AGL-2+:

- Multimode fiber OC–3 — maximum distance of .93 miles (1.5Km)

- Single mode fiber OC–3 — maximum distance of 15.54 miles (25Km)

- Category 5 unshielded twisted pair

OC–3 Link

For each OC–3 link, a SONET STS–3c/SDH STM–1 PHY card and a single port on an AGL linecard are required. Both ports on the AGL linecard can be populated with a SONET STS–3c/SDH STM–1 PHY card. A typical configuration is shown in Figure 2–2.

Figure 2–2 Example of an OC–3 Network Topology Enabled by the AGL Linecard
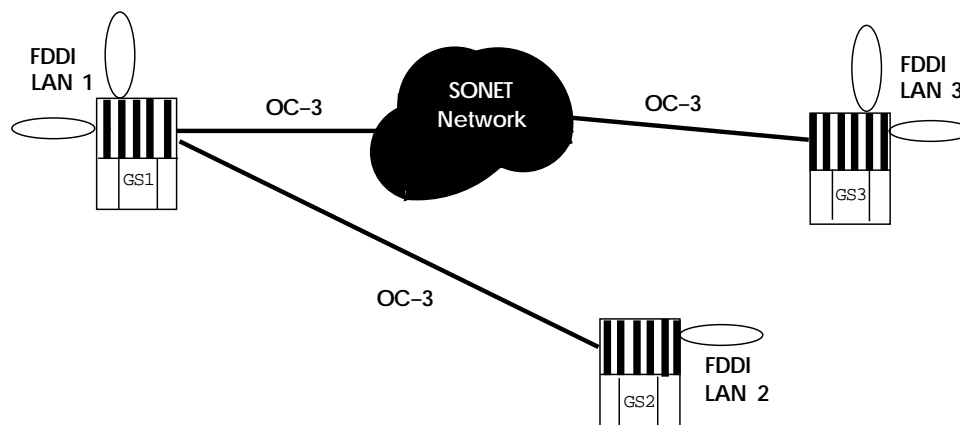
**SONET
Network Cloud**

In Figure 2–2, the SONET network cloud may be composed of multiple cross-connects, add/drop multiplexors and regenerators. The AGL can be synchronized to the SONET/SDH network using the loop-timing option in the PHY card. FDDI traffic is bridged over the OC–3 links according to the rules of the IEEE 802.1d bridging protocol. This is no different than bridging between multiple FDDI and/or T3 ports. Therefore, FDDI LAN1, FDDI LAN2, and FDDI LAN3 form one extended-LAN.

See Chapter 3 for details on changing configuration parameters related to the OC–3 port.

FDDI Bridging Over ATM

Asynchronous Transfer Mode (ATM) is a connection-oriented data link service that can be offered over a variety of transmission media. The AGL and it's associated PHY cards can be configured to conform with relevant portions of the ATM Forum's User Network Interface (UNI) specification.

Each AGL port supports bridging of FDDI traffic over a single Virtual Channel Connection (VCC). A default VCC is automatically set up on powerup. It can be modified, using SNMP, from a network management station. This type of VCC is referred to as a Permanent VCC (PVCC). When the AGL linecard is initialized, each port is set up to transmit and receive bridged FDDI traffic on a bi-directional circuit with the following default values:

- VPI = 0

- VCI = 63

- Peak Cell Rate = E3 or T3 or OC–3 line rate

- Average Cell Rate = E3 or T3 or OC–3 line rate

- Adaptation Layer = AAL5

- Packet format = VC multiplexed bridge FDDI frame format as per RFC 1483

Certain default values for the bridged FDDI circuit can be changed using the GIGAswitch/FDDI MIB. The automatic establishment of the default bridged circuit on each AGL port allows directly connected GIGAswitch/FDDI Systems to auto-configure. This means that if two GIGAswitch/FDDI Systems are connected by a T3 or OC–3, a bidirectional ATM PVCC is automatically established between them, and bridged FDDI traffic is exchanged without requiring any network management.

A VCC may involve multiple hops. Each hop is referred to as virtual channel link (VCL). In Figure 2–3, logical connection VCC1 is established between GIGAswitch/FDDI System GS1 and GIGAswitch/FDDI System GS3, and VCC2 is established between GIGAswitch/FDDI System GS1 and GIGAswitch/FDDI System GS2. VCC1 requires two hops to be established. These are VCL1.1 and VCL1.2. The VPI and VCI values used for each VCL can be the same or different.

Figure 2–3 Example Topology for FDDI Bridging over ATM
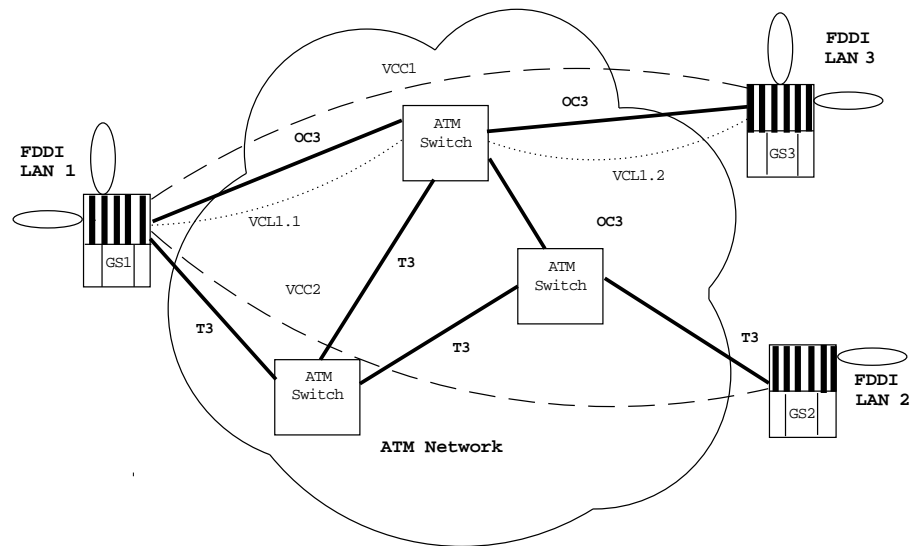
To set up a VCC, you must use a network management station
and the associated MIBs to establish each VCL contained
in the VCC. Refer to Appendix A for examples on how to do
this. Therefore, if an ATM switch is in the connection path
between GIGAswitch/FDDI Systems, the extended LAN does not
auto-configure.

When you are using an ATM leased-line service from a public
carrier, it is unlikely that you will have management access to
the service provider's ATM switch. In this case, the public carrier
may provide you with the information necessary to set up your
end of the VCLs at the ingress and egress points of the ATM
network. Or the carrier may ask you what VPI and VCI settings
you prefer. In this case, provide the VPI and VCI values listed on
the preceding page.

Once the desired VCCs are established through management, the
GIGAswitch/FDDI System stores these configuration parameters
in non-volatile memory. Subsequent re-initialization of the
linecard or swapping out of the linecard, does not cause the
VCC information to be lost. The attributes of an established
VCC can be changed using the management station and the
GIGAswitch/FDDI MIB.

3

Configuration Guidelines

SNMP

The AGL is fully managed through SNMP (Simple Network Management Protocol). Any SNMP compliant network management station can be used to access and control the AGL MIB objects. SNMP Get, GetNext, and Set operations are supported.

This chapter identifies the MIBs and discusses the use of some of the important MIB objects that are supported by the AGL. These objects are used for configuration, statistics gathering, and performance monitoring functions. The following attributes of AGL operation are discussed in this chapter:

- OC–3 PHY configuration and statistics
- E3 and T3 PHY configuration and statistics
- AGL configuration

Note

Only MIB object values that are supported by AGL are listed in the tables in this chapter.

MIB Support

The following MIBs are required for control of the AGL linecard by the network management station:

- GIGAswitch/FDDI MIB Version 3.0

- DS3/E3 MIB: RFC 1407 "Definitions of Managed Objects for the DS3/E3 Interface Type" (Please refer to the section titled "Obtaining MIBs" in the *GIGAswitch/FDDI System Manager's Guide* for details on obtaining this MIB.)

The GIGAswitch/FDDI MIB contains a set of objects that are specific to the AGL linecard. Some objects have been selected from the following MIBs which were classified as experimental at the time the linecard was first released.

- ATM MIB V3.0, Nov 19, 1993

- SONET MIB "Definitions of Managed Objects for the SONET /SDH Interface Type", draft-ietf-atommib-sonet-01

OC–3 PHY Configuration

The configuration attributes of the OC–3 PHY can be determined from the following groups in the GIGAswitch/FDDI MIB:

aglConfig
aglSonet
aglSonetMedium

Some key configuration objects are described in the following sections. See Appendix C and the AGL related MIB objects glossary for a full list of objects available.

Before reconfiguring the PHY daughter card, check that the proper PHY type is installed in the AGL port. To determine this, use the MIB object shown in Table 3–1.

Table 3–1 PHY Type MIB Object

MIB	**gigaswitch**
Group	**aglConfig**
Object	**aglInterfacePhyType** read-only
Description	Indicates the type of physical interface used on the ATM port. Two physical layer types are supported:
	STS3c/STM-1 (1) DS3/E3 (2) Unknown (3)
	If the value returned by the SNMP read is 1, then the installed PHY is of type OC-3. A returned value of 2 indicates a type of DS3/E3, and a value of 3 indicates that the type is unknown.
	The type is unknown if the PMD is not present or the physical layer type is not known.

SONET STS-3c / SDH STM-1 Mode

The OC-3 PHY can operate in two standard modes:

1. SONET STS-3c as defined by Bellcore and ANSI

2. SDH STM-1 as defined by CCITT

Although the differences between these modes are very small, the user must select the proper mode to interoperate properly with other SONET or SDH equipment. You can use an object in the GIGAswitch/FDDI MIB to determine (get) the current mode of operation or to change (set), as shown in Table 3–2.

Table 3–2   SONET STS-3c/SDH STM-1 Mode MIB Object

MIB	**gigaswitch**
Group	**aglSonet**
Object	**aglInterfaceSonetMode** read-write
Description	Specifies whether the PHY operates in SONET STS-3c or SDH STM-1 mode. The following code points are used:
	SONET STS-3c (1)
	SDH STM-1 (2)

Default Setting: SONET STS-3c mode

Guidelines:

When connecting two devices together with a SONET STS-3c or SDH STM-1 link, the near-end and far-end of the link must be set to the same mode for proper operation.

Sonet Timing Mode

Quite often, a public carrier requires that you can only source data into a SONET / SDH network if the transmit clock is derived from a received OC-N line signal or from an external reference clock of stratum 3 or better. In the OC-3 PHY, an option exists to derive the transmit data timing from either:

- The incoming OC-3 signal (loop-timing mode)

- An on-board transmit clock with 20ppm minimum accuracy (local-timing mode)

Option 1 causes the AGL port to be synchronized to the SONET / SDH network. For private applications, it is not necessary to use the loop-timing mode.

The MIB object used to read or set this mode is shown in Table 3–3.

Table 3–3 Synchronization Mode MIB Object

MIB	**gigaswitch**
Group	**aglSonet**
Object	**aglInterfaceSonetTiming** read-write
Description	Specifies whether the PHY operates in loop-timing or local-timing mode. In loop-timing, the recovered clock from the receive signal is used directly to time transmit data. Hence, the PHY is synchronized to the far-end transmitter. In local timing, transmit data is timed from an on-board oscillator of frequency 155.52 MHz (20ppm). The following code points are used: • Loop-timing (1) • local-timing (2)

Default Setting: local-timing

Guidelines:

When you select loop-timing, you must ensure that only one end of the link is in loop-timing. If both ends of the link (connected by a simple cable) are in loop-timing, the link will be unreliable. The AGL has no means to determine this condition automatically.

SONET/SDH Medium Line Type

The OC-3 PHY supports two medium line types:

• Short-range Single-Mode fiber (< 25 Km)

• Multi-Mode fiber (< 1.5 Km)

If you wish to determine the type of medium being used in the OC-3 PHY daughter card, you can use the MIB object shown in Table 3–4.

Table 3–4 SONET/SDH Medium Line Type MIB Object

MIB	**gigaswitch**
Group	**aglSonet**
Object	**aglInterfaceSonetMediumLineType** read-only

Description	This variable describes the line type for this interface. The line types are Short-Range Single Mode fiber or Multi-Mode fiber.
	
	    sonetShortsinglemode (2)
	    sonetMultiMode (4)

SONET/SDH Medium Line Coding

The OC-3 PHY only supports Non-Return to Zero (NRZ) coding. The SONET/SDH transmit data is always scrambled using a frame synchronous scrambler of sequence length 127.

You can determine the medium line coding using the MIB object shown in Table 3–5.

