Doc. No. 78-2235-02

Catalyst 5000 Series Supervisor Engine Configuration Note

Product Number: WS-X5009

This document contains instructions for installing and configuring the Catalyst 5000 series supervisor engine. Configuration examples are also provided. For a complete description of commands used to configure and maintain the Catalyst 5000 series switch, refer to the *Catalyst 5000 Series Configuration Guide and Command Reference*. For complete hardware configuration and maintenance procedures, refer to the *Catalyst 5000 Series Installation Guide.* These documents are available on the Cisco Connection Documentation, Enterprise Series CD-ROM, or in print.

Sections in this document include the following:

- What is the Catalyst 5000 Series Switch?
- Supervisor Engine Description
- Specifications
- Supervisor Engine LEDs
- Preparing Network Connections
- Supervisor Engine Connector Signals
- Safety Recommendations
- Installing and Configuring the Supervisor Engine
- Configuring the Interfaces
- Configuring the Fast Ethernet Ports
- Checking the Configuration

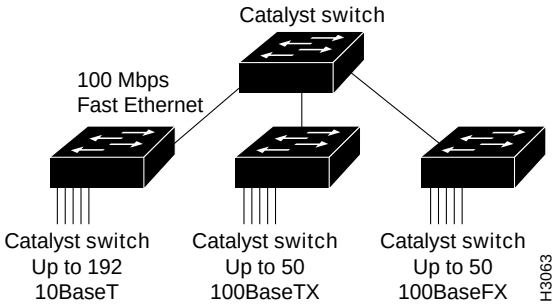
Warning Only trained and qualified personnel should be allowed to install or replace this equipment.

What is the Catalyst 5000 Series Switch?

The Catalyst 5000 series switch provides high-density switched Ethernet and Fast Ethernet for both wiring closet and data center applications. The switch includes a single, integrated 1.2-Gbps switching backplane that supports switched Ethernet with repeater connections, and Fast Ethernet

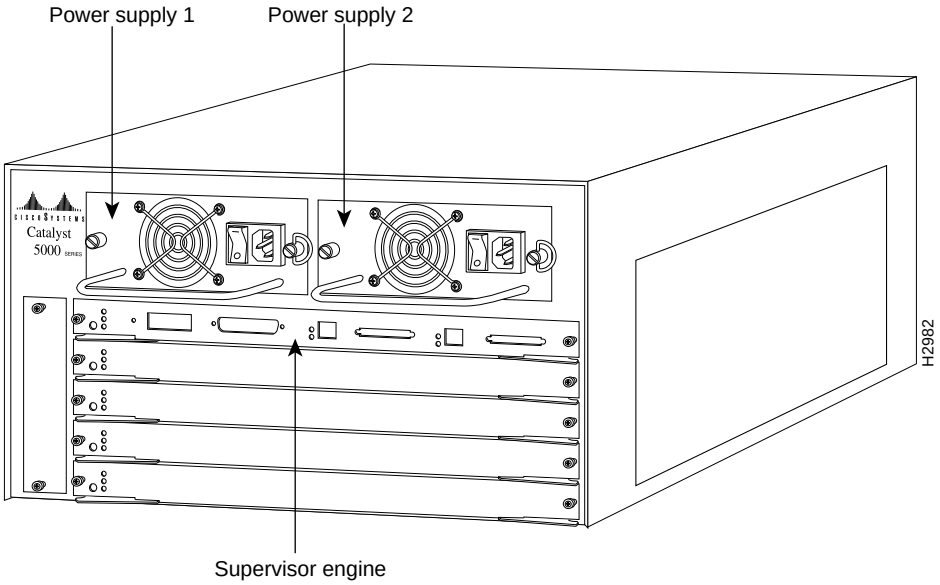
with backbone connections, Fiber Distributed Data Interface (FDDI), Copper Distributed Data Interface (CDDI), and Asynchronous Transfer Mode (ATM). The Catalyst 5000 provides switched connections to individual workstations, servers, LAN segments, backbones, or other Catalyst 5000 switches using shielded twisted-pair (STP), unshielded twisted-pair (UTP), and fiber-optic cable. Figure 1 is an example of a configuration using the Catalyst 5000 series switch.

Figure 1 Cascaded Switches Using Fast Ethernet Interfaces



The Catalyst 5000 series switch chassis has five slots. Slot 1 is reserved for the supervisor engine, which provides Layer 2 switching, local and remote management, and dual Fast Ethernet interfaces. The remaining four slots are used for any combination of modules for additional Ethernet, Fast Ethernet, CDDI/FDDI, and ATM connections. Figure 2 shows the rear view of the Catalyst 5000 series switch, which provides access to the supervisor engine, all switching modules, power supplies, and fan assembly.

Figure 2 Catalyst 5000 Series Switch Chassis Rear View

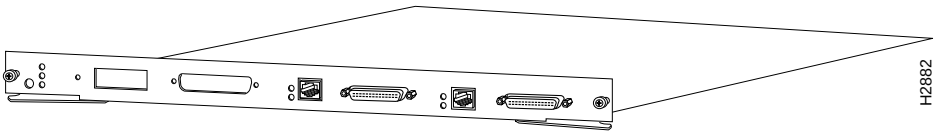


Supervisor Engine Description

The supervisor engine (see Figure 3) is the main system processor in the switch. It contains the Layer 2 switching engine and network management processor for the system software, and also contains most of the system memory components. It maintains and executes the management functions that control the system.

Note The supervisor engine must be installed in slot number 1. The supervisor engine requires network management processor (NMP) software version 1.4 or later.

Figure 3 Supervisor Engine



The supervisor engine has the following features:

- Interfacing to the 1.2-Gbps switching bus capable of switching over 1 million packets per second (pps)
- Bridge address table for up to 16,000 active Media Access Control (MAC) addresses and associated virtual LANs (VLANs) dynamically allocated between active ports
- 25-MHz Motorola MC68EC040 Network Management Processor
- MAC-layer switching engine that provides data path and control for all network interfaces and supports two integrated Fast Ethernet interfaces
- Two half- and full-duplex, Fast Ethernet, RJ-45 TX connectors, and two media-independent interface (MII) connectors
- Hardware support for 1000 VLANs
- 8 MB of DRAM components that contain the default system software, 4 MB of Flash memory for downloading the system software, and 256 KB NVRAM for storing the configuration file
- Air-temperature sensors for environmental monitoring

In addition to these features, the supervisor engine performs the following management functions:

- Monitors interface and environmental status
- Provides Simple Network Management Protocol SNMP management and the console/Telnet interface

Flash Memory

The embedded Flash memory allows you to remotely load and store the system software image. You can download a new software image over the network or from a local server, and add the new image to Flash memory or replace an existing file.

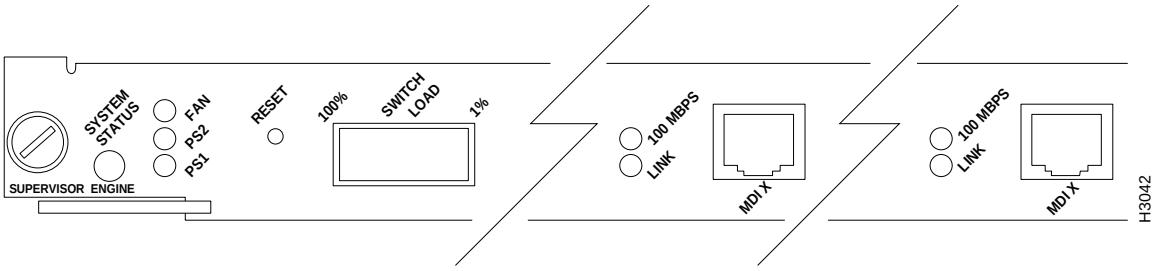
EEPROM

An electrically erasable programmable read-only memory (EEPROM) component on the supervisor engine stores board-specific information such as the serial number, part number, controller type, hardware revision, configuration information, and other details unique to each board. In addition to this standard information, the supervisor engine EEPROM also contains an address allocator—a bank of 1024 hardware or MAC addresses—one for each possible VLAN in the system. For an explanation of the hardware addressing function, refer to "MAC Address Allocation" later in this configuration note.

LEDs

LEDs on the supervisor engine (shown in Figure 4) indicate the status of the system; they are described in the section "Supervisor Engine LEDs."

Figure 4 Supervisor Engine LEDs



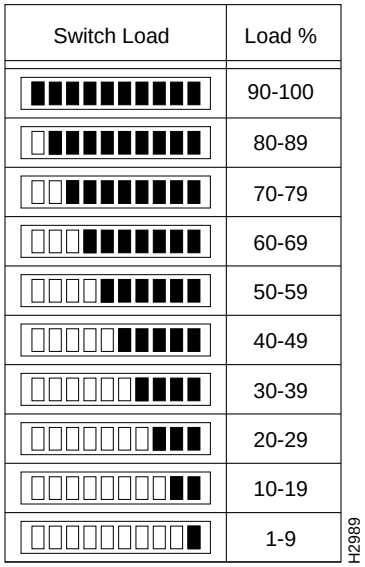
Reset Switch

Access to the reset switch, located behind the faceplate of the supervisor engine, is through a small hole approximately 1 1/2 inches to the right of the supervisor engine status LED. (See Figure 4.)

