# Product Overview

**Revised: October 27, 2011**

This chapter describes the Catalyst 4900 series switches, as well as system features and components.

This chapter contains these sections:

# Catalyst 4900 Series Switch Applications

The Catalyst 4900 series switches (see Figure 1-1, Figure 1-2, and Figure 1-3) are designed for high-performance, high-density edge switching applications. They are fixed configuration switching solutions delivering 10/100/1000 connectivity on all ports, supporting hot swappable, redundant power supplies in a compact one rack-unit size for applications where space is limited.
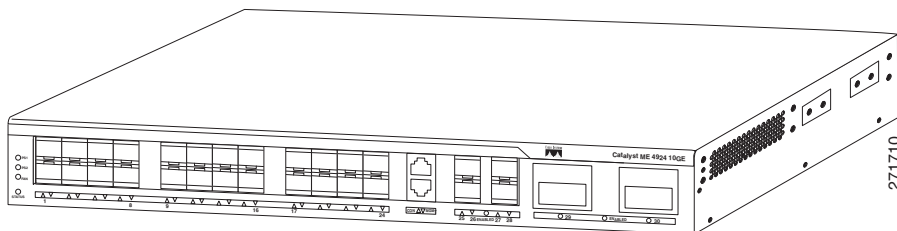
*Figure 1-1        Catalyst 4948 Switch*
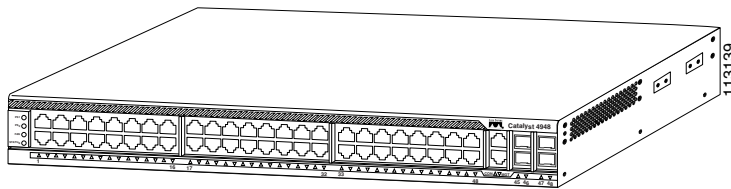


The Catalyst 4948 switch has a 96-Gbps, nonblocking, full-duplex switching fabric, providing 72 million packets-per-second of switching capacity for high-speed applications. The Catalyst 4948 chassis has 44 10BASE-T/100BASE-TX/1000BASE-T Ethernet ports and four ports that can be either 1000BASE-X SFP ports or 10BASE-T/100BASE-TX/1000BASE-T Ethernet ports.

*Figure 1-2        Catalyst 4948-10GE Switch*
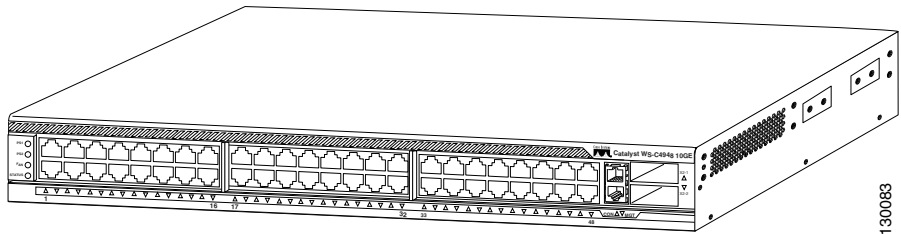


The Catalyst 4948-10GE switch has a 136-Gbps, nonblocking, full-duplex switching fabric, providing 102 million packets-per-second of switching capacity for high-speed applications. The Catalyst 4948-10GE chassis has 48 10/100/1000BASE-T Ethernet ports and two 10-Gigabit Ethernet uplink ports.

*Figure 1-3        Catalyst 4928-10GE Switch*



The Catalyst 4928-10GE switch has a 48-Gbps, nonblocking, full-duplex switching fabric, providing 102 million packets-per-second of switching capacity for high-speed applications. The Catalyst 4928-10GE chassis has 28 1000BASEX SFP ports, and two X2 10-Gigabit Ethernet uplink ports.

All three switches have a removable automatic variable speed fan tray for low noise operation at room temperature and removable and redundant 300 W AC or 300 W DC power supply provides fault-tolerance protection for the switch. See the "Connecting AC Power to the Switch" section on page 3-8.

