Doc. No. 78-1865-02

Catalyst 5000 Series CDDI and FDDI Module Configuration Note

Product Numbers: WS-X5101, WS-X5104, and WS-X5103

This document contains instructions for installing the Catalyst 500 series CDDI and FDDI modules. It also contains procedures for configuring the modules once they are installed. 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, or in printed form.

Sections in this document include the following:

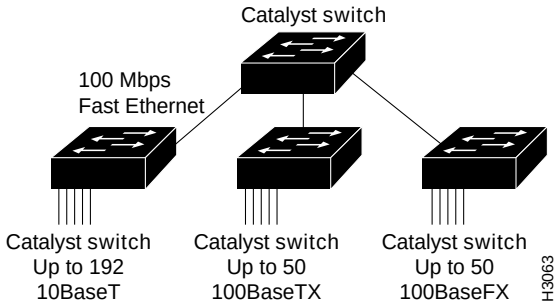
- What is the Catalyst 5000 Series Switch?
- CDDI Module Description
- FDDI Module MMF (Multimode Fiber) Description
- FDDI Module SMF (Single-Mode Fiber) Description
- Specifications
- Module LEDs
- Preparing Network Connections
- Safety Recommendations
- Installing and Configuring Modules
- Configuring the Interfaces
- CDDI/FDDI Configuration
- Checking the Configuration

Warning Only trained and qualified personnel should install or replace the Catalyst 5000 series switch, chassis, power supplies, fan assembly, or modules.

What is the Catalyst 5000 Series Switch?

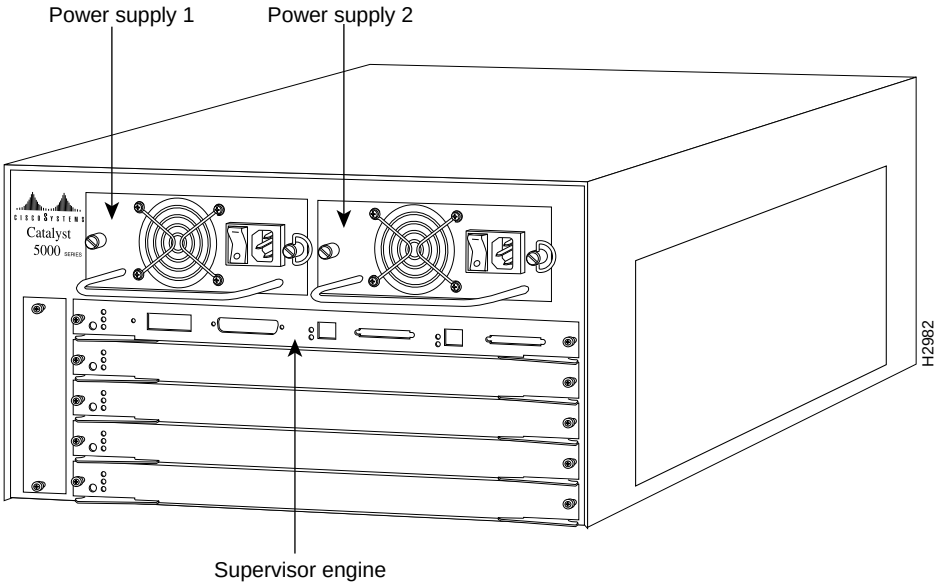
The Catalyst 5000 series switch provides high-density switched Ethernet and Fast Ethernet for both wiring closet and data center applications. The switch includes a single, integrated 1.2-Gbps switching backplane that supports switched Ethernet with repeater connections, and Fast Ethernet with backbone connections, Copper Distributed Data Interface (CDDI), Fiber Distributed Data Interface (FDDI), 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

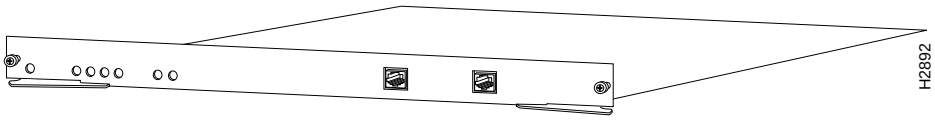


CDDI Module Description

The CDDI module, shown in Figure 3, provides a single- or dual-attachment station connection to two Category 5 UTP Fast Ehernet CDDI interfaces using two RJ-45 female connections.

