System Specifications

This section lists specific site preparation specifications for each Cisco product. Included are any special requirements for your system, such as rack-mounting options, special power requirements, or cable connections.

The following is a list of the Cisco products covered in this section:

- Cisco 200 series
- Cisco 750 and 760 series
- Cisco 1000 series
- Cisco 2500 series
- Cisco 4000 series
- Cisco AS5100 access server
- Cisco AS5200 universal access server
- Cisco 7000 series and 7500 series
- Cisco LightStream 1010
- Cisco LightStream 2020
- Catalyst 1200
- Catalyst 1600
- Catalyst 1700
- Catalyst 2000 series
- Catalyst 3000
- Catalyst 5000
- Catalyst WS-C1400 concentrator

Note On-Site Services (OSS) is not responsible for the software configuration for your Cisco product. Service is limited to hardware installation and setup.

Cisco 200 Series

This section contains the hardware, software, and external connection requirements for the Cisco 200 series products, which include the Cisco 201, Cisco 202, Cisco 203, and Cisco 204.

Hardware and Software Requirements

Table 15 lists the hardware and software requirements for the Cisco 200 series.

Table 15   Cisco 200 Series Minimum Hardware and Software Requirements

Description	Specification
PC CPU type	80386 or higher
PC type	Desktop
Memory	At least 1 MB
PC slot	One available half-length ISA slot
PC operating system	DOS version 5.0 or later
Windows	Version 3.1 or later
Windows for Workgroups	Version 3.11 or later
Windows 95	Version 4.0 or later

External Connection Requirements

This section contains the external connection requirements for the Cisco 200 series products.

- One ISDN BRI port with S/T for the Cisco 201 and Cisco 203. Uses an external NT-1 device.

- One U interface for the Cisco 202 and Cisco 204. An NT-1 device is integrated with the interface.

Cisco 750 and 760 Series

This section contains physical specifications and external connection requirements for the Cisco 750 and 760 series routers, which include the Cisco 751, Cisco 752, Cisco 753, Cisco 765, and Cisco 766.

Physical Specifications

Table 16 lists the physical specifications for the Cisco 750 and 760 series routers.

Table 16   Cisco 750 and 760 Series Physical Specifications

Description	Specification
Dimensions (H x W x D)	Cisco 751 and 752: 1.5 x 6.2 x 9.5 in. (3.8 x 15.8 x 24.1 cm) Cisco 753: 1.5 x 7.5 x 9.5 in. (3.8 x 19.1 x 24.1 cm) Cisco 760 series:1.6 x 8.3 x 9.6 in. (4.1 x 21.1 x 24.4 cm)
Weight	Cisco 751 and 752: 1.4 lb. (.6 kg) Cisco 753: 1.9 lb. (.85 kg) Cisco 765: 1.6 lb. (0.7 kg) Cisco 766: 1.7 lb. (0.8 kg)
Power supply	External, Wall-mounted on 751 and 752 External, Desktop-mounted on Cisco 753 and Cisco 760 series
Voltage	100-120 or 220-240 VAC on Cisco 751 and 752 100-250 VAC on Cisco 753 and Cisco 760 series
Frequency	50 to 60 Hz
Operating temperature	32 to 120 F (0 to 50 C)
Storage temperature	– 30 to 160 F (– 35 to 70 C)
Operating humidity	20% to 95%, noncondensing

External Connection Requirements

This section contains the external connection requirements for the Cisco 750 and 760 series routers.

- ISDN Basic Rate Interfaces (BRIs)

    — ISDN S/T using an RJ-45 connector

    — ISDN U using an RJ-45 connector

- Ethernet Interfaces supported

    — Ethernet 10BaseT using an RJ-45 connector

    — Ethernet 10Base2 using a BNC connector

    — Ethernet attachment unit interface (AUI) using a DB-15 connector

    — Basic telephone service interface using an RJ-11 connector (on the Cisco 753, 765 and 766 only)

- Console configuration port using a DB-9F 9-pin female connector

Cisco 1000 Series

This section contains the physical specifications and external connection requirements for the Cisco 1000 series, which includes the following models: the Cisco 1001 LAN Extender, the Cisco 1003, Cisco 1004, and the Cisco 1005 routers.

Physical Specifications

Table 17 lists the physical specifications for the Cisco 1000 series models.

Table 17   Cisco 1000 Series Models Physical Specifications

Description	Design Specification
Dimensions (H x W x D)	1.75 x 8.0 x 8.3 in. (4.5 x 20. x 21 cm)
Weight	6.0 lb (2.75 kg)
Input voltage	12 VDC External power supply: 100 to 240 VAC
Frequency	50 to 60 Hz
Power dissipation	12W (maximum), 135.5 Btus/hour
Operating temperature	32 to 104 F (0 to 40 C)
Nonoperating temperature	– 40 to 185 F (– 40 to 85 C)
Humidity (noncondensing)	10 to 90%

External Connection Requirements

This section contains the external connection requirements for the Cisco 1000 series.

- Ethernet attachment unit interface (AUI) using a DB-15 connector

- Ethernet 10BaseT interface using an RJ-45 connector.

- X.21 synchronous serial, data terminal equipment (DTE) interface, using a DB-15 connector.

- V.35 synchronous serial, nonreturn to zero (NRZ) interface, using a 34-pin connector.

- ISDN BRI interface using an RJ-45 connector. The port is labeled "ISDN S/T" on the Cisco 1003 router and "ISDN U" on the Cisco 1004 router. The Cisco 1004 router includes an integrated NT1 device.

- Synchronous serial port using a DB-60 connector. Supports the following interfaces: EIA/TIA-232, EIA/TIA-449, V.35, X.21, and EIA-530.

- EIA/TIA-232 console port using an RJ-45 connector.

- EIA/TIA-232 console/asynchronous serial port using an RJ-45 connector.

- One external PCMCIA Type-2 slot for an integrated modem, V.34 speed.

Cisco 2500 Series

This section contains the physical specifications and external connection requirements for the Cisco 2500 series. The specifications apply to the following Cisco 2500 series models:

- Single LAN routers: 2501, 2502, 2503, 2504, 2520, 2521, 2522, and 2523

- Mission-specific, entry-level routers: 2501CF, 2502CF, 2503I, 2504I, 2520CF, 2520LF, 2521CF, 2521LF, 2522CF, 2522LF, 2523CF, and 2523LF

- Router/hub combinations: 2505, 2507, 2516, 2517, 2518, and 2519

- Access servers: 2509, 2510, 2511, 2512

- Dual LAN routers: 2513, 2514, and 2515

- Modular routers: 2524 and 2525

Physical Specifications

Table 18 lists the physical specifications for Cisco 2500 series.

Table 18   Cisco 2500 Series Physical Specifications

Description	Specification
Dimensions (H x W x D)	Models 2501 to 2516 and 2520 to 2525: 1.75 x 17.5 x 10.56 in. (4.44 x 44.45 x 26.82 cm)
	Models 2517 to 2519: 3.0 x 19.0 in. (7.62 x 48.26 cm)
Weight (average shipping)	Models 2501 to 2516 and 2520 to 2525: 10 lb (4.5 kg)
	Models 2517 to 2519: 12.5 lb (5.7 kg)
Power consumption	For models 2501 to 2525: 40W
Input voltage and frequency, AC power supply	For models 2501 to 2516 and 2520 to 2525: 110 to 220 VAC, 50 to 60 Hz
	For models 2517 to 2519: 90 to 260 VAC, 47 to 63 Hz
Input voltage, DC power supply	40 to 72 VDC
Current rating	For models 2501 to 2516 and 2520 to 2525: 1.0A at 60 Hz, 0.5A at 50 Hz
	For models 2517 to 2519: 5.0A at 60 Hz, 3.5A at 50 Hz
Operating temperature range	For models 2501 to 2516 and 2520 to 2525: 32 to 104 F (0 to 40 C)
	For models 2517 to 2519: 50 to 95 F (10 to 35 C)
Nonoperating temperature range	For models 2501 to 2516 and 2520 to 2525: – 40 to 185 F (– 40 to 85 C)
	For models 2517 to 2519: – 4 to 185 F (– 20 to 85 C)
Humidity (noncondensing)	For models 2501 to 2525: 5 to 95%
Noise level	34 dBa @ 3' (0.914 m)

External Connection Requirements for Fixed-Configuration Models

This section contains the external connection requirements for the Cisco 2500 series. The interfaces available for Cisco 2500 series products vary from model to model.

- Asynchronous serial console and auxiliary ports with RJ-45 connectors.

- Synchronous serial interface with a DB-60 connector. The synchronous serial interface supports the following standards in DTE and DCE mode: EIA/TIA-232, EIA/TIA-449, V.35, and X.21. The EIA-530 standard is supported in DTE only.

- Ethernet attachment unit interface (AUI) IEEE 802.3 with a DB-15 connector or 10BaseT with an RJ-45 connector.

- Token Ring IEEE 802.5 interface with a DB-9 connector or RJ-45 connector.

- ISDN BRI interface with an RJ-45 connector.

- UTP hub ports with RJ-45 connectors.

- The Cisco 2500 series chassis can be mounted in a 19-inch or 24-inch rack, on a wall, or placed on a desktop.

External Connection Requirements for Modular Router Modules

Only two Cisco 2500 series models include removable WAN modules: the Cisco 2524 and the Cisco 2525. The Cisco 2524 and Cisco 2525 routers provide LAN and WAN access in a modular router platform. The Cisco 2524 router includes an Ethernet (AUI or 10BaseT) LAN connection, and the Cisco 2525 router includes a Token Ring (STP or UTP) LAN connection. Both routers can accommodate up to three WAN modules: two synchronous serial and one ISDN.

The ISDN WAN modules are keyed so that you cannot insert them into the synchronous serial WAN slots. A blank slot cover is installed over unused slots to ensure proper air flow inside the chassis.

The synchronous serial WAN modules include the following external connectors:

- 2-wire switched 56-kbps digital service unit/channel service unit (DSU/CSU) WAN module with an RJ-11 connector.

- 4-wire 56/64-kbps DSU/CSU WAN module with an RJ-48S connector.

- Fractional T1/T1 DSU/CSU WAN module with an RJ-48C connector.

- Five-in-one synchronous serial WAN module with a DB-60 serial connector. The five-in-one synchronous serial interface supports the following signaling standards: EIA/TIA-232, EIA/TIA-449, V.35, X.21, and EIA-530.

The ISDN WAN modules include the following external connectors:

- ISDN BRI WAN module with an RJ-45 connector

- ISDN WAN module, with integrated NT1 device, with an RJ-45 connector

Cisco 4000 Series

Following are the physical specifications and external connection requirements for the Cisco 4000 series products, which include the Cisco 4000-M, the Cisco 4500-M, and the Cisco 4700-M.

Physical Specifications

Table 19 contains the physical specifications for the Cisco 4000 series products.

Table 19   Cisco 4000 Series Physical Specifications

Description	Specification
Dimensions (H x W x D)	3.4 x 17.6 x 17.7 in. (8.6 x 44.7 x 43.4 cm)
Weight	24 lb (10.9 kg)
Power (heat) dissipation	200W (682.6 Btu/hr)
Input voltage, current, and frequency	100 to 240 VAC, 3.0 to 1.5A, 47to 63 Hz
Operating temperature	32 to 104 F (0 to 40 C)
Nonoperating temperature	– 40 to 185 F (– 40 to 85 C)
Humidity (noncondensing)	5 to 95%
Air flow and fan noise	Fan rated at 31 cfm, at 52 dBa
Agency approvals	UL 1950, CSA 22.2, TÜV-GS mark, EN 60950, FCC Class A, Canadian DOC Class A, VDE Class B, EN 55022 Class B, VCCI Class 2

External Connection Requirements

This section contains external connection requirements for the Cisco 4000 network processor modules, along with the other connections on the Cisco 4000 chassis.

