

## CISCO MGX PXM-1E PROCESSOR SWITCH MODULE

The Cisco® MGX® PXM-1E Processor Switch Module for the Cisco MGX 8850 and Cisco MGX 8830 Advanced ATM Multiservice Switch is a combination ATM switching fabric and ATM interface and processor card (Figure 1). The PXM-1E provides flexible support of ATM interfaces and allows fast and efficient expansion of ATM modular optics from one OC-3c/STM1 to eight OC-3c/STM1 ports.

The Cisco MGX PXM-1E combines a 1.2-Gbps shared-memory switching fabric with integrated trunking at speeds up to 622 Mbps. The switching fabric provides 1.2 Gbps of nonblocking switching capacity, while the processor provides the control plane that delivers advanced multiservice networking software, diagnostics, and performance monitoring.

**Figure 1.** Cisco MGX PXM-1E Processor Switch Module



### KEY FEATURES

- 1.2 Gbps nonblocking switching
- Support for T1/E1, T3/E3 to OC-3c/STM1 interfaces
- High-density combination interface speed cards with modular optics allow bandwidth on demand, and is expandable from one OC-3c/STM1 to eight OC-3c/STM1 ports
- Hierarchical Private Network-to-Network Interface (PNNI) routing with Multiple Peer Group (MPG)
- PNNI/switched virtual circuit (PNNI/SVC) routing and signaling
- Support for both new and existing service-resource modules (SRMs)

### KEY APPLICATIONS

- Frame Relay
- Frame Relay-to-ATM network interworking
- Frame Relay-to-ATM service interworking
- IP-enabled Frame Relay
- ATM
- IP virtual private networks (IP VPNs)
- VoIP, VoATM
- DSL aggregation
- Circuit emulation

## TECHNICAL SPECIFICATIONS

### ATM Switch Fabric Card

- Offers 1.2 Gbps nonblocking switching
- Supports hot insertion and removal
- Supports 1:1 hot-standby redundancy
- Provides full environmental monitoring of cabinet temperature, cooling fan speeds, and supply voltages
- Provides four LED indicators:
  - Card status
  - Major/minor network alarms
  - LAN control port activity detect
  - DC power status
- Flexible trunking capability on the processor through various back-card combinations provides the following interfaces:
  - 4 x OC-3c/STM-1
  - 8 x OC-3c/STM-1
  - 8 x T3/E3
  - 16 x T1/E1—includes support for IMA version 1.0 and 1.1
  - Combo card—8 x T3/E3 + 4 x OC-3c/STM1
- Modular optics allow “pluggable” capacity as needed; hot swappable with enhanced serviceability
- Upper back card supports the following functions:
  - User and management interfaces
- EIA/TIA-232 control port
- EIA/TIA-232 maintenance port
- 10BASE-T Ethernet port
  - Network synchronization for the shelf
- T1/E1 BITS synchronization port
- Stratum-3 clocking
- Conformance to AT&T Pub. 62411
  - Central-office-compatible major and minor alarm interface
- DB-15 connector
- Major alarm audio
- Major alarm visual
- Minor alarm visual

## PHYSICAL LAYER T1/E1 INTERFACE

Table 1 describes the physical characteristics of the Cisco MGX PXM-1E T1/E1 interface.

**Table 1.** Physical Layer T1/E1 Interface Type of Back Card

	T1	E1
Port Speed	1.544 Mbps	2.048 Mbps
Cell Transfer Rate	3622 cells/sec	4528 cells/sec (G.704)
Number of Ports	16	16
Line Coding	B8ZS	HDB3
Line Framing	ANSI T1.408 extended Super Frame format line framing	ITU-T G.704 16 frame multiframe line framing
Port Media	100 ohm twisted pair	120 ohm twisted pair for RBBN and 75 ohm coaxial for MCC
Port Connector	RBBN	RBBN and MCC
Cell Mapping	Direct	Direct
Redundancy	1:1, Y-cable	1:1, Y-cable

## PHYSICAL LAYER T3/E3 INTERFACE

Table 2 describes the physical characteristics of the Cisco MGX PXM-1E T3/E3 interface (8 T3/E3 port or 8 T3/E3 ports plus 4 port OC-3c/STM1 Combo modules).