Note This module requires Network Management Processor (NMP) software version 1.3 or later.

Figure 3 CDDI Module



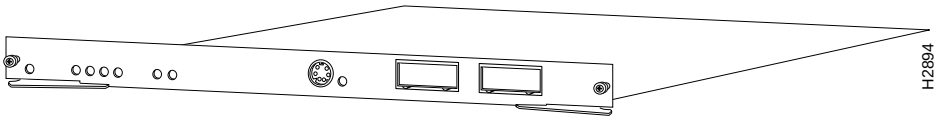
The LEDs provide status information for the module and individual Ethernet port connections. The LEDs are described in the section “CDDI Switching Module LEDs.”

FDDI Module MMF (Multimode Fiber) Description

The FDDI module MMF (multimode fiber), shown in Figure 4, provides a single- or dual-attachment station connection to the Fast Ethernet FDDI backbone network using a multimode (MIC) fiber optic connection.

Note This module requires NMP software version 1.3 or later.

Figure 4 FDDI Module MMF (Multimode Fiber)



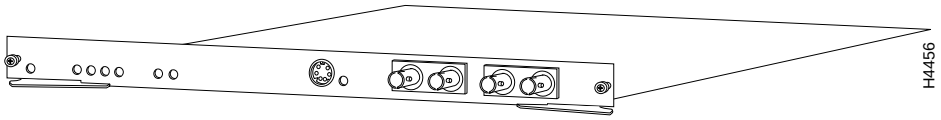
The LEDs provide status information for the module and individual FDDI port connections. The LEDs are described in the section “FDDI Switching Module (Multimode Fiber) LEDs.”

FDDI Module SMF (Single-Mode Fiber) Description

The FDDI module SMF (single-mode fiber), shown in Figure 5, provides a single- or dual-attachment station connection to the Fast Ethernet FDDI backbone network using a single-mode ST fiber-optic connection.

Note This module requires NMP software version 1.3 or later.

Figure 5 FDDI Module (Single Mode Fiber)



The LEDs provide status information for the module and individual FDDI port connections. The LEDs are described in the section “FDDI Switching Module (Single-mode Fiber) LEDs.”

Specifications

Table 1 lists the FDDI and CDDI module specifications:

Table 1 FDDI and CDDI Module 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)
Weight:	
FDDI module SMF (single-mode)	4.2 lb (1.9 kg)
FDDI module MMF (multimode)	4.2 lb (1.9 kg
CDDI UTP	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	CDDI (RJ-45) FDDI (MIC and ST)
RAM buffer memory	192 KB per interface
Maximum station-to-station cabling distance	FDDI: 50/125-micron multimode fiber: 1.24 miles (2 km) FDDI: 8/125-micron single-mode fiber: 18.6 miles (30 km) CDDI: Category 5 UTP: 328' (100 m)
FDDI transmit power levels:	
Single-mode fiber	Average optical power: Maximum: –4.0 dBm[1] Minimum: –7.0 dBm
Multimode fiber	Maximum: –14.0 dBm Minimum: –18.5 dBm
FDDI receive power levels:	
Single-mode fiber	Average optical sensitivity: –33 dBm Average maximum input power: –14 dBm
Multimode fiber	Average optical sensitivity: –34 dBm Average maximum input power: –14 dBm
Frame processing	IP fragmentation (RFC 791) Translation (802.1h, 802.1i)
Network management	SNMP[2] agent, Station Management (SMT) Specification, Revision 7.3

Description	Specification
Agency approvals:	
Safety	UL[4] 1950, CSA[5]-C22.2 No. 950-93, and EN60950
EMI[3]	FCC Class A (47 CFR, Part 15), CE Mark, EN55022 Class B and VCCI Class 2 with shielded cables

1. dBm = decibels per milliwatt
2. SNMP = Simple Network Management Protocol
3. EMI = electromagnetic interference
4. UL = Underwriters Laboratory
5. CSA = Canadian Standards Association

Maximum Configuration

The five available interface slots on the Catalyst 5000 series switch support a supervisor engine (slot 1 only), and any combination of network interface switching modules (slots 2 through 5), providing the maximum port densities of up to four switched FDDI or CDDI modules.

