Site Preparation

This chapter tells you how to prepare your site for installing a LightStream 2020 (LS2020) enterprise ATM switch. It provides a convenient checklist that you can use to ensure an orderly, step-by-step installation process. An LS2020 switch can be installed in any area that meets the specifications outlined in this chapter. A dedicated computer room with raised floors, controlled temperature and humidity, and clean air is desirable, but not required.

Site Preparation Checklist

Use the checklist provided in Table 1-1 to prepare your LS2020 site and to ensure that you make adequate plans to obtain appropriate ancillary equipment.

If you plan to install more than one LS2020 switch, you may want to photocopy the blank site preparation checklist in Table 1-1 as a vehicle for collecting appropriate information for each switch.

Note   Cisco Systems recommends that you complete this checklist several weeks before taking delivery of your LS2020 switch.

Table 1-1   LightStream 2020 Site Preparation Checklist

Checkmark Column	Task Description
	Select a rack that meets the characteristics and dimensional requirements described in the section "Rack Selection Guidelines."
	Place the rack in an area that accommodates the cable routing and chassis clearance requirements described in the section "Site Selection and Space Requirements."
	Ensure that the floor is capable of supporting the weight of the LS2020 system, as described in the section "Floor Loading Requirements."
	Ensure that your LS2020 switch will be placed in an area that meets the environmental requirements described in Table 1-4.
	Ensure that your LS2020 switch will be placed in an area that accommodates the power consumption and component heat dissipation factors listed in Table 1-5.
	Ensure that your power supply meets the site power, AC power, or DC power requirements presented in the section "Electrical Requirements." Ensure that each LS2020 system has its own dedicated branch power circuit with a circuit breaker and grounded outlet. For LS2020 systems equipped with redundant power trays, you may wish to have two separate power circuits.
	If you plan to use DC power, schedule a licensed electrician to wire the LS2020 chassis to the DC power source.
	To provide connectivity to each LS2020 node in the event of network problems, Cisco Systems recommends that you obtain a modem for each switch card in your LS2020 network. Select a modem according to the information provided in the section "Modem Recommendations."
	Read the section "Miscellaneous Site Preparation Considerations" for information about safety factors, acoustic emissions, and applicable standards.
	For network management purposes, obtain a Sun workstation that meets the hardware and software requirements provided in the chapter entitled "Network Management System Requirements."
	Order data cables appropriate to your LS2020 switch configuration using the connector and cabling information provided in the chapter entitled "Cables and Connectors."
	If you are installing the LS2020 switch outside the United States, order the appropriate country power kit or DC mounting kit using the information provided in the chapter entitled "Cables and Connectors."
	Using the information provided in the appendix entitled "IP Addresses," derive the information below for each LS2020 switch that you plan to install. Note that each LS2020 switch requires unique information.
	Chassis ID: _____ Node Name: _____ Primary IP Address: _____ Primary NP Address Subnet Mask: _____ Secondary NP Address: _____ Secondary NP Address Subnet Mask: _____ NP Ethernet Address: _____ NP Ethernet Address Subnet Mask: _____ Default Router: _____

Rack Selection Guidelines

This section provides guidelines for selecting an equipment rack to house your LS2020 enterprise ATM switch.

Rack Characteristics

The rack you select for your LS2020 switch should be a TIA or EIA compliant, 19-inch (48.3 cm) wide rack with the following characteristics:

- Rails with a RETMA hole pattern. Mounting screws, clip nuts, and dress washers are shipped with each LS2020 system. If your rack has metric-threaded rails, you must provide your own metric screws.

- Leveling feet

- Perforated top

- Open bottom

- Solid side panels

- Front and rear doors (optional); if present, they must be fully louvered

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Note For physical stability when an LS2020 chassis is installed in a rack, the rack/chassis combination should comply with UL Standard 1950, Par. 4.1.1, and IEC 950, 4.1.1.

LightStream 2020 Switch Dimensions

Table 1-2 shows the physical dimensions of the LS2020 switch and the shipping crate.

Table 1-2   LightStream 2020 Switch/Shipping Crate Dimensions

Dimension	Chassis		Shipping Crate	
Height	26.07 inches	66.2 cm	36 inches	91.4 cm
Width	18.91 inches	48.0 cm	24 inches	61.0 cm
Depth	24.73 inches	62.8 cm	31 inches	78.7 cm
All chassis dimensions are within a manufacturing tolerance of plus or minus .02 inches (.05 centimeters).				

