Overview of the LightStream 1010 ATM Switch

The LightStream 1010 ATM switch is an Asynchronous Transfer Mode (ATM) switch for workgroup and enterprise backbone deployment.

The LightStream 1010 uses a five-slot, modular chassis with dual, fault-tolerant, load-sharing AC or DC power supplies. (See Figure 1-1.)

Figure 1-1  LightStream 1010 Chassis
Summary of Features

The center slot in the LightStream 1010 is dedicated to an ATM switch processor (ASP) module that provides a 5-Gbps shared memory-based, nonblocking switch fabric. The remaining slots support up to four hot swappable carrier modules (CMs). Each CM supports up to two hot swappable port adapter modules (PAMs) for a maximum of eight PAMs per switch, supporting a wide variety of desktop, backbone, and wide-area interfaces.

The LightStream 1010 ATM switch should be installed in a standard 19-inch (48-centimeter) rack.

See the following documents for detailed ASP and PAM configuration information:

- LightStream 1010 ATM Switch ASP Installation Guide
- LightStream 1010 ATM Switch PAM Installation Guide

Summary of Features

The LightStream 1010 ATM switch supports the following features:

- ATM User Network Interface (UNI) for both network and user sides
- ATM Network-to-Network Interface (NNI) between switches
- The following ATM connection types:
  - Permanent virtual channel connections (PVCCs)
  - Permanent virtual path connections (PVPCs)
  - Soft permanent virtual channel connections (SPVCCs)
  - Soft permanent virtual path connections (SPVPCs)
  - Switched virtual channel connections (SVCCs)
  - Switched virtual path connections (SVPCs)
  - Virtual path (VP) tunneling
  - Point-to-point ATM connections
  - Point-to-multipoint ATM connections
Summary of Features

- ATM Operation, Administration, and Maintenance (OAM) fault management (F4 and F5 flow)
- Resource management to support the following categories of service:
  - Constant bit rate (CBR)
  - Variable bit rate (VBR)
  - Available bit rate (ABR)
  - Unspecified bit rate (UBR)
- Interim Local Management Interface (ILMI) as per UNI 3.0/3.1/4.0
- ATM UNI signaling protocol for both user and network as per UNI 3.0/3.1/4.0
- ATM NNI signaling protocols:
  - Interim-Interswitch Signaling Protocol (IISP) as defined by the ATM Forum
  - Private Network-Network Interface (PNNI), a prestandard release of the ATM Forum PNNI that supports a single peer group
- LAN Emulation Client and server (LEC/LES) support as defined by ATM Forum LAN Emulation (LANE) over ATM Version 1.0
- In-band device network management using IP over ATM Simple Network Management Protocol (SNMP agent V1/V2 and Telnet)
- Out-of-band device network management using Ethernet and console ports
- ATM and other applicable industry Management Information Bases (MIBs)
- Command-line interface (CLI) at the EIA/TIA-232 console and Telnet
- Upload/download software code image
- Port snooping
Switch Applications

The LightStream 1010 ATM switch provides Layer 2 switching, with both local and remote management.

Figure 1-2 shows an example of a network configuration using the LightStream 1010 ATM switch in a high-performance workgroup.

Figure 1-2  LightStream 1010 Workgroup Configuration Example
Figure 1-3 shows an example of a network configuration using the LightStream 1010 ATM switch for a campus backbone.

**Figure 1-3**  
**LightStream 1010 Backbone Configuration Example**
Figure 1-4 shows an example of a network configuration using the LightStream 1010 ATM switch in a multisite network.

**Figure 1-4 LightStream 1010 Multisite Configuration Example**

![Diagram of LightStream 1010 Multisite Network Configuration](image)

Figure 1-5 shows an example of a network configuration using the LightStream 1010 ATM switch in a LANE network.

**Figure 1-5 LightStream 1010 LANE Configuration Example**

![Diagram of LightStream 1010 LANE Network Configuration](image)
Support Functions

Figure 1-6 shows an example of a network configuration in which private switches form a private network interconnected over permanent VPs. These VPs provide logical trunks tunneling across a public network.

See the LightStream 1010 ATM Software Configuration Guide and the LightStream 1010 ATM Switch Command Reference publication for detailed description of ATM functions and network configuration.

Support Functions

This section describes functions that support and maintain the LightStream 1010 ATM switch. The hot-swapping feature for modules and the redundant hot swapping feature for power supplies allow you to install new equipment without interrupting system power or shutting down interfaces. The environmental monitoring and reporting functions continuously monitor temperature and voltage points in the system and provide reports and warning messages that allow you to locate and resolve problems and maintain uninterrupted operation. The redundant power option provides dual load-sharing power supplies. In the event of a power supply failure, or a failure of one of two separate AC power sources, the redundant power option assures uninterrupted operation.
Port Densities

You can install any combination of PAMs in any of the eight available PAM slots. There are no restrictions on either the number of modules that can be installed or their proximity to the ASP. See the LightStream 1010 ATM Switch PAM Installation Guide for detailed port density information.

Hot Swapping Feature

The hot-swapping feature lets you install and replace PAMs while the system is operating; you do not need to disable the software or shut down the system power. All PAMs support hot swapping.

Caution The ASP is a required system component. Removing an ASP while the system is operating causes the system to shut down and can damage the processor.

Environmental Monitoring Functions

You can maintain normal system operation by identifying and resolving adverse conditions before the system fails by using environmental monitoring and reporting functions. Environmental monitoring functions constantly monitor the internal chassis air temperature. Each power supply monitors its own voltage and shuts itself down if it detects a critical condition within the power supply. The reporting functions let you retrieve and display the present values of measured parameters, and they display alarms on the console if any of the monitored parameters exceed defined thresholds.

The environmental monitoring functions use three levels of status conditions to monitor the system: normal, alarm, and critical. The processor monitors the temperature inside the module compartment, and the power supplies use the normal and critical levels to monitor DC voltages.
Table 1-1 lists temperature thresholds for the processor-monitored levels.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Normal</th>
<th>Alarm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airflow</td>
<td>10–55°C</td>
<td>&gt; 55°C</td>
</tr>
</tbody>
</table>

Table 1-2 lists the DC power thresholds for the normal and critical power supply-monitored levels.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Critical</th>
<th>Normal</th>
<th>Critical</th>
</tr>
</thead>
<tbody>
<tr>
<td>+5V</td>
<td>&lt; 4.74V</td>
<td>4.74–5.26V</td>
<td>&gt; 5.26V</td>
</tr>
</tbody>
</table>

The levels of status condition include:

- Normal—all monitored parameters are within normal tolerances.
- Alarm—an out-of-tolerance temperature or voltage condition exists. The system might not continue operation. If a voltage measurement reaches this level, the power supply can shut down the system. Immediate action is required. The +12 VDC line remains active to allow the fan assembly to continue operation.

The power supply monitors its own internal temperature and voltages. The power supply is either within tolerance (normal) or out of tolerance (alarm level), as shown in Table 1-2. If an internal power supply temperature or voltage reaches a critical level, the power supply shuts down without any interaction with the processor.