CHAPTER 1

Product Overview

This describes the Cisco UCS Fabric Interconnects and their components, and includes the following sections:

- Interconnect Features, page 1-1
- Cisco UCS 6120XP Chassis, page 1-2
- Cisco UCS 6140XP Chassis, page 1-4
- Expansion Modules, page 1-6
- Ports, page 1-10
- Power Supply, page 1-14
- Fan Module, page 1-16
- LED Descriptions, page 1-17
- Supported Transceivers, page 1-18

Interconnect Features

A Cisco UCS 6100 series fabric interconnect is a top-of-rack fabric interconnect that provides Ethernet and Fibre Channel to all servers in the rack. Servers connect to the fabric interconnect, and it connects to the LAN or SAN.

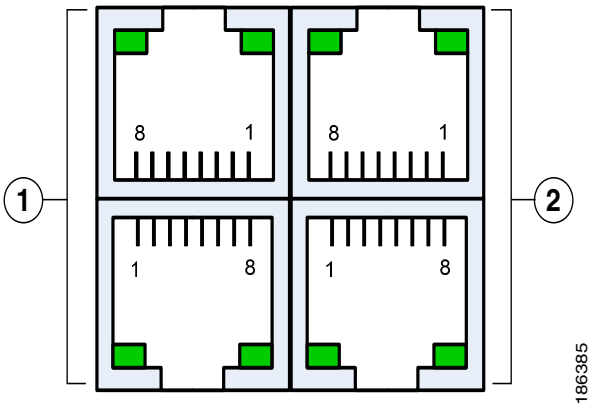
This family of fabric interconnects connect UCS servers to 10 Gigabit Ethernet 1, 2, and 4 Gbps Fibre Channel networks, and provides consolidated I/O connectivity to both production Ethernet LANs and Fibre Channel SANs in a cost-effective, high-performance, low-latency environment.

The Cisco UCS 6100 series has the following characteristics:

- Depending on the model and expansion modules used, 20 to56 ports are on the back of the chassis. The Cisco UCS 6120XP has 20 ports on the base system and can be upgraded with one expansion module. The Cisco UCS 6140XP has 40 ports on the base system and can be upgraded with two expansion modules.
- There are four expansion modules available for the Cisco UCS 6100 series: N10-E0080 (eight Fiber Channel ports), N10-E0060 (six Fiber Channel ports), N10-E0600 (six 10-Gbps Ethernet ports), and N10-E0440 (four 10-Gbps Ethernet ports and four Fibre Channel ports).
- Two slots on the front of the chassis for hot swap-capable power supplies.
- Two slots on the front of the chassis for fan modules. Each fan module houses six fans. The combination of six fans for each module and two modules provides the chassis with 12 fans.

The Ethernet connector port exposes four Ethernet ports that are in a 2x2 stacked RJ-45 jack. Figure 1-1 shows a close-up view of the Ethernet connector port.

Figure 1-1 Ethernet Connector Port



1	UCS cluster cross connect ports	**2**	Network management ports

Table 1-1 lists the LED descriptions for all Ethernet LEDs.

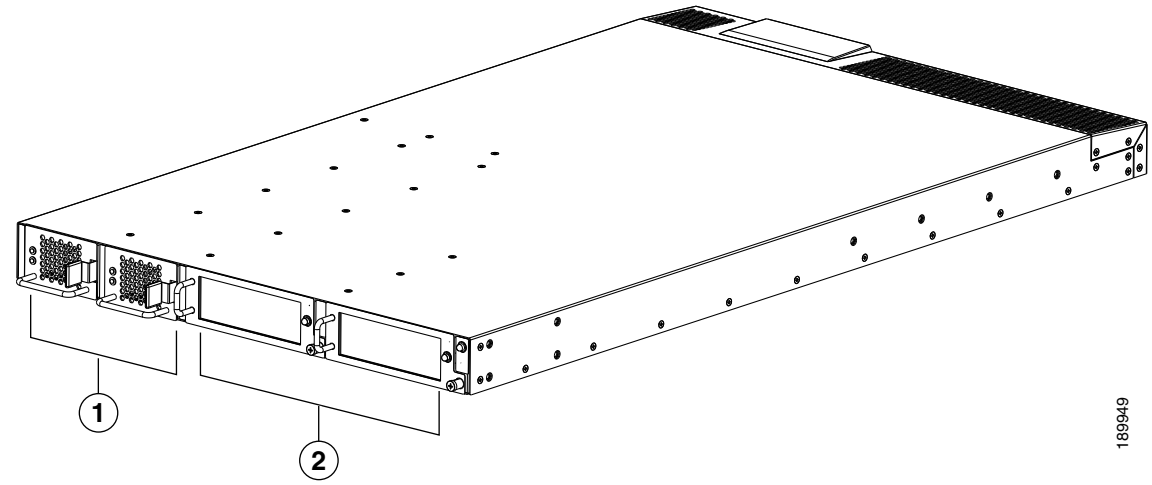
Table 1-1 Ethernet LED Descriptions

LED	Status	Description
Left	Off	No link
	Solid green	Physical link
Right	Off	No activity
	Blinking green	Activity

Cisco UCS 6120XP Chassis

The Cisco UCS 6120XP chassis is 1 RU, 1.72 inches tall, 17.3 inches wide and 30.0 inches deep. It mounts in a standard 19-inch rack (the Cisco R Series Rack is an ideal choice). The chassis has two power supplies and two fan modules on the front of the chassis, and it has network ports on the rear of the chassis. The airflow is front to back. Figure 1-2 shows the front of the Cisco UCS 6120XP.

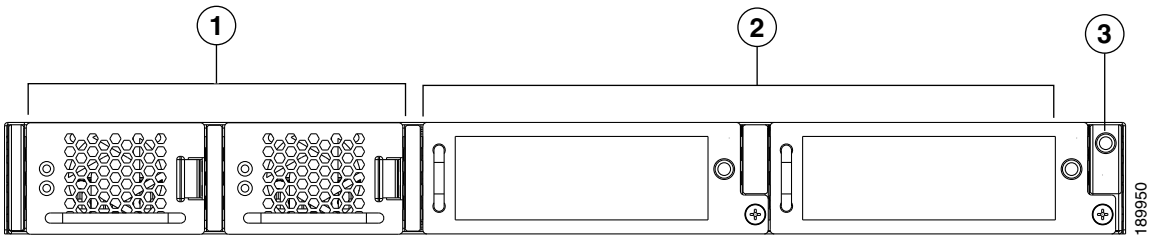
Figure 1-2 Cisco UCS 6120XP Front View



1	Two power supplies	2	Two fan modules

Figure 1-3 shows a close-up view of the front of the chassis.

