



Connect Switch to the Network



Note The images in this chapter are only for representation purposes, unless specified otherwise. The chassis' actual appearance and size may vary.

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Connecting a Console to the Switch

Before you create a network management connection for the switch or connect the switch to the network, you must create a local management connection through a console terminal and configure an IP address for the switch. The switch can be accessed using remote management protocols, such as SSH and Telnet. By default, SSH is included in the software image. But telnet is not part of the software image. You must manually install the telnet optional package to use it.

You also can use the console to perform the following functions, each of which can be performed through the management interface after you make that connection:

- configure the switch using the command-line interface (CLI)
- monitor network statistics and errors
- configure Simple Network Management Protocol (SNMP) agent parameters
- initiate software download updates via console

You make this local management connection between the asynchronous serial port on a Supervisor module and a console device capable of asynchronous transmission. Typically, you can use a computer terminal as the console device. On the Supervisor module, you use the console serial port.



Note Before you can connect the console port to a computer terminal, make sure that the computer terminal supports VT100 terminal emulation. The terminal emulation software makes communication between the switch and computer possible during setup and configuration.

Before you begin

- The switch must be fully installed in its rack. The switch must be connected to a power source and grounded.
- The necessary cabling for the console, management, and network connections must be available.
 - An RJ45 rollover cable and a DB9F/RJ45 adapter.
 - Network cabling should already be routed to the location of the installed switch.

Step 1 Configure the console device to match the following default port characteristics:

- 115200 baud
- 8 data bits
- 1 stop bit
- No parity

Step 2 Connect an RJ45 rollover cable to a terminal, PC terminal emulator, or terminal server.

The RJ45 rollover cable is not part of the accessory kit.

Step 3 Route the RJ45 rollover cable as appropriate and connect the cable to the console port on the chassis.

If the console or modem cannot use an RJ45 connection, use the DB9F/RJ45F PC terminal adapter. Alternatively, you can use an RJ45/DSUB F/F or RJ45/DSUB R/P adapter, but you must provide those adapters.

What to do next

You are ready to create the initial switch configuration.

Connect the Management Interface

The Supervisor Module's management port (MGMT ETH) provides out-of-band management, which lets you to use the command-line interface (CLI) to manage the switch by its IP address. This port uses a 10/100/1000 Ethernet connection with an RJ-45 interface.



Note In a dual Supervisor Module switch, you can ensure that the active Supervisor Module is always connected to the network by connecting the management interface on both Supervisor Module to the network. That is, you can perform this task for each Supervisor Module. When the Supervisor Module is active, the switch automatically has a management interface that is running and accessible from the network.



Caution To prevent an IP address conflict, do not connect the MGMT 100/1000 Ethernet port until the initial configuration is complete.

Before you begin

You must have completed the initial switch configuration.

-
- Step 1** Connect a modular, RJ-45, UTP cable to the MGMT ETH port on the Supervisor Module.
- Step 2** Route the cable through the central slot in the cable management system.
- Step 3** Connect the other end of the cable to a 100/1000 Ethernet port on a network device.
-

What to do next

You are ready to connect the interface ports on each of the line cards to the network.

Transceivers, Connectors, and Cables

Transceiver and Cable Specifications

To determine which transceivers and cables are supported by this switch, see [Cisco Transceiver Modules Compatibility Information](#).

To see the transceiver specifications and installation information, see [Cisco Transceiver Modules Install and Upgrade Guides](#).

RJ-45 Connectors

The RJ-45 connector connects Category 3, Category 5, Category 5e, Category 6, or Category 6A foil twisted-pair or unshielded twisted-pair cable from the external network to the following module interface connectors:

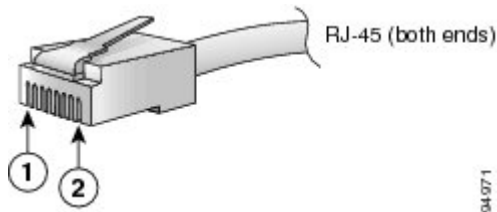
- Switch chassis
 - CONSOLE port
 - MGMT ETH port



Caution To comply with GR-1089 intrabuilding, lightning immunity requirements, you must use a foil twisted-pair (FTP) cable that is properly grounded at both ends.

The following figure shows the RJ-45 connector.