Network Processor Modules

All Cisco 4000 series models provide a configurable modular router platform using network processor modules (NPMs), individual removable cards used for external network connections.

The Cisco 4000 series routers can support combinations of up to three of the following NPMs:

- One-, two-, or six-port Ethernet

  Ethernet interface supported: IEEE 802.3 using attachment unit interface (AUI), DB-15 connectors, and 10BaseT using RJ-45 connectors.

- One- or two-port Token Ring

  Token Ring interfaces use DB-9 to IEEE 802.5, media attachment unit (MAU) connectors.

- One-port, both single and dual attachment station (DAS), multimode FDDI

  The multimode network processor module connectors are FDDI-standard physical sublayer (PHY) connectors. The media interface connector (MIC) connects to FDDI standard 62.5/125 micron multimode fiber-optic cable. The module also has an optical bypass switch connector using a 6-pin DIN connector.

- One-port dual attachment single-mode FDDI

  The XMTR and RCVR ports use simplex, FC-type connectors.

- Two- or four-port synchronous serial

  Serial interfaces supported by these modules: EIA-530, EIA/TIA-232, EIA/TIA-449, V.35, and X.21. All can be configured as nonreturn to zero inverted (NRZI), nonreturn to zero (NRZ), and DCE or DTE (except EIA-530, which is DTE only). Serial cables have DB-50 connectors for the two port module, and DB-60 connectors for the four port module.

- Four- or eight-port ISDN BRI

  Uses RJ-45 8-pin connectors.

- One-port channelized T1/ISDN PRI

  Uses a 15-pin, DB-15 connector.

- One-port channelized E1/ISDN PRI (balanced or unbalanced)

  Uses a 15-pin, DB-15 connector.

- Four-port serial G.703 (balanced or unbalanced)

  Uses 15-pin, DB-15 connectors.

- One-port ATM (single-mode or multimode) OC-3c

  Uses a duplex SC connector.

- One-port ATM DS-3

  Uses a duplex SC connector.

- One-port ATM E3

Other External Connection Requirements

This section includes the other external connection requirements for Cisco 4000 series systems.

- The data communications equipment (DCE) console port uses a male DB-25 connection, and the data terminal equipment (DTE) auxiliary port uses a female DB-25 connection. (A standard EIA/TIA-232 cable can be used for either.)

- The Cisco 4000 series chassis can be optionally rack- (standard 19 inch and telco), slide-, desk- (top or side), or wall-mounted.

Cisco AS5100 Access Server

This section contains the physical specifications and the external connection requirements for the
Cisco AS5100 access server.

Physical Specifications

Table 20 contains the physical specifications for the AS5100.

Table 20   Cisco AS5100 Access Server Physical Specifications

Specification	Description
AS5100 chassis capacity	Up to 17 front-loaded NACs, and their associated rear-loaded NICs. Two power supplies (both are required)
Power requirements	DC power supply nominal –48 VDC (–42 VDC to –60 VDC) with respect to ground
	AC power supply nominal 120V (90 to 132 VAC) @ 47 to 63 Hz, or strap-selectable nominal 240V (180 to 264 VAC) @ 47 to 63 Hz
Power supply output (maximum)	330W 45A @ +5.2V 2A @ –5 V 3.5A @ +12.2V 3.5A @ –12.2V
Power supply input (maximum)	470W 1604 Btus 4A (DC) 10A (DC)
Operating temperature	32 to 104ºF (0 to 40ºC)
Relative humidity	0-95% noncondensing
Agency approvals	Complies with FCC Part 15 Class A EMI/RFI requirements; complies with FCC Part 68 for nationwide telephone systems; listed by Underwriters' Laboratories (UL), approved by the Canadian Standards Association (CSA), and is Department of Communications (DOC) certified

Table 21 contains the physical specifications for the AS51 NAC and NIC cards.

Table 21   AS51 NAC and NIC Physical Specifications

Specification	Description
Power requirements (maximum)	4A @ +5 VDC, 6.75W 55 mA @ – 5 VDC, 275 mW 50 mA @ +12 VDC, 600 mW 50 mA @ 12 VDC, 600 mW
Dimensions (L x H)	NAC: 12.45 x 6.4 in. (31.62 x 16.26 cm) NIC: 4.85 x 6.4 in. (12.32 x 16.26 cm)
Certification	Complies with FCC Part 15, UL-listed, CSA-approved

Table 22 contains the physical specifications for the Quad Modem NAC and NIC cards.

Table 22   Quad Modem NAC and NIC Physical Specifications

Specification	Description
Power requirements (maximum)	1.35A @ +5 VDC, 6.75W 55 mA @ -5 VDC, 275 mW 50 mA @ +12 VDC, 600 mW 50 mA @ 12 VDC, 600 mW
Dimensions (L x H)	NAC: 12.45 x 6.4 in. (31.62 x 16.26 cm) NIC: 4.85 x 6.4 in. (12.32 x 16.26 cm)
Certification	Complies with FCC Part 15, UL-listed, CSA-approved

Table 23 contains the physical specifications for the T1 NAC and NIC cards.

Table 23   T1 NAC and NIC Physical Specifications

Specification	Description
Power requirements	1.5A @ 5 VDC 0.1A @ 12 VDC 5W
Dimensions (L x H)	NAC: 12.45 x 6.4 in. (31.62 x 16.26 cm) NIC: 4.85 x 6.4 in. (12.32 x 16.26 cm)
Heat	17 Btus

Table 24 contains the physical specifications for the network management NAC card.

Table 24   Network Management NAC Physical Specifications

Specification	Description
Power requirements (maximum)	3.5A @ +5 VDC 20 mA @ – 5 VDC 50 mA @ +12 VDC 50 mA @ – 12 VDC
Dimensions (L x H)	12.45 x 6.4 in. (31.62 x 16.26 cm)
Certification	Complies with FCC Part 15 Class A, FCC Part 68, UL-listed, CSA-approved, and DOC-certified

Table 25 contains the physical specifications for the network management Ethernet NIC card.

Table 25   Network Management Ethernet NIC Physical Specifications

Specification	Description
Power requirements	1.5A @ +5 VDC 50 mA @ +12 VDC 50 mA @ – 12 VDC
Dimensions (L x H)	4.85 x 6.4 in. (12.32 x 16.26 cm)
Certification	Complies with FCC Part 15 Class A, FCC Part 68, UL-listed, CSA-approved, and DOC-certified

External Connection Requirements

This section contains the external connection requirements for the AS5100 access server.

- AS51 NAC and NIC cards

  The AS51 NAC and NIC function together to form 16 asynchronous serial ports using the SCSI II-to-DB-50 breakout cable. The access server module interfaces include Ethernet 10BaseT, asynchronous serial, and synchronous serial. The AS51 NIC provides two 68-pin asynchronous ports that connect to the modem NICs in the Access Server 5100 chassis.

  NAC card

  — Ethernet 10BaseT using an RJ-45 connector.

  — Console port.

    The NAC has an RJ-45 console asynchronous serial port. A connection to a terminal uses an RJ-45-to-DB-25 adapter. Depending on the adapter used, this port becomes a data communications equipment (DCE) device or a data terminal equipment (DTE) device. To use the terminal as a console you should use a DCE RJ-45-to-DB-25 adapter.

  — Auxiliary port.

    An RJ-45 auxiliary asynchronous serial port is included on the NAC. A connection to a modem for network access uses an RJ-45-to-DB-25 adapter. The adapter you use turns this port into a DCE device or a DTE device. A connection to a digital service unit/channel service unit (DSU/CSU) or protocol analyzer uses a DTE RJ-45-to-DB-25 adapter.

  — Synchronous serial interface port.

    Supports the following interfaces: EIA/TIA-530, EIA/TIA-232, EIA/TIA-449, V.35, and X.21.

  NIC card

  — 68-pin asynchronous serial ports.

    Each of the two 68-pin asynchronous serial ports supports eight EIA/TIA-232 serial ports. A supplied breakout cable splits each 68-pin port into two 50-pin connectors, which in turn connect to the quad modem NICs.

- Quad modem cards

  Each chassis houses up to 48 high-speed analog or digital modems. Digital modems connect to the phone system by a direct T1 link through the T1 interface card. Analog modems connect to standard telephone lines through the modem interface card.

The quad modem provides four dial-up modems on a single card. Each modem is capable of supporting V.32 (19.2 kbps) modulation and MNP Levels 1-5 or V.42/V.42 error correction and data compression, or V.34 (28.8 kbps).

The quad modem EIA/TIA-232 NIC provides the physical interface for four EIA/TIA-232 ports via a 50-pin connector. A breakout cable is provided to adapt this interface to standard DB-25/DB-9 EIA/TIA-232 connectors.

- T1 cards

  The T1 NIC and T1 NAC route incoming digital T1 lines to the quad modems.

  The T1 NIC uses RJ-48 connectors. It also provides an RJ-45 connector for the EIA/TIA-232 interface port. The T1 NIC is compatible with an external channel service unit (CSU) if required, and provides a serial interface to the T1 NAC.

- Network management cards

  The network management NAC and NIC manage all the devices in the AS5100 access server using SNMP.

- Two power supplies provides AC or DC power input, and supplies DC power to the installed cards via connectors in the midplane. Both power supplies are required in the chassis.

Cisco AS5200 Universal Access Server

This section contains the physical specifications and external connection requirements of the Cisco AS5200 universal access server.

Physical Specifications

Table 26 lists the physical specifications for the AS5200 access server.

Table 26   Cisco AS5200 Universal Access Server Physical Specifications

Description	Specification
Dimensions (H x W x D)	3.5 x 17.5 x 15 in. two rack units (8.89 x 44.45 x 38.1 cm)
Weight	25 lb (11.4 kg)
Input voltage, AC power supply Current frequency Power dissipation	100 to 240 VAC 1.0 to 2.0A50 to 60 Hz 180W (maximum), 135.5 Btus/hour
Input voltage, DC power supply Maximum input current Typical input current Power dissipation Output voltage	– 48 to – 60 VDC 6.0A 4.0A 180W (maximum) 5.0 VDC
Alarm relay rating: Voltage Current Maximum switching power Maximum switching voltage	 48 VDC 3A 150W 220 VAC
Operating environment	32 to 104 F (0 to 40 C)
Nonoperating temperature	– 40 to 185 F (– 40 to 85 C)
Operating humidity	5 to 95%, noncondensing
Noise level	34 dB @ 3 ft. (0.914 m)

External Connection Requirements

The Cisco AS5200 access server has a 19-inch modular chassis that accommodates up to three feature cards. The feature cards should be a combination of one or two WAN cards and one or two modem carrier cards.

The types of cards and their external connection requirements are as follows:

- Dual T1 Primary Rate Interface (PRI) card with integrated channel service units (CSUs)

  The dual T1 PRI card routes incoming digital T1 lines to the modem modules. It uses RJ-48C connectors.

- Modem carrier card with one or two 12-port modem cards

  The Cisco AS5200 access server can contain 12, 24, 36, or 48 modem ports installed on two carrier cards in the chassis card slots. Each modem carrier card holds up to two, 12-port modem cards. The modem cards connect through the carrier card and the system backplane to the dual T1 PRI card. Transmission or reception is then accomplished on T1 lines connected to the dual T1 PRI card.

A serial connection to the modem can be made through the Ethernet attachment unit interface (AUI) port or the serial ports on the chassis.

A blank slot cover is installed over any unused slots.