Note Slot 1 is reserved for the supervisor engine.

Module LEDs

Each CDDI and FDDI module contains a status LED. When on, this LED indicates that the module is operational and that it is powered up. It does not necessarily mean that the interface ports are functional or enabled.

CDDI Module LEDs

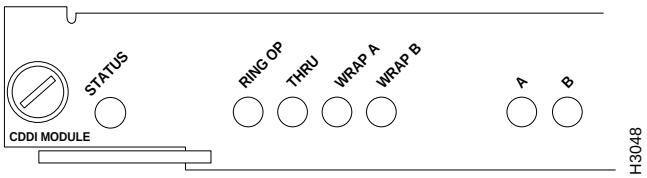
The LEDs on the faceplate of the CDDI module, shown in Figure 6, are described in Table 2.

Table 2 CDDI Module 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 a test other than an individual port test fails, the status LED is red. During system boot or if the module is disabled, the LED is orange. During self-test diagnostics, the LED is orange. If the module is disabled, the LED is orange.
RingOp	Indicates whether or not the ring is operational. If the ring is operational, the RingOp LED is green. If the ring is not operational, the RingOp LED is offf.
Thru	If the FDDI/CDDI A and B ports are connected to the primary and secondary rings, the Thru LED is green; otherwise, it is off.
Wrap A	If the FDDI/CDDI A port is connected to the ring and the B port is isolated, the Wrap A LED is green; otherwise, it is off.
Wrap B	If the FDDI/CDDI B port is connected to the ring and the A port is isolated, the Wrap B LED is green; otherwise, it is off.

LED	Description
Port A status	If the FDDI/CDDI A port is connected to the ring, the port A LED is green. If the FDDI/CDDI A port receives a signal but fails to connect, or a dual homing condition exists, the port A LED is orange. The LED is turned off if no receive signal is detected.
Port B status	If the FDDI/CDDI B port is connected to the ring, the port B LED is green. If the FDDI/CDDI B port receives a signal but fails to connect, or a dual homing condition exists, the port B LED is orange. The LED is turned off if no receive signal is detected.
In	The optical Bypass switch LED indicates the status of the device connected to the line module. When the LED is on, the Bypass switch is activated and is in Thru mode (the line module is attached to the dual ring).

Figure 6 CDDI Module LEDs



FDDI Module MMF (Multimode Fiber) LEDs

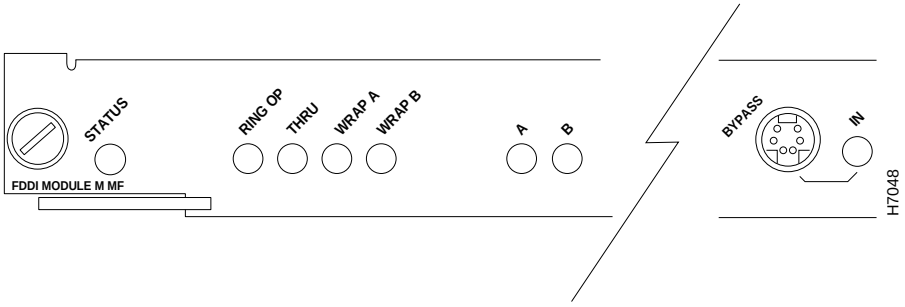
The LEDs on the faceplate of the FDDI module MMF (multimode fiber), shown in Figure 7, are described in Table 3.

Table 3 FDDI Module (Multimode Fiber) 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 a test other than an individual port test fails, the status LED is red. During system boot or if the module is disabled, the LED is orange. During self-test diagnostics, the LED is orange. If the module is disabled, the LED is orange.
RingOp	Indicates whether or not the ring is operational. If the ring is operational, the RingOp LED is green. If the ring is not operational, the RingOp LED is off.
Thru	If the FDDI/CDDI A and B ports are connected to the primary and secondary rings, the Thru LED is green; otherwise, it is off.
Wrap A	If the FDDI/CDDI A port is connected to the ring and the B port is isolated, the wrap A LED is green; otherwise, it is off.
Wrap B	If the FDDI/CDDI B port is connected to the ring and the A port is isolated, the wrap B LED is green; otherwise, it is off.
Port A status	If the FDDI/CDDI A port is connected to the ring, the port A LED is green. If the FDDI/CDDI A port receives a signal but fails to connect, or a dual homing condition exists, the port A LED is orange. The LED is turned off if no receive signal is detected.