Figure 1: RJ-45 Connector



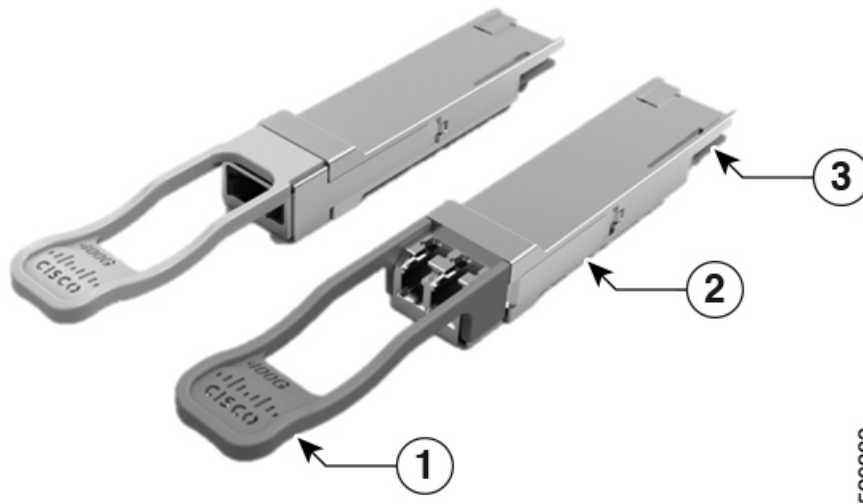
1	Pin 1	2	Pin 8
---	-------	---	-------

Install and Remove QSFP Transceiver Modules

This section provides the installation, cabling, and removal instructions for the Quad Small Form-Factor Pluggable transceiver modules. Refer to the [Cisco Optical Transceiver Handling Guide](#) for additional details on optical transceivers.

The following figure shows a 400-Gigabit QSFP-DD optical transceiver.

Figure 2: 400-Gigabit QSFP-DD Transceiver Module



1	Pull-tab	2	QSFP-DD transceiver body
3	Electrical connection to the module circuitry		

Required Tools and Equipment

You need these tools to install the transceiver modules:

- Wrist strap or other personal grounding device to prevent ESD occurrences.
- Antistatic mat or antistatic foam to set the transceiver on.
- Fiber-optic end-face cleaning tools and inspection equipment.

Installing the Transceiver Module

**Caution**

The transceiver module is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling transceiver modules or coming into contact with system modules.

**Caution**

Protect the transceiver ports by inserting clean dust caps (NXA-ACC-QDD-DC) into any ports not in use. Be sure to clean the optic surfaces of the fiber cables before you plug them back into the optical ports of another module. Use dust caps for all the open ports on the chassis.

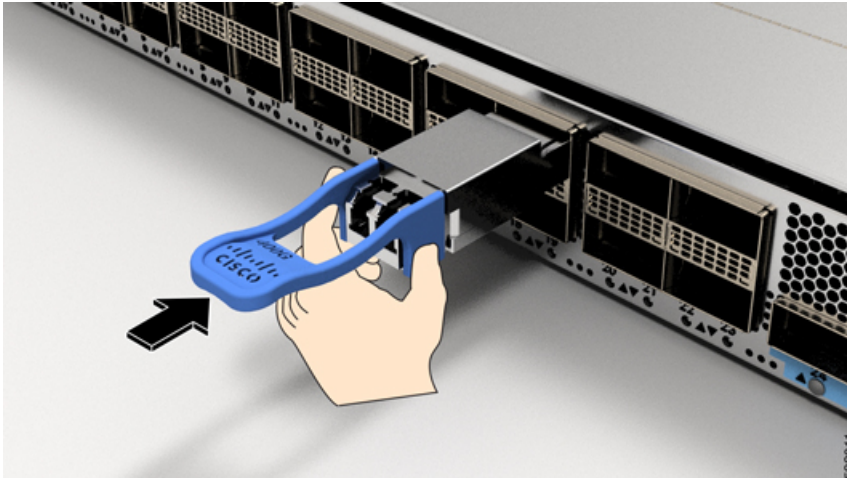
The switch ships with dust caps plugged in. We highly recommend you to keep the dust caps plugged in until you are ready to plug an optic.

The dust caps protect the ports from possible EMI interference and also avoid contamination due to dust collection. To meet the EMI interference requirements, you must use the metal dust caps when the ports are not in use by optical modules.