Other External Connections

Additional external connections for the Cisco AS5200 are as follows:

- Two serial WAN interface ports

  The serial ports on the Cisco AS5200 are five-in-one synchronous serial using 60-pin, D-type connectors. The interface supports EIA/TIA-232, EIA/TIA-449, V.35, X.21 (NRZ/NRZI and data terminal equipment (DTE)/DCE mode), and EIA-530 (NRZ/NRZI and DTE mode).

- One Ethernet LAN port using an AUI, DB-15 connector

- Console port

  An EIA/TIA-232 (RJ-45) console asynchronous serial port connects to a terminal using an RJ-45 cable and an RJ-45-to-DB-25 adapter or to a PC using an RJ-45 to DB-9 adapter.

- Auxiliary port

  An EIA/TIA-232 (RJ-45) auxiliary asynchronous serial port can connect to a modem for remote maintenance or other access services. The port uses an RJ-45 roll-over cable with a male modem (MMOD) adapter (labeled "Modem") for this connection.

- Alarm port connections

  The three-pin alarm port is a future enhancement that will connect the Cisco AS5200 to an external audio, visual, or other alarm. The alarm port is not supported by current versions of the system software or the feature cards.

- Two Cisco AS5200 power supplies provide AC or DC power input and supply DC power to the installed cards via connectors in the backplane. Either the AC or DC power supply is required in the chassis.

Cisco 7000 Series and 7500 Series

The following are the physical specifications and external connection requirements for the Cisco 7000 series and the Cisco 7500 series. The external connection requirements and rack mount requirements are the same for Cisco 7000 series and Cisco 7500 series. Physical specifications and power supply requirements vary from system to system. This section includes the following systems: the Cisco 7000 series—the Cisco 7000 and the Cisco 7010; the Cisco 7500 series—the Cisco 7505, Cisco 7507, and the Cisco 7513.

Cisco 7000

This section includes the physical specifications and power supply requirements of the Cisco 7000.

Physical Specifications

Table 27 lists the physical specifications for the Cisco 7000.

Table 27   Cisco 7000 Physical Specifications

Description	Specifications
Dimensions (H x W x D)	19.25 x 17.5 x 25.1 in. (48.90 x 44.45 x 63.75 cm)
Weight	Chassis only: 76 lb (34.47 kg)[1]; chassis fully configured: 1 RP[2], 1 SP (or SSP), or RSP7000 and RSP7000CI, 7 interface processors, and 2 power supplies: 145 lb (65.76 kg)
Power supply	700W maximum
Power (heat) dissipation	282W (962.5 Btu/hr), maximum configuration 626W (2136.5 Btu/hr), maximum configuration 530W (1808.9 Btu/hr), typical with maximum configuration
Total power (heat) dissipation	1200W (4095.6 Btu/hr)
Input voltage and frequency	100 to 240 VAC wide input with power factor corrector (PFC), 50 to 60 Hz
AC input rating	12A maximum @ 90 VAC with chassis fully configured (AC-input power supplies)
DC input rating	– 40 volts (V) minimum, – 48V nominal, – 72V maximum (AC-input power supplies)
Airflow	Dual blowers rated at a total of 140 cfm, at a noise level of 58 dBa
Humidity	10 to 90% noncondensing
Agency approvals	Safety: UL 1950, CSA 22.2-950, EN60950, EN41003, AUSTEL TS001, AS/NZS 3260 EMI: FCC Class A, EN55022 Class B, VCCI Class 2

1. The weight of the Cisco 7000 requires that two people be available for the chassis installation.
2. RP = Route Processor. SP = Switch Processor. RSP-7000 = 7000 series Route Switch Processor. RSP7000CI = 7000 series Chassis Interface.

Power Supply Requirements

The Cisco 7000 contains either one 700W AC-input power supply or one 700W DC-input power supply. A second power supply, identical to the first, can be added for redundant power. These power supplies are automatically load sharing and redundant, which means a second power supply can be installed or replaced without interrupting system operation.

Each power supply should be connected to a separate AC or DC source, so that, in case of an input power line or power supply failure, the second power supply maintains uninterrupted system power. Ideally, an uninterruptible powers source (UPS) would be available for each AC-input power supply.

Cisco 7010

This section contains the physical specifications and power supply requirements for the Cisco 7010.

Physical Specifications

Table 28 lists the physical specifications for the Cisco 7010.

Table 28   Cisco 7010 Physical Specifications

Description	Specifications
Dimensions (H x W x D)	10.5 x 17.5 x 17 in. (26.67 x 44.45 x 43.18 cm)
Weight	Chassis only (power supply and fan array): 46 lb (20.87 kg) Chassis fully configured: 1 RP[1], 1 SP (or SSP), or RSP7000 and RSP7000CI, 3 interface processors: 70 lb (31.75 kg)
Power supply	600W maximum
Power dissipation	550W maximum configuration, 540W typical with maximum configuration
Heat dissipation	715W (2440 Btu/hr)
Input voltage and frequency	100 to 240 VAC wide input with power factor corrector (PFC), 50 to 60 Hz
AC input rating (AC-input power supply)	9A maximum at 100 VAC, 4A maximum at 240 VAC with chassis fully configured
DC input rating (DC-input power supply)	– 40 volts DC (VDC) minimum in North America (– 56V in Europe) – 48 VDC nominal in North America (– 60V in Europe) – 52 VDC maximum in North America (– 75V in Europe)
Airflow	Six muffin fans (fan array), side to side through chassis
Operating temperatures	32 to 104 F (0 to 40 C) and – 4 to 149 F (– 20 to 65 C) for nonoperating temperature
Humidity	10 to 90%, noncondensing
Agency approvals	Safety: UL 1950, CSA 22.2-950, EN60950, EN41003, AUSTEL TS001, AS/NZS 3260EMI: FCC Class A, EN60555-2, EN55022 Class B, VDE 0878 Part 3, 30 Class B Immunity: EN55101/2 (ESD), EN55101/3 (RFI), EN55101/4 (Burst), EN55101/5 (Surge), EN55101/6 (Conducted), IEC77B (AC Disturbance)

1. RP = Route Processor. SP = Switch Processor. RSP-7000 = 7000 series Route Switch Processor. RSP7000CI = 7000 series Chassis Interface.

Power Supply Requirements

The Cisco 7010 comes equipped with one 600W AC-input power supply or one 600W DC-input power supply. The AC-input power supply operates on AC input power and supplies DC power to the internal components. The DC-input power supply operates on DC input power and supplies DC power to the internal components.

The AC power receptacle (or DC-input terminal block), power on/off switch, and status LED are on the interface processor end of the power supply. A modular power cord connects the AC power supply to the site power source. A cable retention clip on the power supply AC receptacle prevents the cable from being pulled out accidentally. The DC-input is supplied by a three-lead, 8-AWG cable you provide.

Inside the AC-input or DC-input power supply, two small fans draw cooling air through the power supply interior. The air flows in one side of the supply and out the other side, following the same direction as the chassis cooling air.

Cisco 7505

This section includes the physical specifications and power supply requirements of the Cisco 7505.

Physical Specifications

Table 29 lists the physical specifications for the Cisco 7505.

Table 29   Cisco 7505 Physical Specifications

Description	Specification
High-speed backplane	5-slot, 1.067-Gbps CyBus: 4 interface processor slots plus the RSP slot
Dimensions (H x W x D)	10.5 x 17.5 x 17.0 in. (26.67 x 44.45 x 43.18 cm) Chassis depth including power cord and cable management fixture is 19 in. (48.26 cm)
Weight	Chassis only (including power supply and fan array): 46 lb (20.87 kg) Chassis fully configured with RSP1 and 4 interface processors: 70 lb (31.75 kg)
Power dissipation	600W maximum configuration with AC-input power supply 600W maximum configuration with DC-input power supply 540W typical with maximum configuration
Heat dissipation	715W (2440 Btus/hr)
AC-input voltage	100 to 240 volts AC (VAC), wide input with power factor corrector (PFC)
Frequency	50 to 60 Hz
AC-input current	9A maximum @ 100 VAC 4A maximum @ 240 VAC at 600W
DC-input voltage	–40 volts DC (VDC) minimum in North America (–56 VDC in the Europe Community) –48 VDC nominal in North America (–60 VDC in the Europe Community) –52 VDC maximum in North America (–72 VDC in the Europe Community) 20A maximum at –48 VDC and 16A maximum @ –60 VDC
DC voltages supplied and maximum, steady-state current ratings for AC- and DC-input	+5.2 VDC @ 75 amps (A) +12 VDC @ 15A – 12 VDC @ 3A +24 VDC @ 5A

Description	Specification
DC-input cable	8 AWG (American Wire Gauge); recommended minimum wire gauge
DC-input hold-up time	10 milliseconds (ms) of output after the DC input has been interrupted
Airflow	Side-to-side through chassis by variable-speed, 6-fan array
Operating temperature	32 to 104 F (0 to 40 C)
Nonoperating temperature	–4 to 149 F (–20 to 65 C)
Relative humidity	10 to 90%, noncondensing

Power Supply Requirements

The Cisco 7505 comes equipped with one 600W AC-input power supply or one 600W DC-input power supply. The AC-input power supply operates on AC-input power and supplies DC power to the internal components. The DC-input power supply operates on DC-input power and supplies DC power to the internal components.

The AC power receptacle (or DC-input terminal block), power on/off switch (or circuit breaker-type switch on the DC-input power supply), and status LED are on the interface processor end of the power supply. A modular power cable connects the AC-input power supply to the site AC power source. A cable retention clip on the power supply AC receptacle prevents the cable from being pulled out accidentally. The DC-input is supplied by a three-lead, 8-AWG cable that you provide.

Inside the AC-input or DC-input power supply, two small fans draw cooling air through the power supply interior. The air flows in one side of the supply and out the other side, following the same direction as the chassis cooling air.

Cisco 7507

This section includes the physical specifications and power supply requirements of the Cisco 7507.

Physical Specifications

Table 30 lists the physical specifications for the Cisco 7507.

Table 30   Cisco 7507 Physical Specifications

Description	Specifications
High-speed backplane	1.067-Gbps CyBus (the 7507 has dual CyBuses), 7 slots
Dimensions (H x W x D)	19.25 x 17.5 x 25.1 in. (48.90 x 44.45 x 63.75 cm) Chassis depth including power cable is 28 in. (71.12 cm).
Weight	Chassis only: 76 lb (34.47 kg) Chassis fully configured with 2 RSP2s, 5 interface processors, and 2 power supplies: 145 lb (65.76 kg)
DC-input voltage	–40 volts direct current (VDC) minimum –48 VDC nominal –72 VDC maximum
DC voltages supplied and steady-state maximum current ratings	+5.2V @ 100 amps (A) +12V @ 15A –12V @ 3A +24V @ 5A

Description	Specifications
DC-input power	1000 watts (W)
DC-input power supply hold-up time specification	10 milliseconds (ms) of output after the input has been interrupted
DC-input wiring	8 AWG (American Wire Gauge) wire, which you provide
Power supply	700W maximum (AC-input and DC-input power supplies)
Power dissipation	626W maximum configuration, 530W typical with maximum configuration
Heat dissipation	1200W (4100 Btu/hr)
Input voltage	100 to 240 VAC wide input with power factor correction (PFC)
Frequency	50 to 60 Hz (hertz) autoranging
AC current rating	12A maximum at 100 VAC, 6A maximum at 240 VAC with the chassis fully configured
Airflow	140 cfm (cubic feet per minute) through the system blower
Operating temperature	32 to 104 F (0 to 40 C)
Nonoperating temperature	–4 to 149 F (–20 to 65 C)
Humidity	10 to 90%, noncondensing

Power Supply Requirements

The Cisco 7507 contains either one 700W AC-input power supply or one 700W DC-input power supply. An optional second power supply, identical to the first, can be added for redundant power. These power supplies are automatically load-sharing and redundant, which means a second power supply can be installed or replaced without interrupting system operation.

