

# ExtremeRouting MLX Series Technical Specifications

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# ExtremeRouting MLX Series Technical Specifications

This document highlights the features and specifications for MLX Series core routers.

## System specifications

System component	Description
Enclosure	MLXe-4 - 5U, 19-inch EIA310-D compliant MLXe-8 - 7U, 19-inch EIA310-D compliant MLXe-16 - 14U, 19-inch EIA310-D compliant MLXe-32 - 33U, 19-inch EIA310-D compliant
Power inlet	C20
Power supplies	MLXe-4 - Four 1200W or 1800W AC or DC power supplies, 1+1 redundancy MLXe-8 - Four 1200W or 1800W AC or DC power supplies, 1+1 redundancy MLXe-16 - Eight 1200W or 1800W AC or DC power supplies, 1+1 redundancy MLXe-32 - Eight 2100W AC, 2400W AC and DC, and 3000W AC and DC power supplies, 1+1 redundancy
Fan modules	MLXe-4 - 4 MLXe-8 - 2 MLXe-16 - 2 MLXe-32 - 8
Cooling	MLXe-4 - One fan assembly with two 4-speed fans and two fan controllers; side-to-back airflow MLXe-8 - One fan assembly with four 4-speed fans and four fan controllers; side-to-back airflow MLXe-16 - Three fan assemblies with six 4-speed fans; front-to-back airflow MLXe-32 - Ten fan assemblies with one 4-speed fan in each; front-to-back airflow
System architecture	Fully distributed, nonblocking, and programmable architecture with up to 15.36 Tbps fabric capacity

## Ethernet

System component	Description
SFP GbE ports	24 1-GbE ports
Ethernet management port	10/100/1000 Ethernet port

## LEDs

System component	Description
<b>Management module LEDs</b>	
Port 1 and Port 2	Indicates whether the software is currently accessing the auxiliary flash card
Active	Indicates whether the module is functioning as the active management module
Pwr	Indicates whether the module is receiving power
10/100/1000 Ethernet Port 1	Indicates whether a link is established with the remote port
10/100/1000 Ethernet Port 2	Indicates whether the port is transmitting and receiving packets
<b>Interface module LEDs</b>	
Pwr	Indicates whether the module is receiving power
Mgmt Act	Indicates whether the active management module processor and the interface module processor are communicating
Link	Indicates whether a link is established with the remote port
Active	Indicates whether the port is transmitting and receiving packets
<b>Switch fabric module LEDs</b>	
Pwr	Indicates whether the module is receiving power
Active	Indicates whether the switch fabric module is active and ready to switch user packets
<b>Power supply LEDs</b>	
AC OK	Indicates whether the power supply is receiving power from the AC power source
DC OK	Indicates whether the power supply is providing DC power to the router
DC IN	Indicates whether the power supply is receiving power from the DC power source
DC OUT	Indicates whether the power supply is providing DC power to the router
ALM	Indicates whether the power supply is in normal operating condition
<b>Fan control LEDs</b>	
Unlabeled	Indicates whether the fans are working and responding to controls from the fan control module

## Other

System component	Description
Serial cable	EIA or TIA DB9 serial cable
RJ-45 connector	10/100/1000 copper

## Weight and physical dimensions

Model	Height	Width	Depth	Weight (empty)	Weight (fully loaded)
MLXe-4	22.1 cm	43.7 cm	58.4 cm	27 kg	53 kg
	8.7 inches	17.2 inches	23.0 inches	60 lb	117 lb
MLXe-8	31.0 cm	43.7 cm	61.0 cm	36 kg	78 kg
	12.2 inches	17.2 inches	24.0 inches	78 lb	171 lb
MLXe-16	62.2 cm	44.3 cm	61.4 cm	42 kg	159 kg

Model	Height	Width	Depth	Weight (empty)	Weight (fully loaded)
	24.5 inches	17.5 inches	24.2 inches	100 lb	351 lb
MLXe-32	146.7 cm	44.3 cm	68.5 cm	129 kg	229 kg
	57.8 inches	17.5 inches	27.0 inches	284 lb	505 lb

## Environmental requirements

Condition	Operational	Non-operational
Ambient temperature	0°C to 40°C (32°F to 104°F)	-25°C to 70°C (-13°F to 158°F)
Relative humidity (non-condensing)	5% to 95% at 40°C (104°F)	95% maximum
Altitude (above sea level)	2012 m (6600 feet)	4500 m (15,000 feet)
Shock	N/A	N/A
Vibration	N/A	N/A
Airflow	N/A	N/A
Heat dissipation	N/A	N/A
Operating noise	N/A	N/A

## Power supply specifications (per PSU)

### NOTE

3000W power supplies do not support low line AC input voltage.