# Catalyst 4948 Switch Software Features

The following is an overview of Catalyst 4948 features:

- Layer 2, Layer 3, and Layer 4 switching services
- Support for 32,768 MAC addresses for Layer 2 switching
- Support for 2,048 VLANs and 4,096 VLAN IDs
    - IEEE 802.1Q VLAN tagging on all ports
    - Q-in-Q for EFM
    - Cisco Inter Switch Link (ISL) tagging on all ports
- 16,000 multicast forwarding entries and 16,000 unicast forwarding entries
- 512 ingress policers and 512 egress policers
- 8,000 ingress Security ACEs (Access Control Entries) and 8,000 egress Security ACEs
- Support for port aggregation using Port Aggregation Protocol (PAgP) for Gigabit EtherChannel

- Catalyst 4500 series management software features include the following:

  – Command-line interface (CLI) and Simple Network Management Protocol (SNMP) interfaces consistent with the Catalyst 4500 series switches

  – Compatible development of new features with the Catalyst 4500 series switches

  – Support for out-of-band management over serial lines through a terminal attached to the console interface

  – Support for in-band management through any switch port through SNMP, Telnet client, and Trivial File Transfer Protocol (TFTP)

  – Remote Monitoring (RMON) with RMON-1

  – Support for standard Layer 2 features: 802.1D Spanning Tree, Cisco Discovery Protocol (CDP), VTP version 2 with pruning extensions, and Cisco Group Management Protocol (CGMP) client

- Embedded management features include the following:

  – Full SNMP instrumentation including entity-Management Information Base (MIB), all relevant standard MIBs, and all relevant Cisco MIBs

  – Support for the first four RMON groups (Ethernet Statistics, Alarms, Events, and History) on a per-port basis without the need for an optional RMON processing module

  – Performance management information

  – Embedded CiscoView support

# Catalyst 4948-10GE and Catalyst 4928-10GE Switch Software Features

The following is an overview of Catalyst 4948-10GE features:

- Layer 2, Layer 3, and Layer 4 switching services

- Support for 55,000 MAC addresses for Layer 2 switching

- Support for 4,096 VLANs and 4,096 VLAN IDs

  – IEEE 802.1Q VLAN tagging on all ports

- Q-in-Q for EFM

- Cisco Inter Switch Link (ISL) tagging on all ports

- 16,000 multicast forwarding entries and 16,000 unicast forwarding entries

- 1022 ingress policers and 1022 egress policers

- 32,000 ingress Security ACEs and 32,000 egress Security ACEs

- Support for port aggregation using Port Aggregation Protocol (PAgP) for Gigabit EtherChannel

- Catalyst 4500 series management software features include the following:

  - Command-line interface (CLI) and Simple Network Management Protocol (SNMP) interfaces consistent with the Catalyst 4500 series switches

  - Compatible development of new features with the Catalyst 4500 series switches

  - Support for out-of-band management over serial lines through a terminal attached to the console interface

  - Support for in-band management through any switch port through SNMP, Telnet client, and Trivial File Transfer Protocol (TFTP)

  - Remote Monitoring (RMON) with RMON-1

  - Support for standard Layer 2 features: 802.1D Spanning Tree, Cisco Discovery Protocol (CDP), VTP version 2 with pruning extensions, and Cisco Group Management Protocol (CGMP) client

- Embedded management features include the following:

  - Full SNMP instrumentation including entity-Management Information Base (MIB), all relevant standard MIBs, and all relevant Cisco MIBs

  - Support for the first four RMON groups (Ethernet Statistics, Alarms, Events, and History) on a per-port basis without the need for an optional RMON processing module

  - Performance management information

  - Embedded CiscoView support

# Hardware System Features

The Catalyst 4900 series switches are high-performance dedicated Ethernet switches that fully integrate into the Catalyst family of switches using Catalyst 4500 series system software.