Each power supply should be connected to a separate AC or DC source, so that, in case of an input power line or power supply failure, the second power supply maintains uninterrupted system power. Ideally, an uninterruptible powers source (UPS) would be available for each AC-input power supply.

Cisco 7513

This section includes the physical specifications and power supply requirements of the Cisco 7513.

Physical Specifications

Table 31 lists the physical specifications for the Cisco 7513.

Table 31   Cisco 7513 Physical Specifications

Description	Specification
Backplane	13-slot, two 1.0677-Gbps CyBuses: 11 interface processor slots plus the two RSP2 slots
Dimensions (H x W x D)	33.75 x 17.5 x 22 in. (85.73 x 44.45 x 55.88 cm) Chassis width including rack-mount flanges is 18.93 in (48.1 cm) Chassis depth including power cord and cable management fixture is 24 in. (60.96 cm)

Description	Specification
Weight	Chassis with blower module: 75 lb (34.02 kg) Chassis with blower module and 1 power supply: 100 lb (45.36 kg) Chassis with blower module and 2 power supplies: 125 lb (56.7 kg) Chassis with blower module, 2 power supplies, and all slots filled: 160 lb (72.58 kg) Each processor module weighs 2.5 lb (1.13 kg)
Power dissipation	1600W with a maximum configuration and one AC-input power supply 1600W with a maximum configuration and one DC-input power supply 1700W nominal with a maximum configuration and two AC- or DC-input power supplies
Heat dissipation	1600W (5461 Btu/hr)
AC-input voltage and current	100 VAC[1] at 16 amps (A) maximum[2] wide input with power factor correction (PFC) 240 VAC at 7A maximum
Frequency	50/60 Hz
AC-input cable	12 AWG (American Wire Gauge), with three-leads, an IEC-320 receptacle on the power supply end, and a country-dependent plug on the power source end
DC-input voltage and current	–48 VDC[3] nominal, at 35 amps (A) in North America (–60 VDC at 35A in the E.C.)
DC-input cable	8 AWG recommended minimum, with three conductors rated for at least 194 F (90 C)
DC voltages supplied and maximum, steady-state current (AC- and DC-input)	+5.2 VDC @ 75 A +12 VDC @ 15A –12 VDC @ 3A +24 VDC @ 5A
Airflow and noise level	Through chassis by variable-speed blower; 62 to 70 dBA
Temperature	32 to 104 F (0 to 40 C), operating; – 4 to 149 F (– 20 to 65 C), nonoperating
Relative humidity	10 to 90%, noncondensing

1. VAC = volts alternating current.
2. Each AC-input power supply operating at 120 VAC requires a dedicated 20A service and a 20A receptacle.
3. VDC = volts direct current.

Power Supply Requirements

The Cisco 7513 contains either one 1200W AC-input power supply or one 1200W DC-input power supply. An optional second power supply, identical to the first, can be added for redundant power. These power supplies are automatically load sharing and redundant, which means a second power supply can be installed or replaced without interrupting system operation. Each power supply should be connected to a separate AC or DC source, so that, in case of an input power line or power supply failure, the second power supply maintains uninterrupted system power. Ideally, an uninterruptible power source (UPS) would be available for each AC-input power supply.

Note The Cisco 7513 requires that a 20-amp (A) service be available at your site. Wiring codes prevent 20A plugs from being used with most equipment rack power strips. The installation must comply with all applicable codes. The ground bond fastening hardware should be of compatible material and preclude loosening, deterioration, and electro-chemical corrosion of hardware and joined material. Installation is approved for use with copper conductors only. Attachment of the chassis ground receptacles to the central office or other interior ground system should be made with a Number 6 AWG copper ground conductor as a minimum. The Cisco 7513 chassis employs two threaded, M4 x .7 chassis ground receptacles. These receptacles are intended to be bonded directly to the central office or other interior ground system, and are located on each side of the rear of the chassis. The chassis ground receptacles require M4 bolts and locking hardware, which are not included.

Follow these precautions and recommendations when planning power connections to the router:

- Check the power at your site before installation and periodically after installation to ensure that you are receiving clean power. Install a power conditioner if necessary.

- Provide redundant power sources for each power supply installed in the chassis.

- For AC-input installations, install an uninterruptible power source where possible.

- Install proper grounding to avoid damage from lightning and power surges.

- For both AC-input and DC-input installations, observe the power specifications listed in Table 31.

The AC-input-powered chassis operating at 120 VAC requires, at the minimum, a 20-amp service, with a 20-amp receptacle at the power source. The power cable supplied with the chassis uses a 20-amp plug. Figure 1 shows the cable features needed to connect the 20-amp plug to your AC source.

Figure 1   20-amp AC Power Cable Connector, Plug, and 20-amp Receptacle

IEC 320 20-amp connector
(to the AC power supply)   20-amp plug   20-amp receptacle
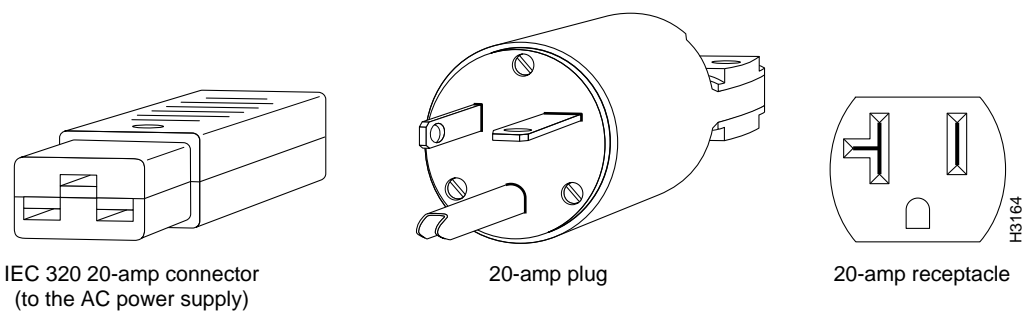
Note Wiring codes prevent 20A plugs from being used with most equipment rack power strips.

The DC powered chassis requires a minimum 35A dedicated service (at – 48VDC). We recommend that you use an 8 AWG, highly flexible, stranded cable for the DC power connections. The stranded cable should be routed through conduit at your site, and the conduit should attach to the terminal block cover on the power supply. (See Figure 2.)
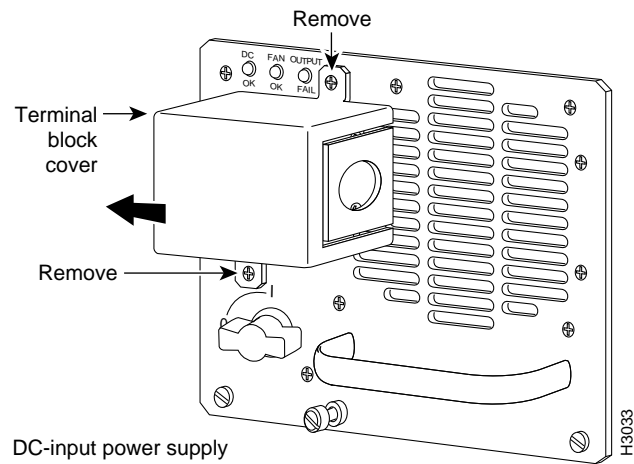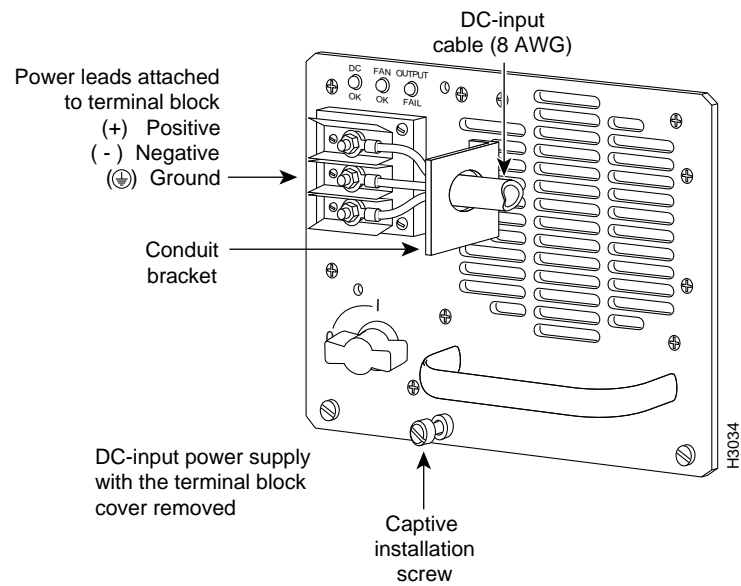
Figure 2   Terminal Block Cover

Figure 3 shows the conductor preparation for the DC-input cable connections.

Figure 3   DC Power Cable Connection to Terminal Block

Cisco 7000 Series and 7500 Series External Connection Requirements

This section lists the external connection requirements for the Cisco 7000 series and 7500 series.

- Asynchronous Transfer Mode (ATM) Interface Processor (AIP)

  All AIP interfaces are full duplex. Use the appropriate ATM interface cable to connect the AIP to an external ATM network.

  The AIP supports the following interface connectors:

  — Transparent Asynchronous Transmitter/Receiver Interface (TAXI) multimode fiber-optic using a MIC connector

  — SONET/SDH using simplex or duplex SC connectors

  — SONET/SDH using ST2 connectors

  — E3 using a coaxial BNC connector

  — DS3 using a coaxial BNC connector

- Ethernet Interface Processor (EIP)

  Each Ethernet port on the EIP requires a connection to an Ethernet transceiver with a transceiver cable, or to an attachment unit with an AUI. Some Ethernet transceivers, usually 10BaseT, can connect directly to the EIP port.

- Fast Ethernet Interface Processor (FEIP)

  — The MII port may be connected to your network directly with an MII cable, or may be connected through a 100BaseT or 100BaseF transceiver.

  — RJ-45 ports do not require a transceiver.

Note A single 100BaseT port adapter can use either the RJ-45 (or optical-fiber) connection or the MII connection. If you have two port adapters on your FEIP, you can use either one of the two connections on each port adapter, but not both connections on each port adapter simultaneously.

- Token Ring Interface Processor (TRIP)

  Token Ring MAU connectors provide a direct connection between the TRIP and the ring.

- Fiber Distributed Data Interface (FDDI) Interface Processor (FIP)

  Both single-mode and multimode, single and dual attachment connections are available and can be combined on one FIP. Fiber-optic cable connects directly to FIP ports using SC connectors for single mode and MIC connectors for multimode. Single-mode uses separate transmit and receive cables. Multimode uses one transmit/receive cable for each physical sublayer (PHY) interface.

- Optical bypass switch connector (6-pin DIN) on the Multimode/Multimode interface.

- Fast Serial Interface Processor (FSIP)

  All FSIP ports support any available interface type and mode. The serial adapter cable determines the electrical interface type and mode of the port to which it is connected. E1-G.703/G.704, EIA/TIA-232, EIA/TIA-449, V.35, and X.21 interfaces are available in data terminal equipment (DTE) mode with a plug at the network end and in DCE mode with a receptacle at the network end. EIA-530 is available only in DTE mode with a plug.

- High-Speed Serial Interface (HSSI) Interface Processor (HIP)

  The HIP port functions as a DTE when it is connected to a DSU for a standard HSSI connection; it can also be connected to a collocated router with a null-modem cable. Connecting the router to an HSSI network uses an HSSI interface cable between the HIP port and the DSU. HSSI cable ends are identical.