Switch Load Meter

The switch load meter LEDs provide, as an approximate percentage, a visual indication of the current traffic load over the 1.2-Gbps switching backplane. (See Figure 5.)

Figure 5 Switch Load LEDs



Console Port

The console port is the local, out-of-band, console terminal connection to the switch—a DB-25 female connector. To use the console port, connect an EIA/TIA-232 terminal (configured for 9600 baud, no parity, eight data bits, and one stop bit), modem or network management workstation. The console port lets you perform the following functions:

- Configure the switch with a command-line interface
- Monitor network statistics and errors
- Configure SNMP agent parameters
- Download software updates to the switch or distribute software images residing in Flash memory to attached devices

Fast Ethernet Ports

The supervisor engine provides two Fast Ethernet fiber-optic ports, operating in full- or half duplex mode. These ports use either multimode or single-mode fiber-optic cable between each port and your Fast Ethernet network.

Each Fast Ethernet port has two status LEDs—the 100-Mbps and Link LEDs—described in the section “Supervisor Engine LEDs.”

Specifications

Table 1 gives the supervisor engine specifications:

Table 1 Supervisor Engine Specifications

Description	Specification
Dimensions (H x W x D)	1.2 x 14.4 x 16 in (3 x 35.6 x 40.6 cm)

Description	Specification
Weight	3 lb (1.36 kg)
Environmental Conditions:	
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
Connectors	12 RJ-45 IEEE 802.3 Fast Ethernet 100BaseTX 2 40-pin MII[1] IEEE 802.3 Ethernet 100BaseT MII and a DB-25 console port for an administration workstation
Memory	4 MB of Flash memory 8 MB of packet-buffer DRAM[2] 256 KB of NVRAM[3]
Maximum station-to-station cabling distance	Category 5 UTP[4]: 328' (100 m)
Frame processing	Transparent bridging (802.1d)
Network management	SNMP[5] agent
Agency approvals:	
Safety	UL[7] 1950, CSA[8]-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 UTP cables

1. MII = media independent interface
2. DRAM = dynamic random-access memory
3. NVRAM = nonvolatile random-access memory
4. UTP = unshielded twisted pair
5. SNMP = Simple Network Management Protocol
6. EMI = electromagnetic interference
7. UL = Underwriters Laboratory
8. CSA = Canadian Standards Association

Maximum Configuration

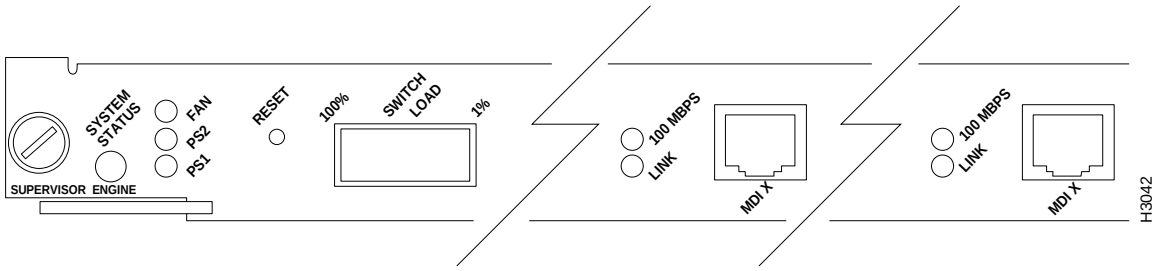
The five available interface slots on the Catalyst 5000 series switch support the supervisor engine and switching modules, providing a maximum port density of up to 50 switched Fast Ethernet interfaces. Slot 1 is reserved for the supervisor engine; slots 2 through 5 are used for any combination of Catalyst 5000 series switching modules:

- Up to 192 group-switched 10BaseT Ethernet interfaces (192 Ethernet and 2 Fast Ethernet switched interfaces)
- Up to 98 switched Ethernet interfaces (96 Ethernet and 2 Fast Ethernet switched interfaces)
- Up to 48 switched fiber-optic Ethernet interfaces
- Up to 48 switched fiber-optic Fast Ethernet interfaces
- Up to 50 Fast Ethernet interfaces
- Up to 4 FDDI or CDDI modules
- Up to 3 ATM modules

Supervisor Engine LEDs

The PS1 and PS2 LEDs on the supervisor engine (see Figure 6) are on when the power supply is receiving AC power and providing DC power to the internal system components. The power supply monitors its own temperature and internal voltages.

Figure 6 Supervisor Engine LEDs



The LEDs on the supervisor engine, shown in Figure 6, are described in Table 2.

Table 2 Supervisor Engine LED Descriptions

LED	Description
Status	The switch performs a series of self-tests and diagnostic tests. If all the tests pass, the Status LED is green. If any test fails, the Status LED is red. During system boot or if the module is disabled, the Status LED is orange. If the redundant power supply is installed but not powered on or receiving ACinput, the Status LED is red. If the fan module fails, the Status status is red.
Fan	Indicates whether or not the Fan is operational. If the fan is operational, the Fan LED is green. If the fan is not operational, the Fan LED is red.
PS1	If the left-bay power supply is operational, the PS1 LED is green. If the left-bay power supply is not operational, powered off, or not receiving AC input, the PS1 LED is red. If the left bay power supply is off or not installed, the PS1 LED is red.
PS2	If the right-bay power supply is operational, the PS2 LED is green. If the left-bay power supply is not operational, powered off, or not receiving AC input, the PS2 LED is red. If the right-bay power supply is off or not installed, the PS2 LED is red.
100 Mbps	If the port is operating at 100 Mbps, the LED is green.
Link	If the port is operational, the link LED is green. If the link has been disabled by software, the link LED is orange. If the link is bad and has been disabled due to a hardware failure, the link LED is flashing orange. If no signal is detected, the link LED is off.

Preparing Network Connections

When preparing your site for network connections to the switch, you need to consider a few factors related to each type of interface:

- Type of cabling required (fiber, thin, or twisted-pair cabling)
- Distance limitations for each signal type
- Specific cables you need to connect each interface
- Any additional interface equipment you need, such as transceivers and converters

Before installing the switch, have all additional external equipment and cables on hand. If you intend to build your own cables, refer to the cable pinouts in the "Cabling Specifications" appendix in the *Catalyst 5000 Series Installation Guide*. For ordering information, contact a customer service representative.

Distance Limitations

Distance and rate limitations discussed in this section are IEEE recommended maximum speeds and distances for signaling. If you understand the electrical problems that may arise and can compensate for them, you may get good results with rates and distances greater than those described here, but you do so at your own risk.

Fast Ethernet Connections

The maximum distances for Fast Ethernet network segments and connections depend on the type of transmission cable used, for example, unshielded twisted-pair (100BaseTX).

The IEEE 100BaseTX standard recommends a maximum distance of 328 feet (100 meters) between station (connection) and switch for 100BaseTX connections using Category 5 UTP. For greater distances, use a fiber-optic transceiver attached to the MII connector.

Table 3 Fast Ethernet Maximum Transmission Distances

Transceiver Speed	Cable Type	Duplex Mode	Maximum Distance Between Stations
100 Mbps	Category 5 UTP	Full & half	328 feet (100 meters)
100 Mbp	Multimode fiber	Full	1.2 miles (2 km)
100 Mbp	Multimode fiber	Half	1,312 feet (400 meters)

Serial Connections

As with all signaling systems, serial signals can travel a limited distance at any given baud rate; generally, the slower the baud rate, the greater the distance. Table 4 shows the standard relationship between baud rate and distance for EIA/TIA-232 signals.

Table 4 IEEE Standard EIA/TIA-232 Transmission Speed Versus Distance

Rate (bps)	Distance (Feet)	Distance (Meters)
2400	200	60
4800	100	30
9600	50	15
19200	25	7.6
38400	12	3.7
56000	8.6	2.6

Fast Ethernet Connection Equipment

You will need an Ethernet transceiver and transceiver cable between each Fast Ethernet port and the Ethernet network. You can use two different Fast Ethernet connectors:

- RJ-45 male connectors to connect to both Ethernet and Fast Ethernet ports (see Figure 7).
- 40-pin MII male connectors to connect to Fast Ethernet ports (see Figure 8).