### NOTE

1200W and 2400W power supplies are no longer available for purchase.

Power supply model	Maximum output power rating (DC)	Input voltage	Input line frequency	Maximum input current	Input line protection	Maximum inrush current
<b>MLXe-4, MLXe-8, and MLXe-16 routers</b>						
N/A	1200 W	100 - 240 VAC (nominal) 90 - 264 VAC (range)	50/60 Hz (nominal) 47 - 63 Hz (range)	16 A	Line & Neutral Fused	<60 A peak for <10 ms at cold or warm start <25 A peak for cycles 10 ms - 150 ms
BR-MLXE-ACPWR-1800	1200 W	100-180 VAC (nominal) 90 - 264 VAC (range)	50/60 Hz (nominal) 47 - 63 Hz (range)	16 A	Line & Neutral Fused	<60 A peak for <10 ms at cold or warm start <25 A peak for cycles 10 ms - 150 ms
	1800 W	180-240 VAC (nominal) 90 - 264 VAC (range)	50/60 Hz (nominal) 47 - 63 Hz (range)	16 A	Line & Neutral Fused	<60 A peak for <10 ms at cold or warm start

Power consumption (maximum configuration)

Power supply model	Maximum output power rating (DC)	Input voltage	Input line frequency	Maximum input current	Input line protection	Maximum inrush current
						<25 A peak for cycles 10 ms - 150 ms
N/A	1200 W	-48 VDC(nominal) -40 to -60 VDC (range)	N/A	40 A	-Ve Fused	<80 A peak for <10 ms at cold or warm start
BR-MLXE-DCPWR-1800	1800 W	-48 VDC (nominal) -40 to -60 VDC (range)	N/A	60 A	-Ve Fused	<80 A peak for <10 ms at cold or warm start
<b>MLXe-32 router</b>						
N/A	2400 W	200-240 VAC (nominal) 180-264 VAC (range)	50/60 Hz (nominal) 47 - 63 Hz (range)	16 A	Line Fused	<60 A peak for <10 ms at cold or warm start <25 A peak for cycles 10 ms - 150 ms
N/A	2400 W	-48 VDC (nominal) -40 to -60 VDC (range)	N/A	75 A	-Ve Fused	<70 A peak for <10 ms at cold or warm start
BR-MLXE-32-DCPWR-3000	3000 W	-48 VDC (nominal) -40 to -60 VDC (range)	N/A	80 A	-Ve Fused	<70 A peak for <10 ms at cold or warm start

## Power consumption (maximum configuration)

**NOTE**

The MLX-32 device does not support 100 VAC input power.

Model name	@100 VAC input	@200 VAC input	@-48 VDC input	Minimum number of power supplies	Notes
<b>Maximum per MLX (using 8x10G-D, 8x10G-M, 4x10G, 2x10G, 1G modules only)</b>					
MLXe-4	17 A 1730 W 5905 BTU/hr	9 A 1730 W 5905 BTU/hr	36 A 1730 W 5905 BTU/hr	1200W - 2 1800W - 1	
MLXe-8	33 A 3332 W 11372 BTU/hr	17 A 3332 W 11372 BTU/hr	70 A 3332 W 11372 BTU/hr	1200W - 3 1800W - 2	
MLXe-16	57 A 5674 W 19365 BTU/hr	28 A 5674 W 19365 BTU/hr	118 A 5674 W 19365 BTU/hr	1200W - 4 1800W - 3	
MLXe-32	N/A	57 A 11414 W 38958 BTU/hr	238 A 11414 W 38958 BTU/hr	2400W - 4 3000W - 4	