- Channel Interface Processor (CIP)

  The CIP has two channel adaptors, a bus and tag adapter and an ESCON adapter. The bus and tag adapter is called a Parallel Channel Adapter (PCA), and the ESCON adapter is called an ESCON Channel Adapter (ECA). The PCA uses 78-pin connectors for a Y cable. The ECA uses a fiber-optic ESCON cable with duplex connectors.

- Multichannel Interface Processor (MIP)

  Two standard T1 serial cables may be used to connect the MIP: null-modem and straight-through. These interface cables are used to connect your MIPs to additional MIPs or to external CSUs, respectively.

  You must use null-modem cables for MIP-to-MIP connections and straight-through cables for MIP-to-CSU connections. The T1 cables used to connect the MIP with external T1 equipment have DB-15 male connectors on each end.

  Four types of E1 cable may be used to connect the MIP: BNC, Twinax, DB-15, and RJ-45. The E1 cables used to connect the MIP with external E1 equipment have a DB-15 male connector on the MIP end.

- Versatile Interface Processor (VIP)

  The VIP uses port adapters that provide the following electrical interfaces: synchronous serial using EIA/TIA-232, EIA/TIA-449, V.35, and X.21 DTE and DCE cables, and EIA-530 DTE cables only; IEEE 802.5 Token Ring using RJ-45, IEEE 802.3 Ethernet 10BaseT using RJ-45, IEEE 802.3u Fast Ethernet 100BaseTX and 100BaseFX using MII and RJ-45 or MII and SC-type optical-fiber.

- Second-Generation Versatile Interface Processor (VIP2)

  The VIP2 uses port adapters that provide the following electrical interfaces: synchronous serial using EIA/TIA-232, EIA/TIA-449, V.35, and X.21 DTE and DCE cables, and EIA-530 DTE cables only; IEEE 802.5 Token Ring using RJ-45; IEEE 802.3 Ethernet 10BaseT using RJ-45; IEEE 802.3 Ethernet 10BaseFL using ST-type multimode, optical-fiber; IEEE 802.3u Fast Ethernet 100BaseTX and 100BaseFX using MII and RJ-45 or MII and SC-type optical-fiber; and single-mode and multimode FDDI using MIC and SC-type optical-fiber.

Note The VIP2 requires that the Cisco 7000 series system has the 7000 Series Route Switch Processor (RSP7000) and the 7000 Series Chassis Interface (RSP7000CI) installed.

- The data communications equipment (DCE) console port uses a male DB-25 connection, and the data terminal equipment (DTE) auxiliary port uses a female DB-25 connection.
  (A standard EIA/TIA-232 cable can be used for either.)

Rack-Mount Requirements

The Cisco 7000 series and 7500 series operate as either freestanding or rack-mounted units. An optional rack-mount kit is available for mounting the chassis in an EIA-310C standard 19-inch equipment rack or in a Telco-type rack. When the system is not mounted in a rack, place it on the floor or on a sturdy platform. Do not stack the chassis on other Cisco 7000 series, 7500 series, or any other equipment.

Note The Cisco 7000, Cisco 7507, and Cisco 7513 use the same rack-mount kit, but have different rack-mounting applications and requirements, which are discussed in the documentation that ships with the rack-mount kit.

Cisco LightStream 1010

This section contains the physical specifications and external connection requirements for the LightStream 1010 ATM switch.

Physical Specifications

Table 32 lists the physical specifications for the Cisco LightStream 1010.

Table 32   Cisco Light Stream 1010 Physical Specifications

Specification	Description
Dimensions (H x W x D)	Chassis: 10.5 x 17.2 x 18.1 in. (26.7 x 43.7 x 46.1 cm); standard 19-inch rack mount ASP[1] and CAM: 1.2 x 14.4 x 16.0 in. (3.0 x 36.6 x 40.6 cm) PAM[2]: 1.2 x 6.5 x 10 in. (3.0 x 16.5 x 25.4 cm)
Weight	Empty: 43 lb (19.5 kg) Fully loaded: approximately 85 lb (39 kg) (depends on loading)
Power supply	Maximum power budget: 9.8A @ 115 VAC, 60 Hz 4.9A @ 230 VAC, 50 Hz Auto sensing limits: 100-127/200-240 VAC, 8/4A, 47-63 Hz Maximum wattage: 376 watts (W)
Altitude	– 500 ft. to 10,000 ft. (– 52 m to 3,048 m)
Temperature	32 F to 104 F (0 C to 40 C)
Relative humidity	10 to 90% noncondensing
Safety certifications	UL 1950 EN 60950 CSA-C22.2 No. 950-93 Electromagnetic emissions certifications FCC Class A (Part 15) EN 55022 Class B CE Mark VCCI Class II

1. ASP = ATM Switch Processor.
2. PAM = Port adapter module.

External Connection Requirements

The LightStream 1010 uses a five-slot chassis with an ATM backplane and fan tray. It has the following external connection requirements:

- ATM Switch Processor (ASP)

    — Console and Auxiliary (AUX) serial port

    Two asynchronous EIA/TIA-232 serial ports on the ASP, the console and auxiliary ports, provide the means for connecting a terminal, modem, or other device for configuring and managing the system. A data communications equipment (DCE) EIA/TIA-232 (female connector) receptacle console port on the ASP provides a direct connection for a console terminal.

    The adjacent data terminal equipment (DTE) EIA/TIA-232 (male connector) plug auxiliary port supports flow control and is often used to connect a modem, a channel service unit (CSU), or other optional equipment for Telnet management of the attached device.

— Ethernet port

The Ethernet management RJ-45 port may be used to connect a management workstation and enables SNMP management of the LightStream 1010 switch.

- Feature card

The feature card is a daughter card of the ASP module and implements a number of value-add capabilities over and above the base switch mechanisms.

- Port adapter module carrier

The port adapter module carrier (CAM) may be installed in any slot, except slot number 2, in the LightStream 1010 and allows any combination of port adapter modules (PAMs) to be installed with a maximum of two PAMs per CAM. Port adapters are numbered 0 and 1, with 0 on the left, facing the rear of the switch.

— 155-MM port adapter module

Provides connections for four multimode fiber-optic interfaces using four duplex SC connectors.

— 155-SM port adapter module

Provides connections for four single-mode fiber-optic interfaces using SC connectors.

— 155-UTP port adapter module

Provides connections to four UTP interfaces using RJ-45 connectors.

— DS-3 port adapter module

Provides connections to two DS-3 interfaces using BNC coaxial connectors.

— E3 port adapter module

Provides connections to two E3 interfaces using BNC coaxial connectors.

— 622-SM port adapter module

Provides a connection to an OC12 interface using a duplex SC, single-mode, fiber-optic connector.

— System backplane

The high-speed backplane operates at 5 Gbps. The backplane provides the connection between the power supplies, the ASP, the port adapter modules, and the backbone. The backplane slots are numbered 0 through 4, with 0 at the top of the card cage and 4 at the bottom.

Power Supply Requirements

The LightStream 1010 ATM switch comes equipped with one 350W AC-input power supply. An optional second power supply, identical to the first, can be added for redundant power. Dual power supplies are automatically load sharing and redundant, which means that a second power supply can be installed or replaced without interrupting system operation.

When two power supplies are installed and both are turned on, each concurrently provides about half of the required power to the system. If one of the power supplies fails, the second power supply immediately ramps up to full power to maintain uninterrupted system operation. Load sharing and fault tolerance are automatically enabled when the second power supply is installed; no software configuration is required.

Each power supply can be connected to a separate AC source so that, in case of an input power line or power supply failure, the second power supply maintains uninterrupted system power.

Ventilation Requirements

The field-replaceable system fan assembly provides cooling air for the ASP, interface modules, and backplane. The fan assembly is located inside the chassis.

An internal fan in each power supply draws cooling air from the front of the chassis through the power supply and out the rear of the chassis. An air dam keeps the power-supply airflow separate from that of the rest of the chassis, which is cooled by the fan assembly.

When you are facing the front of the chassis, the fan assembly draws cool air from the right side of the chassis to cool the modules. The exhaust air is forced out the left side of the chassis.

Sensors on the ASP monitor the internal chassis air temperatures. If the air temperature at the sensor exceeds a desired threshold, the environmental monitor displays warning messages.

Cisco LightStream 2020

This section contains the physical specifications, external connection requirements, power supply requirements, and ventilation requirements for the Cisco LightStream 2020 ATM switch.

Physical Specifications

Table 33 lists the dimension and environmental specifications for the LightStream 2020.

Table 33   LightStream 2020 Switch Physical Specifications

Specification	Description
Dimensions (H x W x D)	26.07 x 18.91 x 24.73 in. (66.2 x x 48.0 62.8 cm)
Operating temperature at sea level (760 mm Hg)[1]	41° to 104° F (5° to 40° C)
Relative operating humidity	10% to 90% noncondensing
Altitude[1]	Up to 10,000 feet (3048 m)
Nonoperating temperature	-4° to 140° F (-20° to 60° C)
Nonoperating humidity	10% to 95% noncondensing
Air quality	The LightStream 2020 is designed to run in a noncorrosive, relatively dust-free environment.

1. Reduce the maximum operating temperature by 1° F ($.56\,^o$ C) for every 1000 feet (304.8 m) of altitude above 10,000 feet (3048 m).

Table 34 shows how to calculate the weight of a LightStream 2020 system.

Table 34   Calculating the Weight of a LightStream 2020

System Configuration	Weight
Base system/AC power[1]	96.0 lb (43.6 kg)
Redundant base system[2]/AC power	118.0 lb (53.6 kg)
Base system/DC power	91.0 lb (41 kg)
Redundant base system/DC power	108.0 lb (49 kg)
Optional components:	
Interface module (up to nine modules)	3.75 lb (1.7 kg)
Fantail[3] (up to 18 fantails)	1.9 lb (0.9 kg)
Example:	
Base system/AC power	96.0 lb
With four medium-speed modules (4 x 3.75 lb)	15.0 lb
With two low-speed modules (2 x 3.75 lb)	07.5 lb
With four fantails (4 x 1.9 lb)	07.6 lb
Total Weight	126.1 lb

1. Base system includes chassis, two blowers, power supply, disk assembly, network processor module, and switch card.
2. Redundant base system includes chassis, two blowers, two power supplies, two disk assemblies, two network processor modules, and two switch cards.
3. All low-speed and serial interface modules require fantails. T3, E3, and E1 CEMAC modules may also require fantails, depending on mode of operation.

To ensure that your heating, ventilation, and air conditioning system is capable of maintaining the proper operating temperature range for your LightStream 2020 switch, refer to the heat dissipation information provided in Table 35.

Table 35   LightStream 2020 Power Consumption/Heat Dissipation

Component	Power Consumption	Heat Dissipation
Base system	335W	1145 Btu/hr
Redundant base system	445W	1525 Btu/hr
Optional components:		
Low-speed modules	65W	225 Btu/hr
Medium-speed modules	65W	225 Btu/hr
Packet modules	55W	190 Btu/hr
Cell modules	30W	105 Btu/hr
Maximum configuration[1]	965W	3325 Btu/hr

1. Redundant base system with 8 low-speed or medium-speed modules.

Table 36 lists the power requirements of the LightStream 2020.

Table 36   LightStream 2020 Site Power Requirements

Power Option	Voltage	Current
AC	100 to 240V	20A to 10A
DC	48V	24A

Table 37 lists the AC power ratings for the LightStream 2020.