Figure 7 Fast Ethernet RJ-45 Interface Cable Connectors

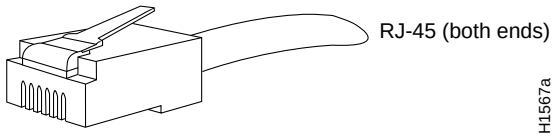
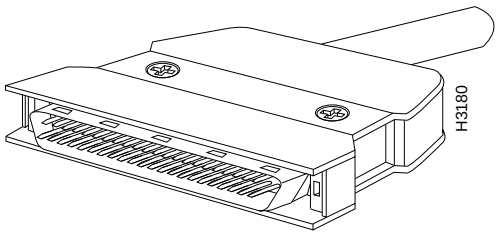
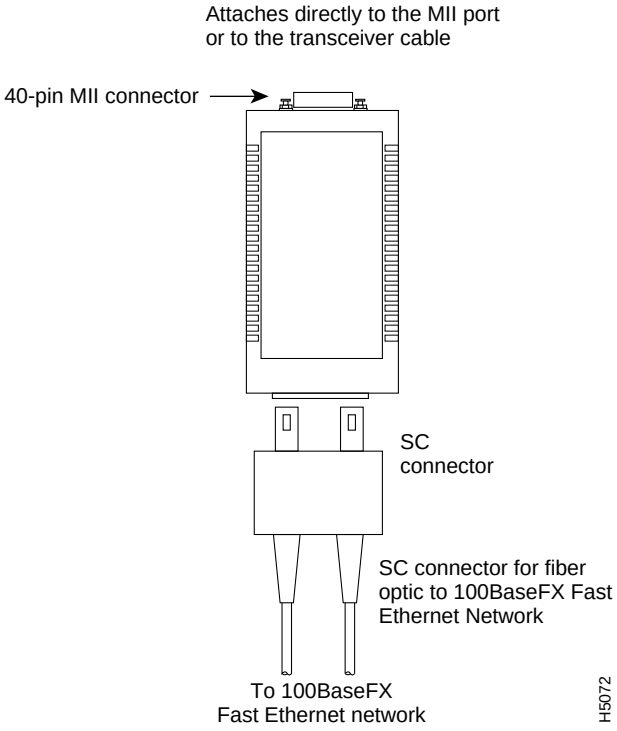


Figure 8 Fast-Ethernet 40-Pin MII Interface Cable Connectors



Ethernet transceivers are available from a variety of sources for unshielded twisted-pair cabling (100BaseTX). Figure 9 shows examples of transceivers and connection equipment. You can connect either Ethernet Version 1 or Version 2/IEEE 802.3 interfaces. The switch automatically supports both types.

Figure 9 Ethernet Transceivers and Connection Equipment



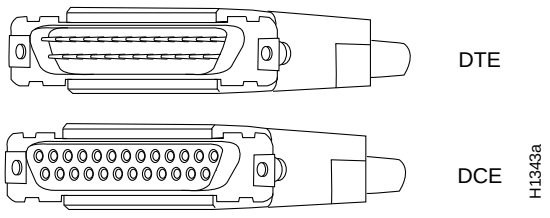
When planning your connections, consider the types and locations of connectors on adjacent switching modules to avoid having the transceiver overlap and impair access to other connections.

EIA/TIA-232 Connections

EIA/TIA-232, the most common interface standard in the U.S., supports unbalanced circuits at signal speeds up to 64 kbps. The supervisor engine console connection is a standard 25-pin, D-shell connector (known as a DB-25) commonly used for EIA/TIA-232 connections. Figure 10 shows the connector at the local end of the adapter cable. The system console port on the supervisor engine EIA/TIA-232 connection ports support only asynchronous connections. For further information on the console port, refer to the section “Console Port Connection Equipment.”

When connecting serial devices, consider the adapter cables as an extension of the switch for external connections. Therefore, use data terminal equipment (DTE) cables to connect the switch to remote data communication equipment (DCE) devices, such as modems or data service units (DSUs), and use DCE cables to connect the switch to remote DTE devices such as a host or PC.

Figure 10 EIA/TIA-232 Adapter Cable Connectors, Network End



Console Port Connection Equipment

The supervisor engine contains an EIA/TIA-232 asynchronous console port (DB-25 receptacle). Synchronous transmission uses precise timing to synchronize transmissions between the transmitter and receiver, and maintains separate clock and data signals. Asynchronous transmission uses control bits instead of a precise clock signal to indicate the beginning and end of characters.

You will need a terminal to configure the interfaces and bring up the system. You will also need an EIA/TIA-232 DCE console cable to connect the terminal to the console port on the supervisor engine. After you establish normal operation, you can disconnect the terminal. Both ends of the console cable should be EIA/TIA-232 plugs to enable you to connect to the supervisor engine DCE console port DB-25 receptacle and to the DB-25 receptacles used on the DTE ports on most terminals.

Before you connect a terminal to the console port, configure the terminal to match the switch console port, as follows:

- 9600 baud
- 8 data bits
- No parity
- 1 stop bit

Supervisor Engine Connector Signals

Most Ethernet transceivers require a transceiver cable to connect an Ethernet transceiver to the supervisor engine and Ethernet switching module Ethernet ports. Some unshielded twisted-pair (10BaseT) transceivers are compact enough to connect directly to the Ethernet module ports without impeding other connections. For descriptions of Ethernet transceivers, connectors, and cables, refer to the section “Fast Ethernet Connection Equipment.”

Fast Ethernet Port Signals

Table 5 lists the signals for the supervisor engine RJ-45 Fast Ethernet MDI X port.

Table 5 Supervisor Engine 100BaseTX MDI X Port Signals

Pin	Signal	Direction	Description
1	RxD+	Input	Receive data +
2	RxD–	Input	Receive data –
3	TxD+	Output	Transmit data +
4	NC		No connection
5	NC		No connection
6	TxD–	Output	Transmit data –
7	NC		No connection
8	NC		No connection

Table 6 lists the signals for the supervisor engine 40-pin MII Fast Ethernet connector cable.

Table 6 Supervisor Engine 40-Pin MII Fast Ethernet Connector Signals

Pin	Signal
1	+5V
2	MDIO
3	MDC
4	RxD<3>
5	RxD<2>
6	RxD<1>
7	RxD<0>
8	Rx_DV
9	Rx_Clk
10	Rx_Er
11	Tx_Er
12	Tx_Clk
13	Tx_En
14	TxD<0>
15	TxD<1>
16	TxD<2>
17	TxD<3>
18	Col
19	CRS
20	+5V
21	+5V
22	Common
23	Common
24	Common
25	Common
26	Common
27	Common
28	Common
29	Common
30	Common
31	Common
32	Common
33	Common
34	Common
35	Common
36	Common
37	Common
38	Common

Pin	Signal
39	Common
40	+5V

Console Port Signals

The supervisor engine's console port is an EIA/TIA-232, DCE, DB-25 receptacle. Table 7 lists the signals used on this port.

Table 7 Supervisor Engine DB-25 Console Port Signals

Pin	Signal	Direction	Description
1	GND		Ground
2	RxD	Input	Receive Data
3	TxD+	Output	Transmit Data
4	CTS	Input	Clear-to-Send
5	RTS	Output	Request-to-Send
7	GND		Ground
8	DTR	Output	Data Terminal Ready
18	GND		Ground
20	DCD	Input	Data Carrier Ready

Safety Recommendations

The following guidelines will help to ensure your safety and protect the equipment. This list is not inclusive of all potentially hazardous situations that you may be exposed to when installing the switch, so *be alert*.

- Never try to lift the chassis by yourself; *two people are required* to lift the switch.
- Always turn off all power supplies and unplug all power cords before removing the chassis front panel.
- Always unplug all power cords before installing or removing a chassis.
- Keep the chassis area clear and dust free during and after installation.
- Keep tools and chassis components away from walk areas.
- Do not wear loose clothing, jewelry (including rings and chains), or other items that could get caught in the chassis. Avoid wearing or securely fasten any loose clothing, such as a tie, scarf, or sleeves.

Warning Metal objects heat up when connected to power and ground, and can cause serious burns.

Safety with Electricity

The supervisor engine, switching modules, and redundant power supplies are designed to be removed and replaced while the system is operating without presenting an electrical hazard or damage to the system. Before removing a redundant power supply, ensure that the primary supply is powered on.

You must shut down the system before removing or replacing any of the replaceable components inside the front panel—for example, the backplane. Never install equipment that appears damaged.

Follow these basic guidelines when working with any electrical equipment:

- Before beginning any procedures requiring access to the chassis interior, locate the emergency power-off switch for the room in which you are working.
- Disconnect all power and external cables before installing or removing a chassis.
- Do not work alone when potentially hazardous conditions exist.
- Never assume that power has been disconnected from a circuit; always check.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.

In addition, use the following guidelines when working with any equipment that is disconnected from a power source but still connected to telephone wiring or other network cabling.

- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.

Warning Do not work on the system or connect or disconnect cables during periods of lightning activity.

Preventing Electrostatic Discharge Damage

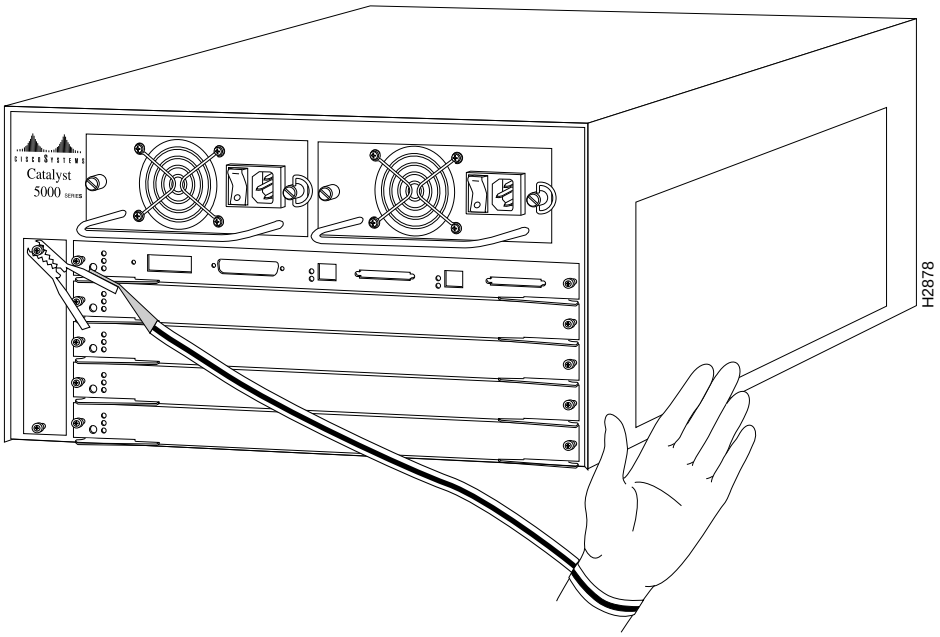
Electrostatic Discharge (ESD) damage occurs when electronic or components are improperly handled, resulting in complete or intermittent failures. The supervisor engine and switching modules each consist of a printed circuit board (PCB) fixed in a metal carrier. Electromagnetic interference (EMI) shielding, connectors, and a handle are integral components of the carrier. Although the metal carrier helps to protect modules from ESD, use a preventive antistatic strap whenever you handle the supervisor engine or switching modules. Handle the carriers by the handles and the carrier edges only, never touch the modules or connector pins.