The QSFP transceiver module has a pull-tab latch. To install a transceiver module, follow these steps:

- Step 1** Attach an ESD wrist strap to yourself and a properly grounded point on the chassis or the rack.
- Step 2** Remove the transceiver module from its protective packaging.
- Step 3** Check the label on the transceiver module body to verify that you have the correct model for your network. Do not remove the dust plug until you're ready to attach the network interface cable. Dust plug is not shown in the images.
- Step 4** Hold the transceiver by the pull-tab so that the identifier label is on the top.
- Step 5** Align the transceiver module in front of the module's transceiver socket opening and carefully slide the transceiver into the socket until the transceiver contact with the socket electrical connector.

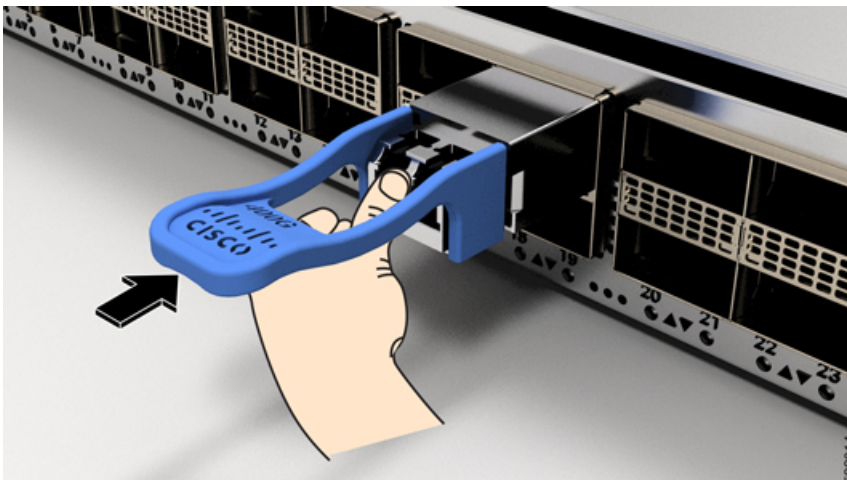
Figure 3: Installing the QSFP Transceiver Module



Step 6 Press firmly on the front of the transceiver module with your thumb to fully seat the transceiver in the module's transceiver socket (see the below figure).

Caution If the latch isn't fully engaged, you might accidentally disconnect the transceiver module.

Figure 4: Seating the QSFP Transceiver Module



Attach the Optical Network Cable

Before you begin

Before you remove the dust plugs and make any optical connections, follow these guidelines:

- Keep the protective dust plugs installed in the unplugged fiber-optic cable connectors and in the transceiver optical bores until you are ready to make a connection.
- Inspect and clean the optical connector end faces just before you make any connections.

- Grasp the optical connector only by the housing to plug or unplug a fiber-optic cable.



Note The transceiver modules and fiber connectors are keyed to prevent incorrect insertion.



Note The multiple-fiber push-on (MPO) connectors on the optical transceivers support network interface cables with either physical contact (PC) or ultra-physical contact (UPC) flat polished face types. The MPO connectors on the optical transceivers do not support network interface cables with an angle-polished contact (APC) face type.

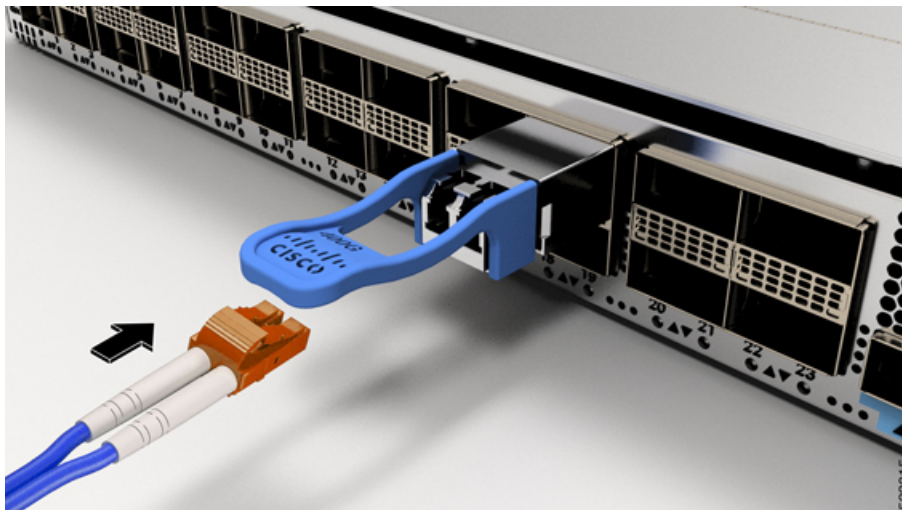


Note Inspect the MPO connector for the correct cable type, cleanliness, and any damage. For complete information on inspecting and cleaning fiber-optic connections, see the [Inspection and Cleaning Procedures for Fiber-Optic Connections](#) document.