LED	Description
Port B status	If the FDDI/CDDI B port is connected to the ring, the port B LED is green. If the FDDI/CDDI B port receives a signal but fails to connect, or a dual homing condition exists, the port B LED is orange. The LED is turned off if no receive signal is detected.
In	The optical Bypass switch LED indicates the status of the device connected to the line module. When the LED is on, the Bypass switch is activated and is in Thru mode (the line module is attached to the dual ring).

Figure 7 FDDI Module MMF (Multimode Fiber) LEDs



FDDI Module SMF (Single-Mode Fiber) LEDs

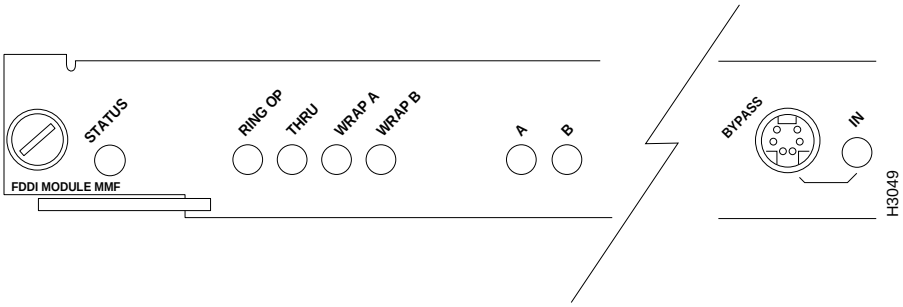
The LEDs on the faceplate of the FDDI module SMF (single-mode fiber), shown in Figure 8, are described in Table 4.

Table 4 FDDI Module SMF (Single-Mode Fiber) 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 a test other than an individual port test fails, the status LED is red. During system boot or if the module is disabled, the LED is orange. During self-test diagnostics, the LED is orange. If the module is disabled, the LED is orange..
RingOp	Indicates whether or not the ring is operational. If the ring is operational, the RingOp LED is green. If the ring is not operational, the RingOp LED is off.
Thru	If the FDDI/CDDI A and B ports are connected to the primary and secondary rings, the Thru LED is green; otherwise, it is off.
Wrap A	If the FDDI/CDDI A port is connected to the ring and the B port is isolated, the Wrap A LED is green; otherwise, it is off..
Wrap B	If the FDDI/CDDI B port is connected to the ring and the A port is isolated, the Wrap B LED is green; otherwise, it is off.
Port A status	If the FDDI/CDDI A port is connected to the ring, the port A LED is green. If the FDDI/CDDI A port receives a signal but fails to connect, or a dual homing condition exists, the port A LED is orange. The LED is turned off if no receive signal is detected.

LED	Description
Port B status	If the FDDI/CDDI B port is connected to the ring, the port B LED is green. If the FDDI/CDDI B port receives a signal but fails to connect, or a dual homing condition exists, the port B LED is orange. The LED is turned off if no receive signal is detected.
In	The optical Bypass switch LED indicates the status of the device connected to the line module. When the LED is on, the Bypass switch is activated and is in Thru mode (the line module is attached to the dual ring).

Figure 8 FDDI Module SMF (Single-Mode Fiber) LEDs



Preparing Network Connections

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

- Type of cabling required for each type (fiber, thick, 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 appendix "Cabling Specifications" in the *Catalyst 5000 Series Installation*. For ordering information, contact a customer service representative.

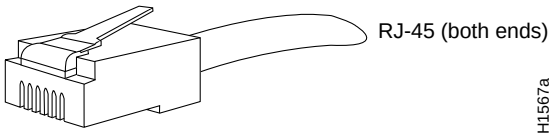
Fast Ethernet Distance Limitations

The distance and rate limits discussed in this section are the IEEE recommended maximum speeds and distances for signaling; however, if you understand the electrical problems that may arise and can compensate for them, you should get good results with rates and distances greater than those described here. But, you do so at your own risk. The following distance limits are provided as guidelines for planning your network connections before installation.