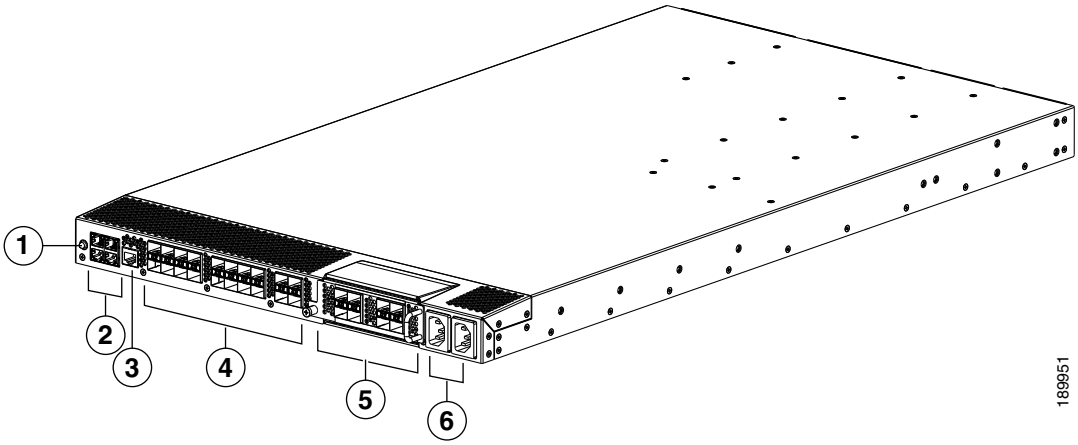
Figure 1-3 Cisco UCS 6120XP Front View Close-up



1	Two power supplies	2	Two fan modules	3	System status LED

The rear of the Cisco UCS 6120XP chassis has 20 fixed 10-Gigabit, Fiber Channel over Ethernet-capable SFP+ Ethernet ports, 1 slot for an optional expansion module, an Ethernet connector with 2 cross-connect ports and 2 management ports, a console port, and 2 AC power connectors. Up to eight of the 20 ports can be 1Gbps SFP ports if necessary. Figure 1-4 shows the rear of the Cisco UCS 6120XP.

Figure 1-4 Cisco UCS 6120XP Rear View

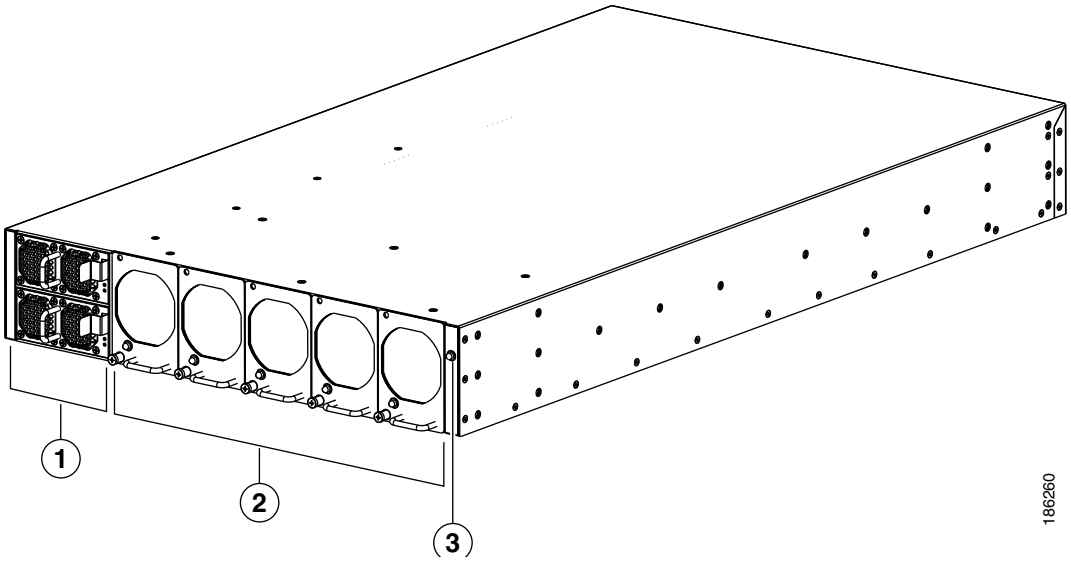


1	System status LED	**2**	Ethernet connector with two cross-connect ports on the left (top and bottom), and two network management ports on the right (top and bottom)
3	Console port	**4**	20 fixed SFP+ 10-Gigabit Ethernet ports (up to 8 can be 1G SFP)
5	Expansion modules	**6**	AC power connectors

Cisco UCS 6140XP Chassis

The Cisco UCS 6140XP chassis is 2 RU, 3.45 inches tall, 17.3 inches wide and 30.0 inches deep. It mounts in a standard 19-inch rack (the Cisco R Series Rack is an ideal choice). The chassis has two power supplies and two fan modules on the front of the chassis, and it has network ports on the rear of the chassis. The airflow is front to back. Figure 1-5 shows the front of the Cisco UCS 6140XP.

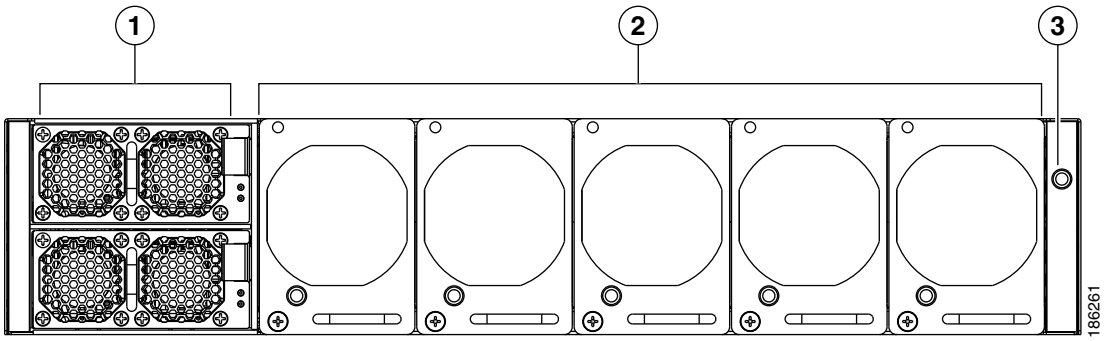
Figure 1-5 Cisco UCS 6140XP Front View



1	Two power supplies	2	Five fan modules

Figure 1-3 shows a close-up view of the front of the chassis.