Step 1 Remove the dust plugs from the optical network interface cable MPO connectors and from the transceiver module optical bores. Save the dust plugs for future use.

Step 2 Attach the network interface cable MPO connectors immediately to the transceiver module.

Figure 5: Cabling a Transceiver Module



Removing the Transceiver Module

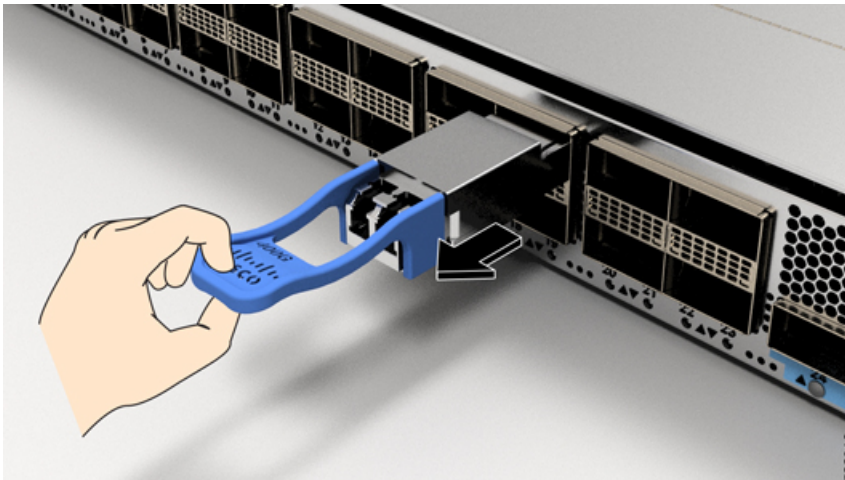


Caution The transceiver module is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling transceiver modules or coming into contact with modules.

To remove a transceiver module, follow these steps:

- Step 1** Disconnect the network interface cable from the transceiver connector.
- Step 2** Install the dust plug immediately into the transceiver's optical bore.
- Step 3** Grasp the pull-tab and gently pull to release the transceiver from the socket.

Figure 6: Removing the QSFP Transceiver Module



- Step 4** Slide the transceiver out of the socket.
- Step 5** Place the transceiver module into an antistatic bag.

Connect Interface Ports

You can connect optical interface ports with other devices for network connectivity.

Connect a Fiber-Optic Port to the Network

Some transceivers work with fiber-optic cables that you attach to the transceivers and other transceivers work with pre-attached copper cables. You must install a transceiver in the port before installing the fiber-optic cable in the transceiver.

**Caution**

Removing and installing a transceiver can shorten its useful life. Do not remove and insert transceivers any more than is absolutely necessary. We recommend that you disconnect cables before installing or removing transceivers to prevent damage to the cable or transceiver.

Disconnect Optical Ports from the Network

When you need to remove fiber-optic transceivers, you must first remove the fiber-optic cables from the transceiver before you remove the transceiver from the port.

Maintain Transceivers and Optical Cables

Refer to [Inspection and Cleaning Procedures for Fiber-Optic Connections](#) document for inspection and cleaning processes for fiber optic connections.

Create the Initial Switch Configuration

You must assign an IP address to the switch management interface to connect the switch to the network.

When you initially power up the switch, it boots up and asks a series of configuration-related questions. You can use the default choices for each configuration except for the IP address, which you must provide.

When the system is powered on and the console port is connected to the terminal, the RP CPU messages are seen. You can see RP CPU messages by pressing the hot-key sequence Ctrl-O.

Before you begin

- A console device must be connected with the switch.
- The switch must be connected to a power source.
- Determine the IP address and netmask that is needed for the Management interfaces: `MgmtEth0/RP0/CPU0/0`
:

Step 1 Power up the switch.

The LEDs on each power supply light up (green) when the power supply units are sending power to the switch, and the software asks you to specify a password to use with the switch.

