



# Technical Specifications

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This appendix provides the technical specifications for the Cisco 6160 system. The appendix contains the following sections:

- [Hardware Specifications, page A-1](#)
- [Software Specifications, page A-14](#)

## A.1 Hardware Specifications

This section details the specifications for the following hardware components:

- Cisco 6160 system
- Octal-port ITU-C line card (8xIDSL)
- Octal-port G.SHDSL SHTU-C line card (8xG.SHDSL)
- Octal-port DMT ATU-C line card (8xDMT)
- Quad-port STU-C line card (4xSDSL)
- Quad-port flexi ATU-C line card (4xflexi)
- DS3+T1/E1 IMA NI-2 card
- DS3/2DS3 NI-2 card
- OC-3c/2DS3 NI-2 card
- OC-3c/OC-3c NI-2 card
- DS2/2DS3+8xT1 IMA I/O card
- DS3/2DS3 I/O card
- Power entry module (PEM)
- Blower tray

## A.1.1 Cisco 6160 System

Table A-1 lists the hardware specifications for the Cisco 6160 system.

*Table A-1 Cisco 6160 System Hardware Specifications*

Specification	Description						
Cisco 6160 chassis dimensions	11 RUs <sup>1</sup> —18.35 in. x 21.35 <sup>2</sup> in. x 11.8 in. (46.6 cm x 54.2 cm x 30.0 cm)						
Cisco 6160 chassis weight	Empty—Approximately 40 lb (18.2 kg) Loaded—Approximately 95 lb (43.2 kg)						
Acoustic noise	60 dB at normal fan speed						
Network interface	<ul style="list-style-type: none"> <li>OC-3c (single- or multimode fiber) WAN uplink or subtend</li> <li>DS3 WAN uplink or subtend</li> <li>T1 WAN uplink or subtend</li> <li>T1 IMA group WAN uplink or subtend</li> </ul>						
ADSL Interface	CAP—Up to 7.168 Mbps downstream/1.088 Mbps upstream DMT—Up to 8.032 Mbps downstream/864 kbps upstream G.lite—Up to 1.536 Mbps downstream/512 kbps upstream						
SDSL Interface	2B1Q up to 1168 kbps upstream and downstream						
SHDSL Interface	TC-PAM up to 2312 kbps upstream and downstream						
IDSL Interface	2B1Q						
Craft interface	Console terminal connection on the NI-2 card						
Management access	<ul style="list-style-type: none"> <li>RJ-45 interface for craft alarm discovery</li> <li>RJ-45 Ethernet</li> <li>ATM in-band management</li> </ul>						
External alarm contacts	Single dry contact alarm input (NO)						
Power requirements	Dual inputs, –48VDC each <b>Note</b> See <a href="#">Chapter 2, “Preparing for Installation,”</a> for detailed power requirements.						
CO operating requirements	<table border="0"> <tr> <td>Temperature</td> <td>41 to 104°F (5 to 40°C)—Operating 23 to 122°F (–5 to 50°C)—Short-term operating</td> </tr> <tr> <td>Altitude</td> <td>–197 to 13,124 feet (–60 to 4,000 meters)</td> </tr> <tr> <td>Humidity</td> <td>5 to 90% (noncondensing)</td> </tr> </table>	Temperature	41 to 104°F (5 to 40°C)—Operating 23 to 122°F (–5 to 50°C)—Short-term operating	Altitude	–197 to 13,124 feet (–60 to 4,000 meters)	Humidity	5 to 90% (noncondensing)
Temperature	41 to 104°F (5 to 40°C)—Operating 23 to 122°F (–5 to 50°C)—Short-term operating						
Altitude	–197 to 13,124 feet (–60 to 4,000 meters)						
Humidity	5 to 90% (noncondensing)						
Subtending	NI-2 card DS3/2DS3+8xT1 IMA I/O card DS3/2DS3 I/O card						

1. RU = rack unit. An RU is equal to 1.75 inches (4.45 cm).

2. Mounting brackets not included in width

## A.1.2 8xIDSL Specifications

Table A-2 lists the specifications for the 8xIDSL.