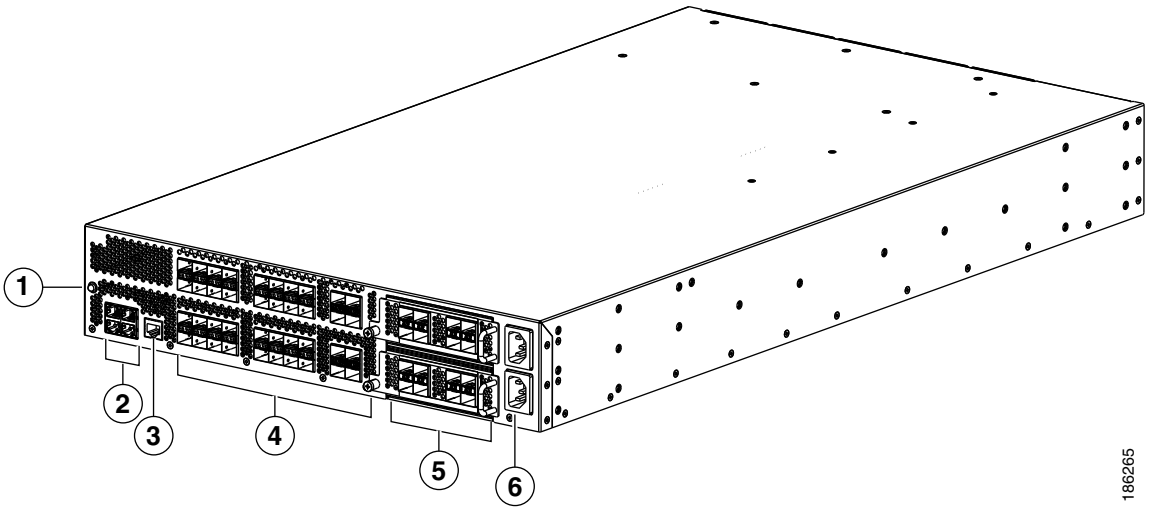
Figure 1-6 Cisco UCS 6140XP Front View Close-up



1	Two power supplies	2	Five fan modules	3	System status LED

The rear of the Cisco UCS 6140XP chassis has 40 fixed 10-Gigabit, FCoE-capable Ethernet ports, 2 slots for an optional expansion module, an Ethernet connector with 2 cross-connect ports and 2 management ports, a console port, and 2 AC power connectors. Up to sixteen of the 40 ports can be 1Gbps SFP ports if necessary. Figure 1-4 shows the rear of the Cisco UCS 6140XP.

Figure 1-7 Cisco UCS 6140XP Rear View



1	System status LED	**2**	Ethernet connector with two cross-connect ports on the left (top and bottom), and two network management ports on the right (top and bottom)
3	Console port	**4**	40 fixed SFP+ 10-Gigabit Ethernet ports (up to 16 can be 1G SFP)
5	Expansion modules, shown here with two 4-port Fibre Channel plus 4-port 10-Gigabit Ethernet expansion modules	**6**	AC power connectors

Expansion Modules

Expansion modules allow Cisco UCS 6100 Series Fabric Interconnect to be configured as cost-effective 10-Gigabit Ethernet fabric interconnects and as I/O consolidation platforms with native Fibre Channel connectivity. The Cisco UCS 6120XP has one slot for an optional uplink expansion module. The Cisco UCS 6140XP has two slot for an optional uplink expansion module.There are several modules that can be accommodated in this slot:

- N10-E0440 provides 4 10G SFP+, and 4 Fibre Channel 1/2/4G SFP-based uplink connections. The 10GE ports are encryption capable.
- N10-E0600 provides 6 10G SFP+ based uplink connections.
- N10-E0080 provides 8 1/2/4 G Fibre Channel, SFP-based uplink connection.
- N10-E0060 provides 6 8/4/2/1 G Fibre Channel uplink connections

The chassis supports hot swapping of the expansion modules. If the expansion modules are not in place, a cover plate should be used to ensure proper airflow in the chassis.

N10-E0440

The N10-E0440 supports four SFP+ transceiver modules and four 1-, 2-, 4-Gbps Fibre Channel transceivers. The Fibre Channel plus Ethernet expansion module is a field-replaceable unit (FRU). Figure 1-8 shows the Fibre Channel plus Ethernet expansion module.

Figure 1-8 N10-E0440 Expansion Module

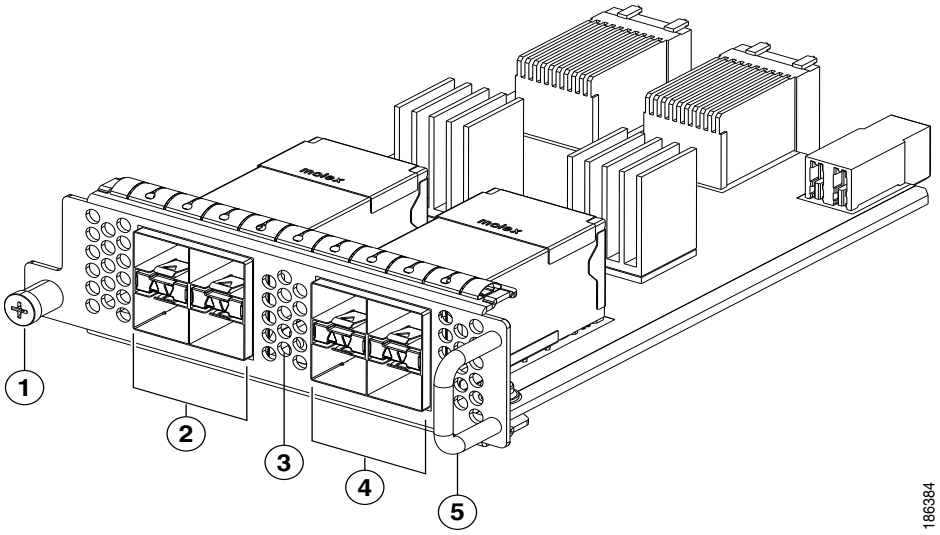
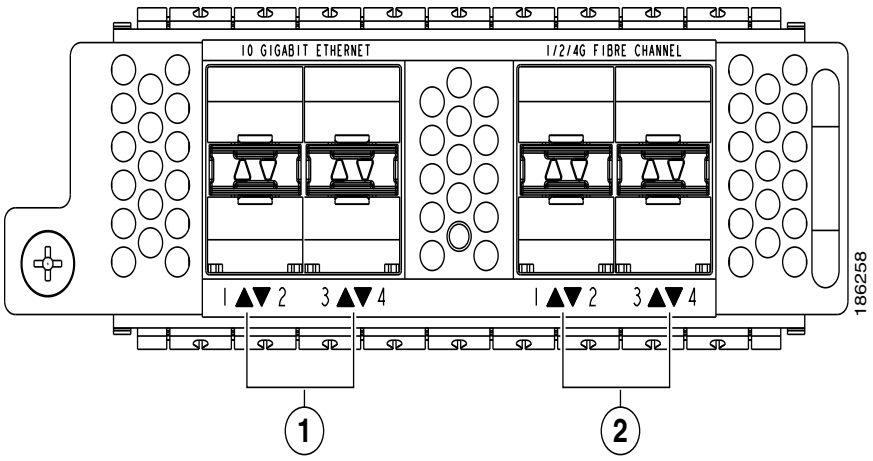


Figure 1-9 shows the front of the Fibre Channel plus Ethernet expansion module, and shows how ports are numbered on the Fibre Channel plus Ethernet expansion module.