Table 37   LightStream 2020 AC Power Ratings

Specification	Description
Inlet power connector	IEC 320 C20
Input voltage frequency phase	100 to 240 VAC, 50 to 60 Hz single
Input current	16A to 8A
Power consumption[1]	975W maximum
Heat dissipation	3330 Btu/hr maximum

1. See Table 35 for additional power-related information.

Table 38 lists the DC power ratings for the LightStream 2020.

Table 38   LightStream 2020 DC Power Ratings

Specification	Description
Input connections	Support for up to 2 separate – 48 VDC input feeds via 3-position terminal blocks
Input voltage	– 43 to – 60VDC
Input current	24A
Power consumption[1]	975W maximum
Heat dissipation	3330 Btu/hr maximum

1. See Table 35 for additional power-related information.

External Connection Requirements

This section contains the external connection requirements for the Cisco LightStream 2020. External connectors attach to access cards and fantails on the interface modules of the LightStream 2020. The following interface modules are listed in this section:

- Cell line card

- Packet line card

- Fiber Ethernet access card

- FDDI access card

- T1 and E1 circuit emulation access card

- Serial access card

Cell Line Card

The cell line card is designed to support up to 15 ports. It supports the following access cards and fantails:

- OC-3c multimode access card (OC3AC MM) uses duplex SC connectors for up to two ports

- OC-3c single-mode access card (OC3AC SM) uses ST connectors for up to two ports

- E3 access card (E3AC)

  E3ACs are available in 8-port or 4-port versions. Each port has two SMB connectors.

  The E3 access card contains internal digital service units/channel service units (DSU/CSUs) that can connect directly to an E3 line. E3 access card ports can also connect LightStream 2020 nodes directly at distances up to 1250 feet (381 meters).

- T3 access card (T3AC)

  T3ACs are available in 8-port or 4-port versions. Each port has two SMB connectors. Each connector is cabled to a 75-ohm BNC coaxial connector on the fantail that provides DS3-compliant connections.

  Each access card contains internal DSU/CSUs that can connect directly to a leased T3 line. T3 access card ports can also connect LightStream 2020 nodes directly at distances up to 900 feet (274 meters).

- T3/E3 Fantails

  Certain interface modules support more ports than can be accommodated on the access cards. T3/E3 fantails provide ports for cell line card/T3 modules and cell line card/E3 modules.

  T3/E3 fantails are available in four-port and eight-port versions.

  The fantail has 8 or 16 BNC connectors, one for transmitting (TX) and one for receiving (RX) on each port. The fantail measures 1.75 inches (1 rack unit, or 4.5 cm) high by 19 inches (48.3 cm) wide. It is designed to fit standard 19-inch equipment racks. Each T3/E3 fantail includes a special cable harness to connect the fantail to its access card.

Packet Line Card

The packet line card supports the following access cards:

- Ethernet access card

  The Ethernet access card operates in conjunction with a packet line card. Each card supports up to eight IEEE 802.3 Ethernet ports. There are a total of ten connectors for the eight ports.

  — Six of the ports have a single RJ-45 female connector (ports 1 to 6)

  — Two of the ports have two connectors: an RJ-45 female connector and a DB-15 female connector (ports 0 and 7)

  These ports support the following interfaces:

  10BaseT twisted pair Ethernet (RJ-45)

  10Base5 (thick wire) Ethernet (DB-15 attachment unit interface [AUI])

  10Base2 (thin wire) Ethernet (DB-15 AUI)

  10BaseFL (fiber) Ethernet (DB-15 AUI)

Note   Only one of the two connectors for each of these ports can be used at a time.

- Fiber Ethernet access card

  Each fiber Ethernet access card supports up to eight 802.3 Ethernet 10BaseFL ports. For each port, the fiber Ethernet access card has two ST connectors that support a multimode fiber interface. One connector is for the receive channel and the other is for the transmit channel. There are a total of 16 connectors on the card.

- FDDI access card

  Each FDDI access card supports two multimode FDDI ports. Each port consists of two media interface connectors (MIC), keyed and labeled as MIC A and MIC B. One 6-pin DIN connector per port is provided for an optional optical bypass cable.

- T1 and E1 circuit emulation access cards

  The circuit emulation access cards have a single 50-pin champ (or "telco") I/O connector, to which you attach a fanout device to support up to eight ports. The necessary connectors are provided by fantail devices.

- E1 fantails

  The E1 fantail provides 75-ohm ports for E1 circuit emulation access card modules. The fantail measures 3.27 inches (8.3 cm) high by 19 inches (48.3 cm) wide. It is designed to fit standard 19-inch equipment racks. Two versions of the E1 fantail are available:

  — E1 fantail with BNC connectors

  — E1 fantail with SMZ connectors

  Each E1 fantail supports up to 12 ports with 24 connectors—one for transmitting and one for receiving on each port. (E1 fantails currently support a maximum of eight ports because the circuit emulation access card supports a maximum of eight ports.)

- Serial access card

  The serial access card supports up to eight full-duplex serial I/O ports that can be frame forwarding ports, Frame Relay ports, or a combination of the two. To accommodate those ports, the card has two 100-pin connectors. These connectors can be attached to interface-specific fantails (V.35, EIA/TIA-449, or X.21) that hold the connectors for the I/O ports.

- External DSU/CSUs

  Access to T1 (DS1) or E1 lines is accomplished through the use of external data service units and channel service units (DSUs/CSUs) connected to EIA/TIA-232 ports on the V.35 or EIA/TIA-449 fantails.

  Each line on the serial access card includes a separate interface to control the external DSU/CSU. The control interface is supported by 9-pin male connectors for each port on the V.35 and EIA/TIA-449 fantails. (X.21 lines do not require DSU/CSU control ports.)

Low-Speed Line Card

A low-speed line card configured as an edge card provides eight full-duplex serial lines. The card supports Frame Forwarding and Frame Relay interfaces, and a single card can have any mix of Frame Relay and Frame Forwarding ports. Physical line interfaces include V.35, X.21, and EIA/TIA-449.

- External DSU/CSU for the low-speed line card

  Access to T1 (DS1) or E1 lines is accomplished through the use of external DSUs/CSUs connected to fantails over V.35 or EIA/TIA-449 serial interfaces.

  Each line on the low-speed line card includes a separate interface to control the external DSU/CSU. The control interface is supported by 9-pin male connectors for each port on the V.35 and EIA/TIA-449 fantails. (X.21 lines do not require DSU/CSU control ports.)

- Low-speed access card

  The V.35/EIA/TIA-449/X.21 low-speed access card operates in conjunction with the low-speed line card. The card supports up to eight I/O ports. To accommodate those ports, the card has two 100-pin connectors. These connectors can be attached to interface-specific fantails (V.35, EIA/TIA-449, or X.21) that hold the connectors for the I/O ports.

- Serial and low-speed fantails

  Certain interface modules support more ports than can be accommodated on the access cards. The necessary connectors are provided by fantail devices. Fantails provide ports for serial interface modules and low-speed interface modules. Serial speed fantails measure 1.75 inches (1 rack unit or 4.5 cm) high by 19 inches (48.3 cm) wide, and weigh 2 lb (0.9 kg). They are designed to fit standard 19-inch equipment racks.

Three types of fantails are available for these modules:

— The V.35 fantail has four V.35 data terminal equipment (DTE) ports, using four ISO 2593 connectors.

— The EIA/TIA-449 fantail has four EIA/TIA-449 DTE ports, using male DB-37 connectors.

— The X.21 fantail has eight X.21 ports, using female DB-15 connectors.

Using switches on the X.21 fantail, each X.21 port can be set to either DTE or DCE mode. The connectors on the fantail are female, the standard for DCE. If you set an X.21 port to be a DTE, you must attach a 15-pin male-to-male gender converter to change the connector on the fantail from female to male.

DSU/CSU control ports

— In addition to the four port connectors, each V.35 and EIA/TIA-449 fantail has four 9-pin male D-type EIA/TIA-232 connectors for DSU/CSU control ports, also known as craft ports. X.21 fantails do not have DSU/CSU connectors.

Medium-Speed Line Card

This section describes medium-speed line and access cards.

- Medium-speed edge card

  A single access card for each medium-speed edge card supports two ports. (No fantails are needed for medium-speed edge ports.) Three medium-speed access cards are available; one supports DS3/T3 lines, and the other two support E3 lines. The medium-speed edge card handles ATM UNI traffic between the LightStream 2020 network and other ATM devices.

- Medium-speed trunk card

  A single access card for each medium-speed trunk card supports two ports. (No fantails are needed for medium-speed trunk ports.) Three medium-speed access cards are available; one supports DS3/T3 lines, and the other two support E3 lines. All cards labeled MSC on the bulkhead are functionally equivalent.

- E3 medium-speed access card

  E3 medium-speed access cards, labeled MSAC, support up to two ports each. Each port has two 75-ohm BNC coaxial connectors that provide G.703-compliant connections. One connector is for the receive channel (Rx), and the other is for the transmit channel (Tx).

- T3 medium-speed access card

  T3 medium-speed access cards, labeled MSAC, support up to two ports each.

  Each T3 medium-speed access card has four 75-ohm BNC coaxial connectors that provide DS3-compliant connections. Each port consists of two connectors: one for the receive channel (Rx) and one for the transmit channel (Tx).

  Each access card contains internal DSU/CSUs that can connect directly to a leased T3 line. T3 access card ports can also connect LightStream 2020 nodes directly at distances up to 900 feet (274 meters).

Network Processor Access Card

The network processor access card supports one Ethernet port and a pair of serial ports.

Power Supply Requirements

In an LightStream 2020 switch, a bulk power tray unit converts power from an external source to bulk DC voltage before distributing DC power to the individual function and switch cards. The nominal voltage of the bulk power unit is –48 VDC.

There are up to two power trays in each chassis; each power tray is a field replaceable unit (FRU). If there are two power trays, both are connected to a 48-volt rail so that either tray can drive the entire system.

The power tray slots, designated A (on top) and B (on the bottom), are accessible from the rear of the chassis.

LightStream 2020 systems are available with two power options:

- AC-powered systems for sites with alternating current (100 to 240 VAC, 50/60 Hz)

  AC power supplies accept input power over a continuous range from 100 VAC to 240 VAC at 50 or 60 Hz. No adjustment or configuration is required. Each AC power tray has one recessed male power inlet that conforms to IEC standard 320 C20; it requires a power cord with an IEC 320 C19 connector.

  If a system has two power trays, the trays must be plugged into separate electrical circuits for true redundancy.

- DC-powered systems for sites with direct current (–48 VDC)

  DC-powered LightStream 2020 systems accept power over a continuous range from –43 VDC to – 60 VDC. No adjustment or configuration is required. Power from an external –48 VDC source is brought into the system by the DC power tray.

  DC-powered LightStream 2020 systems do not use detachable power cords; they must be permanently wired to a DC power source by qualified service personnel. Systems with the optional second power tray can be wired from a dual power feed.

Ventilation Requirements

The LightStream 2020 chassis takes in cooling air from the front. Air is drawn up through the chassis and is exhausted at the back and the right side by blower units.

There are two blowers located at the top of the chassis in each LightStream 2020 system. One blower is accessible from the front and the other from the rear. Each blower is an FRU. During normal operation, both blowers should be running. If one blower fails, the system can continue to operate; however, the failed blower should be replaced as soon as possible.

In addition to the main air flow through the chassis, each bulk power tray in an AC-powered system contains its own fans.

The cooling system operates properly only when all cards, bulkheads, filler panels, covers, and components are in place. Removing these items disrupts the flow of air through the chassis, which may cause the system to shut down components to prevent damage from overheating.

Catalyst 1200

This section contains the physical specifications and external connection requirements for the Catalyst 1200 series switch. The Catalyst 1200 includes four models: WS-C1201, WS-C1202, WS-C1211, and WS-C1212.