**Table 2.** T3/E3 Interface Physical Characteristics

Characteristic	T3 (DS3)***	E3***
Line Rate	44.736 Mbps $\pm$ 20 ppm	34.368 Mbps $\pm$ 20 ppm
Line Code	B3ZS	HDB3
Cell Transfer Rate	96,000 cells per second in PLCP mode 104,268 cells per second in ADM mode	80,000 cells per second
Framing	C-bit Parity	ITU** T G.832
Signal Level	ANSI T1.102, Telecordia GR-499 Core	ITU-T G.703
Connector	Male SMB* and MCC**	Male SMB* and MCC**
Cell Mapping	Physical Layer Convergence Protocol (PLCP) and Direct	Direct***

\* Male SMB for 8 port T3/E3 modules

\*\* MCC is used in the 8 port T3/E3 ports on the MGX-T3E3-155 Combo Modules

\*\*\*T3 or E3 is software configurable in the 8 port T3/E3 ports on the MGX-T3E3-155 Combo Modules

## PHYSICAL LAYER OC-3C/STM-1 INTERFACE

- Four OC-3c/STM-1 (155.520-Mbps) ports
- Trunk or port interface mode
- Cell transfer rate of 353,208 cells per second
- Compliant with Synchronous Optical Network (SONET) standards
  - Telecordia GR-253-CORE
  - ANSI T1.105
- Compliant with SDH standards
- ITU-T G.707, G. 708, and G.709
- ITU-T G. 957, G.958
- ITU-G.783 Annex-A

Table 3 describes the OC-3c/STM-1 interface.

**Table 3.** OC-3c/STM-1 Interface Physical Characteristics

Type of back card	Source 1310 nm	Tx Power (dBm)		Rx Range (dBm)		Physical	Range (km)
		Min	Max	Min	Max		
<b>Multimode Fiber (MMF)</b>	LED	–22	–15	–31	–10	SC* and LC**	2 km
<b>Single-Mode Fiber (SMF) Intermediate Reach (IR)</b>	Laser (Class 1)	–15	–8	–28	–8	SC* and LC**	15 km
<b>SMF Long Reach (LR)</b>	Laser (Class 1)	–5	0	–34	–10	SC* and LC**	40 km
<b>STM* Electrical</b>	N/A	N/A		N/A		MCC***	100m for IG59 cables

\* SC is used in the 4 port OC-3c/STM1 modules

\*\* LC is used in the 8 port T3/E3 plus 4 port OC3-c/STM1 Combo modules and 8 port OC-3c/STM1 modules

\*\*\* MCC for 8 port STM1 Electric modules

## ATM LAYER

- Configurable for trunk and public or private User-Network Interface (UNI) application
- UNI compliant to ATM Forum UNI Specifications V.3.0 and V.3.1 and V4.0, and ITU-T I.361 and I.432 specifications
- Complies with standard usage parameter control (UPC) and connection admission control (CAC) per ATM Forum UNI Specification V.3.1 and Traffic Management V.4.0 and ITU-T I.371
- Supports virtual circuit connections (VCCs) and virtual path connections (VPCs) per ATM Forum UNI Specification V.4.0 and ITU-T I.371
- 27,000 connections per chassis
- Virtual path identifier/virtual channel identifier (VPI/VCI) range for VCCs and VPCs: per UNI Specification 4.0
- Early Packet Discard (EPD) and Partial Packet Discard (PPD)

## **VIRTUAL TRUNKS**

- Up to 31 virtual interfaces and each supports 16 CoS queues
- Interfaces can be ports, trunks, VNNI, VUNI, EVNNI, and EVUNI

## **TRAFFIC MANAGEMENT**

- Constant Bit Rate (CBR), variable bit rate real time (VBR-rt), variable bit rate non-real time (VBR-nrt), unspecified bit rate (UBR), available bit rate ABR-STD
- Up to 16 classes of service (CoS)

## **CELL BUFFERING**

- Large ingress and egress cell buffer architecture
- 128,000 cells stored per card:
  - Accommodates large traffic bursts
  - Avoids network congestion and cell discard
  - Suited to Transmission Control Protocol/Internet Protocol (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 and SPVC/SPVP
- 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.

## **NETWORK MANAGEMENT**

- Management using Cisco WAN Manager
- Simple Network Management Protocol (SNMP)-based for configuration and statistics collection
- Graphical user interface (GUI)

## **PHYSICAL SPECIFICATIONS**

- Dimensions: (H x D): 15.83 x 15.65 in. (40.2 x 39.8 cm)

## **ELECTRICAL SPECIFICATIONS**

- Input power required: -48 VDC
- Power consumption: 100W

## ELECTRICAL, SAFETY, AND STANDARDS COMPLIANCE

- EMI/ESD compliance
  - FCC Part 15
  - Bellcore GR1089-CORE
  - IEC 61000-4-2
  - EN55022
- Safety compliance
  - EN 60950
  - UL 60950
- Bellcore NEBS: Level 3 compliant
- Optical safety: IEC 60825-1 (Class 1)



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