Table 3–5 SONET/SDH Medium Line Coding MIB Object

MIB	**gigaswitch**
Group	**aglSonet**
Object	**aglInterfaceSonetMediumLineCoding** read-only
Description	This variable describes the line type for this interface.
	sonetMediumNRZ (4)

Default Setting: sonetMediumNRZ

OC-3 PHY Statistics

The statistics available from the OC-3 PHY can be determined from the following read-only tables in the GIGAswitch/FDDI MIB:

aglatmInterfaceSonetTCTable
aglsonetMediumTable
aglsonetSectionCurrentTable
aglsonetLineCurrentTable
aglsonetPathCurrentTable

The **aglsonetMediumTimeElapsed** object in the **aglsonetMediumTable** tracks the number of seconds that have elapsed since the beginning of the current error measurement period. The error measurement period is 15 minutes (900 seconds). After 15 minutes this object will reset to zero and begin counting again. All the statistical objects in the **aglsonetSectionCurrentTable**, **aglsonetLineCurrentTable**, and **aglsonetPathCurrentTable** reset to zero after 15 minutes. Previous interval and total statistic gathering is currently not supported.

DS3 PHY Configuration

The configuration attributes of the DS3 PHY can be determined using the following GIGAswitch/FDDI MIB and DS3/E3 MIB groups:

> **aglConfig**
> **aglDS3E3**

Refer to Table 3–1 for more information about the **aglConfig** group.

DS3 Power Mode

The T3 PHY transmitter contains a selectable Line Buildout (LBO) equalizer for operating at distances shorter than 225 feet (68.58 meters). For distances greater than 225 feet (68.58 meters), the line buildout equalizer should be turned off.

You can use an object in the GIGAswitch/FDDI MIB to determine (read) the current mode of operation or to change (set) it, as shown in Table 3–6.

Table 3–6 DS3 Power Mode MIB Object

MIB	**gigaswitch**
Group	**aglDS3E3**
Object	**aglInterfaceDS3E3Mode** read-write
Description	Specifies whether the DS3/E3 PHY operates in low power mode for short distances (less than 225 feet /68.58 meters) or high power mode for longer distances (up to 450 feet /137 meters). The following code points are used:
	low-power (1) high power (2)

Default Setting: low-power

DS3 PLCP Mode

The AGL-2/T3 PHY supports the option of transmitting cells over T3 with the DS-3 PLCP as defined by Bellcore. However, the use of PLCP is not usually mandatory. To enable or disable T3 PLCP, you can use the GIGAswitch/FDDI MIB object shown in Table 3–7.

Table 3–7 DS3 PLCP Mode MIB Object

MIB	**gigaswitch**
Group	**aglDS3E3**
Object	**aglInterfaceDS3E3Plcp** read-write
Description	Specifies whether ATM cells should be mapped into the DS3 PLCP. In the enabled mode, PLCP framing and timing is applied to each ATM cell. The following code points are used: enable (1) disable (2)

Default Setting: disable

Guidelines:

When connecting two devices using a DS3 link, the near-end and far-end of the link must be set to the same mode for proper operation.

DS3 Line Type The T3 PHY can operate in two standard modes:

- Clear-Channel
- C-bit parity

In clear-channel mode the basic DS3 framing format as defined in ANSI T1.102 is used.

In C-bit parity mode, the C bit positions in the frame are used for the FEBE, path parity and mode indication. The terminal data link and FEAC channel are not implemented in this version of the T3 PHY. You can use an object in the DS3/E3 MIB to determine (read) the current mode of operation or to change it (set), as shown in Table 3–8.

Table 3–8 DS3 Line Type MIB Object

MIB	**DS3/E3**
Group	**Dsx3ConfigEntry**
Object	**dsx3LineType** read-write
Description	This variable indicates the type of interface. The type affects the interpretation of the usage and error statistics. The rate of DS3 is 44.736 Mbps. The dsx3ClearChannel value means that the C-bits are not used except for sending /receiving AIS. The following values are supported:
	dsx3CbitParity (4)
	dsx3ClearChannel (5)

Default Setting: dsx3ClearChannel

DS3 Line Coding

The DS3 PHY supports B3ZS coding as required by the standards. You can determine the medium line coding using the MIB object shown in Table 3–9.

Table 3–9 DS3 Line Coding MIB Object

MIB	**DS3/E3**
Group	**Dsx3ConfigEntry**
Object	**dsx3LineCoding** read-write
Description	This variable describes the variety of Zero Code Suppression used on this interface, which in turn affects a number of its characteristics. dsx3B3ZS refers to the use of specified patterns of normal bits and bipolar violations which are used to replace sequences of zero bits of a specified length.
	dsx3B3ZS (2)

Default Setting: dsx3B3ZS

DS3 Transmit Clock Source

Similar to the SONET/SDH case, a public carrier may require that you source data into a T3 network if and only if the transmit clock is derived from a received T-3 line signal or from an external reference clock of stratum 3 or better. In the T3 PHY, an option exists to derive the transmit data timing from either:

- The incoming T3 signal (loop-timing mode)

- An on-board transmit clock with 20ppm minimum accuracy (local-timing mode)

Option 1 causes the AGL port to be synchronized to the DS3 network.

For example (refer to Figure 2-1) the T3 Network provided by the public carrier requires that they provide basic timing; therefore loop-timing must be enabled on GS1 and GS3.

A private or direct T3 connection from GS1 - GS2 could use local-timing at one end and loop-timing at the other. However, the recommended configuration for direct T3 links is local-timing at both ends.

Table 3–10 DS3 Clock Source MIB Object

MIB	**DS3/E3**
Group	**Dsx3ConfigEntry**
Object	**dsx3TransmitClockSource** read-write
Description	Specifies whether the PHY operates in loop-timing or local-timing mode. In loop-timing, the recoveredclock from the receive signal is used directly to time transmit data. Hence, the PHY is synchronized to the far-end transmitter. In local timing, transmit data is timed from an on-board oscillator of frequency 44.736 MHz (20ppm). The following code points are used:
	loop-timing (1)
	local-timing (2)

Default Setting: local-timing

Guidelines:

When you select loop-timing, you must ensure that only one end of the physical link is in loop-timing. If both ends of the link (connected by a simple cable) are in loop-timing, the link will be unreliable. The AGL has no means to determine this condition automatically.

DS3 PHY Statistics

The statistics available from the DS3 PHY can be determined from the following tables in the GIGAswitch/FDDI and DS3/E3 MIBs.

>   **aglatmInterfaceDs3PlcpTable**
>   **dsx3ConfigTable**
>   **dsx3CurrentTable**

The **dsx3TimeElapsed** object in the **dsx3ConfigTable** tracks the number of seconds that have elapsed since the beginning of the current error measurement period. The error measurement period is 15 minutes (900 seconds). After 15 minutes, this object

will reset to zero and begin counting again. All the statistical objects in the **dsx3CurrentTable** reset to zero after 15 minutes. Previous interval and total statistic gathering is currently not supported.

ATM Configuration

The ATM configuration attributes of the AGL can be determined using the following GIGAswitch/FDDI MIB groups:

> **aglConfig**
> **aglAtm**

ATM Cell Scramble Status

The AGL-2 linecard supports scrambling/descrambling of the ATM cell payload using a self synchronous scrambler with a generating polynomial of $X43+ 1$. By default, the scrambling/descrambling is enabled for transmission over SONET STS-3c / SDH STM-1, and disabled for T3 operation. The AGL-2 does not support ATM payload scrambling when using T3 PLCP mode. If PLCP is not used in T3 mode, the cell payload scrambler may be enabled. AGL-2+ does support payload scrambling in T3 PLCP mode.

You can enable or disable cell payload scrambling/descrambling on a per port basis using a MIB object in the GIGAswitch/FDDI MIB as shown in Table 3–11.

Table 3–11 T3 PLCP Mode MIB Object

MIB	**gigaswitch**
Group	**aglATM**
Object	**aglInterfaceATMScrambleStatus** read-write
Description	This object indicates the desired status of the cell scramble module. In the enabled state the outgoing cells are scrambled. The following code points are used: enable (1) disable (2)

Default Setting: enabled for OC-3 / disabled for T3

Guidelines:

An **ATM** link is a link between two ATM entities, for example, a link from an AGL to an ATM switch or a link from an AGL to an AGL. If cell payload scrambling/descrambling is set at one end of an ATM link, it must also be set at the other end of the ATM link for proper operation.

**Operations
Adminstration
and
Maintenance**

The AGL-2 linecard supports F5 OAM flows for all active Virtual Channel Connections (VCC). The F5 OAM cells are used for connectivity verification. If enabled, the AGL-2 UNI port transmits a F5 OAM segment and end-to-end connectivity-check cell approximately every ten seconds. If it does not receive a cell back within 30 seconds, it declares the circuit to be in the "down" state.

You can enable or disable OAM cell transmission on a per port basis using a MIB object in the GIGAswitch/FDDI MIB as shown in Table 3–12.

Table 3–12   OAM Mode MIB Object

MIB	**gigaswitch**
Group	**aglATM**
Object	**aglInterfaceATMOAMStatus** read-write

Description	This object enables automatic transmission of OAM cells. In the enabled state F5 segment and end-to-end OAM cells are transmitted once every 10 seconds on every active VCC.The code points are as follows:
	
	    disable (1)
	    enable (2)

Default Setting: disabled

ATM Circuit Operations

Each AGL port supports bridging of FDDI traffic over a single Virtual Channel Connection (VCC). When the AGL-2 linecard is powered up initially, the firmware automatically establishes a bidirectional circuit with the following default values:

- VPI = 0

- VCI = 63

- Peak Cell Rate = E3 T3 or OC-3 line rate

- Average Cell Rate = E3 T3 or OC-3 line rate

- Adaptation Layer = AAL5

- Packet format = VC multiplexed bridge FDDI frame format as per RFC 1483

The automatic establishment of the default bridged circuit, on each AGL-2 port, allows directly connected Gigaswitch systems to auto-configure. This means that if two GIGAswitch/FDDI Systems are connected via a T3 or OC-3 link when they are powered up, a bidirectional ATM PVCC is automatically established between them, and bridged FDDI traffic is exchanged without any network management intervention.

If you wish to connect GIGAswitch/FDDI Systems together with ATM switches as shown in Figure 3–1, you may have to use various MIB objects in the GIGAswitch MIB. Some examples of the operations which may be needed are:

- Change the VPI/VCI address of the Virtual Channel Link (VCL)

- Change the peak rate.

- Disable or enable the circuit.

Specific examples and procedures for carrying out these operations are discussed in Appendix A.

In Figure 3–1, GS1 is connected to GS3 using a logical connection called VCC1. This logical connection is known as a virtual channel connection (VCC). More precisely, it is called a Permanent VCC (PVCC) because it is set up and torn down by management, that is, no signalling protocol is used. The Virtual Channel Connection between GS1 and GS3 (VCC1) involves two hops. Each hop is called a Virtual Channel Link (VCL). Therefore VCC1 is composed of two VCLs:

- VCL1.1

- VCL1.2

Figure 3–1 Connecting Multiple GIGAswitch Systems Using ATM
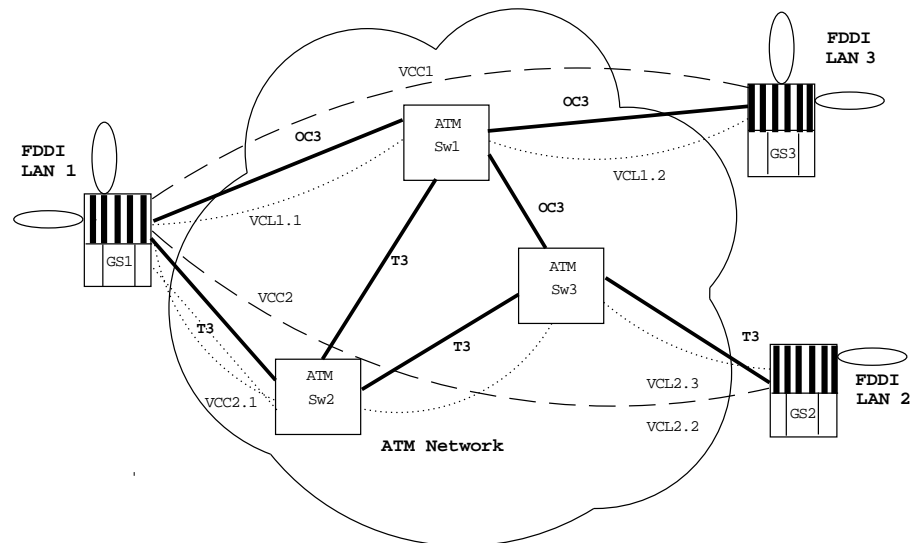
Similarly the VCC between GS1 and GS2 (VCC2) involves three VCLs:

> VCL2.1
> VCL2.2
> VCL2.3

To establish VCC1, you must manually set up VCL1.1 and VCL1.2 using your network management station. Before attempting this operation, you should know the values of the parameters that you wish to establish for each VCL, for example, Port Number, VPI, VCI, PeakRate. Refer to Appendix A for more information. The full procedure for setting up VCC1 uses SNMP to access MIB objects in:

- GS1

- ATM Sw1

- GS3

The following attributes of the VCLs must be the same value within a single VCC:

- AAL type (at each end)

- Traffic Type

The VPI/VCI values for each VCL can be different, within the same VCC. This may occur as a VCC passes through an ATM switch. The ATM switch maintains the logical association between the two VCLs. However, you must ensure that the VPI/VCI values at each end of a VCL are the same value. Otherwise, no connection is established.