Figure 1-9 Front of the N10-E0440 Expansion Module

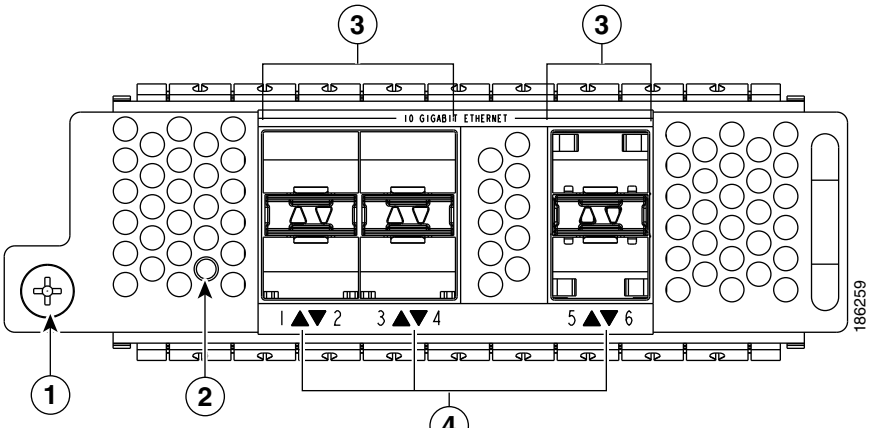


1	Four 10-Gigabit Ethernet ports	2	Module LED	3	Four 1, 2, or 4 Gbps Fibre Channel ports

N10-E0600

The N10-E0600 expansion module supports 6 10G SFP+ based uplink connections. Figure 1-10 shows the N10-E0600 expansion module.

Figure 1-10 N10-E0600 Expansion Module



1	Four 10-Gigabit Ethernet ports	2	Module LED	3	Two 10-Gigabit Ethernet ports

See Figure 1-15 for an illustration of how ports are grouped and numbered on the Ethernet expansion module.

N10-E0080

The N10-E0080 expansion module supports 8 1/2/4G Fibre Channel, SFP-based uplink connection. Figure 1-11 shows the N10-E0080 expansion module. Figure 1-12 shows LED and port locations for the N10-E0080 expansion module.

Figure 1-11 N10-E0080 Expansion Module

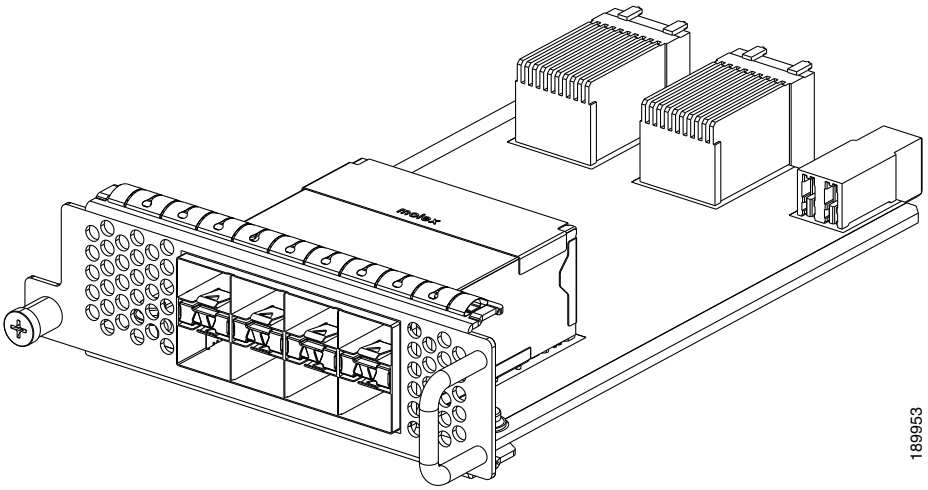
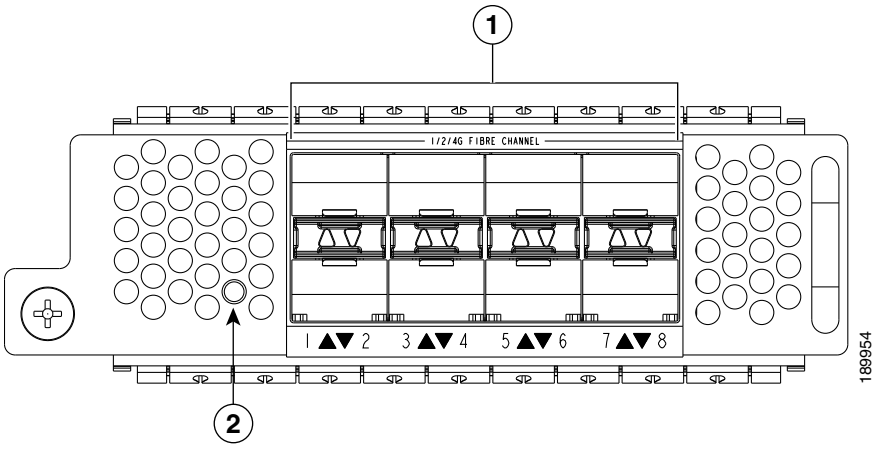


Figure 1-12 Front of the N10-E0080 Expansion Module



1	Eight 1-, 2-, 4-Gbps Fibre Channel ports	**2**	Module LED

N10-E0060

The N10-E0060 expansion module supports 6 1/2/4/ 8 G Fibre Channel, SFP-based uplink connections. Figure 1-11 shows the N10-E0060 expansion module. Figure 1-12 shows LED and port locations for the N10-E0060 expansion module.