An LS2020 chassis requires 26.25 inches (15 rack units, or 66.7 cm) of vertical rack space. An LS2020 rack should be at least 30 inches (76.2 cm) deep; a depth of 36 inches (91.4 cm) is recommended to ensure adequate clearance at the rear of the chassis for installing fantails and interface cables.

Fantail Vertical Space Requirements

If your LS2020 system contains low-speed line cards, cell line cards with T3/E3 access cards, or an E1 Circuit Emulation Access Card (CEMAC) fantail in a 75-ohm configuration, you must consider the vertical space requirements in planning the use of rack space for fantails. These requirements are discussed under separate headings below.

Low-Speed Line Card Fantails

If you fully configure your LS2020 switch with nine low-speed line cards, the rack can accommodate a total of 18 V.35 and/or RS-449 fantails in some combination — two such fantails per card. However, in the case of X.21 fantails, the same LS2020 system requires only nine X.21 fantails — one per low-speed line card.

Each V.35, RS-449, or X.21 fantail requires 1.75 inches of vertical rack space (one rack unit, or 4.45 cm). Hence, in an LS2020 switch using V.35 or RS-449 fantails in some combination totaling 18, 31.5 inches (80 cm) of vertical rack space are required.

If you configure the rack with less than the maximum number of V.35, RS-449, or X.21 fantails, or with a mixture of such fantails, you can install them adjacent to each other (without intervening space) or distribute them over the rack in a manner that best suits your particular cabling and interconnection requirements.

T3/E3 Access Card Dressing Panels

An LS2020 switch fully configured with nine T3/E3 access cards can accommodate up to nine T3/E3 dressing panels (see Figure 3-16 in the chapter entitled "Cables and Connectors"). Each dressing panel requires 1.75 inches of vertical rack space (one rack unit, or 4.45 cm).

As with the fantails for the low-speed line cards above, you can position the T3/E3 dressing panels physically adjacent to each other, or you can disperse them over the available vertical space on the rack.

Note Medium-speed cards do not use fantails.

E1 CEMAC Fantails

An LS2020 switch fully configured with nine CEMAC access cards can accommodate a maximum of nine E1 CEMAC fantails in a 75-ohm configuration (see Figure 3-12). Each E1 CEMAC fantail requires 3.5 inches of vertical rack space (two rack units, or 8.9 cm).

As with other fantails, you can disperse the E1 CEMAC 75-ohm fantails over the available rack space to suit your particular cabling and interconnection requirements or to accommodate the presence of other fantail types in the LS2020 rack.

Site Selection and Space Requirements

Consider the factors described below in selecting a location for your LS2020 switch.

Cable Routing

Choose a location convenient to the data cables that you plan to connect to the LS2020 switch. Cisco Systems recommends that you develop a plan for managing external data cables. Such a plan might entail running cables under a raised floor or through a dropped ceiling, or placing the system in a low-traffic area where cables are less likely to be disturbed.

Hardware Placement

An LS2020 chassis takes in cooling air through the bottom of the front panel and exhausts it at the top rear and the top right side of the enclosure. The air vents on the right side can safely be covered with rack side panels, but they should not otherwise be blocked.

To minimize the potential for thermal problems with LS2020 circuitry, position the LS2020 chassis so that the air intake panel is not adjacent to the exhaust of other equipment. In addition, ensure that the LS2020 exhaust air is not near the air intake of other equipment.

LightStream 2020 Clearance Requirements

To facilitate LS2020 maintenance and cable access, allow at least two feet of clearance at the front and rear of the LS2020 chassis. Figure 1-1 illustrates the overall LS2020 clearance requirements.