*Table A-2 8xIDSL Specifications*

Specification	Description
Standards supported	<ul style="list-style-type: none"> <li>• Frame Relay FRF.8</li> <li>• Frame Relay FRF.9 (compatible)</li> <li>• RFC 1661/1662 (PPP over HDLC)</li> <li>• RFC 1973 (PPP over Frame Relay)</li> <li>• ANSI T1.601-1992</li> <li>• ETSI ETR 080 (1966)</li> <li>• ITU G.961</li> </ul>
External interfaces	8 (no connectors on card)
Data rates (per port)	Downstream: Up to 144 kbps Upstream: Up to 144 kbps
Line encoding	2B1Q
Internal hardware	<ul style="list-style-type: none"> <li>• 50 MHz Motorola MPC860 microprocessor</li> <li>• Siemens PEF 24911/24902 (DFE/AFE)</li> <li>• 32 MB SDRAM</li> <li>• 2 MB Flash</li> </ul>
Dimensions	Height: 6.07 in. (15.42 cm) Depth: 8.50 in. (21.59 cm) Width: 0.88 in. (2.24 cm)
Weight	0.8 lb (0.36 kg)
Power consumption	5.5W
Minimum software and network management requirement	Cisco IOS—Release 12.1(2)DA CDM <sup>1</sup> — Release 3.2 (optional)

1. CDM = Cisco DSL Manager

## A.1.3 8xG.SHDSL Specifications

Table A-3 lists the specifications for the 8xG.SHDSL.

*Table A-3 8xG.SHDSL Specifications*

Specification	Description
Standards supported	<ul style="list-style-type: none"> <li>• TC-PAM without optis</li> <li>• ITU G.991.2</li> <li>• ITU G.994.1</li> <li>• ETSI SDSL, TM6(00)10</li> <li>• ETSI SDSL DRAFT (TS 101 524)</li> </ul>
Power consumption	11.3W at 136 kbps 15.0W at 1.554 Mbps 16.5W at 2.312 Mbps
Maximum data rates (per port)	2.312 Mbps
Maximum data rate (per card)	Minimum software—Cisco IOS 12.1(7)DA2 <ul style="list-style-type: none"> <li>• 18.5 Mbps downstream</li> <li>• 5.0 Mbps for odd ports upstream</li> <li>• 5.0 Mbps for even ports upstream</li> </ul> Minimum software—Cisco IOS 12.2(7)DA <ul style="list-style-type: none"> <li>• 18.5 Mbps downstream</li> <li>• 18.5 Mbps upstream</li> </ul>
External interfaces	8 (no connectors on card)
Internal hardware	MPC850 3.3V power 40-Mhz CPU
Dimensions	Height: 6.07 in. (15.42 cm) Depth: 8.50 in. (21.59 cm) Width: 0.88 in. (2.24 cm)
Weight	0.70 lb (0.32 kg)
Minimum software and network management requirement	Cisco IOS—Release 12.1(7)DA2 CDM—Release 3.3(3) (optional)
Minimum software and network management requirement for RADSL <sup>1</sup>	Cisco IOS—Release 12.2(7)DA CDM—Release 3.4 (optional)

1. RADSL = rate adaptive digital subscriber line

## A.1.4 8xDMT Specifications

Table A-4 lists the specifications for the 8xDMT.

*Table A-4 8xDMT Specifications*

Specification	Description
Standards supported	<ul style="list-style-type: none"> <li>• ANSI T1.413, Category 1 only</li> <li>• ANSI T1.413, Annex F (Reduced NEXT)\</li> <li>• Universal Test &amp; Operations PHY for ATM, Level 2; A standard for transport of ATM cells over a 16-bit parallel data bus. Refer to the ATM Forum document af-phy-0039.000.</li> <li>• ITU G.992.1, Annex A (G.dmt)</li> <li>• ITU G.992.2. (G.lite)</li> <li>• ITU G.994.1. (G.hs)</li> </ul>
External interfaces	8 (no connectors on card)
Data rates (per port)	Upstream: Up to 1024 kbps Downstream: Up to 8.064 Mbps
Internal hardware	<ul style="list-style-type: none"> <li>• 40 MHz Motorola MPC850 microprocessor</li> <li>• 8 MB SDRAM</li> <li>• 1 Mb boot flash</li> <li>• 1 kb serial EEPROM</li> </ul>
Dimensions	Height: 6.07 in. (15.42 cm) Depth: 8.50 in. (21.59 cm) Width: 0.88 in. (2.24 cm)
Weight	0.875 lb (0.4 kg)
Power consumption	24W
Minimum software and network management requirement	Cisco IOS—Release 12.1(6)DA CDM—Release 3.3(2) (optional)

## A.1.5 4xSDSL Specifications

Table A-5 lists the specifications for the 4xSDSL.