Figure 1-13 N10-E0060 Expansion Module

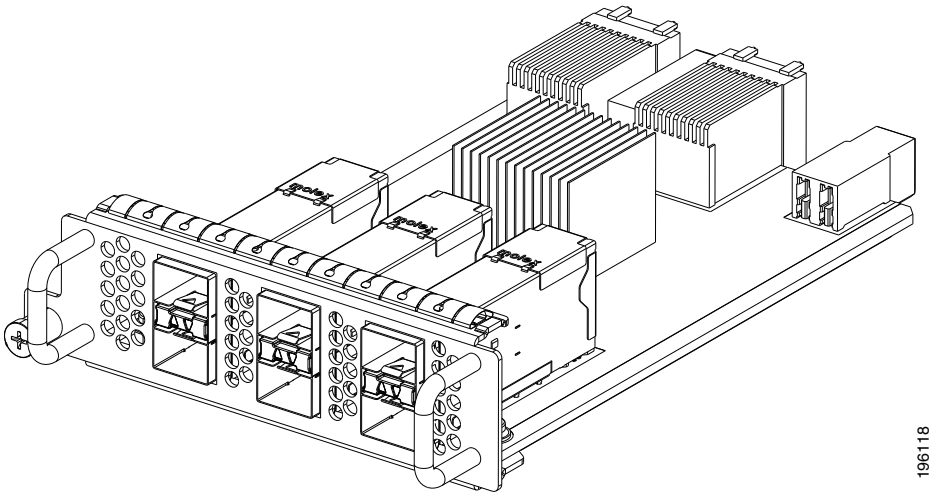
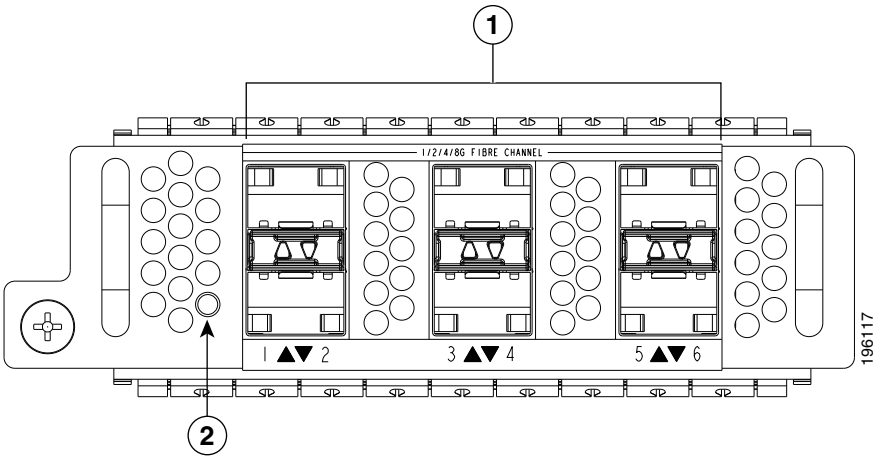


Figure 1-14 Front of the N10-E0060 Expansion Module



1	Six 1-, 2-, 4-, or 8- Gbps Fibre Channel ports	**2**	Module LED

Ports

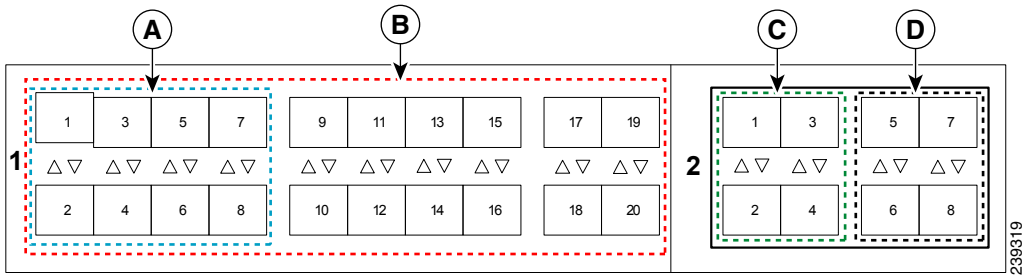
Each individual port is numbered, and groups of ports are numbered based on their function. The ports are numbered top to bottom and left to right.

Cisco UCS 6120XP

There are 20 to 28 ports on the Cisco UCS 6120XP, depending on which expansion module is installed. The fixed ports form group 1 and are named 1/*port_number*. Ports 1 through 20 are unencrypted Ethernet ports. Of these, ports 1 through 8 are 10-Gigabit Ethernet and 1-Gigabit Ethernet-capable ports. Group 2 includes the ports in the expansion module or modules. Group 2 ports 1 through 4 are Ethernet ports. Group 2 ports 5 through 8 are Fibre Channel ports.

Figure 1-15 shows how ports are numbered and grouped by function on a Cisco UCS 6120XP with the N10-E0440 expansion module installed.

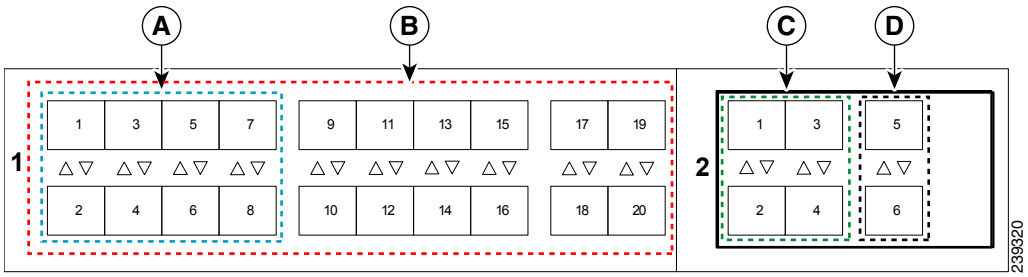
Figure 1-15 Port Numbering of the Cisco UCS 6120XP Configured with the N10-E0440 Expansion Module



A	Group 1 ports 1 through 8: 10-Gigabit or 1-Gigabit Ethernet capable unencrypted ports	**C**	Group 2 ports 1 through 4: Unencrypted Ethernet ports
B	Group 1 ports 1 through 20: Unencrypted Ethernet ports	**D**	Group 2 ports 5 through 8: Fibre Channel ports

Figure 1-16 shows how ports are numbered and grouped by function with the N10-E0600 expansion module installed.

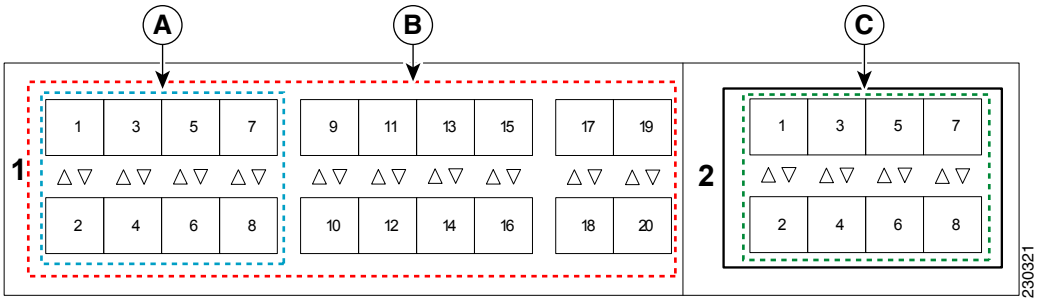
Figure 1-16 Port Numbering of the Cisco UCS 6120XP Configured with the N10-E0600 Expansion Module



A	Group 1 ports 1 through 8: 10-Gigabit or 1 Gigabit Ethernet capable unencrypted ports	**C**	Group 2 ports 1 through 4: Encrypted Ethernet ports
B	Group 1 ports 1 through 20: Unencrypted Ethernet ports	**D**	Group 2 ports 5 and 6: Unencrypted Ethernet ports

Figure 1-17 shows how ports are numbered and grouped by function with the N10-E0080 expansion module installed.