The following is an overview of the Catalyst 4900 series hardware features:

- (Catalyst 4948 and 4948-10GE) 48 10BASE-T/100BASE-TX/1000BASE-T Ethernet ports using RJ-45 interfaces. The following standards are supported:
    - IEEE 802.3 10BASE-T
    - IEEE 802.3u 100BASE-TX
    - IEEE 802.3z 1000BASE-X
    - IEEE 802.3x Pause and/or Full Duplex
    - IEEE 802.1Q
    - IEEE 802.3ab 1000BASE-T
    - IEEE 802.3ae
    - IEEE 802.1p
- (Catalyst 4948) Four 1000BASE-X Ethernet ports using SFP interfaces (These ports share MAC addresses with the last four 10BASE-T/100BASE-TX/1000BASE-T Ethernet ports.)
- (Catalyst 4928-10GE) 28 1000BASE-X Ethernet ports using SFP interfaces
- (Catalyst 4948-10GE and Catalyst 4928-10GE) Two 10-Gigabit Ethernet uplink ports using X2 interfaces
- Serial console management port using an RJ-45 interface
- A removable automatic variable speed fan tray for low noise (no more than 48 dB) operation at room temperature
- Redundant and removable 300 W AC or 300 W DC power supplies
- 256-MB SDRAM (fixed), 64-MB embedded Flash memory
- EtherChannel at 10/100/1000 Mbps (and 10 Gbps for the Catalyst 4948-10GE and Catalyst 4928-10GE)
- Hardware-based access lists
- Storm control in hardware

# Switch Components

This section describes the hardware components.

## Traffic Ports on the Catalyst 4948

There are 48 10/100/1000BASE-T Ethernet ports using RJ-45 interfaces and four 1000BASE-X Ethernet ports using SFP interfaces. These SFP ports share MAC addresses with the last four 10/100/1000BASE-T ports. The interface configuration mode command **media-type sfp | rj45** can be used to configure the media type for these ports in the switch software and to determine whether the SFP connector or the RJ-45 connector is used. The default is SFP.

## Traffic Ports on the Catalyst 4948-10GE

There are 48 10/100/1000BASE-T Ethernet ports using RJ-45 interfaces and two 10-Gigabit Ethernet uplink ports using X2 interfaces.

## Traffic Ports on the Catalyst 4928-10GE

There are 28 1000BASE-X Ethernet ports using SFP interfaces.

## Console Port

A console serial port (RJ-45) provides for switch management using standard console equipment. (See Figure 1-4.) A connector pinout table is provided in Appendix A, "Specifications," for the console and management ports.

The Management port on the front panel is only operational when the switch is in rommon mode. When in use, it offers the same TCP/IP based management services available using inband access (Telnet, SNMP, etc.). IP address configuration using BOOTP is supported on the Management port; it also supports image download to the switch.

**Note**    A console cable is not provided with the chassis. It is available as a separately orderable option.

Figure 1-4 and Figure 1-5 show the location of the management and console ports on the switches.

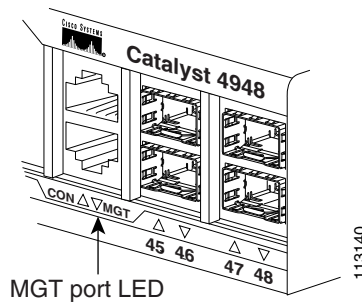*Figure 1-4*        *(Catalyst 4948) Management Port LEDs Detailed View*