Caution Always tighten the captive installation screws on the supervisor engine and switching modules when you install them. These screws prevent accidental removal, provide proper grounding for the system, and ensure that the bus connectors are properly seated in the backplane.

Following are guidelines for preventing ESD damage:

- Always use an ESD wrist strap or ankle strap, and ensure that it makes good skin contact.
- When removing the supervisor engine or switching modules, connect the equipment end of the strap to one of the captive installation screws on an installed switching module, power supply, or fan assembly. (See Figure 11.) When replacing internal components, such as the supervisor engine, that are accessible from the rear of the chassis, connect the strap to an unpainted inner surface of the chassis, such as the inner frame that is exposed when a module is removed.
- When installing a supervisor engine or switching module, use the ejector levers to properly seat the bus connectors in the backplane, then tighten both captive installation screws. These screws prevent accidental removal, provide proper grounding for the system, and help to ensure that the bus connectors are seated in the backplane.
- When removing a supervisor engine or switching module, use the ejectors levers to release the bus connectors from the backplane. Grasp the captive screws and pull the carrier out slowly, using your hand along the bottom of the carrier to guide it straight out of the slot.
- Handle carriers by the handles and carrier edges only; avoid touching the module or any connector pins.
- When removing a supervisor engine or switching module, place the PCB side up on an antistatic surface or in a static shielding bag. If your are returning the component to the factory, place it in a static shielding bag immediately.
- Handle bare boards by the edges only.
- Avoid contact between the module and clothing. The wrist strap protects only the board from ESD voltages on the body. ESD voltages on clothing can still cause damage.

Figure 11 Placement of ESD Wrist Strap



Caution For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 megohms.

Installing and Configuring the Supervisor Engine

The supervisor engine supports hot swapping, letting you install, remove, and replace it without powering off the system power. You do not need to notify the software or shut down the system power. However, hot swapping the supervisor engine will halt the system.

After the supervisor engine is reinstalled, the system automatically configures all network interfaces with the configuration last stored in the supervisor engine's nonvolatile memory. If the supervisor engine is new, the system uses the factory default configuration

Overview of Hot Swapping

All Catalyst 5000 supervisor engines and switching modules support hot swapping. This section gives a brief overview of the switch's hot-swap feature.

Note Hot swapping the supervisor engine will halt the system temporarily.

The supervisor engine contains a bus-type connector that connects to the backplane. Each connector consists of a set of tiered pins in two lengths. The pins send specific signals to the system as they make contact with the backplane. The system assesses the signals it receives and the order in which it receives them to determine what event is occurring and what task it needs to perform, such as reinitializing new interfaces or shutting down removed ones.

For example, when inserting the supervisor engine, the longest pins make contact with the backplane first, and the shortest pins make contact last. The system recognizes the signals and the sequence in which it receives them. The system expects to receive signals from individual pins in this logical sequence.

When you remove or insert the supervisor engine, the backplane pins send signals to notify the system, and performs as follows:

1. Rapidly scans the backplane for configuration changes.
2. Initializes all newly inserted switching modules, noting any removed interfaces and placing them in the privileged shut-down state.
3. Brings all previously configured interfaces on the supervisor engine and switching modules back to the state they were in before the supervisor engine was removed. Any newly inserted interfaces are put in the administratively shut-down state, as if they were present, but unconfigured, at boot time. If a switching module has been reinserted into a slot, then its ports are configured and brought on line up to the port count of the original switching module.

Note If you installed a supervisor engine from another switch, the supervisor engine may have a different system configuration from the engine you are replacing. For instance, System A has a faulty supervisor engine, and you are replacing it with one from System B. But System B's supervisor engine is configured differently from the one you are replacing. Once the supervisor engine from System B is installed in A, you may need to reconfigure it to match System A's original configuration. See the section "Configuring the Interfaces" for details about configuring system interfaces.

When you insert a new supervisor engine, the system runs a diagnostic test on all interfaces, and compares them to the existing configuration. If this initial diagnostic fails, the system remains off line for another 15 seconds while it performs a second set of diagnostic tests to determine whether or not the supervisor engine or a switching module is faulty and if normal system operation is possible.

If the second diagnostic test passes, indicating that the system is operating normally and a new switching module is faulty, the system resumes normal operation but leaves the new interfaces disabled.

If the second diagnostic test fails, the system crashes, which usually indicates that the new supervisor engine or a switching module created a problem in the bus and should be removed.

Note When you install a new supervisor engine, the system is set to the factory default configuration, and you may need to reconfigure the system to your requirements. You can do this manually or, if you uploaded the original configuration to a server before hand, you can download it to the new supervisor engine. Refer to the *Catalyst 5000 Series Configuration Guide and Command Reference* for information about uploading and downloading system information.

Caution To avoid erroneous failure messages, allow at least 15 seconds for the system to reinitialize, and note the current configuration of all interfaces before you hot swap a supervisor engine or switching module.

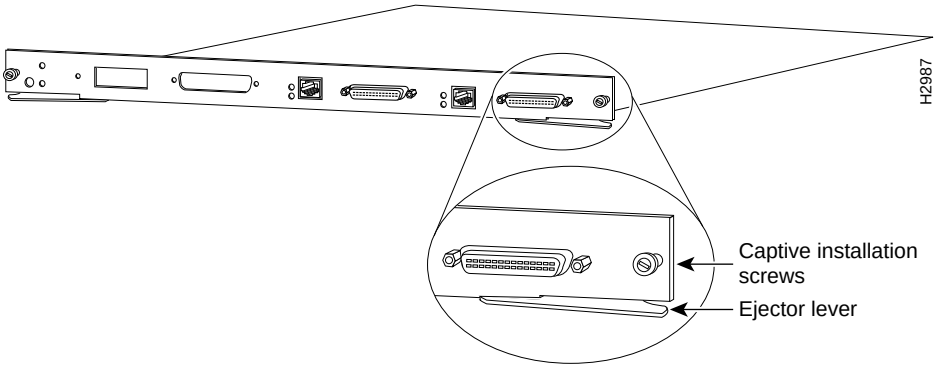
Avoiding Problems When Inserting and Removing the Supervisor Engine

The function of the ejector levers (see Figure 12) on the supervisor engine is to align and seat the board connectors in the backplane. Failure to use the ejector levers and insert the supervisor engine properly can disrupt the order in which the pins make contact with the backplane. Follow the installation and removal instructions carefully, and review the following examples of *incorrect* insertion practices and results:

- Using the faceplate to force a supervisor engine all the way into the slot can pop the ejector levers out of their springs. If you try to use the ejector levers to seat the switching module, the first layer of pins making contact with the backplane can disconnect and make contact with the backplane. The system interprets this as a failure.
- Using the faceplate to force or slam the supervisor engine all the way into the slot can damage the pins on the module connectors if they are not aligned properly with the backplane.
- When using the faceplate, rather than the ejector levers, to seat the supervisor engine in the backplane, you may need to pull the supervisor engine back out and push it in again to align it properly. Even if the connector pins are not damaged, the pins making contact with and disconnecting from the backplane will cause the system to interpret a failure. Using the ejector levers ensures that the engine connector makes contact with the backplane in one continuous movement.
- Using the faceplate to insert or remove a supervisor engine, or failing to push the ejector levers to a full 90-degree position, can cause the board's connector pins to seat improperly with the backplane. This will halt the system. Using the ejector levers properly ensures that the connector pins are seated properly, and that all two layers of pins are making contact with the backplane.

It is also important, when removing the supervisor engine, to use the ejector levers to ensure that the connector pins disconnect from the backplane in the logical sequence expected by the system. Detailed procedures for hot-swapping the supervisor correctly engine are included in the sections that follow.

Figure 12 Ejector Levers and Captive Installation Screws



Tools Required

You need a flat-blade screwdriver to remove the supervisor engine, and to tighten the captive installation screws that secure the engine in its slot. Whenever you handle the supervisor engine, use a wrist strap or other grounding device to prevent ESD damage. See the section “Preventing Electrostatic Discharge Damage.”

Removing the Supervisor Engine

Perform the following steps to remove the supervisor engine from the switch chassis:

Step 1 If you do not plan to immediately reinstall the supervisor engine you are removing, disconnect any network interface and console cables attached to the switching module ports.

Step 2 Use a screwdriver to loosen the supervisor engine’s captive installation screws.

Step 3 Place your thumbs on the left and right ejector levers and simultaneously push the levers outward to release the supervisor engine from the backplane connector.