ATM circuit operations for an AGL-2 port are completely controlled by the **aglVCConnection** table in the GIGAswitch /FDDI MIB. The following entries are contained within the **aglVCConnection** table:

- **aglVCConnectionPortA**
- **aglVCConnectionPortAVpi**
- **aglVCConnectionPortAVci**
- **aglVCConnectionPortB**
- **aglVCConnectionPortBVpi**
- **aglVCConnectionPortBVci**
- **aglVCConnectionTableEntryStatus**
- **aglVCConnectionTrafficType**
- **aglVCConnectionAALType**
- **aglVCConnectionOperStatus**
- **aglVCConnectionAdminStatus**
- **aglVCConnectionTrafficShaperPeakRate**
- **aglVCConnectionTrafficShaperAvgRate**
- **aglVCConnectionTrafficShaperMinGuaranteedRate**
- **aglVCConnectionTrafficShaperPriority**

Refer to Appendix B for a detailed description of each of these parameters. The first six parameters are used as an index and cannot be modified without deleting the current entry. The PortB parameters are not used in this release of firmware and should be set to zero. The PortA parameters are used to identify the circuit. **aglVCConnectionPortA** identifies the AGL-2 port under consideration. **aglVCConnectionPortAVpi** and **aglVCConnectionPortAVci** contain the VPI and VCI values for both the transmit and receive portions of the bidirectional VCL at the AGL-2 side of the link.

The **aglVCConnectionTableEntryStatus** and the **aglVCConnectionAdminStatus** are used to determine the virtual channel link state. To set up and enable a VCL use the SNMP set command for: (See Appendix A for examples.)

- **aglVCConnectionTableEntryStatus** = create
- **aglVCConnectionAdminStatus** = enable

To set up a VCL and leave it disabled or to disable an existing VCL use the SNMP set command for:

- **aglVCConnectionTableEntryStatus** = create
- **aglVCConnectionAdminStatus** = disable

To tear down an existing VCL use the SNMP set command for:

- **aglVCConnectionTableEntryStatus** = delete

To determine the actual state of a VCL use the SNMP read command for the **aglVCConnectionOperStatus** entry.

VPI/VCI Guidelines

In the **aglVCConnectionTable** the **aglVCConnectionPortAVpi** and **aglVCConnectionPortAVci** entries must have the same values on each end of the Virtual Channel Link. For example if AGL port in GS1, as shown in Figure 3–1, has a VPI/VCI pair of 0 and 63 (the default values), then the ATM Sw1 port must have a VPI/VCI pair of 0 and 63.

VCL State

The **aglVCConnectionTableEntryStatus** and **aglVCConnectionAdminStatus** objects are used to delete or disable a circuit. Changing the value of these objects on either GS 1 or GS 3 causes the VCC between the GIGAswitch/FDDI Systems and the ATM switch to be deleted or disabled. Changing the value on one GIGAswitch/FDDI System will not cause the peer object at the other end of the VCL to change. If, for example, the **aglVCConnectionAdminStatus** is changed to disable on a circuit on GS 1, that VCC1.1 is disabled. However, the adminstration status on ATM Sw1 will still be enabled on the same circuit. The **aglVCConnectionOperStatus** object must be used to determine the actual state of the link.

Traffic Type

The **aglVCConnectionTrafficType** object should be set to the same value on each port of the same virtual channel connection.

AAL Type

The **aglVCConnectionAALType** object should be set to the same value on each port of the same virtual channel connection.

_____ **Note** _____

AAL type is transparent to most ATM switches.

_____

Traffic Shaping

The AGL supports limited traffic shaping by enabling a peak rate to be set for the VCI on each port. This is done by using the MIB object **aglVCConnectionTrafficShaperPeakRate**. The value is interpreted as the peak transmit rate in cells per second. The actual peak transmit rate will be the closest multiple of 10% of the port's maximum transmit rate.

A

Managing Virtual Channel Connections

The following sections describe how to modify, tear down and set up VCCs. For each operation, an example is given using the command syntax of Polycenter Manager on NetView. Please see the Configuration Chapter 5 in this manual for more information.

By default, a bridged FDDI circuit is configured on each AGL-2 port at power up. When these GIGAswitch AGL ports are directly connected, a VCC connection is automatically established and bridging operations begin without any user intervention.

If VCC parameters other than the default values are desired or if the GIGAswitch systems are not directly connected, management intervention is required. The following sections guide you through several standard operations to modify, tear down and establish new VCCs.

- Prerequisite Information
- Modifying a VCC
- Tearing down a VCC
- Setting up a new VCC

Prerequisite Information

The *aglVCConnectionTable* found in the GIGAswitch MIB describes the table entries necessary to manipulate a VCC. The following objects make up the *aglVCConnectionTable* and are found under the following branch:

.iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).dec(36) .ema(2).sysobjid(15).bridges(3).gigaswitch(3).agl(4).aglAtm(4) .aglVCConnectionTable(1).aglVCConnectionTableEntry(1).

- *aglVCConnectionPortA*
- *aglVCConnectionPortAVpi*
- *aglVCConnectionPortAVci*
- *aglVCConnectionPortB*
- *aglVCConnectionPortBVpi*
- *aglVCConnectionPortBVci*
- *aglVCConnectionTableEntryStatus*
- *aglVCConnectionTrafficType*
- *aglVCConnectionAALType*
- *aglVCConnectionAdminStatus*
- *aglVCConnectionOperStatus*
- *aglVCConnectionTrafficShaperPeakRate*
- *aglVCConnectionTrafficShaperAvgRate*
- *aglVCConnectionTrafficShaperMinGuaranteedRate*
- *aglVCConnectionTrafficShaperPriority*

The first six objects from the aglVCConnectionTable are used as an index to identify the VCC. The remaining objects in that table are parameters used to characterize the circuit.

For a bridged FDDI circuit, the port B parameters are not used. They should be set to zero.

When modifying the default VCC values or setting up a new VCC, use the index to identify the circuit to be modified or created. The index for the default circuit is:

n.0.63.0.0.0 (that is, aglVCConnectionPortA.aglVCConnectionPortAVpi.agl VCConnectionPortAVci.aglVCConnectionPortB.aglVCConnection PortBVpi.aglVCConnectionPortBVci)

Where n is the bridge port number of the AGL-2 port the circuit is defined on.

For example, to set up a new bridged FDDI circuit on bridge port number 24 (port A) where the VPI number assigned is 10 and the VCI number assigned is 50. The index to identify that circuit would be 24.10.50.0.0.0

The index will be used below in examples to set up, modify and tear down circuits.

Modifying a VCC

Parameters associated with a VCC can be modified once a circuit is created. Modifying a VCC parameter causes the AGL firmware to tear down the circuit, change the parameter, then reestablish the circuit with the changed parameter. This will momentarily affect traffic flow on the circuit.

Any read-write object in the *aglVCConnectionTable* can be modified. The index parameters are read-only. To change any of the index value parameters, a new circuit must be created.

A parameter can be modified by setting it to a new valid value. The MIB object description for each object defines the range of valid values for that object. The following example modifies the traffic shaper peak rate on a default T3 circuit. It uses Polycenter Manager on NetView. Note that the following is a single command line.

Example A–1 Modifying a VCC

```
snmpset -c 08002ba00a00 16.20.152.75 .iso.org.dod.internet.private.
enterprises.dec.ema.sysobjid.bridges.gigaswitch.agl.aglAtm.
aglVCConnectionTable.aglVCConnectionTableEntry.
aglVCConnectionTrafficShaperPeakRate.24.0.63.0.0.0 integer 47500
```

Where:

- -c specifies that the following field is the community string.
- 08002ba00a00 is the community string.
- 16.20.152.75 is the IP address for the GIGAswitch port receiving the SNMP set command.
- .iso.org.dod.internet.private.enterprises.dec.ema.sysobjid .bridges.gigaswitch.agl.aglAtm.aglVCConnectionTable .aglVCConnectionTableEntry. 24.0.63.0.0.0 is the MIB object to be modified. The last 6 values appended to the object name are the index values.
- integer is the datatype of the object.
- 47500 is the value the object is set to.

Tearing Down a VCC

To tear down an existing VCC you must know the index value of the circuit. For example, the default bridged FDDI circuit on bridge port number 24, the index value is 24.0.63.0.0.0 . The *aglVCConnectionTableEntryStatus* object in the GIGAswitch MIB controls creation and deletion (tear down) of a VCC. To delete an existing circuit, set this object to delete(2).

The following example uses Polycenter Manager on NetView:

Example A–2 Tearing Down a VCC

```
snmpset -c 08002ba00a00 16.20.152.75 .iso.org.dod.internet.private.
enterprises.dec.ema.sysobjid.bridges.gigaswitch.agl.aglAtm.
aglVCConnectionTable.aglVCConnectionTableEntry.aglVCConnectionTableEntryStatus.
24.0.63.0.0.0 integer 2
```

Where:

- -c specifies that the following field is the community string.

- 08002ba00a00 is the community string.

- 16.20.152.75 is the IP address for the GIGAswitch port receiving the SNMP set command.

- .iso.org.dod.internet.private.enterprises.dec.ema.sysobjid .bridges.gigaswitch.agl.aglAtm.aglVCConnectionTable .aglVCConnectionTableEntry .aglVCConnectionTableEntryStatus .24.0.63.0.0.0 is the MIB object to be modified. The last 6 values are the index values.

- Integer is the datatype of the object.

- 2 is the value the object is set to.
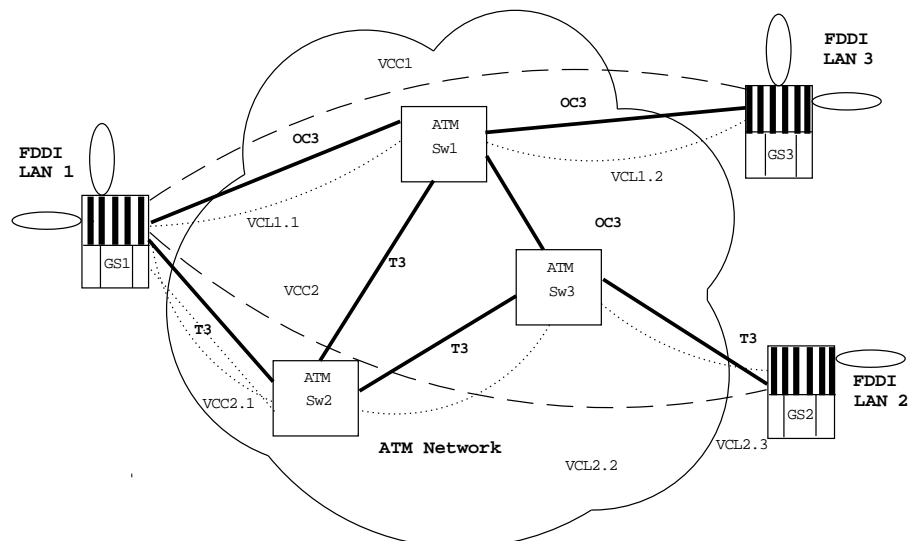
Setting Up a New VCC

The logical VCC1 connection shown between GS1 and GS3 shown in Figure 3–1 is made up of two physical hops. Each hop is referred to as Virtual Channel Link (VCL). This section describes how to configure an AGL-2 port to create a VCL. For each VCL required the following set of information must be gathered:

- Bridge port number of AGL port
- VPI/VCI pair
- AAL type
- Peak traffic rate
- Traffic type
- Admin status (enabled or disabled)

The bridge port number is simply the AGL-2 port which is physically connected.

The VPI/VCI pair, AAL type and peak traffic rate may be determined by the requirements of the ATM switch that GS1 is connected to (as shown in this example) or by the service providing connection between GS1 and GS3.

It is recommended that the default values be used for the AGL traffic rate parameters. If it is required to reduce the traffic rate on the link to something lower than the peak line rate, adjust this parameter.