Figure 1-1   **LightStream 2020 Clearance Requirements**
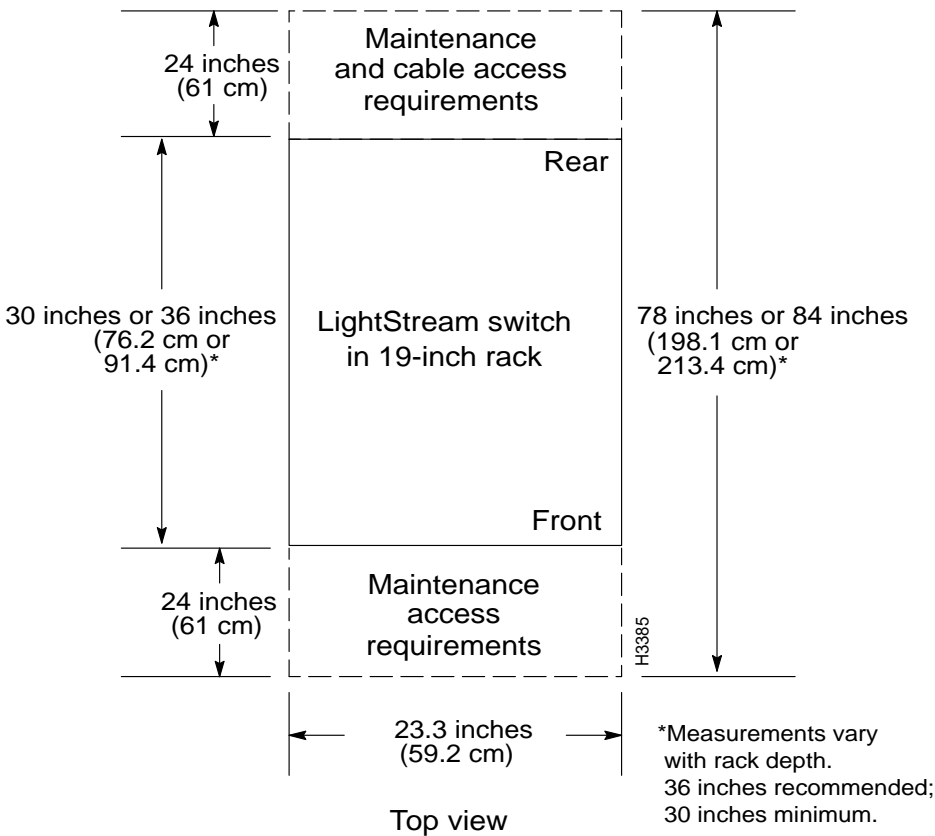
Floor Loading Requirements

Ensure that the floor on which the LS2020 will stand can support the weight of the system. Using the information in Table 1-3, calculate the weight of your system. Add the weight of each optional component (line modules or fantails) to the weight of the appropriate base system or redundant base system to derive total system weight.

Table 1-3   Calculating LightStream 2020 Weight

System Configuration	Weight
Base System/AC power*	96 lb (44 kg)
Redundant Base System/AC**	118 lb (53 kg)
Base System/DC power	91 lb (41 kg)
Redundant Base System/DC	108 lb (48 kg)
Optional Components: Line card module (up to nine modules) Fantail (for low-speed card only - up to 18 fantails)	3.75 lb (1.7 kg) 1.9 lb (0.9 kg)
Example: Base System/AC with four medium-speed line modules (4 x 3.75 lb) and two low-speed line modules (2 x 3.75 lb) and four fantails (4 x 1.9 lb)	96.0 lb 15.0 lb 07.5 lb 07.6 lb
Total Weight	**126.1 lb**
*Base System includes chassis, two blowers, power supply, peripheral assembly, NP module, and switch card	
**Redundant Base System includes chassis, two blowers, two power supplies, two peripheral assemblies, two NP modules, and two switch cards	

Warning   An LS2020 system is heavy. Do not attempt to move the system alone. Avoid personal injury or equipment damage by using proper lifting and transport techniques.

Environmental Requirements

The physical environment during storage, transport, and operation of the LS2020 switch must meet the specifications outlined in Table 1-4.

To ensure that your HVAC system is capable of maintaining the proper operating temperature range for your LS2020 switch, refer to the heat dissipation information provided in Table 1-5.

Table 1-4   LightStream 2020 Environmental Requirements

Factor	Requirement
Operating temperature at sea level (760 mm Hg)*	41° to 104° F (5° to 40° C)
Relative operating humidity	10% to 90% noncondensing
Altitude*	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 LS2020 switch is designed to run in a noncorrosive, relatively dust-free environment.
*Reduce the maximum operating temperature by 1° F (.56° C) for every 1000 feet (304.8 m) of altitude above 10,000 feet (3048 m).	

Table 1-5   LightStream 2020 Power Consumption/Heat Dissipation

Component	Power Consumption	Dissipation
Base System	335 watts	1145 Btu/hr.
Redundant Base System	445 watts	1525 Btu/hr.

Optional Components:
    Low-speed line module
    Medium-speed line module
    Packet line card module
    Cell line card module
	
	65 watts
	65 watts
	55 watts
	30 watts
		
		225 Btu/hr.
		225 Btu/hr.
		190 Btu/hr.
		105 Btu/hr.

Maximum Configuration*	965 watts	3325 Btu/hr.
*Redundant Base System with 8 low-speed or medium-speed line modules.		