Step 2 When the system is booted up for the first time, a new username and a password is to be created. The following prompt appears:

```
!!!!!!!!!!!!!!!!!!!!!! NO root-system username is configured. Need to configure root-system username.
!!!!!!!!!!!!!!!!!!!!!!

--- Administrative User Dialog ---
```

```

Enter root-system username:
% Entry must not be null.

Enter root-system username: cisco
Enter secret:
Use the 'configure' command to modify this configuration.
User Access Verification

Username: cisco
Password:

RP/0/RP0/CPU0:ios#

```

Step 3 Enter a new password to use for this switch.

The software checks the security strength of your password and rejects your password if it is not considered to be a strong password. To increase the security strength of your password, make sure that it adheres to the following guidelines:

- at least eight characters
- minimizes or avoids the use of consecutive characters (such as "abcd")
- minimizes or avoids repeating characters (such as "aaa")
- does not contain recognizable words from the dictionary
- does not contain proper names
- contains both uppercase and lowercase characters
- contains numbers as well as letters

Note Clear text passwords cannot include the dollar sign (\$) special character.

Tip If a password is trivial (such as a short, easy-to-decipher password), the software rejects that password. Passwords are case sensitive.

When you enter a strong password, the software asks you to confirm the password.

Step 4 Reenter the password.

When you enter the same password, the software accepts the password.

Step 5 Enter the configuration mode.**Step 6** Enter the IP address for the management interface.**Step 7** Enter a network mask for the management interface.**Step 8** The software asks whether you want to edit the configuration. Enter 'no' to decline.

Verify Chassis Installation

After installing the chassis, use the following **show** commands to verify the installation and configuration in the EXEC mode. Any issue if detected, take corrective action before making further configurations.

Command	Description
show module	Displays the state information of each card.

Command	Description
show redundancy	Displays the status of supervisor module redundancy.
n9k-184-Man(config)# show locator-led st	<p>Displays LED information for the switch, or for a specific LED location.</p> <pre>n9k-184-Man(config)# show locator-led st ----- Module Locator LED Status ----- Chassis OFF Module 1 ON Module 5 OFF Module 8 OFF Module 19 OFF Module 20 OFF Module 27 OFF FAN Module 1 OFF FAN Module 2 OFF FAN Module 3 OFF FAN Module 4 OFF PSU Module 4 OFF PSU Module 5 OFF PSU Module 6 OFF PSU Module 7 OFF PSU Module 8 OFF PSU Module 9 OFF</pre>
show inventory	Displays information about the field replaceable units (FRUs), including product IDs, serial numbers, and version IDs.
show environment	<p>Displays all the environment-related information.</p> <pre>n9k-184-Man(config)# show environment ? fan Fan information power Power capacity and power distribution information temperature Temperature sensor information</pre>

Command	Description
show environment temperature	<p>Displays temperature readings for card temperature sensors. Each Supervisor Module, line card, and fabric cards have temperature sensors with two thresholds:</p> <ul style="list-style-type: none"> • Minor temperature threshold – When a minor threshold is exceeded, minor alarm occurs and the following actions occur for all four sensors: <ul style="list-style-type: none"> • Displays system messages • Sends SNMP notifications (if configured) • Log environmental alarm event that can be reviewed by running the show alarm command. • Major temperature threshold – When a major threshold is exceeded, a major alarm occurs and the following actions occur: <ul style="list-style-type: none"> • For sensors 1, 3, and 4 (outlet and on board sensors), the following actions occur: <ul style="list-style-type: none"> • Displays system messages. • Sends SNMP notifications (if configured). • Logs environmental alarm event that can be reviewed by running the show alarm command. • For sensor 2 (intake sensor), the following actions occur: <ul style="list-style-type: none"> • If the threshold is exceeded in a switching card, only that card is shut down. • If the threshold exceeds an active Supervisor Module with HA-standby or standby present, only that Supervisor Module is shut down and the standby Supervisor Module takes over. • If you do not have a standby Supervisor Module in your switch, you have up to 2 minutes to decrease the temperature. During this interval, the software monitors the temperature every 5 seconds and continuously sends system messages as configured. <p>Note Cisco recommends that you install dual Supervisor Module.</p>
show environment power	Displays the power usage information for the entire switch.
show environment current	Displays the current environment status.
show environment fan	Displays the status of the fan trays.