*Table A-5 4xSDSL Specifications*

Specification	Description
Standards supported	ITU G.991.1
External interfaces	4 (no connectors on card)
Maximum data rates (per port)	
Downstream	1168 kbps
Upstream	1168 kbps
Line encoding	2B1Q
Internal hardware	<ul style="list-style-type: none"> <li>• AMD 186-based 3.3V 18-MHz CPU</li> <li>• 128 KB SRAM</li> <li>• 512K Flash</li> </ul>
Dimensions	Height: 6.07 in. (15.42 cm) Depth: 8.50 in. (21.59 cm) Width: 0.88 in. (2.24 cm)
Weight	0.875 lb (0.4 kg)
Power consumption	9W
Minimum software and network management requirement	Cisco IOS—Release 12.1(1)DA CDM—Release 3.0 (optional)

## A.1.6 4xflexi Specifications

Table A-6 lists the specifications for the 4xflexi.

*Table A-6 4xflexi Specifications*

Specification	Description
External interfaces	4 (no connectors on card)
Internal hardware	<ul style="list-style-type: none"> <li>• AMD 186-based 3.3V 18-MHz CPU</li> <li>• 128KB SRAM</li> <li>• 512K Flash</li> </ul>
Dimensions	Height: 6.07 in. (15.42 cm) Depth: 8.50 in. (21.59 cm) Width: 0.88 in. (2.24 cm)
Weight	0.875 lb (0.4 kg)

*Table A-6 4xflexi Specifications (continued)*

Specification	Description		
Minimum software and network management requirement	Cisco IOS—Release 12.1(1)DA CDM—Release 3.0 (optional)		
	DMT Mode	CAP Mode	G.lite Mode
Standards supported	<ul style="list-style-type: none"> <li>ITU G.dmt (G.992.1) ANSI T1.413</li> </ul>	<ul style="list-style-type: none"> <li>RADSL</li> </ul>	<ul style="list-style-type: none"> <li>ITU G.lite (G.992.2)</li> </ul>
Power consumption	17.5W	13.5W	13W
Maximum data rates (per port)			
Downstream	8.032 Mbps	7.168 Mbps	1.536 Mbps
Upstream	864 kbps	1.088 Mbps	512 kbps

## A.1.7 DS3+T1/E1 IMA NI-2 Card Specifications

[Table A-7](#) lists the physical and electrical specifications of the DS3+T1/E1 IMA NI-2 card.

*Table A-7 DS3+T1/E1 IMA NI-2 Card Specifications*

Specification	Description
Internal hardware	<ul style="list-style-type: none"> <li>150 MHz RC64475 CPU</li> <li>Galileo GT64120 system controller</li> <li>1M x 32 boot flash</li> <li>4M x 32 Flash</li> <li>512 KB boot EPROM</li> </ul>
Dimensions	Height: 12.38 in. (31.45 cm) Depth: 8.50 in. (21.59 cm) Width: 1.80 in. (4.57 cm)
Weight	3.0 lb (1.36 kg)
External interfaces <sup>1</sup>	One DS3 (44.736 Mbps) coaxial port Eight T1(1.544 Mbps)/E1 (2.048 Mbps) RJ-48 ports
Connector types <sup>2</sup>	DS3—BNC E1/T1—RJ-48
Impedance	DS3—75 ohms (nominal) T1—100 ohms (nominal) E1—120 ohms (nominal)

*Table A-7 DS3+T1/E1 IMA NI-2 Card Specifications (continued)*

Specification	Description
Line encoding	DS3—B3ZS T1—AMI or B8ZS E1—AMI or HDB3
Framing	DS3—C-bit parity, optionally PLCP with M23, otherwise ADM <sup>3</sup> T1—SF or ESF E1—PCM30 or CRC4
Transmission distance	DS3—Short haul: <225 feet (68.58 meters), long haul: 225 to 450 feet (68.58 to 137.16 meters) T1/E1—Short haul: 0 to 655 feet (0 to 199.64 meters), long haul: >655 feet (199.64 meters) no span power
Power consumption	32.5W
Minimum software and network management requirement	Cisco IOS <ul style="list-style-type: none"> <li>• Non-redundant NI-2 card configurations—Release 12.1(6)DA</li> <li>• Redundant NI-2 card configurations—Release 12.1(7)DA</li> </ul> CDM—Release 3.3(2) (optional)

1. All external interfaces for the DS3+T1/E1 IMA NI-2 card are located on the I/O card.
2. All trunk and subtend connectors for the DS3+T1/E1 IMA NI-2 card are located on the I/O card.
3. ADM = add/drop multiplexer.



## A.1.8 DS3/2DS3 NI-2 Card Specifications

Table A-8 lists the specifications of the DS3/2DS3 NI-2 card.