The traffic type must be bridged FDDI.

The Admin status governs whether the circuit should be enabled or disabled once it is created.

Once the above parameters are known a new circuit can be established.

For this example assume the following parameters are required for VCL1.1:

- The bridge port number is 24.
- VPI/VCI of 0/50.
- AAL type of AAL 5.
- Peak traffic rate is equivalent to the line rate.
- Traffic type is bridged FDDI.
- Admin status is enabled.

Before a new bridged FDDI circuit can be created on a port, the default circuit must be torn down. A default circuit is created on power up. See this appendix section Tear Down a VCC for more details on tearing down a circuit.

To set up a new circuit, at least these three fields must be specified by the network manager in a single SNMP set command:

- *aglVCConnectionTrafficType*

- *aglVCConnectionAALType*

- *aglVCConnectionAdminStatus*

The other circuit parameters, if not specified, will use their default value. See Chapter 3 for default values of objects. Any attributes that have default values that are not desired should also be specified by the network manager when setting up a circuit.

Example A–3 uses Polycenter Manager on NetView and Object Identifiers (OIDs) in place of the text object name. Either form is acceptable.

The following command must be entered as a single command line. It is spaced to allow easy readability. The three MIB objects must be sent in a single PDU.

Example A–3 Setting Up a VCC

```
 snmpset -c 08002ba00a00 16.20.152.75
.1.3.6.1.4.1.36.2.15.3.3.4.4.1.1.8.24.0.50.0.0.0 integer 1
.1.3.6.1.4.1.36.2.15.3.3.4.4.1.1.9.24.0.50.0.0.0 integer 2
.1.3.6.1.4.1.36.2.15.3.3.4.4.1.1.11.24.0.50.0.0.0 integer 1
```

Where:

- -c specifies that the following field is the community string.

- 08002ba00a00 is the community string.

- 16.20.152.75 is the IP address for the GIGAswitch port receiving the SNMP set command.

- .1.3.6.1.4.1.36.2.15.3.3.4.4.1.1.8.24.0.50.0.0.0 is the OID for the *aglVCConnectionTrafficType*.

- 1 (bridged-FDDI) is the value the object is set to.

- .1.3.6.1.4.1.36.2.15.3.3.4.4.1.1.9.24.0.50.0.0.0 is the OID for the *aglVCConnectionAALType*.

- 2 (aal5) is the value the object is set to.

- .1.3.6.1.4.1.36.2.15.3.3.4.4.1.1.11.24.0.50.0.0.0 is the OID for the *aglVCConnectionAdminStatus*.

- 1 (enable) is the value the object is set to.

- Integer is the datatype of each object.

_____ **Note** _____

The last 6 values in each OID string are the index values.

In this example, the default peak rate is used since it was not specified.

If desired, additional *aglVCConnectionTable* objects can be specified in the command line to set up a circuit. Or modification of other parameters can be done after the new circuit is created.

_____

B
Packet Flow

Packet Switching

The GIGAswitch is a packet switching device. When an FDDI packet is sent out an AGL-2 port, it is segmented into cells for transport on the ATM link. Conversely when the cells are received at a remote AGL-2 port, they are reassembled into FDDI packets for transmission onto FDDI networks.

The AGL-2 ports receive and transmit ATM Cells. Using the selected ATM Adaptation Layer (AAL) Transport Service, FDDI packets are encapsulated within the AAL and sent through the ATM Network. The diagram shows AAL5 being used. It supports the segmentation and reassembly activities needed to send packets which are larger than the standard ATM cell size (53 bytes) over an ATM network. AAL3/4 are also supported by AGL.

Refer to the following diagram for an understanding of how this is done within the GIGAswitch. On the left side, an incoming FDDI packet is received by an FGL line card. The packet is switched through the Crossbar to the outbound AGL port. When the outbound data leaves the AGL-2 port, the FDDI packet has been segmented into ATM cells and sent into the ATM Network. The receiving AGL, not shown, would then reassemble the ATM cells into an FDDI packet which would then be sent to the receiving FDDI end node.

```
GIGAswitch System
┌──────────────────────────────────────────────────────┐
│ FGL                     AGL                            │
│ Port 1                                      Port 3     │
│ ┌─────────┬───────┐    ┌─────────┬──────┬──────┐       │     ┌───┐ ┌───┐ ┌───┐ ┌───┐ ┌───┐
│ │ PayLoad │ FDDI  │◄──►│ PayLoad │ FDDI │ AAL5 │       │     │ C │ │ C │ │ C │ │ C │ │ C │
│ └─────────┴───────┘    └─────────┴──────┴──────┘       │     └───┘ └───┘ └───┘ └───┘ └───┘
│                                                        │         ATM Cell Stream
└──────────────────────────────────────────────────────┘
```
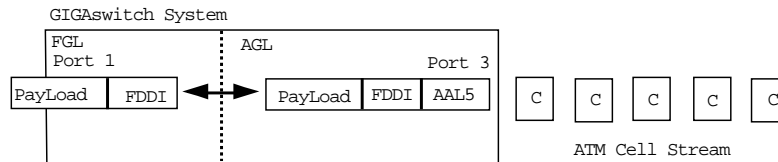
1. An FDDI Packet is received at an FGL port and then switched through the crossbar to the AGL-2 port.

PayLoad	FDDI
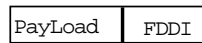
2. Upon receiving the packet via the crossbar, the AGL-2 pass as the FDDI packet to the AGL-2 ATM Segmentation and Reassembly Chip, which performs the ATM Adaptation Layer Services as defined in the ATM User Network Interface Specification. The diagram below shows the original FDDI packet being placed into AAL-5 frame:

PayLoad	FDDI

Packet Data	AAL5
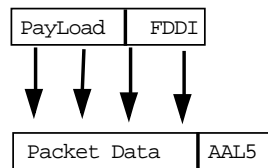
3. Finally, the AAL5 packet is segmented into ATM cells and sent out into the network using either SONET or DS3 framing protocol.

| C | C | C | ... | 48 bytes ATM Cell Payload | 5 bytes ATM Cell Hdr | ... | C | C | C |
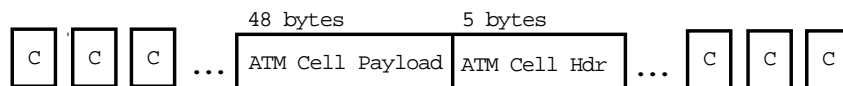
4. The receiving ATM end-node will ultimately receive the AAL5 frame and reassemble the original FDDI packet, which will then be sent to the FDDI end-node.

C

AGL Related MIB Quick Reference

This appendix provides easy access to following characteristics of the AGL related objects: (See the glossary in appendix D for a description of each object.)

- Object name and identifier
- Type of access
- Syntax and choices

In addition, this appendix also states the purpose of each table and the index used to access the objects of the table.

Each object is in italic and each object identifier is enclosed in braces { }. The AGL related objects under the gigaswitch MIB are:

- *agl* { gigaswitch 4 }
- *aglatmMIB* { gigaswitch 5 }
- *aglsonetMIB* { gigaswitch 6 }

The agl { gigaswitch 4 } management information base (MIB) objects consist of the following groups:

Group	Related Tables
aglConfig { agl 1 }	*aglInterfaceConfTable* { aglConfig 1 }
aglSonet { agl 2 }	*aglInterfaceSonetTable* { aglSonet 1 }
aglDS3E3 { agl 3 }	*aglInterfaceDS3E3Table* { aglDS3E3 1 }
aglAtm { agl 4 }	*aglVCConnectionTable* { aglAtm 1 } *aglInterfaceATMTable* { aglAtm 2 }

The aglatmMIB { gigaswitch 5 } consists of:

Group	Related Tables
aglatmMIB { gigaswitch 5 }	*aglatmInterfaceConfTable (aglatmMIBobjects 2) aglatmInterfaceDs3PlcpTable (aglatmMIBobjects 3) aglatmInterfaceSonetTCTable (aglatmMIBobjects 4)*

The aglsonetMIB { gigaswitch 6 } consists of:

Group	Related Tables
aglsonetMIB { gigaswitch 6 }	*aglsonetMediumTable (aglsonetMedium 1)* *aglsonetSectionCurrentTable(aglsonetSection 1)* *aglsonetLineCurrentTable (aglsonetLine 1)* *aglsonetPathCurrentTable (aglsonetPath 1)*

AGL Configuration Group (agl 1)

This table contains the following AGL specific interface configuration parameters, one entry per ATM interface port. Index = *aglInterfaceIndex.*

Table C–1 *aglInterfaceConfTable { aglConfig 1 }*

Object	Access	Syntax
aglInterfaceConfEntry { aglInterfaceConfTable 1 }	No access	*AglInterfaceConfEntry*
aglInterfaceIndex { aglInterfaceConfEntry 1 }	Read-only	Integer
aglInterfacePhyType { aglInterfaceConfEntry 2 }	Read-write	Integer - sts3cStm1 (1), ds3e3 (2), unKnown (3)
aglInterfaceTrafficRateGranularity { aglInterfaceConfEntry 3 }	–	–

AGL Sonet Group (agl 2)

This table contains the AGL specific interface configuration parameters for the SONET/SDH physical layer. Index = *aglInterfaceSonetIndex.*

Table C–2 *aglInterfaceSonetTable { aglSonet 1 }*

Object	Access	Syntax
aglInterfaceSonetEntry { aglInterfaceSonetTable 1 }	No access	*AglInterfaceSonetEntry*
aglInterfaceSonetIndex { aglInterfaceSonetEntry 1 }	Read-only	Integer
aglInterfaceSonetMode { aglInterfaceSonetEntry 2}	Read-write	Integer - sonetSTS3c (1),sdhSTM1 (2)
aglInterfaceSonetTiming { aglInterfaceSonetEntry 3 }	Read-write	Integer - loopTiming (1), localTiming(2)

AGL DS3/E3 Group (agl 3)

This table contains the AGL specific interface configuration parameters for the DS3/E3 physical layer. Index = *aglInterfaceDS3E3Index.*

Table C–3 *aglInterfaceDS3E3Table { aglDS3E3 1 }*

Object	Access	Syntax
aglInterfaceDS3E3Entry { aglInterfaceDS3E3Table 1 }	No access	*AglInterfaceDS3E3Entry*
aglInterfaceDS3E3tIndex { aglInterfaceDS3E3Entry 1 }	Read-only	Integer
aglInterfaceDS3E3Mode { aglInterfaceDS3E3Entry 2}	Read-write	Integer—low-power (1), high-power (2)

AGL ATM Group (agl 4)

This table contains AGL ATM VCC configuration and performance parameters and state variables. Each entry represents a bidirectional traffic flow. Index = *aglVCConnectionPortA, aglVCConnectionPortAVpi, aglVCConnectionPortAVci, aglVCConnectionPortB, aglVCConnectionPortBVpi, aglVCConnectionPortBVci.*

Table C–4 *aglVCConnectionTable { aglAtm 1 }*

Object	Access	Syntax
Index Objects		
aglVCConnectionTableEntry { aglVCConnectionTable 1}	No access	–
aglVCConnectionPortA { aglVCConnectionTableEntry 1 }	Read-only	Integer
aglVCConnectionPortAVpi { aglVCConnectionTableEntry 2 }	Read-only	Integer - (0..255)
aglVCConnectionPortAVci { aglVCConnectionTableEntry 3 }	Read-only	Integer - (32..65535)
aglVCConnectionPortB { aglVCConnectionTableEntry 4 }	Read-only	Integer
aglVCConnectionPortBVpi { aglVCConnectionTableEntry 5 }	Read-only	Integer - (0..255)
aglVCConnectionPortBVci { aglVCConnectionTableEntry 6 }	Read-only	Integer - (32..65535)
Other Objects		
aglVCConnectionTableEntryStatus { aglVCConnectionTableEntry 7 }	Read-write	Integer - create (1),delete (2)
aglVCConnectionTrafficType { aglVCConnectionTableEntry 8 }	Read-write	Integer - FDDI-bridged (1), ATM-to ATM (2)
aglVCConnectionAALType { aglVCConnectionTableEntry 9 }	Read-write	Integer - aal34 (1), aal5 (2)
aglVCConnectionOperStatus { aglVCConnectionTableEntry 10 }	Read-only	Integer - up (1), down (2)
aglVCConnectionAdminStatus { aglVCConnectionTableEntry 11 }	Read-write	Integer - enable (1), disable (2)
aglVCConnectionTrafficShaperPeakRate { aglVCConnectionTableEntry 12 }	Read-write	Integer
aglVCConnectionTrafficShaperAvgRate { aglVCConnectionTableEntry 13 }	Read-write	Integer
aglVCConnectionTrafficShaperMin-GuaranteedRate { aglVCConnectionTableEntry 14 }	Read-write	Integer
aglVCConnectionTrafficShaperPriority { aglVCConnectionTableEntry 15 }	Read-write	Integer - (1..12)

