System Specifications

This appendix contains information for the hardware that makes up a Cisco MGX 8950 system. The descriptions apply to the enclosure, power systems, cooling system, and cards. The following types of information are provided:

- Operational ranges, such as bits per second, voltage ranges, and temperature ranges.
- Physical layer characteristics, such as line coding and line framing.
- Standards compliance, supported protocols, and tolerances, such as parts per million (ppm) for clocks and jitter.
- Per card capacities, such as types and sizes of memory, number of ports, and maximum number of connections.

Enclosure and System Power Specifications

This section describes the physical characteristics and system power requirements for the MGX 8950. Enclosure and electrical characteristics are shown in Table A-1. For a list of the dimensions, weight, and power consumption for each card, see the "Physical and Electrical Characteristics for Cards" section later in this appendix. For a list of the AC power plugs for domestic and international use, see Appendix B, "Cabling Summary."

Table A-1 Enclosure and Electrical Characteristics

Items	Values
Card Slot Capacity	Four single-height slots reserved for XM-60s. Two double-height slots reserved for PXM45/Bs. Up to 28 single-height slots or up to 14 double-height slots.
Enclosure Size, AC-powered system	Height: 40.25 inches (102.3 cm). Width: 19 inches (45.08 cm) for all enclosure modules. Depth: 21.5 inches (54.6 cm) (excluding cable management and front door). Racks must have 17.75 inches minimum between mounting rails.
DC-powered system	Height: 29.75 inches (71.1 cm). Width: 19 inches (45.08 cm) for all enclosure modules. Depth: 21.5 inches (54.6 cm) (excluding cable management and front door). Racks must have 17.75 inches minimum between mounting rails.
Shipping Weight for Populated Enclosure	DC: 200 lb (90 kg) with 2 DC PEMs AC: 300 lb (136 kg)
Shipping Weight for Individual Components	Front and back cards: 6.0 lb (2.73 kg) per card set Card cage with boards: 160 lb (72.73 kg) Exhaust plenum: 8 lb Fan tray: 9.5 lb Inlet plenum: 8 lb AC power tray with power supplies: 45 lb APS Connector: 1 lb
Clearance Requirement for the Enclosure	Minimum 30 inches front and rear; 12-inch side clearance recommended.
Power Input Voltage	AC system: Normal operating range is 200–240 VAC, 47 to 63 Hz. The maximum voltage range is 180–254 VAC. DC system: –42 to –56 VDC.
Current Requirements, AC System	Configuration-dependent: use Network Design Tool for exact requirements. For general planning purposes: 14.4A at a nominal voltage of 200 VAC. At the minimum voltage limit of 180 VAC, the current draw is a maximum of 21A.
Current Requirements, DC System	Configuration-dependent: use Network Design Tool for exact requirements. For general planning purposes: 76A (37.5A per feed) at nominal -48 VDC; 86A (43A per feed) at -42 VDC minimum.
Input AC Power Connector	NEMA L6-30 input connector. For a list of the AC power plugs for domestic and international use, see Appendix B, “Cabling Summary.”
DC Input Connections	Three-position terminal block for 6 AWG wire (10 square millimeters) and #10 screw lugs designed for 6 AWG wire. Note that the customer’s wire must be terminated with a terminal lug that accepts #10-32 screws.
Fan Tray Power Consumption	Nine fans per tray, each dissipates 8W (0.16A) of –48V power, totalling 72W per tray.

Table A-1 Enclosure and Electrical Characteristics (continued)

Items	Values
Operating Environment	0–40 degrees Celsius (32–104 degrees Fahrenheit) normal operation (50 degrees Celsius or 122 degrees Fahrenheit up to 72 hours; 20 to 30 degrees Celsius recommended.). Maximum 85% relative humidity.
Shock	Withstands 10 G, 10 ms at 1/2 sine wave.
Vibration	Withstands 1/4 G, 20–500 Hz.
Heat Transfer to Environment	AC-powered: maximum 14,300 Btu/hr. DC-powered: maximum 12,300 Btu/hr.

Physical and Electrical Characteristics for Cards

For quick reference, Table A-2 shows physical dimensions and power consumption for each card. Detailed information for each card appears later in this appendix.