*Table A-8 DS3/2DS3 NI-2 Card Specifications*

Specification	Description
Internal hardware	<ul style="list-style-type: none"> <li>• 150 MHz RC64475 CPU</li> <li>• Galileo GT64120 system controller</li> <li>• 1M x 32 boot flash</li> <li>• 4M x 32 Flash</li> <li>• 512 KB boot EPROM</li> </ul>
Dimensions	Height: 12.38 in. (31.45 cm) Depth: 8.50 in. (21.59 cm) Width: 1.80 in. (4.57 cm)
Weight	3.0 lb (1.36 kg)
Layer 2 protocol	ATM
External interfaces <sup>1</sup>	Three DS3/E3 coaxial ports
Connector type <sup>2</sup>	BNC
Impedance	75 ohms (nominal)
Line encoding	B3ZS
Framing	C-bit parity, optionally PLCP with M23, otherwise ADM
Transmission distance	DS3—Short haul: <225 feet (68.58 meters), long haul: 225 to 450 feet (68.58 to 137.16 meters)
Power consumption	33.5W
Minimum software and network management requirement	Cisco IOS <ul style="list-style-type: none"> <li>• Non-redundant NI-2 card configurations—Release 12.1(1)DA</li> <li>• Redundant NI-2 card configurations—Release 12.1(7)DA</li> </ul> CDM—Release 3.0/3.2 (optional)

1. All external interfaces for the DS3/2DS3 NI-2 card are located on the I/O card.
2. All trunk and subtend connectors for the DS3/2DS3 NI-2 card are located on the I/O card.

## A.1.9 OC-3c/2DS3 NI-2 Card Specifications

Table A-9 lists the specifications of the OC-3c/2DS3 NI-2 card.

*Table A-9 OC-3c/2DS3 NI-2 Card Specifications*

Specification	Description	
Internal hardware	<ul style="list-style-type: none"> <li>150 MHz RC64475 CPU</li> <li>Galileo GT64120 system controller</li> <li>1M x 32 boot flash</li> <li>4M x 32 Flash</li> <li>512 KB boot EPROM</li> </ul>	
Dimensions	Height: 12.38 in. (31.45 cm) Depth: 8.50 in. (21.59 cm) Width: 1.80 in. (4.57 cm)	
Weight	3.0 lb (1.36 kg)	
Power consumption	33.5W	
Layer 2 protocol	ATM	
Minimum software and network management requirement	Cisco IOS <ul style="list-style-type: none"> <li>Non-redundant NI-2 card configurations—Release 12.1(1)DA</li> <li>Redundant NI-2 card configurations—Release 12.1(7)DA</li> </ul> CDM—Release 3.0/3.2 (optional)	
DS3 Ports (Subtending)	(DS3 port specifications are the same for single-mode and multimode cards.)	
External interfaces <sup>1</sup>	Two DS3 (44.736 Mbps) coaxial ports	
Connector type <sup>2</sup>	BNC	
Impedance	75 ohms (nominal)	
Line encoding	B3ZS	
Framing	C-bit parity, optionally PLCP with M23, otherwise ADM	
<b>OC-3c Port (Trunk)</b>	<b>Single-Mode Card</b>	<b>Multimode Card</b>
External interface	One OC-3c/STM-1 (155 Mbps) single-mode port	One OC-3c/STM-1 (155 Mbps) multimode port
Connector type	SC-PC	SC-PC
Fiber type	Intermediate reach single mode	Multimode
Average transmitted power	-15 to -8 dBm	-20 to -14 dBm
Average received power	-8 dBm	-11 dBm
Transmission distance	Up to 12 miles (19.3 km)	Up to 1.2 miles (1.93 km)
Wavelength	1310 nm	1300 nm

1. The DS3 subtending interfaces for the OC-3c/2DS3 NI-2 card are located on the I/O card.

2. The BNC subtend connectors for the OC-3c/2DS3 NI-2 card are located on the I/O card.

## A.1.10 OC-3c/OC-3c NI-2 Card Specifications

Table A-10 lists the specifications of the single-mode and multimode versions of the OC-3c/OC-3c NI-2 card.