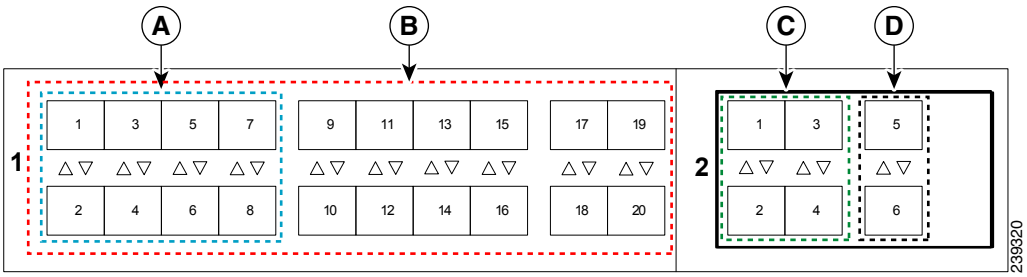
Figure 1-17 Port Numbering of the Cisco UCS 6120XP Configured with the N10-E0080 Expansion Module



A	Group 1 ports 1 through 8: 10-Gigabit or 1-Gigabit Ethernet capable unencrypted ports	**C**	Group 2 ports 1 through 8: Fibre Channel ports
B	Group 1 ports 1 through 20: Unencrypted Ethernet ports		

Figure 1-18 shows how ports are numbered and grouped by function with the N10-E0060 expansion module installed.

Figure 1-18 Port Numbering of the Cisco UCS 6120XP Configured with the N10-E0060 Expansion Module



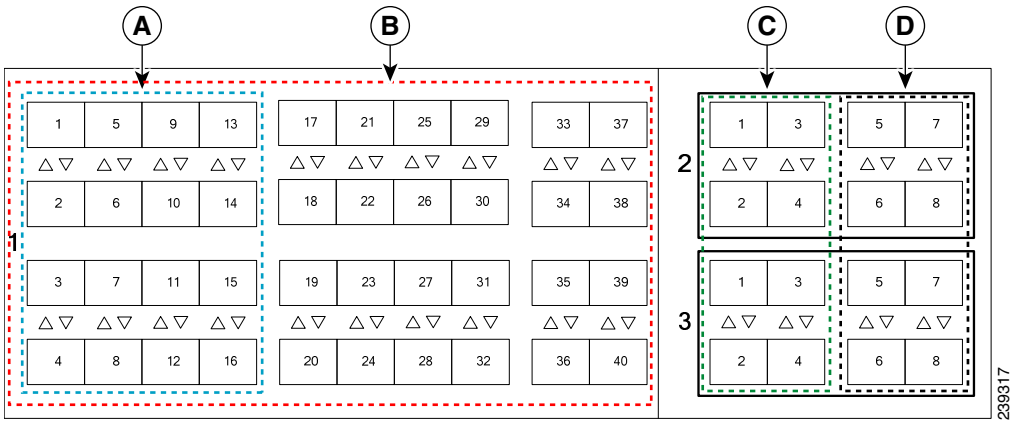
A	Group 1 ports 1 through 8: 10-Gigabit or 1-Gigabit Ethernet capable unencrypted ports	**C, D**	Group 2 ports 1 through 6: Fibre Channel ports
B	Group 1 ports 1 through 20: Unencrypted Ethernet ports		

Cisco UCS 6140XP

There are 40 to 56 ports on the Cisco UCS 6140XP, depending on which expansion module is installed. The fixed ports form group 1 and are named 1/*port_number*. Ports 1 through 40 are unencrypted Ethernet ports. Of these, ports 1 through 16 are 10-Gigabit Ethernet and 1-Gigabit Ethernet-capable ports. Group 2 includes the ports in the top-most expansion module. Group 2 ports 1 through 4 are encrypted Ethernet ports. Group 2 ports 5 through 8 are Fibre Channel ports. Group 3 includes the ports in the bottom-most expansion module. Group 3 ports 1 through 4 are encrypted Ethernet ports. Group 3 ports 5 through 8 are Fibre Channel ports.

Figure 1-19 shows how ports are numbered and grouped by function for both the fixed ports and the Fibre Channel plus Ethernet expansion module ports.

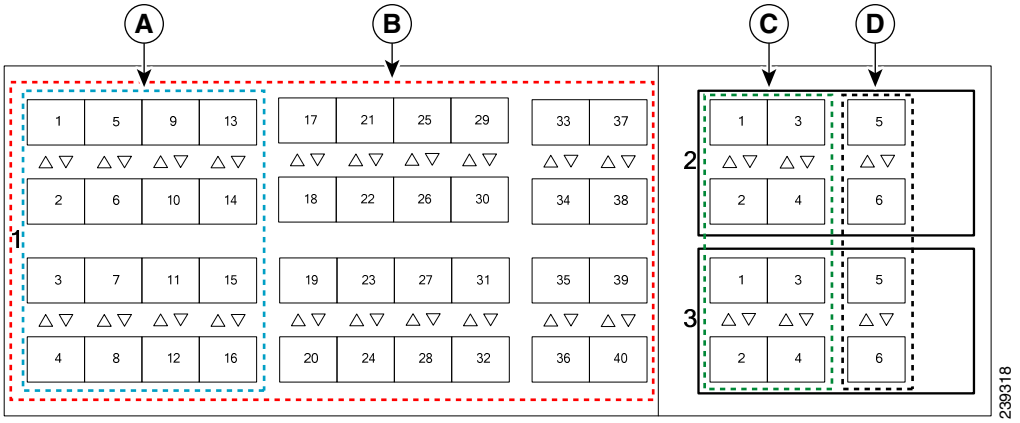
Figure 1-19 Port Numbering of the Cisco UCS 6140XP Configured with the N10-E0080 Expansion Module



A	Group 1/ports 1 through 16: 10-Gigabit Ethernet capable unencrypted ports	**C**	Groups 2 and 3/ ports 1 through 4: Unencrypted Ethernet ports
B	Group 1/ports 1 through 40: Unencrypted Ethernet ports	**D**	Groups 2 and 3/ ports 5 through 8: Fibre Channel ports

Figure 1-20 shows how ports are numbered and grouped by function for both the fixed ports and the Ethernet expansion module ports.