This table contains AGL ATM interface specific settable parameters. Index = *aglInterfaceATMIndex.*

Table C–5 *aglInterfaceATMTable { aglAtm 2 }*

Object	Access	Syntax
aglInterfaceATMTableEntry { aglInterfaceATMTable 1}	No access	AglInterfaceATMTableEntry
aglInterfaceATMIndex { aglInterfaceATMTableEntry 1 }	Read-write	Integer
aglInterfaceATMScrambeStatus { aglInterfaceATMTableEntry 2 }	Read-write	Integer - enable (1), disable (2)
aglInterfaceATMOAMStatus { aglInterfaceATMTableEntry 3 }	Read-write	Integer - enable (1), disable (2)

AGL ATM MIB Group (gigaswitch 5)

This table contains ATM local interface configuration parameters and state variables, one entry per ATM interface port. Index = *aglatmInterfaceIndex.*

Table C–6 *aglatmInterfaceConfTable { aglatmMIBObjects 2 }*

Object	Access	Syntax
aglatmInterfaceConfEntry { aglatmInterfaceConfTable 1 }	No access	AglAtmInterfaceConfEntry
aglatmInterfaceIndex { aglatmInterfaceConfEntry 1 }	No access	Integer
aglatmInterfaceMaxVpcs { aglatmInterfaceConfEntry 2 }	Read-only	Integer
aglatmInterfaceMaxVccs { aglatmInterfaceConfEntry 3 }	Read-only	Integer
aglatmInterfaceConfVpcs { aglatmInterfaceConfEntry 4 }	Read-only	Integer
aglatmInterfaceConfVccs { aglatmInterfaceConfEntry 5 }	Read-only	Integer
aglatmInterfaceMaxActiveVpiBits { aglatmInterfaceConfEntry 6 }	Read-only	Integer
aglatmInterfaceMaxActiveVciBits { aglatmInterfaceConfEntry 7 }	Read-only	Integer
aglatmInterfaceIlmiVpiVci { aglatmInterfaceConfEntry 8 }	Read-only	Integer
aglatmInterfaceSpecific { aglatmInterfaceConfEntry 9 }	Read-only	Object indentifier

This table contains ATM interface DS3 PLCP parameters and state variables, one entry per ATM interface port. Index = *aglatmInterfaceDs3PlcpIndex.*

Table C–7 *aglatmInterfaceDs3PlcpTable { aglatmMIBObjects 3 }*

Object	Access	Syntax
aglatmInterfaceDs3PlcpEntry { aglatmInterfaceDs3PlcpTable 1 }	No access	AglAtmInterfaceDs3PlcpEntry
aglatmInterfaceDs3PlcpIndex { aglatmInterfaceDs3PlcpEntry 1 }	No access	Integer
aglatmInterfaceDs3PlcpSEFSs { aglatmInterfaceDs3PlcpEntry 2 }	Read-only	Counter
aglatmInterfaceDs3PlcpAlarmState { aglatmInterfaceDs3PlcpEntry 3 }	Read-only	Integer {noAlarm(1), receivedFarEndAlarm(2), incomingLOF(3)}
aglatmInterfaceDs3PlcpUASs { aglatmInterfaceDs3PlcpEntry 4 }	Read-only	Counter

This table contains ATM interface SONET TC Sublayer parameters and state variables, one entry per ATM interface port. Index = *aglatmInterfaceSonetTCIndex.*

Table C–8 *aglatmInterfaceSonetTCTable { aglatmMIBObjects 4 }*

Object	Access	Syntax
aglatmInterfaceSonetTCEntry { aglatmInterfaceSonetTCTable 1 }	No access	AglAtmInterfaceSonetTCEntry
aglatmInterfaceSonetTCIndex { aglatmInterfaceSonetTCEntry 1 }	No access	Integer
aglatmInterfaceSonetTCOCDEvents { aglatmInterfaceSonetTCEntry 2 }	Read-only	Counter
aglatmInterfaceSonetTCAlarmState { aglatmInterfaceSonetTCEntry 3 }	Read-only	Integer noAlarm(1), lcdFailure(2)

AGL SONET MIB Group (gigaswitch 6)

The SONET/SDH Medium table follows: Index =
aglsonetMediumIfIndex.

Table C–9 *aglsonetMediumTable { aglsonetMedium 1 }*

Object	Access	Syntax
aglsonetMediumEntry { aglsonetMediumTable 1 }	No access	AglSonetMediumEntry
aglsonetMediumIfIndex { aglsonetMediumEntry 1 }	No access	Integer
aglsonetMediumType { aglsonetMediumEntry 2 }	Read-only	Integer {sonet(1), sdh(2)}
aglsonetMediumTimeElapsed { aglsonetMediumEntry 3 }	Read-only	Integer
aglsonetMediumValidIntervals { aglsonetMediumEntry 4 }	Read-only	Integer
aglsonetMediumLineCoding { aglsonetMediumEntry 5 }	Read-only	Integer {sonetMediumOther(1), sonetMediumB3ZS(2), sonetMediumCMI(3), sonetMediumNRZ(4), sonetMediumRZ(5)
aglsonetMediumLineType { aglsonetMediumEntry 6 }	Read-only	Integer {sonetOther(1), sonetShortSingleMode(2), sonetLongSingleMode(3), sonetMultiMode(4), sonetCoax(5), sonetUTP(6)}
aglsonetMediumCircuitIdentifier { aglsonetMediumEntry 7}	Read-only	DisplayString

The SONET/SDH Section Current table follows: Index =
aglsonetSectionCurrentIfIndex.

Table C–10 *aglsonetSectionCurrentTable { aglsonetSection 1 }*

Object	Access	Syntax
AglSonetSectionCurrentEntry { aglsonetSectionCurrentTable 1 }	No access	AglSonetSectionCurrentEntry
aglsonetSectionCurrentIfIndex { aglsonetSectionCurrentEntry 1 }	No access	Integer
aglsonetSectionCurrentStatus { aglsonetSectionCurrentEntry 2 }	Read-only	Integer
aglsonetSectionCurrentESs { aglsonetSectionCurrentEntry 3 }	Read-only	Gauge
aglsonetSectionCurrentSESs { aglsonetSectionCurrentEntry 4 }	Read-only	Gauge
aglsonetSectionCurrentSEFSs { aglsonetSectionCurrentEntry 5 }	Read-only	Gauge
aglsonetSectionCurrentCVs { aglsonetSectionCurrentEntry 6 }	Read-only	Gauge

The SONET/SDH Line Current table follows (Index = *aglsonetLineCurrentIfIndex*):

Table C–11 *aglsonetLineCurrentTable { aglsonetLine 1 }*

Object	Access	Syntax
AglSonetLineCurrentEntry { aglsonetLineCurrentTable 1 }	No access	AglSonetLineCurrentEntry
aglsonetLineCurrentIfIndex { aglsonetLineCurrentEntry 1 }	No access	Integer
aglsonetLineCurrentStatus { aglsonetLineCurrentEntry 2 }	Read-only	Integer
aglsonetLineCurrentESs { aglsonetLineCurrentEntry 3 }	Read-only	Gauge
aglsonetLineCurrentSESs { aglsonetLineCurrentEntry 4 }	Read-only	Gauge
aglsonetLineCurrentCVs { aglsonetLineCurrentEntry 5 }	Read-only	Gauge
aglsonetLineCurrentUASs { aglsonetLineCurrentEntry 6 }	Read-only	Gauge

The SONET/SDH Path Current table follows (Index = *aglsonetPathCurrentIfIndex*):

Table C–12 *aglsonetPathCurrentTable { aglsonetPath 1 }*

Object	Access	Syntax
AglSonetPathCurrentEntry { aglsonetPathCurrentTable 1 }	No access	AglSonetPathCurrentEntry
aglsonetPathCurrentIfIndex { aglsonetPathCurrentEntry 1	No access	Integer
aglsonetPathCurrentWidth { aglsonetPathCurrentEntry 2 }	Read-write	Integer {sts1(1), sts3cSTM1(2), sts12cSTM4(3), sts24c(4), sts48cSTM16(5)}
aglsonetPathCurrentStatus { aglsonetPathCurrentEntry 3 }	Read-only	Integer
aglsonetPathCurrentESs { aglsonetPathCurrentEntry 4 }	Read-only	Gauge
aglsonetPathCurrentSESs { aglsonetPathCurrentEntry 5 }	Read-only	Gauge
aglsonetPathCurrentCVs { aglsonetPathCurrentEntry 6 }	Read-only	Gauge
aglsonetPathCurrentUASs { aglsonetPathCurrentEntry 7 }	Read-only	Gauge

D

Fault Indications

Power-On Faults

During power up the Module LED and the two Port LEDS report the progress of the power up sequence. The LEDs are used to create a octal code. Normally, a sequence of GREEN colored LEDs will be observed as described in the Operation section. If an error occurs, these GREEN LEDs will become AMBER to indicate which power on sequence state has encountered an error. Below is a detailed list of the power on state.

Octal Code	Color Code	
	Green	**Amber**
0	Not used	Not used
1	Verifying boot code block checksum	Error during verify of boot code block checksum
2	Performing simple firmware memory test	Error performing simple firmware memory test
3	Performing full firmware memory test	Error performing full firmware memory test
4[1]	Verifying Main Code Block image header	Error during verify of Main Code Block image header
5	Copying Main Code Block to firmware memory	Error during copy of Main Code Block to firmware memory
6	Verifying Main Code Block checksum	Main Code Block corrupted, using backup code Block
7	Load to firmware memory complete	Backup code block corrupted, unrecoverable module error

[1]Display code 4 has a dual function. Flashing AMBER = unexpected interrupt.

The recoverable states shown indicate that the Main Code Block has been corrupted. It is recoverable via a special version of the operational firmware which does not contain diagnostics.

This image is only used if the Main Code Block becomes corrupted. For example, if during a down line load, the GIGAswitch is power cycled for some unexpected reason, this power hit would potentially corrupt the Main Code Block, thereby causing alternate use of the Backup Code Block. When this occurs, the firmware version number displayed via the OBM Show Slot Configuration Option would display the number "b.ac", indicating that the Backup Code Block was used. The user could then attempt another reload of the Main Code Block.

For all nonrecoverable faults, please contact your Digital Service Representative.

Diagnostic Faults

All diagnostic faults are unrecoverable. Please contact your Digital Equipment Service Representative.

Operational Faults

During normal operation, the AGL-2 Module LED is solid green. If a nonfatal operational module error occurs, the Module LED will begin blinking Amber/Green. When this occurs, a linecard error log entry will occur. This nonfatal error indication will continue for about 10 minutes at which time, the Module LED will return to a solid green state. If a fatal operational module error occurs, the Module LED will be turned off and the Port LEDs will go amber. Shortly after this occurs, the module will be power-cycled by the SCP and re-initialized for normal operation.

If either one of the nonfatal or fatal errors occur, please contact your Digital Field Service Representative.

Meaning of Symbols

The following diagram indicates which power states are recoverable. The "A" indicates a lit AMBER LED. The "0" indicates a LED which is off.

Table D–1 Recoverable Power States

Power On State	0	1	2	3	4	5	6	7
Module LED (view as bit<2>)	0	0	0	0	A	A	A	A
PORT 1 LED (view as bit<1>)	0	0	A	A	0	0	A	A
PORT 2 LED (view as bit<0>)	0	A	0	A	0	A	0	A
Recoverable	-	N	N	N	Y	Y	Y	N

The recoverable states shown indicate that the Main Code Block has been corrupted. It is recoverable via a special version of the operational firmware which does not contain diagnostics.

E

Guidelines and Installation for T3 or OC-3 AGL Links

A T3 or OC-3 link that is provisioned by a carrier should be checked out by the carrier before initiating this procedure. In the following, one end of the link is called "local" and the other end "remote".

Guidelines

OC-3 Links   For OC-3, check that the proper daughter cards, jumper cables and/or attenuators are available:

- Multi-mode fiber is suitable for installations of 1.5 km or less. Simply make sure that all cables are multi-mode; no attenuators are required.

- Single-mode fiber is used for distances greater than 1.5 km or when connecting to telephone carrier type equipment. Make sure that all cables and attenuators are single-mode. Connect each cable to the transmitter before connecting the cable to the receiver and check the optical power at the receiver. Optical power from -14 to -30 dbm is acceptable.

If the power reading at the receiver is greater than -14 dbm, then a single-mode attenuator is **required** to bring the power within the range above.