CDDI Transceivers and Cable Connectors

The CDDI transceiver supports distances of up to 330 feet (100.6 meters). The CDDI connector is a CDDI-standard physical sublayer (PHY) connector that encodes and decodes the data into a format acceptable for UTP transmission. The CDDI connector accepts standard UTP cable using an RJ-45 connector, as shown in Figure 9.

Figure 9 CDDI Interface RJ-45 Connector



Confirm that all existing cables conform with CDDI distance requirements and ensure that you have the proper connectors (modular RJ-45). Following are cable and distance specifications:

- Data-grade UTP wiring—EIA/TIA-568-B, Category 5, data-grade cable is required for CDDI installations.
- The total length of data-grade UTP cable from the switch to another switch, station, or CDDI concentrator must not exceed 330 feet (100.6 meters), including patch cords and cross-connect jumpers.

When you plan your CDDI installation, remember the following:

- Use cross-connect (patch) panels that comply with the EIA/TIA-568-B, Category 5 wiring standard.
- Do *not* use bridge taps.
- Do *not* use protection coils.
- Do *not* share services (such as voice and data on the same cable). CDDI uses two of the four pairs in the twisted-pair cable. The remaining two pairs cannot be used for other applications.
- Do *not* exceed maximum cable length for CDDI UTP and STP of 330 feet (100 meters).

Fiber (FDDI) Connections

The FDDI standard sets the maximum distances between stations to the fiber lengths listed in Table 5. The maximum circumference of the FDDI network is only half the specified distance because of signal wrapping or loopback during fault correction. The standard allows a maximum of 500 stations. Both single-mode and multimode transceiver types provide 11 dB of optical power.

Table 5 FDDI Maximum Transmission Distances

Transceiver Type	Maximum Distance Between Stations
Single-mode	18.6 miles (30 km)
Multimode	1.2 miles (2 km)
UTP	328 feet (100 meters)

Table 6 Typical Fiber-Optic Link Attenuation and Dispersion Limits

	Single-Mode	Multimode
Attenuation	0.5 dB	1.0 dB/km
Dispersion limit	No limit	500 MHz/km[1]

1. The product of bandwidth and distance must be less than 500 MHz/km.

FDDI Connection Equipment

Fiber-optic transceivers on the FDDI modules provide a direct interface between the switch and the FDDI ring. The FDDI modules support multimode transceivers. Multimode transceivers provide a Class A dual attachment interface that can be connected to a Class A or a Class B station. Class A is a dual attachment station (DAS) with primary and secondary rings; Class B is a single attachment station (SAS) with only a primary ring.

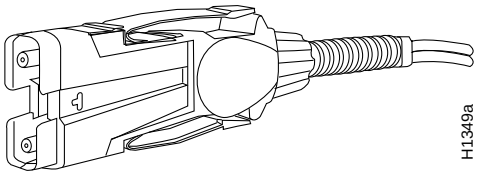
FDDI Media

FDDI networks use two types of fiber-optic cable—single-mode and multimode. *Mode* refers to the angle at which light rays (signals) are reflected and propagated through the optical-fiber core, which acts as a waveguide for the light signals. Multimode fiber has a relatively thick core (62.5/125-micron) that reflects light rays at many angles. Although multimode fiber allows more light signals to enter at a greater variety of angles (modes), the different angles create multiple propagation paths that cause the signals to spread out in time and limit the rate at which data can be accurately received. Multimode transmitters usually use LEDs as a light source, and single-mode transmitters use a laser diode, which is capable of sustaining faster data rates. Multimode transmitters use a photodiode detector at the receiver to translate the light signal into electrical signals.

FDDI Transceivers and Cable Connectors

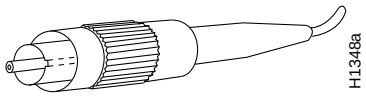
The multimode transceiver supports distances up to 1.2 miles (2 kilometers). The multimode connector is an FDDI-standard physical sublayer (PHY) connector that encodes and decodes the data into a format acceptable for fiber transmission. The multimode connector accepts standard 62.5/125-micron multimode fiber-optic cable using the MIC and, with proper cable terminators, can accept 50/125-micron fiber-optic cable. Multimode and single-mode uses the integrated MIC connector, as shown in Figure 10, at the FDDI modules and the network ends.