The following example shows sample output from the **show environment** command for 9800 switches:

```
n9k-184-Man(config)# show environment
Fan:
-----
Fan Model Hw Direction Status
-----
Fan1(sys_fan1) N9K-C980x-FAN-A 1.0 front-to-back Ok
Fan2(sys_fan2) N9K-C980x-FAN-A 1.0 front-to-back Ok
```

```

Fan3(sys_fan3) N9K-C980x-FAN-A 1.0 front-to-back Ok
Fan4(sys_fan4) N9K-C980x-FAN-A 1.0 front-to-back Ok
Fan_in_PS1 -- front-to-back Absent
Fan_in_PS2 -- front-to-back Absent
Fan_in_PS3 -- front-to-back Absent
Fan_in_PS4 -- front-to-back Shutdown
Fan_in_PS5 -- front-to-back Ok
Fan_in_PS6 -- front-to-back Ok
Fan_in_PS7 -- front-to-back Ok
Fan_in_PS8 -- front-to-back Shutdown
Fan_in_PS9 -- front-to-back Ok
Fan Zone Speed: Zone 1: 0x80
Fan Air Filter : NotSupported

```

Power Supply:

Voltage: 54 Volts

Power Actual Actual Total

Supply Model Output Input Capacity Status

(Watts) (Watts) (Watts)

```

-----
1 ----- 0 W 0 W 0 W Absent
2 ----- 0 W 0 W 0 W Absent
3 ----- 0 W 0 W 0 W Absent
4 PSU6.3KW-20A-HV 0 W 0 W 0 W Shutdown
5 PSU6.3KW-20A-HV 992 W 1048 W 3150 W Ok
6 PSU6.3KW-20A-HV 964 W 1024 W 3150 W Ok
7 PSU6.3KW-20A-HV 964 W 1024 W 3150 W Ok
8 PSU6.3KW-20A-HV 0 W 0 W 0 W Shutdown
9 PSU6.3KW-20A-HV 981 W 1045 W 3150 W Ok

```

Actual Power

Module Model Draw Allocated Status

(Watts) (Watts)

```

-----
1 N9K-X9836DM-A 771.00 W 2435.94 W Powered-Up
5 N9K-X9836DM-A 1046.00 W 2435.94 W Powered-Up
8 N9K-X9836DM-A 776.00 W 2435.94 W Powered-Up
Xb19 N9K-C980x-FM-A 233.00 W 574.56 W Powered-Up
Xb20 N9K-C980x-FM-A 238.00 W 574.56 W Powered-Up
Xb21 xbar N/A 0.00 W Absent
Xb22 xbar N/A 0.00 W Absent
Xb23 xbar N/A 0.00 W Absent
Xb24 xbar N/A 0.00 W Absent
Xb25 xbar N/A 0.00 W Absent
Xb26 xbar N/A 0.00 W Absent
27 N9K-C9800-SUP-A 80.00 W 94.50 W Powered-Up
28 supervisor N/A 94.50 W Absent
fan1 N9K-C980x-FAN-A 170.00 W 686.00 W Powered-Up
fan2 N9K-C980x-FAN-A 187.00 W 686.00 W Powered-Up
fan3 N9K-C980x-FAN-A 176.00 W 686.00 W Powered-Up
fan4 N9K-C980x-FAN-A 175.00 W 686.00 W Powered-Up

```

N/A - Per module power not available

Power Usage Summary:

```

-----
Power Supply redundancy mode (configured) Non-Redundant(combined)
Power Supply redundancy mode (operational) Non-Redundant(combined)

```

Total Power Capacity (based on configured mode) 12599.00 W

Total Power of all Inputs (cumulative) 12599.00 W

```
Total Power Output (actual draw) 3901.00 W
Total Power Input (actual draw) 4141.00 W
Total Power Allocated (budget) 11393.00 W
Total Power Available for additional modules 1206.28 W
```

Temperature:

```
-----
Module Sensor MajorThresh MinorThres CurTemp Status
(Celsius) (Celsius) (Celsius)
-----
```

```
1 CPU 100 98 65 Ok
1 Sone-1 110 100 46 Ok
1 Sone-2 110 100 48 Ok
1 Sone-3 110 100 50 Ok
5 CPU 100 98 79 Ok
5 Sone-1 110 100 71 Ok
5 Sone-2 110 100 69 Ok
5 Sone-3 110 100 65 Ok
8 CPU 100 98 63 Ok
8 Sone-1 110 100 50 Ok
8 Sone-2 110 100 50 Ok
8 Sone-3 110 100 48 Ok
19 Sone-1 110 100 34 Ok
19 Sone-2 110 100 39 Ok
20 Sone-1 110 100 35 Ok
20 Sone-2 110 100 43 Ok
27 OUTLET 85 80 26 Ok
27 INLET 45 42 22 Ok
27 CPU 97 93 44 Ok
```