Table A-2 Physical Characteristics and Power Consumption by Card

Module	Back Cards	Front Card Dimensions (inches)	Back Card Dimensions (inches)	Weight (front and back card)	Power Consumption
MGX-AXSM-1-2488/B	MGX-SMFSR-1-2488/B MGX-SMFLR-1- 2488/B MGX-SMFXLR-1-2488/B	7.25 x 16.25	7.00 x 4.50	1.74 lb/ 0.76 lb	105 W
MGX-AXSM-16-155/B	MGX-MMF-8-155-MT/B MGX-SMFIR-8-155-LC/B MGX-SMFLR-8-155-LC/B	7.25 x 16.25	7.00 x 4.50	1.74 lb/ 0.76 lb	137 W
MGX-AXSM-8-155/B	MGX-SMB-4-155	7.25 x 16.25	7.00 x 4.50	1.74 lb/ 0.76 lb	116 W
MGX-AXSM-4-622/B	MGX-SMFIR-2-622/B MGX-SMFLR-2-622/B	7.25 x 16.25	7.00 x 4.50	1.74 lb/ 0.76 lb	119 W
MGX-AXSM-16-T3E3/B	MGX-SMB-8-T3 MGX-SMB-8-E3	7.25 x 16.25	7.00 x 4.50	1.74 lb/ 0.6 lb	115 W
PXM-45/B	PXM-UI-S3 PXM-HD	15.65 x 15.83	7.00 x 4.50	4.80 lb	113 W
XM-60	—	15.65 x 15.83	—	1.74 lb	55 W
RPM -PR-256	RPM-BC	15.65 x 15.83	7.00 x 4.50	6.75 lb	55 W
RPM-PR-512	RPM-BC	15.65 x 15.83	7.00 x 4.50	6.75 lb	55 W

Processor Switching Module Specifications

This section contains general specifications for the Processor Switching Module (PXM45/B). The information in Table A-3 includes information for the two types of back cards—the PXM-UI-S3 user interface and the Hard Drive back card.

Table A-3 PXM45/B Specifications

Category	Description
Maximum switch fabric throughput	45 Gbps. The switching functions of the PXM45/B are not used on the MGX 8950.
Control access These ports exist on the PXM-UI-S3 back card	Control port: RJ45 connector, EIA/TIA 232, DTE mode, asynchronous interface 19,200 baud, 1 start, 1 stop, no parity. Maintenance port: RJ45 connector, EIA/TIA 232, DTE mode, asynchronous interface 19.2K baud, 1 start bit, 1 stop bit, no parity bits.- LAN port: RJ45 connector, 10BASE-T, 802.3 Ethernet
Controller access port This port exists on the PXM-HD back card	Connector: OC-3 SC
LEDs on PXM45/B front card LEDs display status	Status for the card: • Green means active • Red means failed • Yellow indicates the standby card LAN activity: flashing green indicates activity Node alarm: • Blue indicates a critical alarm • Red indicates major alarm • Yellow indicates minor alarm Node power (note that each AC power supply also has a LED): • “DC OK A” is green for okay or red for trouble • “DC OK B” is green for okay or red for trouble Alarm history: ACO (Alarm Cut Off) Port interface (per port): • Green means active and okay • Red means active and local alarm • Yellow means active and remote alarm • No light means inactive or not provided
LEDs on back cards	Green means active No light means inactive

Table A-3 PXM45/B Specifications (continued)

Category	Description
Synchronization These clock sources satisfy Stratum 3 requirements	8 kHz clock derived from the following sources: • Internal 8 kHz clock (+/- 4.6 ppm) • Recovered clock from service modules or trunk line interfaces • External BITS clock port
BITS clock interface	Clk1 with an RJ45 connector Clk2 with an RJ45 connector
Processor clock speed and memory specifics	Clock speed: 350 MHz internal, 100 MHz external Flash memory: 2 MB DRAM: 256 MB Tertiary cache: 2 MB Secondary cache: 256 KB BRAM: 512 KB Hard disk: 20 GB
Alarm indicators (audible and visual)	Central office-compatible alarm indicators and controls through a DB15 connector
Maintenance features	1:1 redundancy Memory protection feature Temperature monitoring Supply voltage monitoring Hot-pluggable
Card dimensions	Front card: 15.65 in. by 16.50 in. (39.75 cm by 42.75 cm) Back cards: 7 in. by 4.125 in. (18.42 cm by 10.48 cm)
Power	Requires –48 VDC, dissipates 100W, typical

The PXM45/B card LEDs light in the following sequence immediately after the card is inserted into the switch:

1. As soon as the PXM45/B detects power, all of the front faceplate LEDs (except DC-A/DC-B) flash on then off for about 1/3 of a second. This means that the hardware has come up (FPGAs have completely downloaded), and the card is ready to download its software and boot up. If all these LEDs remain on, it means that the hardware is not coming up, and the card will not boot. This happens only if the card is inoperable.
2. ENET LED flashes green if a LAN port cable is attached; otherwise, it stays off.
3. System Status LED flashes red while the card is booting, downloading software, or initializing.
4. DC-A/DC-B LEDs are green if the corresponding power supply trays are detected.
5. After the software download is complete, the System Status LED flashes yellow momentarily. It then flashes green if it becomes the active PXM. It continues to flash yellow if it becomes the standby PXM.