Figure 10 Multimode FDDI Network Interface Connector (MIC Type)



The single-mode transceivers support distances up to 18.6 miles (30 kilometers). The single-mode connector accepts standard 8.7 or 10/125-micron single-mode fiber-optic cable using the ST type connectors for transmit and receive ports. (See Figure 11.)

Figure 11 FDDI Network Interface Connector (ST Type)



Warning Invisible laser radiation may be emitted from the aperture ports of the single-mode FDDI module when no cable is connected. *Avoid exposure and do not stare into open apertures.*

The FDDI modules provide a control port for an optical bypass switch. The control port allows the light signal to pass directly through the bypass switch and completely bypass the FDDI module transceivers when the interface has failed or is shut down. Most optical bypass switches provide the necessary interface cables for connection to the MIC connectors on the FDDI module. However, not all manufacturers use the same type of DIN connector for the control port; some manufacturers use a DIN, and some use a smaller version, a mini-DIN. Figure 7 and Figure 8 show the optical bypass connector on the FDDI module faceplate.

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, 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 first supply is powered on. However, 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 guidelines that follow 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

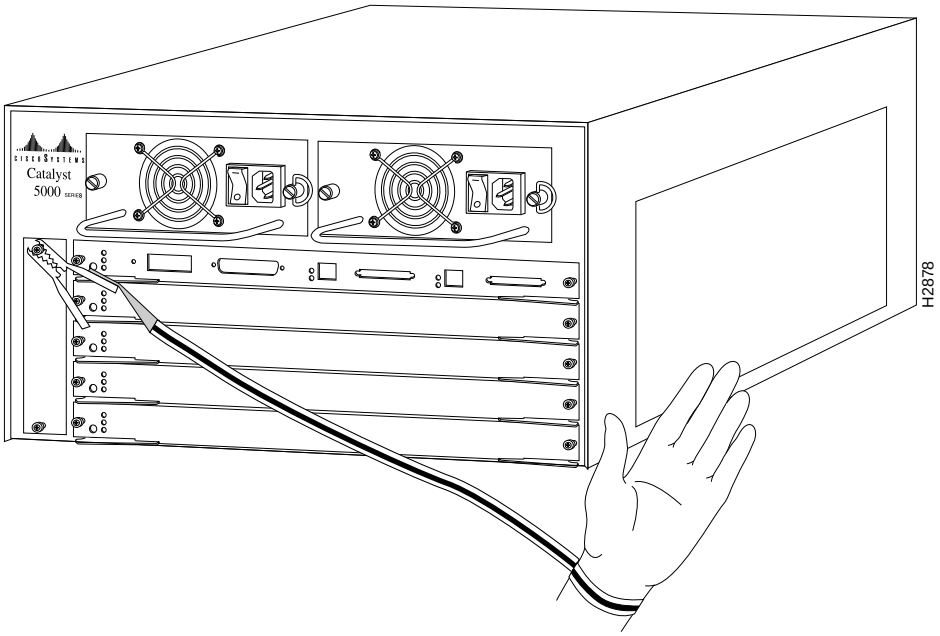
Electrostatic Discharge (ESD) damage occurs when electronic or components are improperly handled, resulting in complete or intermittent failures. The supervisor engine and switching modules each consist of a printed circuit board (PCB) fixed in a metal carrier. Electromagnetic interference (EMI) shielding, 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 are installing them. These screws prevent accidental removal, provide proper grounding for the system, and help to 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 12.) 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.

Figure 12 Placement of ESD Wrist Strap



- 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 switching module, place the printed circuit board (PCB) side up on an antistatic surface or in a static shielding bag. If the component will be returned to the factory, immediately place it in a static shielding bag.
- Handle bare boards by the edges only.

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

Installing and Configuring Modules

All switching modules support hot swapping, letting you install, remove, replace, and rearrange them without turning off the system power. When the system detects that a switching module has been installed or removed, it automatically runs diagnostic and discovery routines, acknowledges the presence or absence of the module, and resumes system operation without any operator intervention.

