Cisco MGX 8850 AXSM Broadband ATM Switching Module

The Cisco® MGX® 8850 AXSM Broadband ATM Switching Module in combination with the high-capacity PXM-45 processor (along with XM-60 switching module when used in MGX 8950 chassis) delivers connectivity from T3/E3 to OC-48c/STM-16. The Cisco MGX 8850 Multiservice Switch can accommodate a total of 12 AXSM modules to provide the high broadband densities required by service providers.

The AXSM 16 COS queues architecture combined with PXM-45 and RPM, offers the industry's most advanced and reliable ATM networking features such as Private Network to Network Interface (PNNI), switched virtual circuit/path (SVC/SVP), soft permanent virtual circuit/path (SPVC/SPVP), and MPLS.

The AXSM module meets service providers' demands for carrier-class availability by offering hot standby 1:1 card redundancy with Y-cable as well as redundancy with SONET/SDH automatic protection switching (APS). The AXSM module with its large connection count achieves tremendous scalability for aggregation applications. The AXSM module in the MGX 8850 switch delivers unprecedented levels of scalability, performance, and functionality required for service provider ATM networks to scale up to OC-48c/STM-16 today.

Key Features

- AXSM can be used in the MGX 8850 to provide ATM capability up to OC-48c/STM-16.
- High scalability in interface speeds with T3/E3 ports, OC-3c/STM-1, OC-12c/STM-4, and OC-48c/ STM-16 AXSM modules. Each port on the AXSM can be configured for either trunk or access applications.
- Industry leading module port densities of 16 T3/E3 ports, 16 OC-3c/STM-1 ports, 4 OC-12c/STM-4 ports, and 1 OC-48c/ STM-16 port that can scale up to 12 OC-48c/STM-16 modules in each MGX 8850 Multiservice Switch. Each OC-48c/STM-16 delivers fully nonblocking, full duplex throughput, in which a connection can occupy the entire line rate.
- Support for all ATM service classes, with up to 16 classes of service (CoS). Supports carrier-class implementation of standards-based PNNI, SVC/SVP, SPVC/SPVP, and MPLS services.
- Large cell buffers (one million cells), which help to maximize "goodput" performance during congestion, reducing the number of retransmits; the buffers are allocated dynamically, depending on connection resource needs, thereby optimizing use of system resources.
- High reliability with hot-standby 1:1 AXSM card redundancy, 1:1 and 1+1 line redundancy using APS.

Figure 1. Cisco MGX 8850 AXSM Broadband ATM Switching Module

Technical Specifications

Physical-Layer Interface

T3/E3

- Ports and trunks supported on same AXSM module
- User-Network Interface (UNI) Specifications 3.0, 3.1, 4.0

Table 1. AXSM T3/E3 Module

Type of Back Card	T3	E3
Port Speed	44.736 Mbps	34.368 Mbps
Cell Transfer Rate	96,000 cells/sec	80,000 cells/sec
Number of Ports/AXSM Module	16	16
Line Coding	B3ZS	HDB3
Line Framing	ANSI T1.107, T1.107a	ITU-T G.804, G.832
Port Media	75-ohm coaxial	75-ohm coaxial
Port Connector	SMB	SMB
Cell Mapping	PLCP Direct	PLCP Direct
Redundancy	1:1, Y-cable	1:1, Y-cable

OC-3c/STM-1

- Ports and trunks supported on same AXSM module
- UNI Specifications 3.0, 3.1, 4.0
- Compliant with SONET standards
- Bellcore GR-253-CORE
- ANSI T1.105
- Compliant with SDH standards
- ITU-T G.707, G.708, G.709
- ITU-T G.957, G.958

Table 2. AXSM OC-3c/STM-1 Module

Type of Back Card	STM-1 Electrical	MMF	SMF-IR	SMF-LR
Port Speed	155 Mbps	155 Mbps	155 Mbps	155 Mbps
Cell Transfer Rate	353,208 cells/sec	353,208 cells/sec	353,208 cells/sec	353,208 cells/sec
Number of Ports/AXSM Module	8	16	16	16
Port Media	75-ohm coaxial	MMF	SMF	SMF
Port Connector	SMB	MT-RJ	LC	LC
Optics		Laser 1310nm	Laser 1310nm	Laser 1310nm
Tx Power Level (dBm)		–15 min –8 max	–15 min –8 max	5 min 0 max
Rx Power Level (dBm)		–23 min –8 max	–28 min –8 max	–34 min –10 max
Typical Reach/km		2	15	40
Redundancy	1:1, Y-cable, 1+1 1:1 APS	1:1, Y-cable, 1+1 1:1 APS	1:1, Y-cable,1+1 1:1 APS	1:1, Y-cable,1+1 1:1 APS

OC-12c/STM-4

- Ports and trunks supported on same AXSM module
- UNI Specifications 3.0, 3.1, 4.0
- Compliant with SONET standards
  - Bellcore GR-253-CORE, TR-TSY-000020
  - ANSI T1.105
- Compliant with SDH standards
  - ITU-T G.707, G.708, G.709
  - ITU-T G.957, G.958