Model name	@100 VAC input	@200 VAC input	@-48 VDC input	Minimum number of power supplies	Notes
<b>Maximum per MLX (any module except 2x100G-Half Slot or 20x10G modules)</b>					
MLXe-4	21 A 2083 W 7108 BTU/hr	10 A 2083 W 7108 BTU/hr	43 A 2083 W 7108 BTU/hr	1200W - 2 1800W - 1	
MLXe-8	40A 4036 W 13777 BTU/hr	20 A 4036 W 13777 BTU/hr	84 A 4036 W 13777 BTU/hr	1200W - 3 1800W - 2	
MLXe-16	71 A 7083 W 24174 BTU/hr	35 A 7083 W 24174 BTU/hr	148 A 7083 W 24174 BTU/hr	1200W - 5 1800W - 4	
MLXe-32	N/A	71 A 14232 W 48575 BTU/hr	297 A 14232 W 48575 BTU/hr	2400W - 5 3000W - 4	
<b>Maximum per MLX (using 2x100G-Half Slot or 20x10G modules)</b>					
MLXe-4	27 A 2654 W 9057 BTU/hr	13 A 2654 W 9057 BTU/hr	55 A 2654 W 9057 BTU/hr	1200W - 2 1800W - 2	
MLXe-8	52 A 5179 W 17676 BTU/hr	26 A 5179 W 17676 BTU/hr	108 A 5179 W 17676 BTU/hr	1200W - 4 1800W - 3	
MLXe-16	94 A 9369 W 31972 BTU/hr	47 A 9369 W 31972 BTU/hr	195 A 9369 W 31972 BTU/hr	1200W - 7 1800W - 5	
MLXe-32	N/A	94 A 18802 W 64171 BTU/hr	392 A 18802 W 64171 BTU/hr	2400W - 7 3000W - 6	

## Power consumption (modules)

Module name	Module description	Maximum power consumption
NI-MLX-MR NI-XMR-MR	MR Management modules for MLX-4, MLX-8, and MLX-16 routers	30 W
NI-MLX-32-MR NI-XMR-32-MR	MR Management modules for MLX-32 router	35 W
BR-MLX-MR2-M BR-MLX-MR2-X	MR2 Management modules for MLX-4, MLX-8, and MLX-16 routers	40 W
BR-MLX-32-MR2-M BR-MLX-32-MR2-X	MR2 Management modules for MLX-32 router	45 W

Module name	Module description	Maximum power consumption
NI-X-SF1	Switch fabric module for 4-slot routers	19 W
NI-X-SF3	Switch fabric module for 8- and 16-slot routers	53 W
NI-X-32-SF	Switch fabric module for 32-slot routers	60 W
NI-X-4-HSF	High-speed switch fabric module for 4-slot routers	19 W
NI-X-16-8-HSF	High-speed switch fabric module for 8- and 16-slot routers	53 W
NI-X-32-HSF	High-speed switch fabric module for 32-slot routers	60 W
BR-MLX-100GX-1	MLX/XMR1-port 100-GbE (X) Module	485 W
BR-MLX-100GX-2	MLX 2-port 100-GbE (X) Module	640 W
NI-XMR-10GX2	XMR Series 2-port 10-Gbps Ethernet module	165 W
NI-MLX-10GX2	MLX Series 2-port 10-GbE module	150 W
NI-MLX-10GX4	MLX Series 4-port 10-GbE module	225 W
NI-XMR-10GX4	XMR Series 4-port 10-GbE module	245 W
BR-MLX-10GX4-X	XMR/MLX 4-port 10-GbE (X) module	240 W
BR-MLX-10Gx4-X-ML	MLX/MLX 4-port 10-GbE (ML) module	240 W
BR-MLX-40Gx4-M	MLX 4-port 40-GbE (M) module	320 W
NI-MLX-10GX8-M	MLX Series 8-port 10-GbE (M) module	246 W
NI-MLX-10GX8-D	MLX Series 8-port 10-GbE (D) module	246 W
BR-MLX-10GX8-X	MLX/XMR 8-port 10-GbE (X) module	270 W
NI-MLX-1GX20-SFP	MLX Series 20-port FE/GE (100/1000) module	175 W
NI-XMR-1GX20-SFP	XMR Series 20-port FE/GE (100/1000) module	185 W
NI-MLX-1GX20-GC	MLX Series 20-port 10/100/1000 copper module	146 W
NI-XMR-1Gx20-GC	XMR Series 20-port 10/100/1000 copper module	156 W
BR-MLX-10GX20-M	MLX 20-port 10-GbE/1GbE (M) combo module	440 W
BR-MLX-10GX20-X2	MLX 20-port 10-GbE/1GbE (X2) SFP+ and SFP combo module	440 W
BR-MLX-100GX2-CFP2-M	MLX 2-port 100-GbE (M) CFP2 module	425 W
BR-MLX-100GX2-CFP2-X2	MLX 2-port 100-GbE (X2) CFP2 module	425 W
BR-MLX-1GCX24-X	XMR/MLX 24-port 10/100/1000 copper (RJ-45) module	160 W
BR-MLX-1GCX24-X-ML	MLX/MLX 24-port 10/100/1000 copper (RJ-45) module	160 W
BR-MLX-1GFX24-X	XMR/MLX 24-port 1-GbE Fiber (SFP) module	160 W
BR-MLX-1GFX24-X-ML	MLX/MLX 24-port 1-GbE Fiber (SFP) module	160 W
BR-MLX-10GX4-IPSEC-M	MLX 4-port 10-GbE and 4-port 1GbE (M) IP	180 W
BR-MLX-10GX24-DM	MLX 24-port 10-GbE module	320 W
NI-MLX-1GX48-T-A	MLX Series 48-port 10/100/1000Base-T, MRJ21 module	260 W