Overview of Hot Swapping

The hot-swap feature lets you remove and replace switching modules while the system is operating. You do not need to notify the software or shut down the system power. All switching modules support hot swapping.

The switching module 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 switching module, 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 a switching module, 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 administratively 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 module 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 the switching module is different from the original, the default configuration is used to bring it on line.

When you insert a new switching module, the system runs a diagnostic test on the new 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 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

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 remove or insert another module.

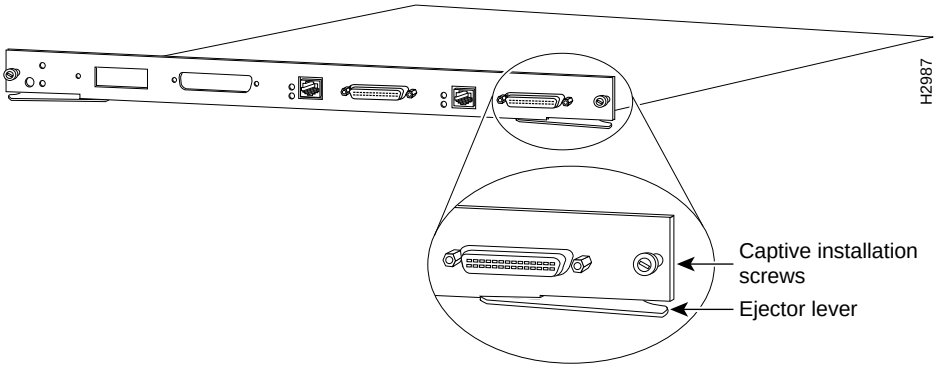
Avoiding Problems When Inserting and Removing Switching Modules

The function of the ejector levers (see Figure 13) on the switching module is to align and seat the board connectors in the backplane. Failure to use the ejector levers and insert the switching module 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 switching module 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 switching module 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 switching module in the backplane, you may need to pull the switching module 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 module connector makes contact with the backplane in one continuous movement.
- Using the faceplate to insert or remove a switching module, or failing to push the ejector levers to a full 90-degree position, can leave some, but not all, of the connector pins making contact with the backplane—a state that will suspend the system. Using the ejector levers and making sure they are properly seated into position, ensures that all two layers of pins are making contact with the backplane.

It is also important to use the ejector levers when removing a switching module, ensuring that its connector pins disconnect from the backplane in the logical sequence expected by the system. A switching module partially connected to the backplane can hang the bus. Detailed steps for correctly performing a hot swap are included in the following procedures for installing and removing a switching module.

Figure 13 Ejector Levers and Captive Installation Screws (Supervisor Engine Module Shown)



Tools Required

You need a flat-blade screwdriver to remove any filler (blank) modules and to tighten the captive installation screws that secure the modules in their slots. Whenever you handle modules, you should use a wrist strap or other grounding device to prevent ESD damage. See the section “Preventing Electrostatic Discharge Damage.”

Removing Modules

Take the following steps to remove a switching module:

Step 1 If you do not plan to immediately reinstall the switching module after removing it, disconnect any network interface cables attached to the switching module ports.

Step 2 Use a screwdriver to loosen the switching module’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 module from the backplane connector.

Step 4 Grasp the switching module handle with one hand and place your other hand under the carrier to support and guide the it out of the slot. Avoid touching the module.

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

Step 6 Place the switching module on an antistatic mat or antistatic foam or immediately install it in another slot.