Step 4 Grasp the supervisor engine handle with one hand and place your other hand under the carrier to support and guide the supervisor engine out of the slot. Avoid touching the board.

Step 5 Carefully pull the supervisor engine straight out of the slot, keeping your other hand under the carrier to guide it. Keep the supervisor engine oriented horizontally.

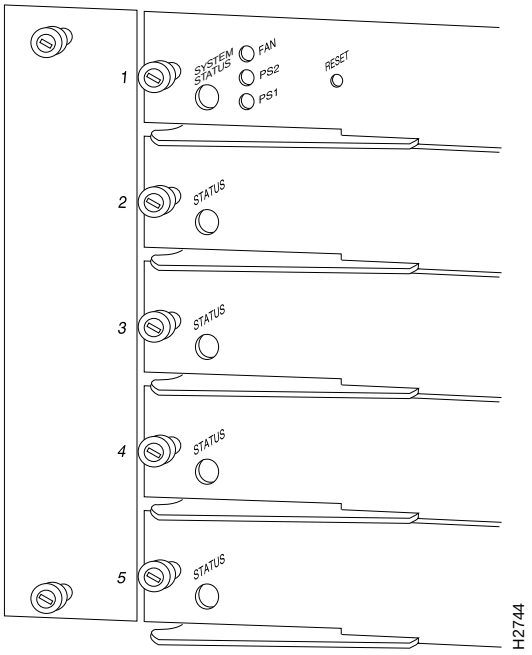
Step 6 Place the supervisor engine on an antistatic mat or antistatic foam.

Step 7 If the slot is to remain empty, install a switching module filler plate (part number 800-00292-01) to keep dust out of the chassis.

Installing the Supervisor Engine

Always install the supervisor engine in slot 1. You can install any switching module in any of the four switching module slots, numbered 2 through 5. (See Figure 13.) Switching module fillers—blank switching module carriers—are installed in slots without switching modules to maintain consistent airflow through the switching module compartment.

Figure 13 Module Slot Numbers



Following is the procedure for installing the supervisor engine:

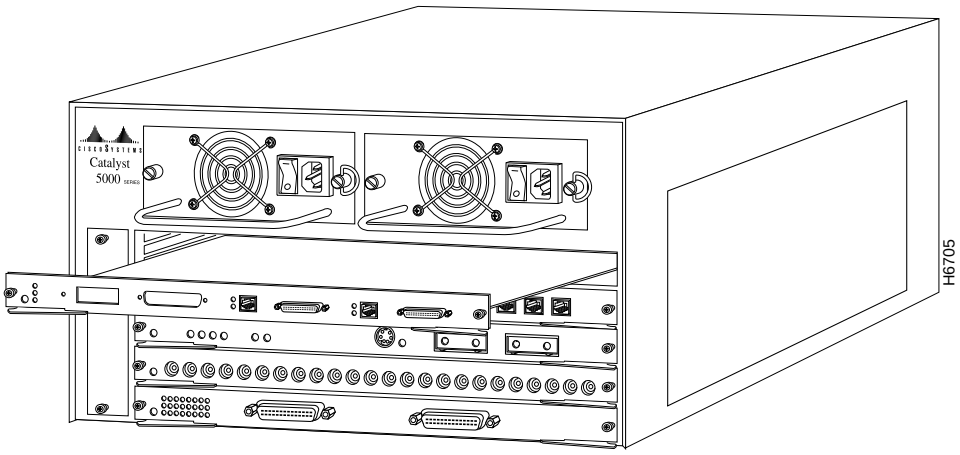
Caution Handle the supervisor engine by its carrier edges only to prevent ESD damage.

Step 1 Hold the supervisor engine handle with one hand, and place your other hand under the carrier to support the module and guide it into the slot. Avoid touching the board.

Step 2 Place the back of the supervisor engine in slot 1, and align the notch on the sides of the engine with the groove in the slot. (See Figure 14.)

Note The supervisor module must be installed in slot 1.

Figure 14 Supervisor Engine Installation



Step 3 While keeping the supervisor engine oriented horizontally, carefully slide it into slot 1 until the engine's faceplate makes contact with the ejector levers.

Step 4 Using your thumbs and forefingers, simultaneously push the ejector levers in to fully seat the supervisor engine in the backplane connector.

Note Always use the ejector levers when installing or removing the supervisor engine. A supervisor engine partially seated in the backplane will cause the system to halt and subsequently crash.

Step 5 Use a screwdriver to tighten the captive installation screws on the supervisor engine.

Step 6 Attach the network interface and console cables to the interface ports.

Step 7 Log on to your console and bring the supervisor engine on line. See sections "Bringing the Supervisor Engine On Line" and "Configuring the Interfaces" for details.

Bringing the Supervisor Engine On Line

Once installed, you need to bring the supervisor engine on line to configure the system interfaces. There are three ways to do this:

1. If you reinstalled the original supervisor engine, the system will detect the configuration that was last stored in memory before the supervisor engine was removed. All interfaces should function as they did before removal. Providing, of course, that the supervisor engine did not have any faulty components before you removed it. Log on to your console and use the **show config** command to verify the configuration.
2. If you installed a supervisor engine from another switch, be aware that the supervisor engine is configured for the other interfaces, and that its configuration is probably not compatible with the current switch. Log on to your console and use **show config** to verify the configuration. If the configuration is compatible with the current switch, you need not reconfigure the system. If the configuration is not compatible, run the **clear config** command to configure the supervisor engine to its factory defaults. Then customize the configuration to your requirements. See the section "Configuring the Fast Ethernet Ports" for details about changing the default configuration.

3 If you installed a new supervisor engine, the system detects and uses the factory default configuration. Log on to your console and use **show config** to display the defaults. See the section "Configuring the Fast Ethernet Ports" for details about changing the default configuration.

Refer to the *Catalyst 5000 Series Configuration Guide and Command Reference* for more details about the switch's configuration commands.

Note It is recommended that you upload the current configuration to a server before removing the supervisor engine. This saves time when bringing the engine back on line because it lets you recover the configuration by downloading it from the server to the nonvolatile memory of the supervisor engine.

Configuring the Interfaces

After you install the supervisor engine, use the following information to configure the systems interfaces. The section "Port Addresses" contains an overview of the module and port numbering scheme used to configure the Catalyst 5000 series switching modules. The section "Configuring the Fast Ethernet Ports" describes how to configure the ports on the supervisor engine and switching modules. The section "Checking the Configuration" describes the procedures you should use to confirm that the module is configured correctly.

Port Addresses

Each interface in the Catalyst 5000 series switch is designated by several different types of addresses. The *physical* interface address is the actual slot and port of the interface connector within the chassis. The system software uses the physical addresses to control activity within the switch and to display status information. These slot and port addresses are not used by other devices in the network. They are specific to the individual switch and its internal components and software.

A second type of address is the *MAC* or *hardware* address—a standard data link address required for every port or device connected to a network. Other devices in the network use these addresses to locate specific ports in the network, and to create and update routing tables and data structures. The Catalyst 5000 series switch uses a unique method to assign and control the MAC addresses of its interfaces.

The following sections describe how the Catalyst 5000 series switch assigns and controls t MAC addresses to slots and ports within the chassis.

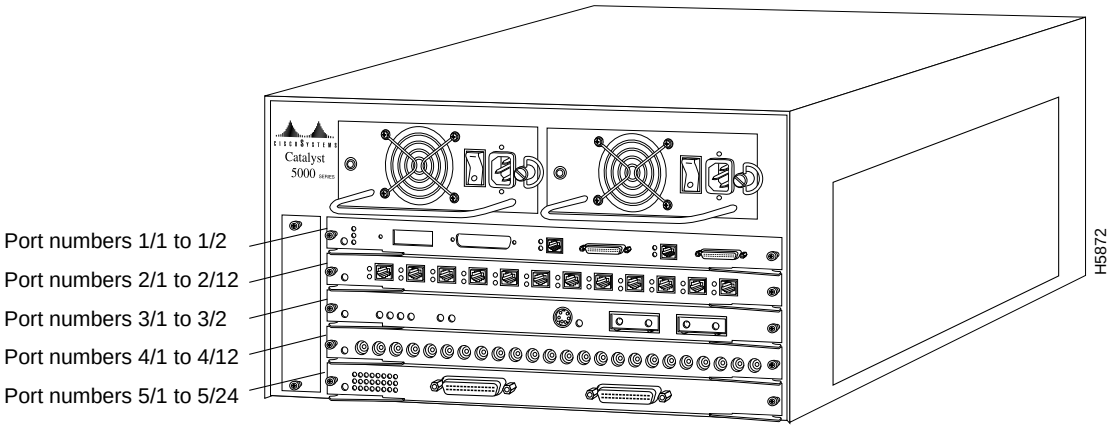
Physical Interface Addresses

In the Catalyst 5000 series switch, physical port addresses specify the actual physical location of each port on the rear of the switch. (See Figure 15.) The address is composed of a two-part number in the format *slot number*/*port number*. The first number identifies the slot in which the supervisor engine or switching module is installed. Module slots are numbered 1 to 5, from top to bottom. The second number identifies the physical port number on the switching module. The port numbers always begin at 1 and are numbered from the left port to right port when facing the rear of the switch. The number of additional ports (/1, /2, and so on) depends on the number of ports available on the module.