## Data port specifications (Ethernet)

Model	Port type	Number of ports	Description
MLXe-4	100 GbE	8	Supports maximum of eight 100-GbE ports per system
	40 GbE	16	Supports maximum of 16 40-GbE ports per system
	10 GbE	96	Supports maximum of 96 10-GbE ports per system
	1 GbE	192	Supports maximum of 192 1-GbE ports per system

Model	Port type	Number of ports	Description
MLXe-8	100 GbE	16	Supports maximum of 16 100-GbE ports per system
	40 GbE	32	Supports maximum of 32 40-GbE ports per system
	10 GbE	192	Supports maximum of 192 10-GbE ports per system
	1 GbE	384	Supports maximum of 384 1-GbE ports per system
MLXe-16	100 GbE	32	Supports maximum of 32 100-GbE ports per system
	40 GbE	64	Supports maximum of 64 40-GbE ports per system
	10 GbE	384	Supports maximum of 384 10-GbE ports per system
	1 GbE	768	Supports maximum of 768 1-GbE ports per system
MLXe-32	100 GbE	64	Supports maximum of 64 100-GbE ports per system
	40 GbE	128	Supports maximum of 128 40-GbE ports per system
	10 GbE	768	Supports maximum of 768 10-GbE ports per system
	1 GbE	1536	Supports maximum of 1536 1-GbE ports per system

## Serial port specifications (DB9)

Pin	Signal	Description
1	Reserved	Reserved
2	TXD (output)	Transmit data
3	RXD (input)	Receive data
4	Reserved	Reserved
5	GND	Logic ground
6	Reserved	Reserved
7	Reserved	Reserved
8	Reserved	Reserved
9	Reserved	Reserved

## Serial port specifications (pinout RJ-45)

Pin	Signal	Description
1	TD+	Transmit data
2	TD-	Transmit data
3	RD+	Receive data
4	Not used (10BaseT) CMT (100BaseTX)	Not used
5	Not used (10BaseT) CMT (100BaseTX)	Not used
6	RD-	Receive data
7	Not used (10BaseT) CMT (100BaseTX)	Not used
8	Not used (10BaseT)	Not used

Pin	Signal	Description
	CMT (100BaseTX)	

## Serial port specifications (protocol)

Parameter	Value
Baud	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	None

## Memory specifications

Memory	Type	Size
Main memory	SDRAM	4 GB
Compact Flash	Internal compact flash	2 GB

## Regulatory compliance (EMC)

- FCC Part 15, Subpart B (Class A)
- EN 55022 (CE mark) (Class A)
- EN 55024 (CE mark) (Immunity) for Information Technology Equipment
- ICES-003 (Canada) (Class A)
- AS/NZ 55022 (Australia) (Class A)
- VCCI (Japan) (Class A)
- EN 61000-3-2
- EN 61000-3-3
- EN 61000-6-1

## Regulatory compliance (safety)

- CAN/CSA-C22.2 No. 60950-1-07/UL60950-1 - Safety of Information Technology Equipment
- EN 60825-1 Safety of Laser Products - Part 1: Equipment Classification, Requirements and User's Guide
- EN 60825-2 Safety of Laser Products - Part 2: Safety of Optical Fibre Communications Systems
- EN 60950-1, IEC 60950-1 Safety of Information Technology Equipment

## Regulatory compliance (environmental)

- 2011/65/EU – Restriction of the use of certain hazardous substance in electrical and electronic equipment (EU RoHS)
- 2012/19/EU – Waste electrical and electronic equipment (EU WEEE)
- 94/62/EC – packaging and packaging waste (EU)
- 2006/66/EC – batteries and accumulators and waste batteries and accumulators (EU battery directive)
- 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (EU REACH)
- Section 1502 of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 – U.S. Conflict Minerals
- 30/2011/TT-BCT – Vietnam circular
- SJ/T 11363-2006 Requirements for Concentration Limits for Certain Hazardous Substances in EIPs (China)
- SJ/T 11364-2006 Marking for the Control of Pollution Caused by EIPs (China)