Table 3. AXSM OC-12c/STM-4 Module

Type of Back Card	SMF-IR	SMF-LR
Port Speed	622 Mbps	622 Mbps
Cell Transfer Rate	1,412,832 cells/sec	1,412,832 cells/sec
Number of Ports/AXSM Module	4	4
Port Media	SMF	SMF
Port Connector	SC	SC
Optics Laser	Laser 1310 nm	Laser 1310 nm
Tx Power Level (dBm)	–15 min –8 max	–3 min +2 max
Rx Power Level (dBm)	–28 min –8 max	–28 min –8 max
Typical Reach/km	15	40
Redundancy	1:1, Y-cable, 1+1 and 1:1APS	1:1, Y-cable, 1+1 1:1 APS

OC-48c/STM-16

- Ports and trunks supported on same AXSM module
- UNI Specifications 3.0, 3.1, 4.0
- Compliant with SONET standards
  - Bellcore GR-253-CORE
  - ANSI T1.105
- Compliant with SDH standards
  - ITU-T G.707, G.708, G.709
  - ITU-T G.957, G.958

Table 4. AXSM OC-48c/STM-16 Module

Type of Back Card	SMF-SR	SMF-LR	SMF-XLR
Port Speed	2.4 Gbps	2.4 Gbps	2.4 Gbps
Cell Transfer Rate	5,651,328 cells/sec	5,651,328 cells/sec	5,651,328 cells/sec
Number of Ports/AXSM Module	1	1	1
Port Media	SMF	SMF	SMF
Port Connector	SC	SC	SC
Optics	Laser 1310 nm	Laser 1310 nm	Laser 1550 nm
Tx Power Level (dBm)	–10 min –3 max	–2 min +3 max	–2 min +3 max
Rx Power Level (dBm)	–18 min –3	–27 min –9	–27 min –9
Typical Reach/km	2	40	80
Redundancy	1:1, Y-cable, 1+1 1:1 APS	1:1, Y-cable, 1+1 1:1 APS	1:1, Y-cable, 1+1 1:1 APS

Network Synchronization

- Can be configured for internal timing from the internal PXM Stratum 3 clock
- System clock synchronization to any service module port
- T1/E1 BITS synchronization port

ATM Layer

- Configurable for trunk, NNI or UNI application
- Conformant to ATM Forum UNI 3.0, 3.1 specification, ITU-T I.361 and I.432 specifications
- Supports up to 16 CoSs and includes all ATM Forum traffic type services: ABR, UBR, VBR-nrt, VBR-rt, CBR; ABR supported for EFCI, RM marking and explicit ER stamping;
- Support for IP quality of service based on Diffserv
- Support for ILMI 4.0
- Complies with standard usage parameter control (UPC) per ATM Forum UNI 3.x, TM 4.0, and ITU-T I.371
- Support for early packet discard (EPD) and partial packet discard (PPD)
- Support for virtual circuit connections (VCCs) and virtual path connections (VPCs)
- Support for up to 128,000 connections per AXSM module controlled by PNNI

- Virtual path identifier (VPI) and virtual circuit identifier (VCI) range for VCCs and VPCs per UNI 3.1
- Support for virtual circuit (VC) merge and multipoint connections

Virtual Trunks

- Supports maximum of 64 virtual interfaces per module; the interfaces can be ports, trunks, or virtual trunks; each virtual interface supports 16 CoS queues

Cell Buffering

- Supports one million cells of buffering to accommodate large traffic bursts, avoid network congestion, and cell discard; suitable for TCP/IP traffic

Support for Dynamic Routing Using PNNI 1.0

- Offers automatic end-to-end connection management mechanism
- Deterministically allocates bandwidth and reroutes connections autonomously over optimum network paths
- Preserves service integrity during network failure
- Offers E.164/NSAP addressing
- Offers support for SVC/SVP, SPVC/SPVP, MPLS link-state packets (LSPs)
- Offers QoS-based routing

Enhanced Call Admission Control

- A user-programmable enhanced connection-admission control (E-CAC) feature decides whether to admit or deny connections based upon the requested quality of service

Statistics

- Statistics supported using user-configurable bucket intervals
- Billing statistics supported on T3/E3, OC-3c/STM-1, and OC-12c/STM-4 interfaces
- Diagnostic statistics available per interface, CoS queues, and connections

OAM

- F4 to F5 fault propagation
- Inband diagnostics support using loopback cells
- Inband continuity check and automatic fault reporting for PVCs
- Loopback facility supported for diagnostics and self-test purposes

Network Management

- Management using Cisco WAN Manager software suite
- Based on Simple Network Management Protocol (SNMP)

Reliability

- Greater than 75,000 hours MTBF

Physical Specifications

- Dimensions: (H x D) 15.83 x 15.65 in.

Electrical Specifications

- Input power required: –48 VDC
- Power consumption: 95W

Electrical and Safety Standards Compliance

- EMI/ESD compliance
  - FCC Part 15
  - Bellcore GR1089-CORE
  - IEC 801-2
  - EN55022
- Safety compliance
  - EN 60950
  - UL 1950
- Bellcore NEBS: Level 3 compliant
- Optical safety: IEC 825-1 (Class 1)

For More Information

For more information about Cisco service and support programs and benefits, go to: http://www.cisco.com.

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Printed in USA C78-406925-00 05/07