Interface ports maintain the same address regardless of whether other switching modules are installed or removed. However, when you move a switching module to a different slot, the first number in the address changes to reflect the new slot number. For example, on a 12-port

10/100BaseTX switching module in slot 2, the address of the left port is 2/1 and the address of the right port is 2/12. If you remove the 12-port 10/100Base TX switching module from slot 2 and install it in slot 4, the addresses of those same ports become 4/1 and 4/12.

Figure 15 Interface Port Address Examples



The supervisor engine is always *n*/1 *to n/2*, because it supports two interfaces—ports 1 and 2. Switching modules are always *n*/1 to n/12 because each switching module supports at least twelve interfaces. (Switching modules with more than 12 interfaces are addressed *n*/1 through *n*/*n*.)

You can identify supervisor engine and switching module interfaces by physically checking the slot and port location on the back of the switch. You can also use software commands to display information about a specific interface, or all interfaces, in the switch. To display information about every interface, use the **show port** command without parameters. To display information about a specific interface, use the **show port** command with the interface type and port address in the format **show port** [*mod_num/port_num*]. If you abbreviate the command (**sho po**) and do not include parameters, the system interprets the command as **show port** and displays the status of all interfaces.

Following is an example of how the **show port** command without parameters displays status information (including the physical slot and port address) for each interface in the switch. In this example, most of the status information for each interface is omitted.

```
Console> (enable) show port
Port Name                 Status     Vlan       Level  Duplex Speed Type
---- -------------------- ---------- ---------- ------ ------ ----- -----------
1/1  100BaseTX Supervisor  connected  1          normal   half   100  100 BaseTX
1/2  100BaseTX Supervisor  connected  trunk      normal   half   100  100 BaseTX
2/1  10/100BaseTX Fast Eth connected  1          normal   half   auto 10/100 BaseTX
2/2  10/100BaseTX Fast Eth connected  1          normal   half   auto 10/100 BaseTX
2/3  10/100BaseTX Fast Eth connected  1          normal   half   auto 10/100 BaseTX
2/4  10/100BaseTX Fast Eth connected  1          normal   half   auto 10/100 BaseTX
2/5  10/100BaseTX Fast Eth connected  1          normal   half   auto 10/100 BaseTX
.
.
.
Port Align-Err  FCS-Err    Xmit-Err   Rcv-Err
---- ---------- ---------- ---------- ----------
1/1           0          0          0          0
1/2           0          0          0          0
2/1           0          0          0          0
2/2           0          0          0          0
2/3           0          0          0          0
.
.
```

```
.
2/21          0          0          0          0
2/22          0          0          0          0
2/23          0          0          0          0
2/24          0          0          0          0TT

Port Auto-Parts Giants     Data-Rate  FCS-Err    Runts      Rcv-frms   Src-Addr
                           Mismatch                                     Changes
---- ---------- ---------- ---------- ---------- ---------- ---------- --------
4/1           0          0          0          0          0          0        0
4/2           0          0          0          0          0          0        0
4/3           0          0          0          0          0          0        0
4/4           0          0          0          0          0          0        0
.
.
.
4/46          0          0          0          0          0          0        0
4/47          0          0          0          0          0          0        0
4/48          0          0          0          0          0          0        0

Port Rcv-Multi  Rcv-Broad  Good-Bytes Align-Err  Short-Evnt Late-Coll Collision
---- ---------- ---------- ---------- ---------- ---------- --------- ---------
4/1           0          0          0          0          0         0         0
4/2           0          0          0          0          0         0         0
4/3           0          0          0          0          0         0         0
.
.
.
4/46          0          0          0          0          0         0         0
4/47          0          0          0          0          0         0         0
4/48          0          0          0          0          0         0         0

Last-Time-Cleared
--------------------------
Tue May 14 1996, 14:37:31
Console> (enable)
```

For complete descriptions of the commands used to configure and maintain the Catalyst 5000 series switch, refer to the *Catalyst 5000 Series Configuration Guide and Command Reference*.

MAC Address Allocation

All network interface connections require a unique MAC address. The switch uses a MAC address allocator, stored in the supervisor engine's nonvolatile memory which identifies all system interface addresses. Each switch interface, configured or not, is allocated a MAC address. For instance, interface 2/10 is allocated a MAC address as a Fast Ethernet connection configured in slot 2, port 10; interface 2/11 is not configured but is also allocated an address. This addressing scheme is important, especially when hot-swapping modules, because it gives the switch the intelligence to identify the state—*connected* or *notconnect*—of each interface on the switch.

Configuring the Fast Ethernet Ports

Once the supervisor engine is installed, it will use the default configuration to configure the system's Fast Ethernet ports. This section describes how to use the privileged interface to configure the Fast Ethernet ports on the supervisor engine.

A description of the system's defaults is in the section "Default Configuration." Refer to the chapter "Configuring the Software" in the *Catalyst 5000 Series Installation Guide* for more information about customizing interface configurations.

Note For definitions of all commands discussed in this section, refer to the "Command Reference" chapter in the *Catalyst 5000 Series Configuration Guide and Command Reference*.

To configure Fast Ethernet ports, complete the tasks in the following sections:

- Default Configuration
- Enable Privileged Mode
- Set Port Name
- Set Port Priority Level
- Set Port Transmission Type
- Set Virtual LANs (VLANs)
- Set Trunks

Default Configuration

The supervisor engine provides the following default configuration. The default values can be changed to suit your network requirements.

- Port names are not assigned to individual ports
- All ports are set to normal priority level
- All 10/100 Mbps Fast Ethernet Switching module ports are set to auto.
- All Ethernet and Fast Ethernet module ports are set to half duplex.

Enable Privileged Mode

Use the **enable** command to enable privileged mode. Privileged mode lets you invoke privileged commands that set the interface features, such as enabling an interface and showing the current configuration.

Example

The following example shows how to enter privileged mode:

```
Console>
Console> enable
Enter password:
Console> (enable)
```

Set Port Name

Assign a name to each port. To set a port name, perform the following tasks in privileged mode:

Task	Command
Configure a name for a port. Figure 16 shows an example **set port name** command.	**set port name** *mod_num/port_num [name_string]*
Verify that the port name is correct. Figure 17 shows an example **show port** command. Port names are listed in the Name column.	**show port** *mod_num/port_num*

Figure 16 set port name Command Example

```
Console> (enable) set port name 1/1 Management Port
Port 1/1 name set.
Console> (enable) set port name 1/2 Interswitch Link
Port 1/2 name set.
Console> (enable)
```

Figure 17 Sample show port Command Display

```
Console> show port
Port Name                 Status     Vlan       Level  Duplex Speed Type
---- -------------------- ---------- ---------- ------ ------ ----- -----------
1/1  Management Port      connected  1          normal   half   100  100BaseTX
1/2  InterSwitch Link     connected  trunk      normal   half   100  100BaseTX
2/1  10/100BaseTX Fast Eth connected  1          normal   half   auto 10/100 BaseTX
2/2  10/100BaseTX Fast Eth connected  1          normal   half   auto 10/100 BaseTX
.
.
.
2/23                      notconnect 1          normal   half    10 10BaseT
2/24                      notconnect 1          normal   half    10 10BaseT

Port Align-Err  FCS-Err    Xmit-Err   Rcv-Err
---- ---------- ---------- ---------- ----------
1/1           0          0          0          0
1/2           0          0          0          0
2/1           0          0          0          0
2/2           0          0          0          0
2/3           0          0          0          0
2/4           0          0          0          0
2/5           0          0          0          0
.
.
.
2/22          0          0          0          0
2/23          0          0          0          0
2/24          0          0          0          0TT

Port Auto-Parts Giants     Data-Rate  FCS-Err    Runts      Rcv-frms   Src-Addr
                           Mismatch                                     Changes
---- ---------- ---------- ---------- ---------- ---------- ---------- --------
4/1           0          0          0          0          0          0        0
4/2           0          0          0          0          0          0        0
.
.
.
4/47          0          0          0          0          0          0        0
```

```
4/48          0          0          0          0          0          0        0
Port Rcv-Multi  Rcv-Broad  Good-Bytes Align-Err  Short-Evnt Late-Coll Collision
---- ---------- ---------- ---------- ---------- ---------- --------- ---------
4/1           0          0          0          0          0         0         0
4/2           0          0          0          0          0         0         0
.
.
.
4/47          0          0          0          0          0         0         0
4/48          0          0          0          0          0         0         0

Last-Time-Cleared
--------------------------
Tue May 14 1996, 14:37:31
Console> (enable)
```

Set Port Priority Level

Configure the priority level of each port. When ports request simultaneous access to the switching bus, the switch uses the port priority level to determine the order in which ports access the bus. To set the priority level, perform the following tasks in privileged mode:

Task	Command
Configure the priority level for each port. Figure 18 shows an example **set port level** command.	**set port level** *mod_num/port_num* **normal | high**
Verify that the port priority level is correct. Figure 17 shows an example **show port** command. Port priority levels are listed in the Level column.	**show port** *mod_num/port_num*

Figure 18 set port level Command Example

```
Console> (enable) set port level 1/1-2 high
Port 1/1-2 level set to high.
Console> (enable)
```

Set Port Transmission Type

Set the transmission type to full- or half-duplex for the ports to be used. To set the transmission type, perform the following tasks in privileged mode:

Task	Command
Enter the module number, port number, and transmission type of each port to be used. Figure 19 shows an example **set port duplex** command.	**set port duplex** *mod num/port num* **[full | half]**
Verify that the transmission type is set correctly. Figure 17 shows an example **show port** command. The transmission type is listed in the Duplex column.	**show port** *mod_num/port_num*

Figure 19 set port duplex Command Example

```
Console> (enable) set port duplex 1/1-2 half
Port 1/1-2 set to half-duplex.
Console> (enable)
```

Set Virtual LANs (VLANs)

VLANs allow ports on the same or different switches to be grouped so that traffic is confined to members of that group only. This feature restricts unicast, broadcast, and multicast traffic (flooding) to ports included in the same VLAN.