AXSM Interface Characteristics

This section contains details for the AXSM cards. For physical characteristics, see Table A-4. For the T3 and E3 interface characteristics, see Table A-5 and Table A-6, respectively. For ATM interface characteristics, see Table A-7. And for OC-3c, OC-12c, and OC-48c interface characteristics, see Table A-8, Table A-9, and Table A-10 respectively.

Table A-4 Physical Characteristics of the AXSM Modules

Category	Description
LED Indicators Per Card	Active (green), Standby (yellow), Fail (red)
LED Indicators Per Line	One per line: Active and OK (green), Active and Local Alarm (red) Active and Remote Alarm (yellow)
Maintenance and Serviceability	Card-dependent
Card Size	Front card: 7.25" x 16.25" (18.43 cm x 41.28 cm) Back cards: 7" x 4.5" (17.78 cm x 11.43 cm)
Power	–48 VDC, 115W
Safety	EN 60950 2nd edition (including EN 41003) UL 1950 3rd edition
Compliance	Card-dependent
ESD	EN 61000-4-2

Table A-5 T3 Interface Characteristics

Category	Description
Line Interface	SMB (75 ohms)
Line Rate	44.736 Mbps ± 4.6 ppm
Synchronization	Loop-timed, receiver, or synchronized to shelf (in normal mode).
Line Code	Bipolar 3 Zero Substitution (B3ZS) per ANSI T1.404 (T3)
Line Framing	C-Bit Parity
Input Jitter Tolerance	Per ATT TR 540141
Output Jitter	Per Telcordia GR-499-CORE
Physical Layer Alarms	LOS, OOF, AIS, RAI
Physical Layer Performance Statistics	LCV, LES, LSES, CV, ES, SES, SEFS, AISS, UAS

Table A-6 E3 Interface Characteristics

Category	Description
Line Interface Connector	SMB (75 ohms)
Line Rate	34.368 Mbps 20 ppm
Synchronization	Transmitter can be: loop-timed, receiver, or synchronized to shelf (normal mode)
Line Code	HDB3
Line Framing	G.832
Input Jitter Tolerance	34.368 Mbps
Output Jitter Generation	34.368 Mbps
Physical Layer Alarms	LOS, OOF, AIS, RAI
Physical Layer Statistics	LCV, LES, LSES, CV, ES, SES, SEFS, AISS, UAS

Table A-7 ATM Interface Characteristics

Category	Description
Standards	ATM UNI v3.1, ITU-T G.804, per CCITT I.361
Channel Configuration	128K per card
VPI/VCI Ranges	VPI: 0 to 255 for UNI and 0 to 4096 for NNI VCI: 0 to 65,535
Traffic Classes	nrt-VBR, rt-VBR, ABR, UBR, CBR
UPC Parameters	PCR, SCR (VBR), CCDV (CBR)
Congestion Control Support	ForeSight (toward Network for VBR+)
ForeSight Parameters	MIR, PIR, Rate Up, Rate Down, QIR, QIR Timeout, IBS

Table A-8 OC-3c Interface Characteristics

Category	Description
Line Interface Connector	MTRJ for MMF, LC for SMF
Line Rate	155.52 Mbps
Line Framing	SONET
Input Jitter Tolerance	Per Telcordia GR-253
Output Jitter Generation	Per Telcordia GR-253
Physical Layer Alarms	Per Telcordia GR-253
Physical Layer Statistics	Per Telcordia GR-253
Standards	Per Telcordia GR-253
Channel Configuration	128K per card

Table A-9 OC-12c Interface Characteristics

Category	Description
Line Interface Connector	SC
Line Rate	622.08 Mbps
Line Framing	SONET
Input Jitter Tolerance	Per Telcordia GR-253
Output Jitter Generation	Per Telcordia GR-253
Physical Layer Alarms	Per Telcordia GR-253
Physical Layer Statistics	Per Telcordia GR-253
Standards	Per Telcordia GR-253
Channel Configuration	128K per card

Table A-10 OC-48c Interface Characteristics

Category	Description
Line Interface Connector	SC
Line Rate	2488.32 Mbps
Line Framing	SONET
Input Jitter Tolerance	Per Telcordia GR-253
Output Jitter Generation	Per Telcordia GR-253
Physical Layer Alarms	Per Telcordia GR-253
Physical Layer Statistics	Per Telcordia GR-253
Standards	Per Telcordia GR-253
Channel Configuration	128K per card