*Table A-10 OC-3c/OC-3c NI-2 Card Specifications*

Specification	Description	
Internal hardware	<ul style="list-style-type: none"> <li>150 MHz RC64475 CPU</li> <li>Galileo GT64120 system controller</li> <li>1M x 32 boot flash<sup>1</sup> (4 MB)</li> <li>4M x 32 Flash (16 MB)</li> <li>512 KB boot EPROM</li> </ul>	
Dimensions	Height: 12.38 in. (31.45 cm) Depth: 8.50 in. (21.59 cm) Width: 1.80 in. (4.57 cm)	
Weight	3.0 lb (1.36 kg)	
Layer 2 protocol	ATM	
Power consumption	33.5W	
Minimum software and network management requirement	Cisco IOS <ul style="list-style-type: none"> <li>Non-redundant NI-2 card configurations—Release 12.1(1)DA</li> <li>Redundant NI-2 card configurations—Release 12.1(7)DA</li> </ul> CDM—Release 3.0/3.2 (optional)	
	Single-Mode Card	Multimode Card
External interfaces	Two OC-3c/STM-1 (155 Mbps) single-mode ports	Two OC-3c/STM-1 (155 Mbps) multimode ports
Connector type	SC-PC	SC-PC
Fiber type	Intermediate reach single mode	Multimode
Average transmitted power	-15 to -8 dBm	-20 to -14 dBm
Average received power	-8 dBm	-11 dBm
Transmission distance	Up to 12 miles (19.3 km)	Up to 1.2 miles (1.93 km)
Wavelength	1310 nm	1300 nm

- The version of the OC-3c/OC-3c NI-2 card with enhanced upstream bandwidth features (NI2-155SM-155SM2 and NI2-155MM-155MM2) has a 2M x 32 bootflash (8 MB).

## A.1.11 DS3/2DS3+8xT1 IMA I/O Card Specifications

Table A-11 lists the specifications of the DS3/2DS3+8xT1 IMA I/O card.

*Table A-11 DS3/2DS3+8xT1 IMA I/O Card Specifications*

Specification	Description
Standards supported	ANSI T1.102
Power consumption	6W
External interfaces	<ul style="list-style-type: none"> <li>• Three DS3</li> <li>• Eight T1</li> <li>• Alarm relay</li> <li>• BITS clock</li> </ul>
Internal hardware	N/A
Dimensions	Height: 9.0 in. (22.86 cm) Depth: 0.69 in. (1.75 cm) Width: 10.72 in. (27.22 cm)
Weight	1.2 lb (0.544 kg)
Minimum software and network management requirement	Cisco IOS—Release 12.1(6)DA CDM—Release 3.3(2) (optional)

## A.1.12 DS3/2DS3 I/O Card Specifications

Table A-12 lists the specifications of the DS3/2DS3 I/O card.

*Table A-12 DS3/2DS3 I/O Card Specifications*

Specification	Description
Standards supported	ANSI T1.102
Power consumption	6W
External interfaces	<ul style="list-style-type: none"> <li>• Three DS3</li> <li>• Alarm relay</li> <li>• BITS clock</li> </ul>
Internal hardware	N/A
Dimensions	Height: 9.0 in. (22.86 cm) Depth: 0.69 in. (1.75 cm) Width: 10.72 in. (27.22 cm)
Weight	1.2 lb (0.544 kg)
Minimum software and network management requirement	Cisco IOS—Release 12.1(1)DA CDM—Release 3.0/3.2 (optional)

## A.1.13 PEM Specifications

Table A-13 lists the specifications of the PEM.

*Table A-13 PEM Specifications*

Specification	Description
Dimensions	Height: 8.82 in. (22.4 cm) Depth: 9.27 in. (23.55 cm) Width: 2.45 in. (6.223 cm)
Weight	6 lb (2.72 kg)
Power consumption	60W
Minimum software and network management requirements	Cisco IOS—Release 12.0(5)DA CDM—Release 3.2 (optional)

## A.1.14 Blower Tray Specifications

Table A-14 lists the specifications of the blower tray.

*Table A-14 Blower Tray Specifications*

Specification	Description
Dimensions	Height: 3.375 in. (8.48 cm) Depth: 8.125 in. (20.64 cm) Width: 18.50 in. (47.0 cm)
Weight	10.5 lb (4.76 kg)
Power consumption	37 to 120W
Minimum software and network management requirement	Cisco IOS—Release 12.0(5)DA CDM—Release 3.2 (optional)

## A.2 Software Specifications

Table A-15 lists Cisco 6160 system software specifications.

*Table A-15 Software Specifications*

Specification	Description
Management protocols	Software support for SNMP to Cisco EMF <sup>1</sup>
Management applications	<ul style="list-style-type: none"> <li>• Cisco IOS</li> <li>• CDM</li> </ul>
Management interfaces	In band—ATM VC Out of band—10BaseT Ethernet, console, auxiliary

1. EMF = Element Management Framework