The **set vlan** command groups ports. The default configuration for all switched Ethernet ports and Ethernet repeater ports in VLAN 1. You can enter groups of ports as individual entries, such as 2/1,3/3,3/4,3/5. You can also use a hyphenated format to indicate a range of ports, such as 2/1, 3/3-5.

To create a VLAN across a networking domain, perform the following steps in privileged mode:

Task	Command
Define the VLAN management domain, indicating the domain name, VLAN trunk protocol mode of operation, and password value. Figure 20 shows an example of the **set vtp** command.	**set vtp** [**domain** *name*] [**mode** *mode*] [**passwd** *passwd*]
Verify that the VLAN management domain configuration is correct. Figure 21 shows a sample display of the **show vtp domain** command.	**show vtp domain**
Define the VLAN, indicating the parameters described above: VLAN number, name, type, maximum transmission unit, SAID, state, ring number, bridge identification number, and number to indicate whether source routing should be set to transparent or bridging. A maximum of 250 VLANs can be active at any time. Figure 22 shows an example of the **set vlan** command. Figure 23 shows a diagram of the established VLANs, illustrating how VTP can traverse trunk connections using the ISL and 802.10 protocols and ATM LAN emulation (LANE). In Figure 23, Ethernet VLAN 1 is translated to FDDI VLAN 4 on the FDDI module, Ethernet VLAN 2 is translated to FDDI VLAN 5, and so on.	**set vlan** *vlan_num* [**name** *name*] [**type** *type*] [**mtu** *mtu*] [**said** *said*] [**state** *state*] [**ring** *ring_number*] [**bridge** *bridge_number*] [**parent** *vlan_num*] [**stp** *stp_type*] [**translation** *vlan_num*]
Verify that the VLAN configuration is correct. Figure 24 shows a sample **show vlan** command.	**show vlan**

Figure 20 set vtp Command Example

```
Console> (enable) set vtp domain engineering mode client interval 160
VTP: domain engineering modified
Console> (enable)
```

Figure 21 show vtp domain Command Example

```
Console> (enable) show vtp domain
Domain Name                    Domain Index VTP Version Local Mode
------------------------------ ------------ ----------- -----------
engineering                    1            1           client

Last Updater    Vlan-count Max-vlan-storage Config Revision Notifications
--------------- ---------- ---------------- --------------- -------------
172.20.25.130   5          256              0               disabled
Console> (enable)
```

Figure 22 set vlan Command Example

```
Console> (enable) set vlan 3 name engineering type ethernet
VTP: vlan addition successful
Console> (enable)
```

Figure 23 VLAN Configuration Across a Management Domain

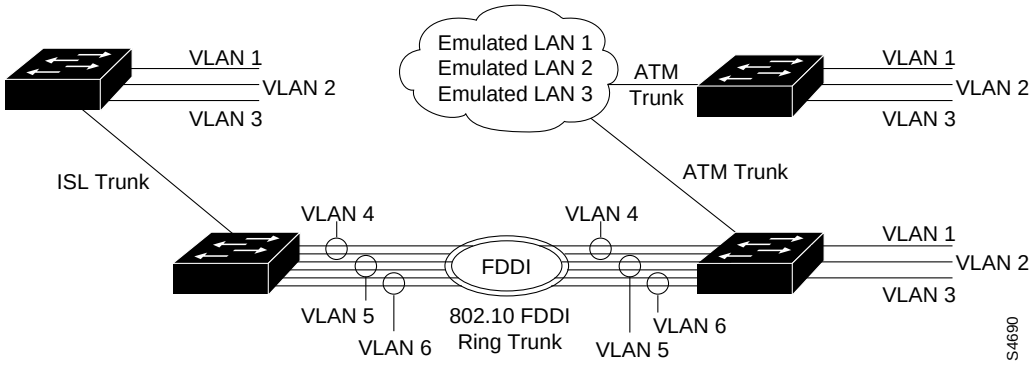


Figure 24 show vlan Command Display Sample

```
Console> (enable) show vlan
VLAN Name                             Status    Mod/Ports
---- -------------------------------- --------- ---------------------------
1    default                          active    1/2
                                                2/1,2/8-24
                                                4/1-24,4/37-48
2    VLAN0002                         active    2/3-7
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active


VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- ------ ------
1    enet  10001      1500  -      -      -        -    1003   1002
2    enet  10002      1500  -      -      -        -    0      0
1002 fddi  1002       1500  0      0      -        -    1003   1
1003 tring 1003       1500  1005   4095   -        -    1      1002
1004 fdnet 33         1500  -      -      0        ieee 0      0
1005 trnet 1005       1500  -      -      15       ibm  0      0
Console> (enable)
```

To create a VLAN across a networking domain, perform the following steps in privileged mode:

Task	Command
Define the VLAN and indicate the ports to be included. Figure 25 shows an example **set vlan** command. Figure 26 shows a diagram of the established VLANs. VLAN 10, in the engineering department, includes module 2, ports 1 through 4. VLAN 20, in the accounting department, includes module 2, ports 5 through 24. The accounting and engineering departments are isolated from each other in this configuration.	**set vlan** *vlan mod/ports*
Verify that the VLAN configuration is correct. Figure 27 shows an example **show vlan** command.	**show vlan**

Figure 25 set vlan Command Example

```
Console> (enable) set vlan 10 2/1-4
VLAN 10 modified.
VLAN 1 modified.
VLAN    Mod/Ports
10      2/1-4
Console> (enable) set vlan 20 2/5-24
VLAN 20 modified.
VLAN 1 modified.
VLAN    Mod/Ports
20      2/5-24
Console> (enable)
```

Figure 26 VLAN Configuration

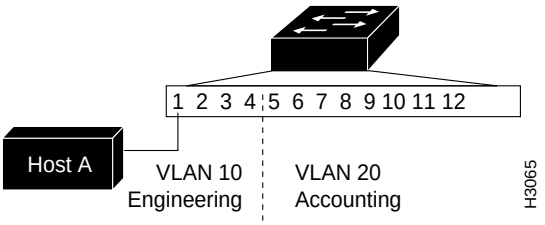


Figure 27 Sample show vlan Command Display

```
Console> (enable) show vlan
VLAN    Mod/Ports
----    ---------------------------------------------------
1       1/1-2
10      2/1-4
20      2/5-24
Console> (enable)
```

Set Trunks

Use the **set trunk** command to configure trunks on ports, and to configure the mode for the trunk: **on**, **off**, **desirable**, or **auto**. To establish a trunk, the port on each Catalyst 5000 series switch must be configured as a trunk port. To establish trunks, perform the following steps in privileged mode:

Task	Command
Establish trunks on specific ports. Set the trunk to **on** to make it a trunk port, **off** to make it a non-trunk port, **desirable** to make it a trunk port if the port it is connected to allows trunking, or **auto** to make it a trunk port if the port it is connected to becomes set for trunking. Figure 28 shows an example of the **set trunk** command. Port 1 on module 1 is configured as a trunk.	**set trunk** ***mod_num/port_num*** **[on | off | desirable | auto] [***vlans***]**
Verify that the trunk configuration is correct. Figure 29 shows a sample display of the **show trunk** command.	**show trunk**

Figure 28 set trunk Command Example

```
Console> (enable) set trunk 1/2 5
Port 1/2 allowed vlans modified to 1-5.
Console> (enable) set trunk 1/1 desirable
Port 1/1 mode set to desirable.
Port 1/1 has become a trunk.
Console> (enable)
```

Figure 29 show trunk Command Display Sample

```
Console> (enable) show trunk
Port     Mode       Status
-------  ---------  ------------
1/1      auto       trunking
1/2      auto       not-trunking

Port     Vlans allowed
-------  ------------------------------------------------------------------------
1/1      1-1000
1/2      1-1000

Port     Vlans active
-------  ------------------------------------------------------------------------
1/1      1-3,5
1/2      1
Console> (enable)
```

Checking the Configuration

This section describes procedures to use to confirm that your supervisor engine is installed and configured correctly.

Checking the Connection

Use the **ping** command to send Internet Control Message Protocol (ICMP) echo request packets to another node on the network. Enter **Ctrl-C** to stop pinging.

ping -s *host [packet_size] [packet_count]*

Syntax Description

-s	Causes **ping** to send one datagram every second, printing one line of output for every response received. The **ping** command does not return any output when no response is received.
host	The IP address or IP alias of the host.
packet_size	(Optional) The number of bytes in a packet, from 1 to 2000 bytes, with a default of 56 bytes. The actual packet size is eight bytes larger because the switch adds header information.
packet_count	(Optional) The number of packets to send.