Electrical Requirements

Each LS2020 chassis requires a dedicated branch circuit. If you choose to equip your LS2020 switch with a dual power cord, you must provide an independent power source for each cord.

The following notice applies to every LS2020 switch:

This device complies with FCC Rules, Part 15. Operation is subject to the following conditions:

— *This device may not cause harmful interference, and*

— *This device must accept any interference that may be received, including interference that may cause undesired operation.*

The LS2020 switch is designed to operate with all boards, bulkheads, filler panels, covers, and components (disks and blowers) in place and securely attached to the LS2020 chassis. When in place, these elements form an enclosure that:

• Limits access to hazardous voltages and currents inside the chassis.

• Confines electromagnetic interference (EMI) within the chassis.

Note An LS2020 switch that is not fully enclosed is not compliant with EMI standards and may interfere with the operation of other equipment.

• Helps maintain the flow of cooling air through the chassis.

Note Air flow disturbances can result in thermal overloading and induce component failures.

Power Requirements and Ratings

Each LS2020 chassis requires at least one dedicated branch circuit. If your system has a redundant power supply, you must provide a dedicated branch circuit for that power supply. Table 1-6, Table 1-7, and Table 1-8 summarize the power requirements for your LS2020 system.

Table 1-6   Site Power Requirements

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

Table 1-7   AC Power Ratings

Characteristic	Rating
Inlet Power Connector	IEC 320 C20
Input Voltage Frequency Phase	100 - 240VAC 50 - 60 Hz Single
Input Current	16A - 8A
Power Consumption*	975 Watts maximum
Heat Dissipation*	3330 Btu/hr. maximum
*See Table 1-5 for additional power-related information.	

Table 1-8   DC Power Ratings

Characteristic	Rating
Input Connections	Support for up to 2 separate -48VDC input feeds via 3-position terminal blocks
Input Voltage	-43 to -60VDC
Input Current	24A
Power Consumption*	975W maximum
Heat Dissipation*	3330 Btu/hr. maximum
*See Table 1-5 for additional power-related information.	

Modem Recommendations

To provide connectivity to each node in the event of network problems, Cisco Systems recommends that you obtain a modem for each LS2020 switch card in your network. (Each LS2020 chassis can have one or two switch cards.) The modem must be a V.42 Hayes-compatible device capable of operating at 2400 baud.

The following modems have been tested and are known to be *compatible* with the LS2020 switch:

- Zoom Telephonics Inc. - Model 9624V

- Zoom Telephonics Inc. - Model FXV (FX9624V)

- Hayes Microcomputer Products Smartmodem 2400 V.42

The following modems have been tested and are known to be *incompatible* with the LS2020 switch:

- Identity System Technology - Model ID2400-C

- Hayes Microcomputer Products Smartmodem 1200

- Telebit Corp. TrailBlazer Plus

- MultiTech Systems MultiModem V32B

Note The above modem lists are not intended to be exhaustive.

Miscellaneous Site Preparation Considerations

Safety Considerations

⚠ **Caution** If you are installing a DC-powered LS2020 system, arrange to have an electrician present during installation. An electrician or other qualified person must wire the chassis to a DC power source.

⚠ **Caution** Do not operate an LS2020 switch without all boards, bulkheads, filler panels, covers, and components firmly secured to the chassis. You must operate the LS2020 properly to limit access to hazardous voltages and currents, to confine EMI radiation within the chassis, and to maintain the flow of cooling air through the chassis.

Acoustic Emissions

An LS2020 switch emits a maximum of 68 db(A) of noise.

Applicable Standards

Table 1-9 lists the environmental standards for the LS2020 switch, while Table 1-10 lists the applicable interface standards for the switch.

Table 1-9   Environmental Standards for LightStream 2020 Switch

Environmental Factor	Applicable Standard
Safety	UL 1950 (for AC systems)
	UL 1459 (for DC systems)
	TUV (EN 60950)
	CSA 22.2 #950*
Emissions	FCC Part 15 Class A
	CISPR 22 Class A (EN 55022)
*Certified by Underwriters Laboratories to Canadian requirements.	

Note Certifications or standards may be undergoing development or revision at any given time. Consult your LS2020 vendor for the latest applicable information.

Table 1-10   Interface Standards for LightStream 2020 Switch

Interface	Applicable Standard
V.35 Interface*	NET 2 Layer 1
RS-449 Interface*	NET 2 Layer 1
X.21 Interface*	NET 1 Layer 1
E3 Interface*	G.703 at 34 Mbps (Germany) SIN 219 (UK)
*Host-independent approval.	