Physical Specifications

Table 39 lists the physical specifications for the Catalyst 1200 series switch.

Table 39   Catalyst 1200 Series Switch Physical Specifications

Specification	Description
Dimensions (H x W x D)	2.7 x 17.4 x 16 in. (6.96 x 44.2 x 40.6 cm)
Weight	17 lb (7.7 kg)
AC and DC voltage and current	100 to 120 VAC, 2.0A maximum, 60 Hz 200 to 240 VAC, 1.0A maximum, 50 Hz 12A @ +5 VDC, 1A @ +12 VDC, 0.5A @ –12 VDC
Power consumption	80W, maximum (273.04 Btu/hr)
EMI[1] certifications	FCC Class A (47 CFR, Part 15) CISPR 22 Class A VDE Class A VCCI Class 1
Safety approvals	UL: 1950 CSA-C22.2 No. 950-M89 IEC 950

FDDI transmit power levels:
  Single-mode fiber
 	
  Multimode fiber
	Average optical power:
	    Maximum: – 4.0 dBm
	    Minimum: – 7.0 dBm[2]
	    Maximum: – 14.0 dBm
	    Minimum: – 18.5 dBm

FDDI receive power levels:
  Single-mode fiber
 	
  Multimode fiber
	
	Average optical sensitivity: – 33 dBm
	Average maximum input power: – 14 dBm
	Average optical sensitivity: – 34 dBm
	Average maximum input power: – 14 dBm

1. EMI = electromagnetic interference.
2. dBm - decibels per milliwatt.

External Connection Requirements

This section contains the external connection requirements for the Catalyst 1200 switch:

- Administrative interface port: EIA/TIA-232 data communications equipment (DCE) using an RJ-45 connector (straight-through modular cables only).

- 8-port Ethernet interface with the following connectors:

  10BaseT (WS-C1201)–using RJ-45 connectors

  10BaseF (WS-C1211)–using ST-type connectors

- A/B port card slot for the following dual attachment station (DAS) interfaces:

    — Multimode FDDI using media interface connectors (MICs)

    — Single-mode FDDI using ST-type connectors

    — CDDI/MLT-3 using category 5, UTP modular, RJ-45 connectors (cross-connect modular cables only)

        For network connections using FDDI-to-CDDI twisted-pair connections, you will need the optional CDDI-FDDI translator.

        To connect CDDI to shielded twisted-pair (STP), use an impedance-matching balance/unbalanced (balun) device.

- Modems

    — The EIA/TIA-232 standard is supported at data rates from 50 to 38,400 baud.

    — Request To Send (RTS), Clear To Send (CTS), and Data Terminal Ready (DTR) signals are supported.

- Optical bypass switch connector (6-pin DIN).

- The stackable unified management port is out-of-band Ethernet 10BaseT using a female, RJ-45, UTP connection. The stackable unified management port uses an RJ-45, modular, cross-connect cable when connecting to end systems; and straight-through cable when connecting to hubs. You can connect the stackable unified management port to an Ethernet 10BaseT hub for Telnet, File Transfer Protocol (FTP), and SNMP management connection to the switch.

Catalyst 1600

This section contains the physical specifications and external connection requirements for the Catalyst 1600 series Token Ring switch.

Physical Specifications

Table 40 lists the physical specifications for the Catalyst 1600 series Token Ring switch.

Table 40   Catalyst 1600 Series Token Ring Switch Physical Specifications

Specification	Description
Network type	IEEE 802.5 Token Ring 4, or 16 Mbps
Dimensions (H x W x D)	5.25 x 19 x 12.5 in. (13.3 x 44 x 31.9 cm)
Weight	22 lb (10 kg)
Mounting	19-inch wide rack, occupies 3U
Power supply	90 to 130 VAC and 180 to 260 VAC; 47 to 63 Hz
Power consumption	100W maximum with 8 ports
Temperature	50 to 104˚F (10 to 40˚C)
Humidity	10 to 90%
Altitude	10 000 ft. (operating)
Agency approvals	FCC Class A EN55022 (Class A UTP cable) EN55022 (Class B STP cable) EN50082-1

External Connection Requirements

This section contains the external connection requirements for the Catalyst 1600:

- Eight or twelve Token Ring switch ports. Each port has the following connectors:

    — One unshielded twisted-pair (UTP) RJ-45 connector

    — One shielded twisted-pair (STP) DB-9 connector

⚠ **Caution**   Attaching devices to the UTP and STP connectors of a Token Ring switch port at the same time can result in damage to the Catalyst 1600 Token Ring switch.

- Console port using one 25-pin, D-type (EIA/TIA-232) connector

Catalyst 1700

This section contains the physical specifications and external connection requirements for the Catalyst 1700 Ethernet desktop switch

Physical Specifications

Table 41 lists the physical specifications for the Catalyst 1700 switch.

Table 41   Catalyst 1700 Switch Physical Specifications

Description	Specification
Dimensions (H x W x D)	5.25 x 12.28 x 19" (13.34 x 31.19 x 48.26 cm)
Weight	18 lb/8.2 kg
Reliability	50,000 hours MTBF
Operating temperature	32 to 104°F (0 to 40°C)
Operating humidity	10% to 90%, noncondensing
Operating altitude	Up to 10,000 feet
Power consumption	60W

External Connection Requirements

This section contains the external connection requirements for the Catalyst 1700.

- 24 personal Ethernet ports, using RJ-45 connectors

  The personal Ethernet ports require 10BaseT compatible Category 3, 4, or 5 unshielded twisted-pair (UTP) or shielded twisted-pair (STP) wiring. The attached workstation must be within 100 meters of the Catalyst 1700 (10BaseT requirement) and have standard 10BaseT adapters and software installed.

- One general Ethernet port

  The port has three available connectors that each support different cabling types:

Note   Only one general Ethernet connector can be plugged in at a time.

— An RJ-45 connector. It uses 10BaseT compatible UTP or STP wiring. The attached network or device must be within 100 meters of the Catalyst 1700.

— A BNC connector. It uses 10Base2 compatible thin coaxial cable and can be up to 185 meters in length.

— A female 15-pin attachment unit interface (AUI) connector. It interfaces to an external thick coaxial, thin coaxial, 10BaseT or fiber-optic transceiver. The external transceiver can be attached via an 802.3 compatible AUI cable, which may be up to 50 meters in length. Supported network and device distances will vary depending on the type of transceiver used.

- Two Fast Ethernet ports using RJ-45 connectors

  Fast Ethernet ports require Category 5 UTP cabling. The attached server, workstation, or hub must be within 100 meters of the port. The server or workstation must have a 100BaseX compatible adapter installed.

Note   Only one port can be connected to a network. The rest must be connected to individual stations.

- One serial EIA/TIA-232 port using a 9-pin male subminiature connector (for configuration and management)

Catalyst 2000 Series

This section includes the physical specifications and the external connection requirements for the Catalyst 2000 series switches. The Catalyst 2000 series consists of three models: the Catalyst 2100, Catalyst 2800, and the Catalyst 2900.

Physical Specifications

Table 42 lists the physical specifications for the Catalyst 2100 and Catalyst 2800 switches.

Table 42   Catalyst 2100 and Catalyst 2800 Physical Specifications

Description	Specification
Dimensions (H x W x D)	5.25 x 19 x 12.28 in. (13.34 x 48.26 x 31.2 cm)
Weight	Catalyst 2100: 18 lb (8.17 kg) Catalyst 2800: 23 lb (10.4 kg)
Input voltage	90 to 250V, 50 to 60 Hz
Power consumption	Catalyst 2100: 60W Catalyst 2800: 110W
Operating altitude	up to 10,000' (3048 m)
Operating temperature	32 to 104 F (0 to 40 C)
Operating relative humidity	10% to 90% noncondensing
Agency approvals	UL 1950, CE, CSA 22.2, LR100902, TUV, EN60950, FCC Class A, EN55022A

Table 43 lists the physical specifications for the Catalyst 2900 switch.

Table 43   Catalyst 2900 Switch Physical Specifications

Description	Specifications
Dimensions (H x W x D)	3.4 x 17.25 x 23 in. (8.5 x 43.8 x 58.4 cm) Chassis depth including cable guide is 21.64 in. (55.0 cm)
Weight	Chassis: 41 lb (18.6 kg)
DC voltages supplied and steady-state maximum current ratings	+5V @ 30A+12V @ 2A+24V @ 0.2A
Power supply	175W maximum (AC-input power supplies)
Power dissipation	240W maximum configuration.
Heat dissipation	240W (818 Btu[1]per hour)
Input voltage	100-240 VAC wide input with power factor corrector
Frequency	47-63 Hz autoranging
AC current rating	3 A maximum at 100-240 VAC
Airflow	95 cfm[2] through the system fan assembly
Operating temperature	32 to 104 F (0 to 40 C)
Nonoperating temperature	– 40 to 167 F (– 40 to 75 C)
Humidity	10 to 90%, noncondensing

Description	Specifications
Agency approvals	Safety: UL[3] 1950, CSA[4]-C22.2 No. 950-93, and EN60950EMI11: FCC Class A (47 CFR, Part 15),CE Mark, EN55022 Class B and VCCI Class 2 with shielded cables

1. Btu = British thermal units.
2. cfm = cubic feet per minute.
3. UL = Underwriters Laboratory.
4. CSA = Canadian Standards Association.

External Connection Requirements

This section lists the external connection requirements for Catalyst 2000 series switches.

Catalyst 2100 and Catalyst 2800 Switches

This section lists the external connection requirements for Catalyst 2100 and Catalyst 2800 switches.

- Twenty-five 10BaseT ports, twenty-four of which require RJ-45 connectors. The twenty-fifth port uses an AUI connector.

- Two 100BaseTX ports (Catalyst 2100) which require RJ-45 connectors.

- EIA/TIA-232(1) management console port that uses a DB-9 connector.

- Two high-speed expansion slots (Catalyst 2800):

  The high-speed expansion slots accept the field-installable modules for the Catalyst 2800. The field modules require the following external connections:

  — 100BaseTX module: uses RJ-45 connectors.

  — 100BaseFX module: uses ST connectors.

  — FDDI module: uses MIC connectors.

  — CDDI module: uses RJ-45 connectors.

Catalyst 2900 Switch

This section contains the external connection and ventilation requirements for the Catalyst 2900.

The Catalyst 2900 is a 2-slot, 14-port, fixed-configuration switch that fits in a standard 19-inch rack. One of the two slots is for the supervisor module; the other slot is for a 10/100BaseTX or 100BaseFX module. The modules have the following external connections:

- Supervisor engine module

  — Console port using a DB-25 female connector.

  — Two 100-Mbps Fast Ethernet ports provide (100BaseTX category 5 UTP) Fast Ethernet interfaces operating in full- or half-duplex mode. The Ethernet ports use either RJ-45 or MII connections. If two cables are connected to the same port, the MII is the default connection.

- 10/100 Mbps Fast Ethernet switching module

  The 10/100-Mbps Fast Ethernet switching module (10/100BaseTX 12 port) provides connections to 12 switched 10/100-Mbps (10/100BaseTX Category 5 UTP) full- or half-duplex Fast Ethernet interfaces using 12 RJ-45 female connectors.

- Fast Ethernet switching module

  The Fast Ethernet switching module (100BaseFX 12 port) provides connection to 12 switched 100-Mbps (100BaseFX fiber-optic) full- or half-duplex Fast Ethernet interfaces using 12 SC fiber-optic connections.