Following are sample results of the **ping** command:

- Normal response—The normal response occurs in one to ten seconds, depending on network traffic.
- Destination does not respond—If the host does not respond, a no answer message appears in ten seconds.
- Destination unreachable—The gateway given in the route table for this destination indicates that the destination is unreachable.
- Network or host unreachable—The switch found no corresponding entry in the route table.

Example

In the following example, a host with IP alias elvis is pinged a single time, then pinged once every second until you enter **Ctrl C** to stop pinging:

```
Console> ping elvis
elvis is alive
Console> ping -s elvis
ping elvis: 56 data bytes
64 bytes from elvis: icmp_seq=0. time=11 ms
64 bytes from elvis: icmp_seq=1. time=8 ms
64 bytes from elvis: icmp_seq=2. time=8 ms
64 bytes from elvis: icmp_seq=3. time=7 ms
64 bytes from elvis: icmp_seq=4. time=11 ms
64 bytes from elvis: icmp_seq=5. time=7 ms
64 bytes from elvis: icmp_seq=6. time=7 ms
^C
----elvis PING Statistics----
7 packets transmitted, 7 packets received, 0% packet loss
round-trip (ms)  min/avg/max = 7/8/11
Console>
```

Displaying the System Status

Use the **show system** command to display the power supply, fan, temperature alarm, system, and modem status; the number of days, hours, minutes, and seconds since the last system restart; the baud rate; the MAC address range; and the system name, location, and contact.

Example

In the following example, the system status and other information is displayed:

```
Console> (enable) show system
PS1-Status PS2-Status Fan-Status Temp-Alarm Sys-Status Uptime d,h:m:s Logout
---------- ---------- ---------- ---------- ---------- ------------- ---------
ok         none       ok         off        ok         0,18:31:53     none

PS1-Type   PS2-Type   Modem   Baud  Traffic Peak Peak-Time
---------- ---------- ------- ----- ------- ---- -------------------------
WS-C5008   none       disable  9600   0%      0% Tue May 14 1996, 14:37:31

System Name              System Location          System Contact
------------------------ ------------------------ ------------------------
Console> (enable)
```

Displaying the System Configuration

Use the **show config** command to display the current port configuration:

```
Console> (enable) show config
begin
set password $1$FMFQ$HfZR5DUszVHIRhrz4h6V70
set enablepass $1$FMFQ$HfZR5DUszVHIRhrz4h6V70
set prompt Console>
set length 100 default
set logout 0
!
#system
set system baud  9600
set system modem disable
set system name
```

```
set system location
set system contact
!
#snmp
set snmp community read-only      public
set snmp community read-write     private
set snmp community read-write-all secret
set snmp rmon enable
set snmp trap disable module
set snmp trap disable chassis
set snmp trap disable bridge
set snmp trap disable repeater
set snmp trap disable vtp
set snmp trap disable auth
!
#ip
set interface sc0 1 172.20.25.130 255.255.0.0 172.20.255.255

set interface sl0 0.0.0.0 0.0.0.0
set arp agingtime 1200
set ip redirect   enable
set ip unreachable   disable
set ip fragmentation enable
set ip route 0.0.0.0         172.20.1.201    1
set ip alias default         0.0.0.0
set ip alias max             171.69.193.165
set ip alias atlas           172.20.1.201
set ip alias chia pet        172.20.25.130
set ip alias floater         172.20.25.132
set ip alias da_bears        172.20.22.7
set ip alias lnf             172.20.0.0
!
!
#vlan
set vlan 1    1/2,2/1-24,4/1,4/13,4/25,4/37
!
#trunks
set trunk 1/1  desirable 1-1000
set trunk 1/2  off 1-1000
.
.
.
#vlan 2
set spantree enable         2
set spantree fwddelay 15    2
set spantree hello    2     2
set spantree maxage   20    2
set spantree priority 32768 2end
!
#trunk
set spantree portcost     1/1  10
set spantree portpri      1/1  32
set spantree portvlanpri  1/1  0 100-102
set spantree portfast     1/1  disable
set spantree portcost     1/2  10
set spantree portpri      1/2  32
set spantree portvlanpri  1/2  0
set spantree portfast     1/2  disable
!
#module 1
set module name    1
set port enable    1/1-2
set port level     1/1-2  normal
set port duplex    1/1-2  half
set port trap      1/1-2  disable
```

```
set port name      1/1 Management Port
set port name      1/2 InterSwitch Link
!
#module 2
set module name    2
set module enable  2
set port enable    2/1-24
set port level     2/1-24  normal
set port duplex    2/1-24  half
set port trap      2/1-24  disable
set port name      2/1-24
!
#module 3 empty
!
#module 4
set module name    4
set module enable  4
set port enable    4/1-48
set port level     4/1,4/13,4/25,4/37  normal
set port trap      4/1-48  disable
set port name      4/1-48
!
#module 5 empty
!
#switch port analyzer
set span 1 1/1  both
set span disable
end
Console> (enable)
```

Displaying the Port Configuration

Use the **show port** command to display the current system configuration:

```
Console> (enable) show port
Port Name                 Status     Vlan       Level  Duplex Speed Type
---- -------------------- ---------- ---------- ------ ------ ----- -----------
1/1  Management Port      connected  1          normal   half   100  100BaseTX
1/2  InterSwitch Link     connected  trunk      normal   half   100  100BaseTX
2/1  10/100BaseTX Fast Eth connected  1          normal   half   auto 10/100 BaseTX
2/2  10/100BaseTX Fast Eth connected  1          normal   half   auto 10/100 BaseTX
2/3  10/100BaseTX Fast Eth connected  1          normal   half   auto 10/100 BaseTX
2/4  10/100BaseTX Fast Eth connected  1          normal   half   auto 10/100 BaseTX
2/5  10/100BaseTX Fast Eth connected  1          normal   half   auto 10/100 BaseTX
.
.
.
2/23                      notconnect 1          normal   half    10 10BaseT
2/24                      notconnect 1          normal   half    10 10BaseT

Port Align-Err  FCS-Err    Xmit-Err   Rcv-Err
---- ---------- ---------- ---------- ----------
1/1           0          0          0          0
1/2           0          0          0          0
2/1           0          0          0          0
2/2           0          0          0          0
2/3           0          0          0          0
.
.
.
2/22          0          0          0          0
2/23          0          0          0          0
2/24          0          0          0          0
```

```
2/25          0          0          0          0TT

Port Auto-Parts Giants     Data-Rate  FCS-Err    Runts      Rcv-frms   Src-Addr
                           Mismatch                                     Changes
---- ---------- ---------- ---------- ---------- ---------- ---------- --------
4/1           0          0          0          0          0          0        0
4/3           0          0          0          0          0          0        0
4/4           0          0          0          0          0          0        0
4/5           0          0          0          0          0          0        0
.
.
.
4/46          0          0          0          0          0          0        0
4/47          0          0          0          0          0          0        0
4/48          0          0          0          0          0          0        0

Port Rcv-Multi  Rcv-Broad  Good-Bytes Align-Err  Short-Evnt Late-Coll Collision
---- ---------- ---------- ---------- ---------- ---------- --------- ---------
4/1           0          0          0          0          0         0         0
4/2           0          0          0          0          0         0         0
4/3           0          0          0          0          0         0         0
.
.
.
4/46          0          0          0          0          0         0         0
4/47          0          0          0          0          0         0         0
4/48          0          0          0          0          0         0         0

Last-Time-Cleared
--------------------------
Tue May 14 1996, 14:37:31
Console> (enable)
```

Cisco Connection Online

Cisco Connection Online (CCO), formerly Cisco Information Online (CIO), is Cisco Systems' primary, real-time support channel. Maintenance customers and partners can self-register on CCO to obtain additional content and services.

Available 24 hours a day, 7 days a week, CCO provides a wealth of standard and value-added services to Cisco's customers and business partners. CCO services include product information, software updates, release notes, technical tips, the Bug Navigator, configuration notes, brochures, descriptions of service offerings, and download access to public and authorized files.

CCO serves a wide variety of users through two interfaces that are updated and enhanced simultaneously—a character-based version and a multimedia version that resides on the World Wide Web (WWW). The character-based CCO supports Zmodem, Kermit, Xmodem, FTP, Internet e-mail, and fax download options, and is excellent for quick access to information over lower bandwidths. The WWW version of CCO provides richly formatted documents with photographs, figures, graphics, and video, as well as hyperlinks to related information.

You can access CCO in the following ways:

- WWW: `http://www.cisco.com`.
- Telnet: `cco.cisco.com`.
- Modem: From North America, 408 526-8070; from Europe, 33 1 64 46 40 82. Use the following terminal settings: VT100 emulation; databits: 8; parity: none; stop bits: 1; and baud rates up to 14.4 kbps.

For a copy of CCO's Frequently Asked Questions (FAQ), contact `cco-help@cisco.com`. For additional information, contact `cco-team@cisco.com`.

Note If you are a network administrator and need personal technical assistance with a Cisco product that is under warranty or covered by a maintenance contract, contact Cisco's Technical Assistance Center (TAC) at 800 553-2447, 408 526-7209, or `tac@cisco.com`. To obtain general information about Cisco Systems, Cisco products, or upgrades, contact 800 553-6387, 408 526-7208, or `cs-rep@cisco.com`.

This document is to be used in conjunction with the *Catalyst 5000 Series Installation Guide* publication.