The following example displays the temperature readings for each of the powered-up cards using the **show environment temperatures** command:

```
9k-184-Man(config)# show environment temperature
Temperature:
```

```
-----
Module Sensor MajorThresh MinorThres CurTemp Status
(Celsius) (Celsius) (Celsius)
-----
```

```
1 CPU 100 98 65 Ok
1 Sone-1 110 100 46 Ok
1 Sone-2 110 100 48 Ok
1 Sone-3 110 100 50 Ok
5 CPU 100 98 80 Ok
5 Sone-1 110 100 71 Ok
5 Sone-2 110 100 68 Ok
5 Sone-3 110 100 65 Ok
8 CPU 100 98 63 Ok
8 Sone-1 110 100 50 Ok
8 Sone-2 110 100 50 Ok
8 Sone-3 110 100 48 Ok
19 Sone-1 110 100 34 Ok
19 Sone-2 110 100 39 Ok
20 Sone-1 110 100 35 Ok
20 Sone-2 110 100 42 Ok
27 OUTLET 85 80 26 Ok
27 INLET 45 42 22 Ok
27 CPU 97 93 43 Ok
n9k-184-Man(config)#
```

The following example shows sample output from the **show environment power** command:

```
n9k-184-Man(config)# show environment power
```

```
Power Supply:
```

```
Voltage: 54 Volts
```

```
Power Actual Actual Total
```

```
Supply Model Output Input Capacity Status
```

```
(Watts ) (Watts ) (Watts )
```

```
-----
1 ----- 0 W 0 W 0 W Absent
2 ----- 0 W 0 W 0 W Absent
3 ----- 0 W 0 W 0 W Absent
4 PSU6.3KW-20A-HV 0 W 0 W 0 W Shutdown
5 PSU6.3KW-20A-HV 992 W 1048 W 3150 W Ok
6 PSU6.3KW-20A-HV 967 W 1024 W 3150 W Ok
7 PSU6.3KW-20A-HV 964 W 1024 W 3150 W Ok
8 PSU6.3KW-20A-HV 0 W 0 W 0 W Shutdown
9 PSU6.3KW-20A-HV 978 W 1045 W 3150 W Ok
```

```
Actual Power
```

```
Module Model Draw Allocated Status
```

```
(Watts ) (Watts )
```

```
-----
1 N9K-X9836DM-A 771.00 W 2435.94 W Powered-Up
5 N9K-X9836DM-A 1046.00 W 2435.94 W Powered-Up
8 N9K-X9836DM-A 775.00 W 2435.94 W Powered-Up
Xb19 N9K-C980x-FM-A 233.00 W 574.56 W Powered-Up
Xb20 N9K-C980x-FM-A 238.00 W 574.56 W Powered-Up
Xb21 xbar N/A 0.00 W Absent
Xb22 xbar N/A 0.00 W Absent
Xb23 xbar N/A 0.00 W Absent
Xb24 xbar N/A 0.00 W Absent
Xb25 xbar N/A 0.00 W Absent
Xb26 xbar N/A 0.00 W Absent
27 N9K-C9800-SUP-A 87.00 W 94.50 W Powered-Up
28 supervisor N/A 94.50 W Absent
fan1 N9K-C980x-FAN-A 198.00 W 686.00 W Powered-Up
fan2 N9K-C980x-FAN-A 184.00 W 686.00 W Powered-Up
fan3 N9K-C980x-FAN-A 173.00 W 686.00 W Powered-Up
fan4 N9K-C980x-FAN-A 189.00 W 686.00 W Powered-Up
```

```
N/A - Per module power not available
```

```
Power Usage Summary:
```

```
-----
```

```
Power Supply redundancy mode (configured) Non-Redundant(combined)
```

```
Power Supply redundancy mode (operational) Non-Redundant(combined)
```

```
Total Power Capacity (based on configured mode) 12599.00 W
```

```
Total Power of all Inputs (cumulative) 12599.00 W
```

```
Total Power Output (actual draw) 3901.00 W
```

```
Total Power Input (actual draw) 4141.00 W
```

```
Total Power Allocated (budget) 11393.00 W
```

```
Total Power Available for additional modules 1206.28 W
```