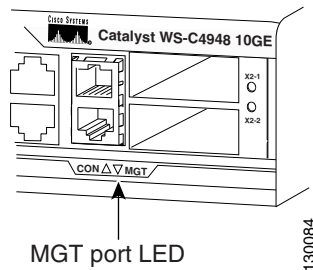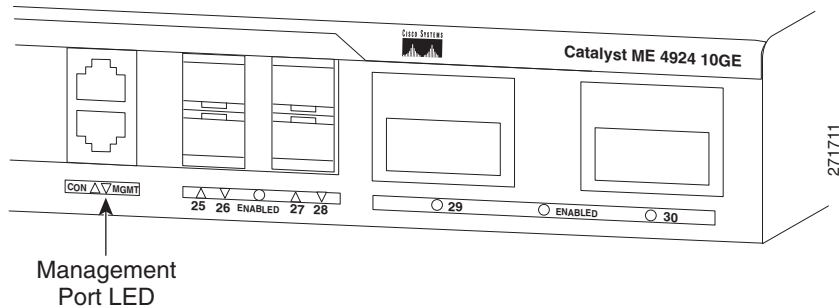*Figure 1-5*        *(Catalyst 4948-10GE) Management Port LEDs Detailed View*

*Figure 1-6         (Catalyst 4928-10GE) Management Port Detailed View*



Management
Port LED

# Front Panel LEDs

The LEDs on the front panel of the switch (see Figure 1-4 and Figure 1-7) provide status information as follows:

*Figure 1-7         Detailed View of the STATUS LEDs*



Power supply 1 LED →  PS1
Power supply 2 LED →  PS2
Fan LED →  FAN
STATUS

Port LEDs
STATUS LED
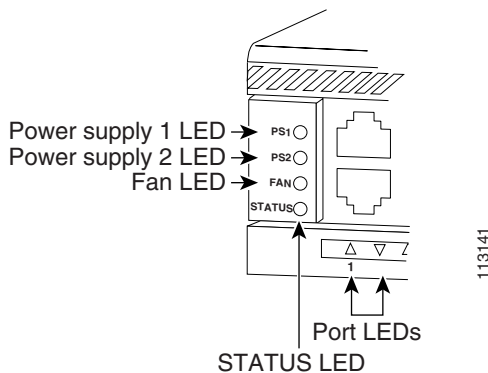
- STATUS LED indicates the operating state of the switch.
- PS1 LED indicates the internal power supply status.
- PS2 LED indicates the internal power supply status.

- FAN LED indicates the fan tray status.
- A link status LED is below the management port.

Table 1-1 describes LED functions.

*Table 1-1        LED Functions*

| LED | Color or State | Description |
|---|---|---|
| STATUS | | At startup, the switch performs a series of diagnostic tests: |
| | Green | All tests pass |
| | Red | A test other than an individual port test fails |
| | Flashing | System boot or diagnostic tests in progress |
| | Yellow | System is in rommon mode or a power supply has failed |
| | Off | Switch is disabled |
| MGT | Green | 10/100 BASE-T Management port is in link-up state |
| | Off | 10/100 BASE-T Management port is in link-down state or not connected |
| | | There are no blinking, red, or yellow states for this port |
| Port 1-48 | Green | Port is operational |
| | Yellow | Port is disabled by user |
| | Flashing yellow | Power-on self-test indicates faulty port |
| | Off | No signal detected or link configuration failure |

*Table 1-1        LED Functions  (continued)*

| LED | Color or State | Description |
|-----|----------------|-------------|
| FAN | Off | No power to the switch or fans (the tray may not be plugged in especially if one or more of the power supplies status LED is green) |
|     | Green | Fan tray operational |
|     | Red | Fault detected |
| PS1 and PS2 | Off | No power to the PS |
|             | Green | Operational[1] |
|             | Red | Fault detected or the on/off switch is set to off while the power supply is plugged in |

1.  If either LED is green and the other is OFF the power supply is probably not plugged in. If it is red, the supply is either plugged in and not switched on or it is faulty. It may be necessary to use the CLI for further status information.

# Chassis Cooling

**Note**    For environmental specifications, see Chapter 2, "Site Planning."

The hot-swappable system fan tray provides cooling air for the internal chassis components. The fans exhaust air to the rear, and fresh air is drawn in from the sides of the chassis.

**Caution**    When the fan tray is removed, internal circuitry is exposed that should not be touched by tools or fingers. The system should not be left operating without a fan tray for longer than is necessary to replace a faulty fan tray with a new one.