It is acceptable to connect to telephone carrier type equipment for distances up to 1.5 KM using a multi-mode daughter card on AGL. In this case, a **single-mode** fiber must be used from the carrier equipment transmitter to the AGL receiver. However, a **multi-mode** fiber must be used from the AGL transmitter to the carrier equipment receiver as shown below:
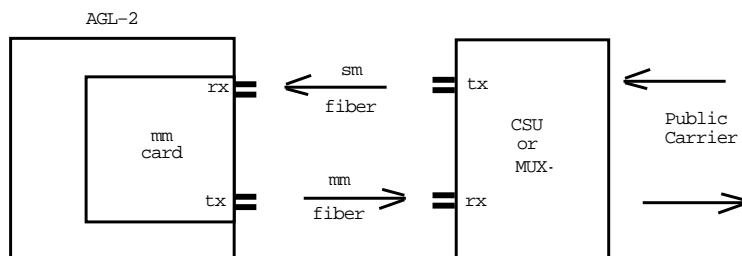
_____ **Note** _____

Mixing single-mode and multi-mode fiber in the path from a transmitter to a receiver will produce unreliable results and should be avoided. Digital cannot service such links until the mixed fiber run is corrected to use one type of fiber that meets specifications for the link distance.

_____

Do not mix fiber types as shown in the following figure, even for a short distance:

```
 _____                                      _____
|           |       mm              sm           |           |
|        rx |==----------------!!000000000000     |           |
|           |                                     |           |
|        tx |                                     |           |
|_____|                                     |_____|
```
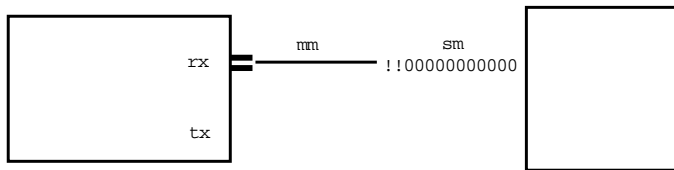
T3 Links   T3 service is delivered via public carrier via coax cable as shown below. Maximum length of cable supported to the carrier service point is 450 feet.

```
 AGL-2
 _____
|                 |         coax          _____
|   _____     |   <---------------   |         |
|  |      rx |==   <---            ==  tx |         |   <===
|  |         |                            |         |
|  |  DS3    |                            |  DS3    |   Public
|  |  Card   |                            |  CSU    |   Carrier
|  |         |         coax               |         |
|  |      tx |==   --------->      ==  rx |         |   ====>
|  |_____|                            |_____|
|_____|
```
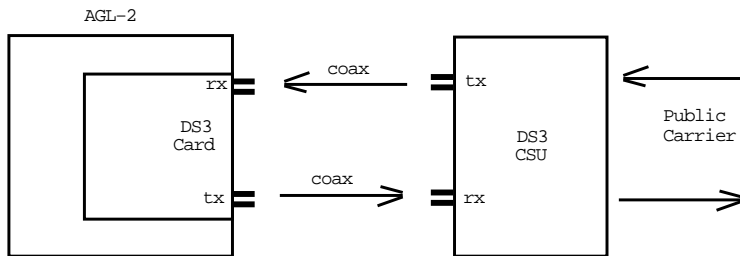
Daughter Card Setup

T3

For T3, check that the AGL T3 power mode on the AGL T3 port is properly configured on both ends of the link for the distance from the AGL to the T3 connection point provided by the carrier. See DS3 Power Mode. For T3 and OC-3, check for proper configuration of the AGL transmit clock on both ends of the link (Sonet Timing Mode and DS3 Transmit Clock Source). If the link is provisioned using telephone carrier type equipment, both AGLs should be set for "loop" timing unless otherwise specified by the carrier. If the link is a cable with no intermediate equipment, use "local" timing on both ends of the link.

—————————————— **Note** ——————————————

Using "loop" timing on both ends of a simple cable link will produce unreliable results and very poor performance although it may work perfectly at first. This can be a difficult problem to diagnose. It is best to avoid such configurations by carefully checking the SNMP object *aglInterfaceSonetTiming* for SONET or *dsx3TransmitClockSource* for T3, as part of link installation.

————————————————————————————————

For T3, check that the AGL T3 power mode on the AGL T3 port is properly configured on both ends of the link for the distance from the AGL to the T3 connection point provided by the carrier. Refer to DS3 Power Mode.

Spanning Tree Check

Before connecting the cables to the AGLs, use UNIX "ping" or some other network application to test for connectivity to the remote end.

_____ **Note** _____

If connectivity is present before the new link is fully connected, both the local and remote switches are connected to the same spanning tree via other links in the network. In this case, it is normal for **one** end of the new link to **not** go into forwarding in step 2 in Connectivity Check . However, if both ends go into forwarding when the new link is established and there is a competing link in the network, then one end of the competing link will go out of forwarding because of the change in the spanning tree topology caused by the addition of the new link.

See *IEEE Std. 802.1D Media Access Control (MAC) Bridges* to control which ports belong to the spanning tree. It is necessary to either disable the competing link or cause the competing link to go into backup in order to fully check out the new link with ping or some other network application.

Physical Cable Installation

1. After completing the spanning tree check, connect the transmit and receive cables of the T3 or OC-3 link to an AGL port at the remote end.

2. Connect the transmit and receive cable at the local end.

Connectivity Check

1. If the daughter card PHY LED turns steady green on both ends, connectivity at the PHY level has been established. If not, see Possible PHY Daughter Card Problems.

2. If the port LED turns steady green 30 seconds after PHY is steady green:

   - THEN a bridge virtual circuit is set up on that AGL port and the GIGAswitch is forwarding traffic through it.

   _____ **Note** _____

   An AGL or FGL port with a steady green port LED is a member of a spanning tree.

   It is possible for both ends of a link to have a steady green port LED without connectivity on the link. In this case there are two spanning trees—one on each side of the link. See Forwarding Indicated But No Connectivity Exists to resolve this.

   _____

   - ELSE see Port Won't Forward and No Competing Spanning Tree.

3. Use ping or some other network application to test for connectivity to the remote end. If connectivity has been established, then checkout is complete; otherwise see Troubleshooting Procedures .

Troubleshooting Procedures

Possible PHY Daughter Card Problems

If you suspect a PHY daughter card problem:

1. Check that both ends of a OC-3 link are in the same mode by using *aglInterfaceSonetMode*.

2. Connect a cable from the transmitter to the receiver of the same AGL port. (Be sure to use an attenuator for a single-mode OC-3 daughter card.)

3. If the daughter card PHY LED does not turn steady green, replace the daughter card.

CAUTION

An AGL port that has a cable looped from the transmit to the receive connector should **never** have a solid green port LED, that is, it should never be in forwarding. In the unlikely event that an AGL port that is in loopback goes into forwarding then **immediately** take **one** of the following steps:

- Disable the AGL port loopback by removing the loopback cable.

OR...

- If further testing is desired, DISABLE all other network connections to the GIGAswitch containing the AGL.

In either case, please report the problem to your Digital Service Representative.

An AGL port which is in loopback mode (via a cable or via loopback by the telephone carrier) and which remains in forwarding will reflect multi-cast and unknown DA traffic back into the network. This can cause severe packet loss and disrupt network communications. GIGAswitch and AGL have been engineered and tested to prevent this.

Solid Green PHY LED in Loopback But Not When Linked

If the daughter card PHY LED is solid green in loopback but not solid green when connected to the link, then check to make sure that the transmit and receive cables are labeled correctly. A good labeling strategy is to draw an arrow (in the direction that the signal is flowing) on each end of each cable. Make sure that there is a valid signal path from each transmitter to each receiver by using test equipment if necessary.

_____ **Note** _____

Blinking amber on the daughter card PHY LED indicates that the receive path to this AGL is alright, but the receiver on the other end of the link is not receiving a valid PHY-level signal. It shows a problem in the path from the local transmitter to the remote receiver.

_____

_____ **Note** _____

Most optical links fail to work because of broken or dirty connections that can be remedied as follows:

- Using alcohol, lint free tissue and air, clean single-mode connectors after every 3 inserts; clean multi-mode connectors after 10 inserts.

- Do not rub the tip of any optical connector with any material, including during cleaning.

- Measure transmitter LAUNCH power and compare with the following:

   Multi-mode (LED) -15 to -20 dbm
   Single-mode (Laser) -5 to -12 dbm

   If the power is outside this range, use another jumper or replace the daughter card.

- Measure optical power at every connector. If loss is excessive, replace connector or jumper

_____

Port Won't Forward and No Competing Spanning Tree

If a port won't go into forwarding and there is no competing spanning tree link (Spanning Tree Check), take the following steps:

1. Check that the SCP firmware version in use has AGL support.

2. Refer to Appendix A and C, and make sure that:

   - A bridge (that is, TrafficType = 1) virtual circuit is set up on the port.

   - The circuit is enabled (AdminStatus = enabled).

   - The circuit is operational at this port (OperStatus = up or unknown).

      Check that the AGL module firmware is up to date.
      Power cycle the AGL module if it still won't go into forwarding.
      Replace the AGL module as a last resort.

Forwarding Indicated But No Connectivity Exists

If both ends of the link indicate forwarding but there is no connectivity via UNIX ping or some other network application, check the following:

- If you are testing for connectivity using the IP address of a GIGAswitch, then check that the IP address of the incoming port on that GIGAswitch is properly configured using OBM.

- Check that "SNMP sets" have not set filters or otherwise confused things. Clear management memory on one or both switches using OBM to clear all SNMP sets; in this case, be sure to reenter the proper IP address for each port to allow SNMP management or testing via ping.

- The SCP firmware that is being used provides AGL support as documented in the AGL Release Notes.

- VCI and VPI match depending on configuration as follows:

  - For a simple cable link or a leased circuit link, the VCI and VPI of the bridge virtual circuit must match the VCI and VPI of the AGL at the other end.

    OR...

  - For an ATM switched service link, the VCI and VPI of the AGL bridged virtual circuit must match the VCI and VPI of the virtual chanel link of the ATM service at each end of the link.

    --------------------- **Note** ---------------------

    The VCI and the VPI of a virtual circuit can be different at each hop in an ATM network. The VCI and VPI need match only on each physical link.

- The AAL type (that is, AAL3/4 or AAL5) of the bridge circuit agrees on both ends.

- The ATM scramble status of the link agrees on both ends of the ATM link. In this case, **ATM link** is defined as the communications link between two ATM entities, for example, AGL to an ATM switch, or AGL to AGL.

- For T3, the PLCP mode (that is, enable or disable) agrees on both ends. If the above are OK, then check that the AGL module firmware is up to date. Power cycle both AGL modules. Replace one or both AGL modules as a last resort.

AGL Related MIB Objects Glossary

aglInterfaceConfTable **{ aglConfig 1 }**

This table contains the AGL specific interface configuration parameters, one entry per ATM interface port.

aglInterfaceConfEntry **{ aglInterfaceConfTable 1 }**

This list contains ATM interface configuration parameters and state variables. " Index = aglInterfaceIndex. Sequence = aglInterfaceIndex INTEGER, aglInterfacePhyType INTEGER, aglInterfaceTrafficRateGranularity INTEGER .

aglInterfaceIndex **{ aglInterfaceConfEntry 1 }**

The value of this object identifies the AGL port interface for which this entry contains management information.

aglInterfacePhyType **{ aglInterfaceConfEntry 2}**

Indicates the type of physical interface used on the ATM port. Two physical layer types are supported: 1. STS3c/STM1 2. DS3/E3.