Ventilation Requirements

The system fan assembly provides cooling air for the supervisor engine module, interface module, and power supply. The fan assembly is located inside the chassis compartment. Facing the front of the chassis, the fan assembly draws cool air from the right side to cool the modules. The exhaust air is forced out the left side of the chassis.

Catalyst 3000

The following sections describe the physical specifications and external connection requirements for the Catalyst 3000 system, which consists of the Catalyst 3000 switch and the Catalyst 3000 Matrix.

Physical Specifications

Table 44 lists the physical specifications for the Catalyst 3000 system.

Table 44   Catalyst 3000 System Physical Specifications

Description	Specification
Mounting	19-inch rack-mount
Dimensions (H x W x D)	Catalyst 3000 switch: 3.5 x 17 x 13.4 in. (8.76 x 43 x 34 cm) Catalyst Matrix: 3.5 x 17 x 13.4 in. (8.75 x 43 x 34 cm)
Weight	Catalyst 3000 switch: 17 lb (7.7 kg) Catalyst Matrix: 14 lb (6.35 kg)
Input	90 to 264 VAC autoranging
Frequency	47 to 63 Hz
AC current rating	Catalyst 3000 switch: 1.5A @ 120V;.75A @ 220V Catalyst Matrix: 1.0A @ 120V;.5A @ 220V
Operating temperature range	50 to 104 F (10 to 40 C)
Storage temperature	– 13 to 167 F (– 25 to 75 C)
Operating humidity	8 to 80% noncondensing
Storage altitude	40,000'
Emissions	FCC Class A (Part 15), EN55022 A, VCCI Class 1, CE Mark
Agency Approvals	UL1950, ULC, EN 60950

External Connection Requirements

This section contains the external connection requirements for the Catalyst 3000 switch and for the Catalyst 3000 Matrix.

Catalyst 3000 Switch

The Catalyst 3000 16-port switch is a stackable switch with the following external connection requirements:

- Sixteen 10BaseT Ethernet ports using RJ-45 connectors (ports 1–15 always MDI-X, port 16 can be MDI or MDI-X)

- One EIA/TIA-232 console port

- One AUI DB-15 SwitchProbe port

- One SCSI-2 port

- Two expansion module slots. The expansion modules require the following external connections:

  — 100BaseTX module: using RJ-45 connectors

  — 100BaseFL module: using ST-type connectors

Catalyst 3000 Matrix

The Catalyst Matrix is an 8-port crosspoint matrix switch used to connect from three to eight 16-port switches to create a single-stack entity.

The Catalyst Matrix has eight I/O stack ports using 50-pin SCSI-2 type connectors (one per port).

Catalyst 5000

The following section describes the physical specifications and external connection requirements for the Catalyst 5000 series switch.

Physical Specifications

Table 45 lists the physical specifications for the Catalyst 5000 series switch.

Table 45   Catalyst 5000 Series Switch Physical Specifications

Description	Specifications
Backplane	1.2-Gbps[1], 5 module connections
Dimensions (H x W x D)	10.4 x 17.25 x 18.4 in. (26.4 x 43.1 x 46.0 cm) Chassis depth including cable guide is 21.64 in. (55.0 cm)
Weight	Chassis only: 43 lb (19.5 kg) Chassis fully configured with 1 supervisor engine module, 4 switching modules, and 2 power supplies: 84 lb (39 kg)
DC voltages supplied and steady-state maximum current ratings	+5V @ 70A +12V @ 2A +24V @ 0.2A
Power supply	376W maximum (AC-input power supplies)
Power dissipation	350W maximum configuration, 110W typical with maximum configuration
Heat dissipation	563W (1919 Btu[2]/hr)
Input voltage	100 to 240 VAC wide input with power factor corrector
Frequency	47 to 63 Hz autoranging
AC current rating	8A maximum at 100-127 VAC, 4A maximum at 200 to 240 VAC with the chassis fully configured
Airflow	95 cfm[3] through the system fan assembly
Operating temperature	32 to 104 F (0 to 40 C)
Nonoperating temperature	– 40 to 167 F (– 40 to 75 C)
Humidity	10 to 90%, noncondensing
Agency approvals	Safety: UL[4] 1950, CSA[5]-C22.2 No. 950-93, and EN60950 EMI[6]: FCC Class A (47 CFR, Part 15),CE Mark, EN55022 Class B and VCCI Class 2 with shielded cables

1. Gbps = gigabits per second.
2. Btu = British thermal units.
3. cfm = cubic feet per minute.
4. UL = Underwriters Laboratory.
5. CSA = Canadian Standards Association.
6. EMI = electromagnetic interference.

External Connection Requirements

This section contains the external connections for the Catalyst 5000 modules and ports.

- The Catalyst 5000 is a five-slot rack-mounted chassis with one slot dedicated to the supervisor engine module and a combination of online insertion and removal (OIR) modules. External connections for the supervisor engine module and OIR modules follow:

  — The supervisor engine module has two Fast Ethernet ports. Each port has two connectors, one MII and one RJ-45.

Note   If two cables are connected to the same port, the MII is the default connection.

  — 10BaseT 24-port Ethernet switching module uses two 50-pin Telco connectors

  — 10BaseFL 12-port Ethernet switching module uses ST-type connectors

  — 10/100BaseTX 12-port 10/100-Mbps fast Ethernet switching module using RJ-45 connectors

  — 100BaseTX 12-port fast Ethernet switching module using RJ-45 connectors

  — 100BaseFX 12-port fast Ethernet switching module using ST-type fiber-optic connectors

  — ATM LAN emulation module (UTP) using RJ-45 connectors

  — ATM LAN emulation module (single-mode and multimode fiber) using SC-type connectors

  — CDDI module (UTP) using RJ-45 connectors

  — FDDI module MMF (multimode fiber) using MIC connectors and (on A/B port card option) an optical bypass switch (9-pin DIN) connector

  — FDDI module SMF (single-mode fiber) using ST-type connectors and (on A/B port card option) an optical bypass switch (9-pin DIN) connector

  — EIA/TIA-232 data terminal equipment (DTE) port using an EIA/TIA-232 data communications equipment (DCE) console cable with DB-25 plugs at one end

Power Supply Requirements

The Catalyst 5000 376W AC-input power supply uses a power factor corrector that allows it to operate on input voltage and current within the ranges of 100 to 240 VAC and 47 to 63 Hz.

A second, identical power supply is also installed in chassis configured with the redundant power option. Redundant power ensures that power to the chassis continues uninterrupted in the event that one power supply fails. It can also provide uninterrupted power in the event a power line fails, so long as the power supplies receive power from separate power lines.

Catalyst WS-C1400 Concentrator

This section contains the physical specifications and external connection requirements for the Catalyst WS-C1400 concentrator.

Physical Specifications

Table 46 lists the physical specifications for the WS-C1400 concentrator.

Table 46   WS-C1400 Concentrator Physical Specifications

Description	Specification
Dimensions (H x W x D)	2.7 x 18 x 16 in. (6.86 x 45.72 x 40.64 cm)
Weight	16 lb (7.3 kg)
Power requirements	3A @ 110 VAC, 60 Hz (WS-C1400) 1.6A @ 220 VAC, 50 Hz (WS-C1400)
Power consumption	FDDI: 90W (maximum) (WS-C1400) CDDI: 110W (maximum) (WS-C1400)
Agency approvals	CDDI/FDDI: FCC Class A (47 CFR, Part 15) CDDI/FDDI: CISPR 22 Class A FDDI: VDE Class B
Safety	UL: 1950 CSA-C22.2 No. 950-M89 IEC 950
Mounting	Desktop 19-inch rack (hardware included) Wall-mount (hardware included with optional kit)

FDDI transmit power levels:
  Single-mode fiber
 	
  Multimode fiber
	Average optical power:
	    Maximum: –4.0 dBm
	    Minimum: –7.0 dBm
	    Maximum: –14.0 dBm
	    Minimum: –18.5 dBm

FDDI receive power levels:
  Single-mode fiber
 	
  Multimode fiber
	
	Average optical sensitivity: –33.0 dBm
	Average maximum input power: –14.0 dBm
	Average optical sensitivity: –34 dBm
	Average maximum input power: –14 dBm

External Connection Requirements

The following are the external connections for the Catalyst WS-C1400 concentrators:

- Administrative interface port: EIA/TIA-232 data communications equipment (DCE) using an RJ-45 connector (straight-through cables only).

- The WS-C1400 has two line card slots. Each slot can support one of the five optional CDDI and FDDI line cards.

    Following are the optional line cards and their connection requirements:

    — WS-X1441: 8 multimode FDDI ports using MIC connectors

    — WS-X1444: 8 multimode FDDI ports using ST connectors

    — WS-X1450: 2 multimode FDDI ports using MIC connectors, and CDDI/MLT-3 ports using RJ-45 connectors

    — WS-X1455: 10 single-mode FDDI ports using SC connectors

    — WS-X1483: CDDI/MLT-3 ports using RJ-45 connectors

    For network connections using FDDI-to-CDDI twisted-pair connections, you will need the optional CDD-FDDI translator.

Note   To connect CDDI to shielded twisted-pair (STP), you must use an impedance-matching balance/unbalanced (balun) device.

- The chassis can be placed on a desktop, or rack-mounted in a standard 19-inch rack.

Site Preparation Checklist

The following Site Preparation Checklist form requests specific information about your installation site. To ensure a successful installation by reducing last-minute complications, verify the preinstallation requirements discussed earlier in this guide, and complete and return the Site Preparation Checklist form to Cisco Systems.

Note   Complete one Site Preparation Checklist form for each system to be installed.

The Site Preparation Checklist form should be filled out by the installation site contact person. After the form is completed, it must be faxed to Cisco Systems.

- Complete one checklist for each chassis to be installed.

- Fax the completed check list to Cisco Systems at 408 526-7550 at least five working days before the scheduled installation.

- If you have installation-specific questions, contact On-Site Services (OSS) at 800 829-2447.

Company Name _____

Installation Date (month/day/year) _____/_____/_____

Site Installation Time _____ a.m.   p.m. (circle one)

Customer Purchase Order Number (new chassis only) _____

Installation Site Address _____

_____

Installation Site Contact and Chassis Information

Main Contact _____

Telephone Number _____ Pager Number _____

Site Contact _____

Telephone Number _____ Pager Number _____

Site Modem Telephone Number (within 25 feet [7.6 m] of router) _____

Site Voice Telephone Number _____

Chassis Type/Model _____

Software Configuration Information

Development of the software configuration is your responsibility. If you need assistance, please consult with your sales representative.

Options for Loading Your Software Configuration

Select one of the following options for loading a software configuration on your system:

_____ **Option 1** You will either e-mail or fax the entire configuration to OSS. (The configuration will be downloaded to your system through the console port via a modem line.) Please check one: _____ e-mail sent to oss-ce@cisco.com _____ fax sent to 408 526-7550

Note OSS must receive the configuration three working days prior to the installation, or the installation will be postponed.

_____ **Option 2** You will store the entire configuration on a TFTP server. (The configuration will be downloaded to your system using Cisco's Autoinstall feature.)

_____ **Option 3** OSS will configure one port on your system so you can Telnet to the system and download the entire configuration. (*Only* IGRP and RIP routing are supported for this option.)

If you choose Option 3, please provide the following information:

Password (the enable and virtual terminal password) _____

Routing Protocol (circle one)   IGRP   RIP

Autonomous system number for routing protocol (if applicable) _____

Encapsulation (circle one)   HDLC   PPP   Frame-Relay   Other_____

Port to configure (for example, serial 0, Ethernet 2, Token Ring 3, etc.) _____

Port IP Address _____

Mask (if subnetting is used) _____

Please retain a copy of this checklist for your records.

Fax this Checklist to Cisco Systems at 408-526-7550