Figure 1-20 Port Numbering of the Cisco UCS 6140XP Configured with the N10-E0600 Expansion Module



A	Group 1/ports 1 through 16: 10-Gigabit or 1 GigabitEthernet capable Encrypted ports	**C, D**	Groups 2 and 3/ ports 1 through 6: Unencrypted Ethernet ports
B	Group 1/ports 1 through 40: 10-Gigabit Unencrypted Ethernet ports		

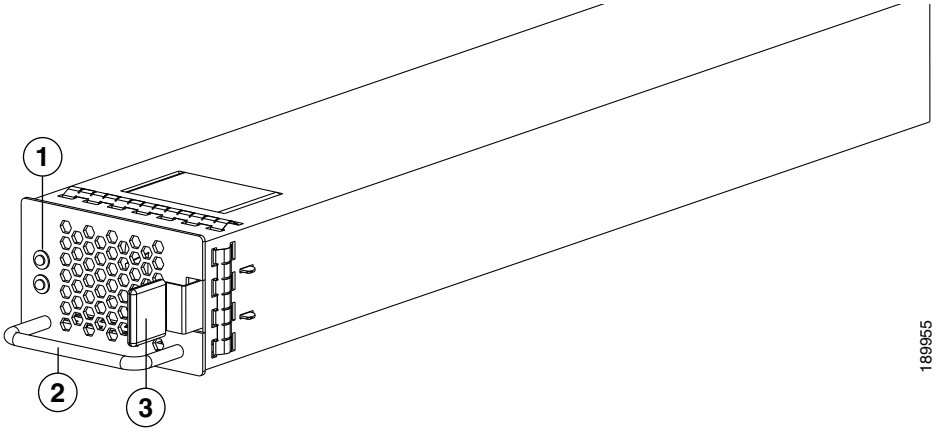
Power Supply

Table 1-2 Power Supply Models

Cisco PID	Fabric Interconnect	AC Source	Wattage
N10-PAC1-550W =	Cisco UCS 6120XP	110 VAC	550
N10-PAC2-750W=	Cisco UCS 6140XP	110 VAC	750

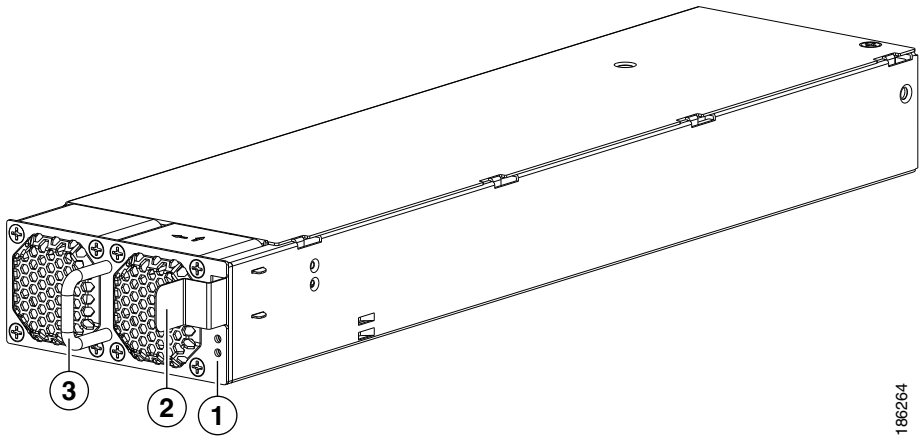
The fabric interconnect uses a front-end power supply. The chassis has slots for two power supplies. Two power supplies can be used for redundancy, but the fabric interconnect is fully functional with one power supply. Figure 1-21 shows the 550 W power supply, which has two LEDs: one for power status and one for failure condition. Figure 1-22 shows the 750 W power supply, which has two LEDs: one for power status and one for failure condition.

Figure 1-21 550W Power Supply (N10-PAC1-550W =)



1	Amber fail LED indicates a failure condition.	2	Green power LED indicates the power status.

Figure 1-22 750W Power Supply (N10-PAC2-750W=)



1	Green power LED indicates the power status.	**2**	Amber fail LED indicates a failure condition.

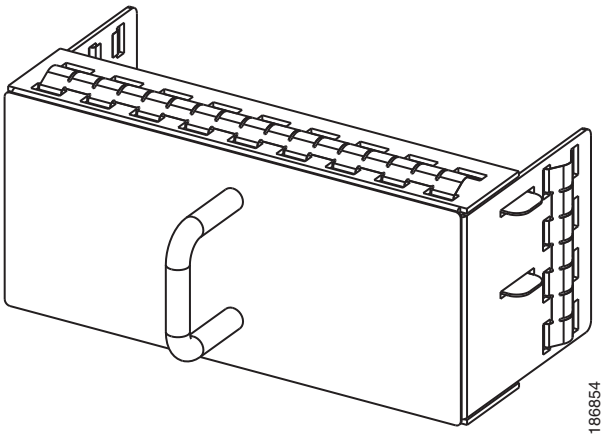
Table 1-3 describes the status of the two power supply LEDs.

Table 1-3 Power Supply LED Descriptions

Power Supply Condition	Power LED Status	Fail LED Status
No AC power to all power supplies.	Off	Off
Power supply failure, including over voltage, over current, over temperature, and fan failure.	Off	On
Power supply warning events where the power supply continues to operate. These events include high temperature, high power, and slow fan.	Off	1 Hz Blinking
AC present, 3.3 voltage standby (VSB) on, and the power supply unit is off.	1 Hz blinking	Off
Power supply on and OK.	On	Off

If one power supply is installed in the chassis, but the other power supply slot is empty, a blank filler panel should be used to cover the empty slot. Figure 1-23 shows a blank power supply filler panel.

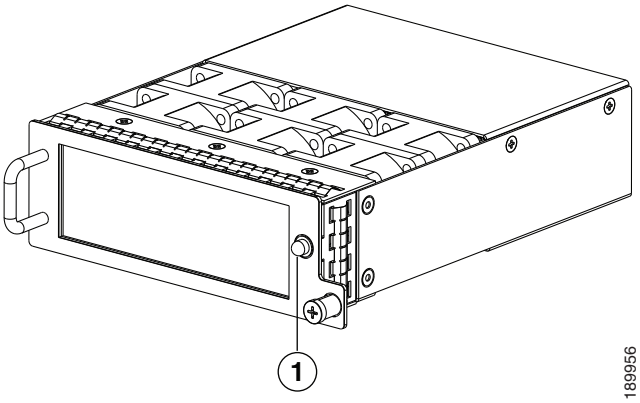
Figure 1-23 Blank Power Supply Filler Panel (N10-S1BLKP= Shown)



Fan Module

TheCisco UCS 6120XP fabric interconnect has slots for two fan modules. Each fan module houses 6 fans. The combination of 6 fans per module and 2 modules provides the chassis with 12 fans. Figure 1-24 shows the fan module for the Cisco UCS 6120XP.