The type is unknown if the port is not present or its physical layer type is not known.

aglInterfaceTrafficRateGranularity **{ aglInterfaceConfEntry 2}**

Indicates the granularity in cell/s for assigning peak, average and minimum guaranteed rates for traffic shaped circuits on the AGL port. This value also represents the minimum rate in cells/s that can be assigned to a circuit. The rates subscribed to in the aglVCConnectionTable will be set to a multiple of this rate.

aglInterfaceSonetTable **{ aglSonet 1 }**

This table contains the AGL specific interface configuration parameters for the SONET/SDH physical layer.

aglInterfaceSonetEntry **{ aglInterfaceSonetTable 1 }**

This list contains SONET/SDH interface configuration parameters and state variables. Index = aglInterfaceSonetIndex. Sequence = *aglInterfaceSonetIndex* INTEGER, *aglInterfaceSonetMode* INTEGER, *aglInterfaceSonetTiming* INTEGER.

aglInterfaceSonetIndex { aglInterfaceSonetEntry 1}

The value of this object identifies the AGL port interface for which this entry contains management information and is the same as aglInterfaceIndex.

aglInterfaceSonetMode { aglInterfaceSonetEntry 2}

Specifies whether the PHY operates in SONET STS-3c or SDH STM-1 mode. The following code points are used: 1 SONET STS-3c 2 SDH STM-1.

aglInterfaceSonetTiming { aglInterfaceSonetEntry 3}

Specifies whether the PHY operates in loop-timing or local-timing mode. In loop-timing, the recovered clock from the receive signal is used directly to time transmit data. Hence, the PHY is synchronized to the far-end transmitter. In local timing, transmit data is timed from a local oscillator of frequency 155.52 MHz (20ppm). The following code points are used: 1 loop-timing 2 local-timing.

aglInterfaceDS3E3Table { aglDS3E3 1 }

This table contains the AGL specific interface configuration parameters for the DS3/E3 physical layer.

aglInterfaceDS3E3Entry { aglInterfaceDS3E3Table 1 }

This list contains DS3/E3 interface configuration parameters and state variables. Index = aglInterfaceDS3E3Index. Sequence = aglInterfaceDS3E3Index INTEGER, aglInterfaceDS3E3Mode INTEGER.

aglInterfaceDS3E3Index { aglInterfaceDS3E3Entry 1 }

The value of this object identifies the AGL port interface for which this entry contains management information and is the same as aglInterfaceIndex.

aglInterfaceDS3E3Mode { aglInterfaceDS3E3Entry 2}

Specifies whether the DS3/E3 PHY operates in low power mode for short distances or high power mode for longer distances. The following code points are used: 1 low-power 2 high-power.

aglVCConnectionTable { aglVCConnectionTable 1}

This table contains AGL ATM VCC configuration and performance parameters and state variables. Each entry represents a bidirectional traffic flow.

aglVCConnectionTableEntry { aglVCConnectionTable 1}

A bidirectional circuit.

Index = aglVCConnectionPortA, aglVCConnectionPortAVpi, aglVCConnectionPortAVci, aglVCConnectionPortB, aglVCConnectionPortBVpi, aglVCConnectionPortBVci.

Sequence = aglVCConnectionPortA INTEGER,
aglVCConnectionPortAVpi INTEGER, aglVCConnectionPortAVci
INTEGER, aglVCConnectionPortB INTEGER,
aglVCConnectionPortBVpi INTEGER, aglVCConnectionPortBVci
INTEGER, aglVCConnectionTableEntryStatus
INTEGER, aglVCConnectionTrafficType
INTEGER, aglVCConnectionAALType INTEGER,
aglVCConnectionOperStatus INTEGER,
aglVCConnectionAdminStatus INTEGER,
aglVCConnectionTrafficShaperPeakRate INTEGER,
aglVCConnectionTrafficShaperAvgRate INTEGER,
aglVCConnectionTrafficShaperMinGuaranteedRate INTEGER,
aglVCConnectionTrafficShaperPriority INTEGER.

aglVCConnectionPortA { aglVCConnectionTableEntry 1 }

The value of this object identifies the AGL ATM port A of the
VCC segment for FDDI-bridged and ATM-to-ATM circuit types.

aglVCConnectionPortAVpi { aglVCConnectionTableEntry 2 }

The VPI value at port A for the bidirectional circuit. The
maximum VPI value cannot exceed the number supported by the
atmInterfaceMaxVpiBits at AGL ATM port A. This value is used
for both transmit and receive VPIs.

aglVCConnectionPortAVci { aglVCConnectionTableEntry 3 }

The VCI value at the port A for the bidirectional circuit. The VCI
values from 0 to 31 are reserved. The maximum VCI value cannot
exceed the number supported by the atmInterfaceMaxVciBits
specified for the AGL ATM port A. This value is used for both
transmit and receive VCIs.

aglVCConnectionPortB { aglVCConnectionTableEntry 4 }

The value of this object identifies the AGL ATM port B of the
VCC segment for ATM-to-ATM circuit types. For FDDI-bridged
circuit types this value should be zero.

aglVCConnectionPortBVpi { aglVCConnectionTableEntry 5 }

The VPI value at port B for the bidirectional ATM-to-ATM circuit.
The maximum VPI value cannot exceed the number supported by
the atmInterfaceMaxVpiBits at AGL ATM port B. This value is
used for both transmit and receive VPIs. For other circuit types
this value should be zero.

aglVCConnectionPortBVci { aglVCConnectionTableEntry 6 }

The VCI value at the port B for the bidirectional ATM-to-
ATM circuit. The VCI values from 0 to 31 are reserved. The
maximum VCI value cannot exceed the number supported by
the atmInterfaceMaxVciBits specified for the AGL ATM port B.
This value is used for both transmit and receive VCIs. For other
circuit types this value should be zero.

aglVCConnectionTableEntryStatus { aglVCConnectionTableEntry 7 }

The status column used for creating, and deleting bidirectional circuit entries in the agl virtual channel connection table.

aglVCConnectionTrafficType { aglVCConnectionTableEntry 8 }

The value of this object identifies the circuit type and characteristics of a particular circuit. There are two types of connections supported: 1. FDDI-bridged 2. ATM-to-ATM An FDDI-bridged circuit carries all bridged FDDI traffic on AGL ATM port A. No information is required to be entered for Port B. Only one bridged FDDI circuit per AGL ATM port is supported. The packet format on this circuit is VC based multiplexed bridged FDDI as per RFC 1483. An ATM-to-ATM circuit carries arbitrary packet types between circuits specified on Port A and Port B of the GIGAswitch. Multiple ATM-to-ATM circuits are supported per AGL ATM port.

aglVCConnectionAALType { aglVCConnectionTableEntry 9 }

The value of this object identifies the AAL type that should be used on a particular circuit.

aglVCConnectionOperStatus { aglVCConnectionTableEntry 10 }

This object indicates the operational status of the VCC, i.e., whether the managed VCC segment is up or down. In the down state, no cells can get across this VCC segment.

aglVCConnectionAdminStatus { aglVCConnectionTableEntry 11 }

This object indicates the desired status of the VCC, i.e., whether the managed VCC segment is enabled or disabled. In the disabled state, no cells can be passed across this VCC segment.

aglVCConnectionTrafficShaperPeakRate { aglVCConnectionTableEntry 12}

The value of this object specifies the peak rate in cells/s that should be used on a particular circuit. The peak rate will be set to a multiple of the aglInterfaceTrafficRateGranularity close to the user specified input.

aglVCConnectionTrafficShaperAvgRate { aglVCConnectionTableEntry 13}

The value of this object specifies the average (sustained) rate in cells/s that should be used on a particular circuit. The average rate must be less than or equal to the peak rate and it will be set to a multiple of the aglInterfaceTrafficRateGranularity close to the user specified input.

aglVCConnectionTrafficShaperMinGuaranteedRate { **aglVCConnectionTableEntry 14 }**

The value of this object specifies the minimum guaranteed rate in cells/s that should be used on a particular circuit. For VBR traffic AGL allows the possibility of overbooking link bandwidth (up to 1200%) to achieve statistical multiplexing. This parameter specifies the minimum peak bandwidth that you want to guarantee to the circuit. The minimum guaranteed rate must be less than or equal to the peak rate and it will be set to a multiple of the aglInterfaceTrafficRateGranularity close to the user specified input.

aglVCConnectionTrafficShaperPriority { **aglVCConnectionTableEntry 15}**

The value of this object specifies the priority which should be given to this circuit in assigning opportunistic bandwidth that arises from AGL's bandwidth overbooking policy.

aglInterfaceATMTable { **aglAtm 2 }**

This table contains AGL ATM interface specific settable parameters.

aglInterfaceATMTableEntry { **aglInterfaceATMTable 1}**

The list of settable parameters. Index = aglInterfaceATMIndex. Sequence = aglInterfaceATMIndexINTEGER, aglInterfaceATMScrambeStatusINTEGER, aglInterfaceATMOAMStatusINTEGER }.

aglInterfaceATMIndex { **aglInterfaceATMTableEntry 1 }**

The value of this object identifies the AGL port interface for which this entry contains management information and is the same as aglInterfaceIndex.

aglInterfaceATMScrambeStatus { **aglInterfaceATMTableEntry 2 }**

This object indicates the desired status of the cell scramble module. In the enabled state, outgoing cells are scrambled.

aglInterfaceATMOAMStatus { **aglInterfaceATMTableEntry 3 }**

This object indicates the desired status of the OAM module. In the enabled state, normal OAM cells are exchanged between the peers.

aglatmInterfaceNoTrafficEnforcement { **aglatmInterfaceTrafficEnforcementTypes 1 }**

This identifies the no ATM traffic enforcement type.

aglatmInterfaceTrafficEnforcementType1 **{ aglatmInterfaceTrafficEnforcementTypes 2 }**

This identifies the ATM traffic enforcement type is 1. For type 1 traffic enforcement, parameter 1 specifies CLP=0+1 peak traffic. Parameters 2, 3, 4 and 5 are not used. The peak rate is measured in cells per second.

aglatmInterfaceTrafficEnforcementType2 **{ aglatmInterfaceTrafficEnforcementTypes 3 }**

This identifies the ATM traffic enforcement type is 2. For type 2 traffic enforcement, parameter 1 specifies CLP=0 peak traffic and parameter 2 specifies CLP=0+1 peak traffic. Parameters 3, 4, and 5 are not used. The peak rate is measured in cells per second.

aglatmInterfaceTrafficEnforcementType3 **{ aglatmInterfaceTrafficEnforcementTypes 4 }**

This identifies the ATM traffic enforcement type is 3. For type 3 traffic enforcement, parameter 1 specifies CLP=0+1 peak traffic, parameter 2 specifies CLP=0 sustained rate, and parameter 3 specifies CLP=0 maximum burst size. Parameters 4 and 5 are not used. The peak rate is measured in cells per second. The sustained rate is measured in cells per second and burst size is measured in cells.

aglatmInterfaceTrafficEnforcementType4 **{ aglatmInterfaceTrafficEnforcementTypes 5 }**

This identifies the ATM traffic enforcement type is 4. For type 4 traffic enforcement, parameter 1 specifies CLP=0 peak traffic, parameter 2 specifies CLP=0+1 peak traffic, and parameter 3 specifies tagging (e.g., a value 1 may be used to indicate tagging). Parameters 4 and 5 are not used. The peak rate is measured in cells per second.

aglatmInterfaceTrafficEnforcementType5 **{ aglatmInterfaceTrafficEnforcementTypes 6 }**

This identifies the ATM traffic enforcement type is 5. For type 5 traffic enforcement, parameter 1 specifies CLP=0+1 peak traffic, parameter 2 specifies CLP=0 sustained rate, parameter 3 specifies CLP=0 maximum burst size, and parameter 4 specifies tagging (e.g., a value 1 may be used to indicate tagging). Parameter 5 is not used.

aglatmInterfaceTrafficEnforcementType6 **{ aglatmInterfaceTrafficEnforcementTypes 7 }**

This identifies the ATM traffic enforcement type is 6. For type 6 traffic enforcement, parameter 1 specifies CLP=0+1 peak traffic, parameter 2 specifies CLP=0+1 sustained rate, and parameter 3 specifies CLP=0+1 maximum burst size. Parameters 4 and 5 are not used.

aglatmInterfaceTrafficEnforcementType7 **{ aglatmInterfaceTrafficEnforcementTypes 8 }**

This identifies the ATM traffic enforcement type is 7. For type 7 traffic enforcement, parameter 1 specifies CLP=0+1 peak traffic and parameter 2 specifies best effort traffic (e.g., a value 1 may be used to indicate best effort traffic). Parameters 3, 4 and 5 are not used.

aglatmInterfaceConfTable **{ aglatmMIBObjects 2 }**

This table contains ATM local interface configuration parameters and state variables, one entry per ATM interface port.

aglatmInterfaceConfEntry **{ aglatmInterfaceConfTable 1 }**

This list contains ATM interface configuration parameters and state variables. Index = aglatmInterfaceIndex. Sequence = { aglatmInterfaceIndex INTEGER, aglatmInterfaceMaxVpcsINTEGER, aglatmInterfaceMaxVccs INTEGER, aglatmInterfaceConfVpcs INTEGER, aglatmInterfaceConfVccs INTEGER, aglatmInterfaceMaxActiveVpiBits INTEGER, aglatmInterfaceMaxActiveVciBits INTEGER, aglatmInterfaceIlmiVpiVci Interger32, aglatmInterfaceSpecific OBJECT IDENTIFIER })

aglatmInterfaceIndex **{ aglatmInterfaceConfEntry 1 }**

The value of this object identifies the ATM port interface for which this entry contains management information.

aglatmInterfaceMaxVpcs **{ aglatmInterfaceConfEntry 2 }**

The maximum number of VPCs supported at this ATM interface.

aglatmInterfaceMaxVccs **{ aglatmInterfaceConfEntry 3 }**

The maximum number of VCCs supported at the ATM interface.