Figure 1-8 shows the direction of airflow going in and out of the switch.

*Figure 1-8        Airflow (Catalyst 4948-10GE shown)*
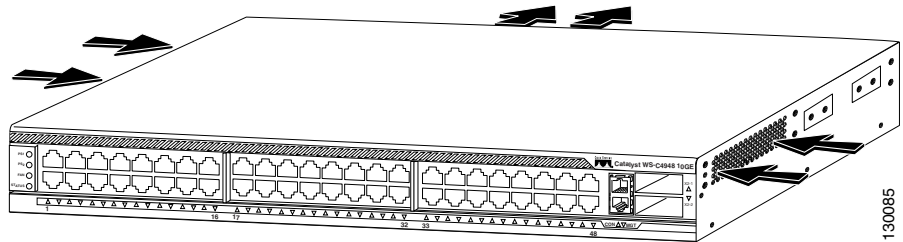


There are four fans in the fan tray. If an individual fan fails, the other fans continue to run. Sensors monitor the internal air temperatures. The number of fans in operation and their speed varies according to the internal temperature for the quietest operation possible. If the air temperature exceeds a desired threshold, the environmental monitor displays warning messages.
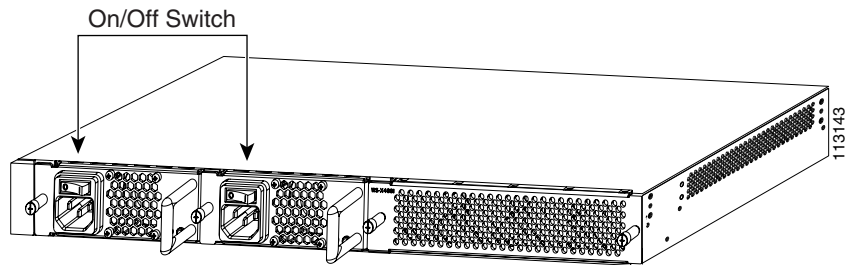
# Power Supplies

**Note**    For complete power specifications for the switch, see Appendix A, "Specifications."

The Catalyst 4900 series switches have two redundant internal 300 W AC or 300 W DC power supplies.

The internal power supplies have individual power cords and status LEDs (PS1 and PS2 on the front panel). There are also LEDs on the power supplies that show status for the input (Input OK) and output (Output OK) currents. A power cord is used to connect the power supplies to the site power source. There is a power switch on the AC power supplies; AC power is present when a power cord is plugged into a power supply and the switch is set to the On position. DC power supplies do not have an on/off switch and do not provide a cable for connection to a DC power source.

*Figure 1-9        On/Off Switch Locations*



The switch will start with only one power supply plugged in, but redundant failover and load sharing will not be available in this configuration. We recommend that you always connect both power supplies to separate AC or DC circuits for optimal power reliability.

For safety reasons, the AC power supply needs to be switched off and unplugged before it is removed from a chassis or inserted into a chassis. DC supplies should have power shut off from the source before they are removed.

If only one power supply will be used, you must use the blank faceplate supplied to cover the empty power bay.

# Environmental Monitoring of the Power Supplies

Using the environmental monitoring and reporting functions, you can maintain normal system operation by resolving adverse environmental conditions prior to loss of operation.

Each power supply monitors its own temperature and output voltages. The switch senses the operating condition of the power supply and reports status through software.

# Power Management for the Switch

You can choose AC or DC power supplies for your switch. The Catalyst 4900 series switches support the following power supplies:

- 300 W AC

- 300 W DC

A redundant power supply can be identified and diagnosed by a running system regardless of its input status. AC and DC supplies are interchangeable.

## Power Management Modes

Catalyst 4900 series switches support the redundant power management mode. In this mode, if both power supplies are operating normally, each provides from 20/80 to 45/55 percent of the total system power requirements at all times. If one power supply fails, the other unit increases power to 100 percent of the total power requirement.