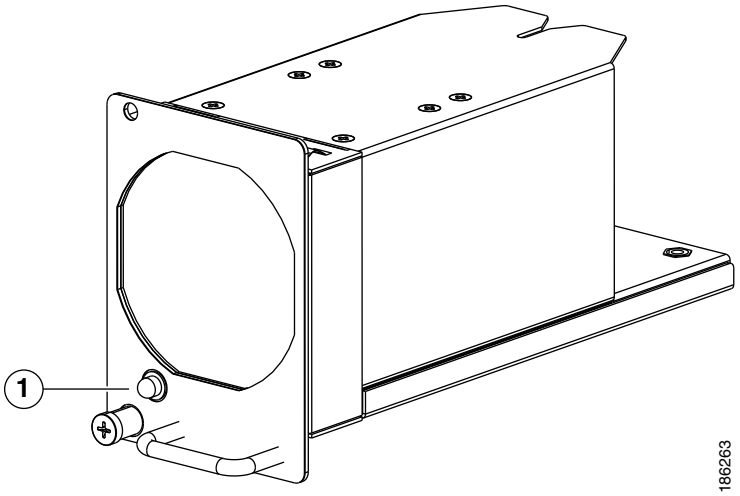
Figure 1-24 Cisco UCS 6120XP Fan Module (N10-FAN1=)



1	Fan module LED

The Cisco UCS 6140XP fabric interconnect has five fan modules. Figure 1-25 shows the fan module.

Figure 1-25 Cisco UCS 6140XP Fabric Interconnect Fan Module (N10-FAN2=)



1	Fan module LED

The bi-color fan module LED indicates fan tray health. Green indicates normal operation, while amber indicates a fan failure.

LED Descriptions

Table 1-4 describes the LEDs.

Table 1-4 LEDs for the Cisco UCS 6120XP and Cisco UCS 6140XP

LED	Location	Color	Description
System Status	Front of chassis	Green	System is operating normally.
		Green (blinking)	Standby.
		Amber (blinking)	Over temperature or major alarm.
		Off	System is powered off.
Fan tray	Fan trays (front of chassis)	Green	Fan tray is operating normally.
		Amber (blinking)	Fan failure is within the fan tray.
		Off	Not receiving power.
Power input	Power supply (front of chassis)	Green	AC power is going to the power supply.
		Green (blinking)	Receiving power, 3.3 Voltage standby (VSB) is on, power supply is off.
		Off	Not receiving power.

Table 1-4 LEDs for the Cisco UCS 6120XP and Cisco UCS 6140XP (continued)

LED	Location	Color	Description
Power supply Failure	Power supply (front of chassis)	Amber	Power supply failure such as over voltage, over current, fan failure, or over temperature.
		Amber (blinking)	Power supply is working with a warning condition such as high temperature, high power, or slow fan.
		Off	No warning or failure condition.
Expansion module	Back of chassis	Green	Expansion module is operating normally.
		Amber (blinking)	Booting, running diagnostics, or minor alert.
		Off	Module not detected.

Port Level LEDs

There are port activity LEDs on the chassis and on the expansion modules. Table 1-5 summarizes the behavior of the port LEDs.

Table 1-5 Port LEDs

Color	Description
Green (blinking)	Link is up, enabled, and active.
Amber	Link is administratively disabled.
Amber (blinking)	POST or operational error.
Off	Link is down.

Supported Transceivers

The fabric interconnect supports SFP+ Ethernet transceivers, SFP transcievers, and SFP Fibre Channel transceivers. Specifications for these transcievers is at:

http://www.cisco.com/en/US/docs/interfaces_modules/transceiver_modules/installation/note/78_15160.html

SFP+ Transceivers

The enhanced SFP+ 10-Gigabit Ethernet transceiver module is a bidirectional device with a transmitter and receiver in the same physical package. It has a 20-pin connector on the electrical interface and duplex LC connector on the optical interface. Table 1-6 lists the supported SFP+ optical transceivers.

Table 1-6 Supported SFP+ Optical Transceivers

Model	Description
SFP-10G-SR	10-Gigabit Ethernet—short range SFP+ module

Table 1-6 Supported SFP+ Optical Transceivers

Model	Description
SFP-10G-LR	10-Gigabit Ethernet—long range SFP+ module
FET-10G	10-Gigabit Ethernet— SFP+ module

Note The maximum length of fiber optic runs is limited to 300 meters. This is imposed by our use of 802.3X/802.1Qbb Priority Pauses. SFP-10G-LR is supported between fabric interconnect and I/O Module, but the 300m limit still applies.

SFP Transceivers

The SFP 1 -Gigabit Ethernet transceiver module is a bidirectional device with a transmitter and receiver in the same physical package. Table 1-6 lists the supported SFP optical transceivers.

Table 1-7 Supported SFP Optical Transceivers

Model	Description
GLC-T	1-Gigabit Ethernet copper SFP module
GLC-SX-MM	1-Gigabit Ethernet—short range (550m max) SFP module
GLC-LH-SM	1-Gigabit Ethernet—long range (10km) SFP module

Note The maximum length of fiber optic runs is limited to 300 meters. This is imposed by our use of 802.3X/802.1Qbb Priority Pauses. SFP-10G-LR is supported between fabric interconnect and I/O Module, but the 300m limit still applies.

SFP+ Copper Cables

Copper cables are available for use with the 10-Gigabit Ethernet SFP+ module. See Table 1-8 for a description of these cables.

Table 1-8 Cables Used with the 10-Gbps Ethernet SFP+ Transceivers

Model	Description
SFP-H10GB-CU1M	10GBASE-CU SFP+ 1-meter cable
SFP-H10GB-CU3M	10GBASE-CU SFP+ 3-meter cable
SFP-H10GB-CU5M	10GBASE-CU SFP+ 5-meter cable
SFP-H10GB-ACU7M	10GBASE-CU SFP+ 7-meter cable
SFP-H10GB-ACU10M	10GBASE-CU SFP+ 10-meter cable

SFP Fibre Channel Transceivers

The Cisco UCS 61oo series fabric interconnects support multimode 850nm 4Gbps SFPs with 150m reach (see Table 1-9).

Table 1-9 SFP Fiber Channel Transceivers

Model	Description
DS-SFP-FC4G-SW	4 Gbps Fibre Channel-SW SFP, LC
DS-SFP-FC4G-LW	4 Gbps Fibre Channel-LW SFP, LC, (10 km reach)
DS-SFP-FC8G-SW	8 Gbps Fibre Channel-SW SFP, LC
DS-SFP-FC8G-LW	8 Gbps Fibre Channel-LW SFP, LC, (10 km reach)

Note The maximum length of fiber optic runs is limited to 300 meters. This is imposed by our use of 802.3X/802.1Qbb Priority Pauses.