aglatmInterfaceConfVpcs **{ aglatmInterfaceConfEntry 4 }**

The number of VPCs configured for use at this ATM interface.

aglatmInterfaceConfVccs **{ aglatmInterfaceConfEntry 5 }**

The number of VCCs configured for use at the ATM interface.

aglatmInterfaceMaxActiveVpiBits **{ aglatmInterfaceConfEntry 6 }**

The maximum number of active VPI bits configured for use at the ATM interface.

aglatmInterfaceMaxActiveVciBits **{ aglatmInterfaceConfEntry 7 }**

The maximum number of active VCI bits configured for use at this ATM interface.

aglatmInterfaceIlmiVpiVci { aglatmInterfaceConfEntry 8 }

The decimal value of the three octet VPI/VCI field that identifies the VCC supporting the ILMI at the ATM interface. If the value of this object is greater than 16777215 then the ILMI is not supported at the ATM interface. The default VPI/VCI values for ILMI are VPI=0 and VCI=16.

aglatmInterfaceSpecific { aglatmInterfaceConfEntry 9 }

This object points to the additional information specific to ATM interfaces. For example, if Enterprise specific objects have been defined in addition to this MIB module, then the value of this object refers to that MIB defining these objects. If the additional information is not present, then the value should be {0 0}.

aglatmInterfaceDs3PlcpTable { aglatmMIBObjects 3 }

This table contains ATM interface DS3 PLCP parameters and state variables, one entry per ATM interface port.

aglatmInterfaceDs3PlcpEntry { aglatmInterfaceDs3PlcpTable 1 }

This list contains DS3 PLCP parameters and state variables at the ATM interface. Index = aglatmInterfaceDs3PlcpIndex. Sequence = { aglatmInterfaceDs3PlcpIndex INTEGER, aglatmInterfaceDs3PlcpSEFSs Counter, aglatmInterfaceDs3PlcpAlarmState INTEGER, aglatmInterfaceDs3PlcpUASs Counter }.

aglatmInterfaceDs3PlcpIndex { aglatmInterfaceDs3PlcpEntry 1 }

The value of this object identifies the ATM interface port for which this entry contains management information and is the same as the atmInterfaceIndex.

aglatmInterfaceDs3PlcpSEFSs { aglatmInterfaceDs3PlcpEntry 2 }

A DS3 Severely Errored Framing Second (SEFS) is a count of one-second intervals containing one or more SEF event.

aglatmInterfaceDs3PlcpAlarmState { aglatmInterfaceDs3PlcpEntry 3 }

This variable indicates if there is an alarm present for the DS3 PLCP. The value receivedFarEndAlarm means that the DS3 PLCP has received an incoming Yellow Signal, the value incomingLOF means that the DS3 PLCP has declared a loss of frame (LOF) failure condition, and the value noAlarm means that there are no alarms present.

aglatmInterfaceDs3PlcpUASs **{ aglatmInterfaceDs3PlcpEntry 4 }**

The counter associated with the number of Unavailable Seconds encountered by the PLCP.

aglatmInterfaceSonetTCEntry **{ aglatmInterfaceSonetTCTable 1 }**

This list contains SONET TC Sublayer parameters and state variables at the ATM interface. Index = aglatmInterfaceSonetTCIndex. Sequence = { aglatmInterfaceSonetTCIndex INTEGER, aglatmInterfaceSonetTCOCDEvents Counter, aglatmInterfaceSonetTCAlarmState INTEGER }.

aglatmInterfaceSonetTCIndex **{ aglatmInterfaceSonetTCEntry 1 }**

The value of this object identifies the ATM interface port for which this entry contains management information and is the same as the atmInterfaceIndex.

aglatmInterfaceSonetTCOCDEvents **{ aglatmInterfaceSonetTCEntry 2 }**

The number of times the Out of Cell Delineation (OCD) events occur. If seven consecutive ATM cells have Header Error Control (HEC) violations, an OCD event occurs. A high number of OCD events may indicate a problem with the SONET TC Sublayer.

aglatmInterfaceSonetTCAlarmState **{ aglatmInterfaceSonetTCEntry 3 }**

This variable indicates if there is an alarm present for the SONET TC Sublayer. The value lcdFailure indicates that a Loss of Cell Delineation (LCD) failure state has been declared for the SONET TC Sublayer.

aglsonetMediumTable **{ aglsonetMedium 1 }**

The SONET/SDH Medium table.

aglsonetMediumEntry **{ aglsonetMediumTable 1 }**

An entry in the SONET/SDH Medium table. Index = aglsonetMediumIfIndex. Sequence = { aglsonetMediumIfIndex INTEGER, aglsonetMediumType INTEGER, aglsonetMediumTimeElapsed INTEGER (-2147483648..2147483647), aglsonetMediumValidIntervals INTEGER (-2147483648..2147483647), aglsonetMediumLineCoding INTEGER, aglsonetMediumLineType INTEGER, aglsonetMediumCircuitIdentifier DisplayString }.

aglsonetMediumIfIndex **{ aglsonetMediumEntry 1 }**

An index value that uniquely identifies a SONET/SDH Medium /Section/Line Interface.

aglsonetMediumType { aglsonetMediumEntry 2 }

This variable identifies whether a SONET or a SDH signal is used across this interface.

aglsonetMediumTimeElapsed { aglsonetMediumEntry 3 }

The number of seconds, including partial seconds, that have elapsed since the beginning of the current error-measurement period.

aglsonetMediumValidIntervals { aglsonetMediumEntry 4 }

The number of previous intervals for which valid data has been stored. A SONET device must support at least n intervals. The minimum value of n is 4. The default of n is 32. The maximum value of n is 96. The value of this object will be n unless the device was brought online within the last (nx15) minutes, in which case the value will be the number of complete 15 minute intervals the device has been online.

aglsonetMediumLineCoding { aglsonetMediumEntry 5 }

This variable describes the line coding for this interface. The B3ZS and CMI are used for electrical SONET/SDH signals (STS-1 and STS-3). The Non-Return to Zero (NRZ) and the Return to Zero are used for optical SONET/SDH signals.

aglsonetMediumLineType { aglsonetMediumEntry 6 }

This variable describes the line type for this interface. The line types are Short and Long Range Single Mode fiber or Multi-Mode fiber interfaces, and coax and UTP for electrical interfaces. The value sonetOther should be used when the Line Type is not one of the listed values.

aglsonetMediumCircuitIdentifier { aglsonetMediumEntry 7 }

This variable contains the transmission vendor's circuit identifier, for the purpose of facilitating troubleshooting.

aglsonetSectionCurrentTable { aglsonetSection 1 }

The SONET/SDH Section Current table.

aglsonetSectionCurrentEntry { aglsonetSectionCurrentTable 1 }

An entry in the SONET/SDH Section Current table. Index = aglsonetSectionCurrentIfIndex. Sequence = { aglsonetSectionCurrentIfIndex INTEGER, aglsonetSectionCurrentStatus INTEGER (-2147483648..2147483647), aglsonetSectionCurrentESs Gauge, aglsonetSectionCurrentSESs Gauge, aglsonetSectionCurrentSEFSs Gauge, aglsonetSectionCurrentCVs Gauge }.

aglsonetSectionCurrentIfIndex **{ aglsonetSectionCurrentEntry 1 }**

The index value which uniquely identifies the SONET/SDH Medium/Section/Line Interface.

aglsonetSectionCurrentStatus **{ aglsonetSectionCurrentEntry 2 }**

This variable indicates the status of the interface. The sonetSectionStatus is a bit map represented as a sum, therefore, it can represent multiple defects simultaneously. The sonetSectionNoDefect should be set if and only if no other flag is set. The various bit positions are: 1 sonetSectionNoDefect 2 sonetSectionLOS 4 sonetSectionLOF.

aglsonetSectionCurrentESs **{ aglsonetSectionCurrentEntry 3 }**

The counter associated with the number of Errored Seconds encountered by a SONET/SDH Section in the current 15 minute interval.

aglsonetSectionCurrentSESs **{ aglsonetSectionCurrentEntry 4 }**

The counter associated with the number of Severely Errored Seconds encountered by a SONET/SDH Section in the current 15-minute interval.

aglsonetSectionCurrentSEFSs **{ aglsonetSectionCurrentEntry 5 }**

The counter associated with the number of Severely Errored Framing Seconds encountered by a SONET/SDH Section in the current 15-minute interval.

aglsonetSectionCurrentCVs **{ aglsonetSectionCurrentEntry 6 }**

Violations encountered by a SONET/SDH Section in the current 15-minute interval.

aglsonetLineCurrentTable **{ aglsonetLine 1 }**

The SONET/SDH Line Current table.

aglsonetLineCurrentEntry **{ aglsonetLineCurrentTable 1 }**

An entry in the SONET/SDH Line Current table. Index = aglsonetLineCurrentIfIndex. Sequence = { aglsonetLineCurrentIfIndex INTEGER, aglsonetLineCurrentStatus INTEGER (-2147483648..2147483647), aglsonetLineCurrentESs Gauge, aglsonetLineCurrentSESs Gauge, aglsonetLineCurrentCVs Gauge, aglsonetLineCurrentUASs Gauge}.

aglsonetLineCurrentIfIndex **{ aglsonetLineCurrentEntry 1 }**

The index value which uniquely identifies the SONET/SDH Medium/Line Interface.

aglsonetLineCurrentStatus { aglsonetLineCurrentEntry 2 }

This variable indicates the status of the interface. The sonetLineStatus is a bit map represented as a sum, therefore, it can represent multiple defects simultaneously. The sonetLineNoDefect should be set if and only if no other flag is set. The various bit positions are: 1 sonetLineNoDefect 2 sonetLineAIS 4 sonetLineRDI.

aglsonetLineCurrentESs { aglsonetLineCurrentEntry 3 }

The counter associated with the number of Errored Seconds encountered by a SONET/SDH Line in the current 15 minute interval.

aglsonetLineCurrentSESs { aglsonetLineCurrentEntry 4 }

The counter associated with the number of Severely Errored Seconds encountered by a SONET/SDH Line in the current 15 minute interval.

aglsonetLineCurrentCVs { aglsonetLineCurrentEntry 5 }

The counter associated with the number of Coding Violations encountered by a SONET/SDH Line in the current 15 minute interval.

aglsonetLineCurrentUASs { aglsonetLineCurrentEntry 6 }

The counter associated with the number of Unavailable Seconds encountered by a SONET/SDH Line in the current 15 minute interval.

aglsonetPathCurrentTable { aglsonetPath 1 }

The SONET/SDH Path Current table.

An entry in the SONET/SDH Path Current table. Index = aglsonetPathCurrentIfIndex. Sequence = { aglsonetPathCurrentIfIndex INTEGER, aglsonetPathCurrentWidth INTEGER, aglsonetPathCurrentStatus INTEGER (-2147483648..2147483647), aglsonetPathCurrentESs Gauge, aglsonetPathCurrentSESs Gauge, aglsonetPathCurrentCVs Gauge, aglsonetPathCurrentUASs Gauge }.

aglsonetPathCurrentIfIndex { aglsonetPathCurrentEntry 1 }

An index value that uniquely identifies a SONET/SDH.

aglsonetPathCurrentWidth { aglsonetPathCurrentEntry 2 }

A value that indicates the type of the SONET/SDH Path. For SONET, the assigned types are the STS-Nc SPEs, where N = 1, 3, 12, 24, and 48. STS-1 is equal to 51.84 Mbps. For SDH, the assigned types are the STM-Nc VCs, where N = 1, 4, and 16.

aglsonetPathCurrentStatus { aglsonetPathCurrentEntry 3 }

This variable indicates the status of the interface. The sonetPathStatus is a bit map represented as a sum, therefore, it can represent multiple defects simultaneously. The sonetPathNoDefect should be set if and only if no other flag is set. The various bit positions are: 1 sonetPathNoDefect 2 sonetPathSTSLOP 4 sonetPathSTSAIS 8 sonetPathSTSRDI 16 sonetPathUnequipped 32 sonetPathSignalLabelMismatch.

aglsonetPathCurrentESs { aglsonetPathCurrentEntry 4 }

The counter associated with the number of Errored Seconds encountered by a SONET/SDH Path in the current 15 minute interval.

aglsonetPathCurrentSESs { aglsonetPathCurrentEntry 5 }

The counter associated with the number of Severely Errored Seconds encountered by a SONET/SDH Path in the current 15 minute interval.

aglsonetPathCurrentCVs { aglsonetPathCurrentEntry 6 }

The counter associated with the number of Coding Violations encountered by a SONET/SDH Path in the current 15 minute interval.

aglsonetPathCurrentUASs { aglsonetPathCurrentEntry 7 }

The counter associated with the number of Unavailable Seconds encountered by a Path in the current 15 minute, interval.