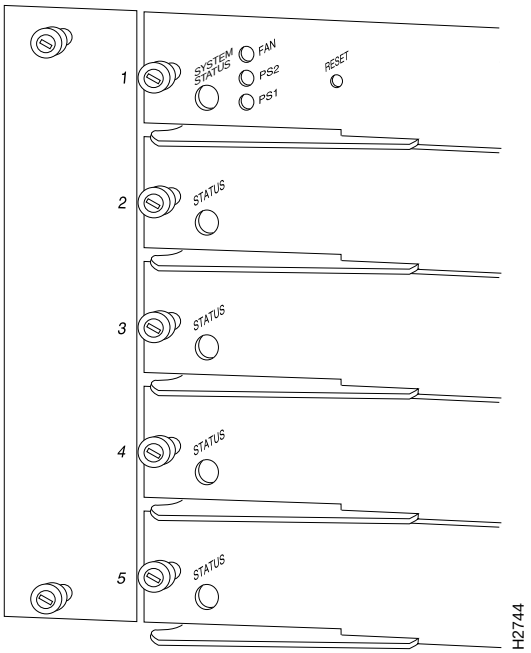
Step 7 If the slot is to remain empty, install a switching module filler plate (part number 800-00292-01) to keep dust out of the chassis and to maintain proper airflow through the switching module compartment.

Caution Always install the switching module filler plate in empty switching module slots to maintain the proper flow of cooling air across the modules.

Installing Switching Modules

You can install switching modules in any of the four switching module slots, numbered 2 through 5 from top to bottom, when viewing the chassis from the rear. (See Figure 14.) The top slot contains the supervisor engine—a required system component. Switching module fillers, blank switching module carriers, are installed in slots without switching modules to maintain consistent airflow through the switching module compartment.

Figure 14 Slot Numbers



Following is the procedure for installing a module:

Caution Handle modules by the carrier edges only to prevent ESD damage.

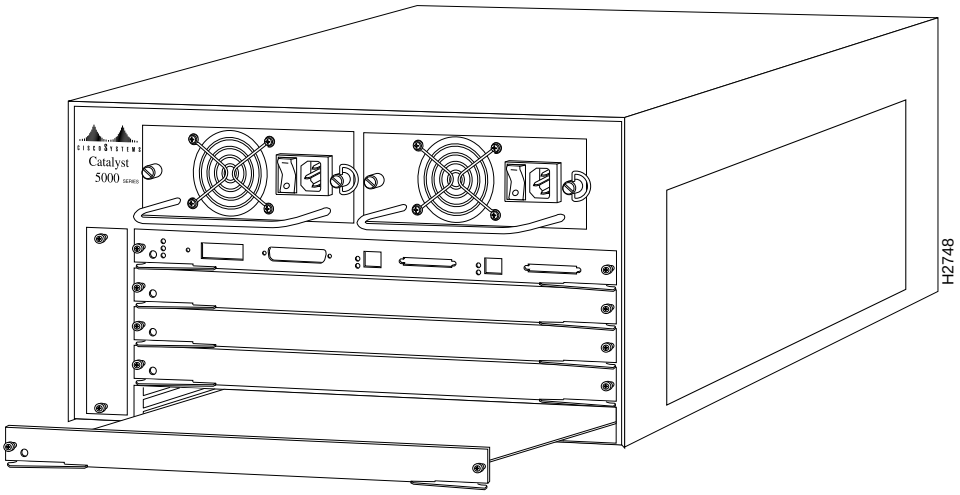
Step 1 Choose a slot for the new switching module and ensure that there is enough clearance to accommodate any interface equipment that you will connect directly to the switching module ports. If possible, place switching modules between empty slots that contain only switching module filler plates.

Step 2 Switching modules are secured with two captive installation screws. Use a flat-blade screwdriver to loosen the captive installation screws and remove the switching module filler or the existing switching module from the slot you want to use.

Step 3 Hold the switching module handle with one hand, and place your other hand under the carrier to support the switching module and guide it into the slot. Avoid touching the board.

Step 4 Place the back of the switching module in the slot and align the notch on the sides of the switching module carrier with the groove in the slot. (See Figure 15.)

Figure 15 Module Installation



Step 5 While keeping the switching module oriented horizontally, carefully slide the module into the slot until the its faceplate makes contact with the ejector levers.

Step 6 Using the thumb and forefinger of each hand, simultaneously push the ejector levers in to fully seat the switching module in the backplane connector.

Note Always use the ejector levers when installing or removing switching modules. A module that is partially seated in the backplane will cause the system to halt and subsequently crash.

Step 7 Use a screwdriver to tighten the captive installation screws on the left and right ends of the switching module.

Step 8 Attach network interface cables or other devices to the interface ports.

Step 9 Check the status of the interfaces as follows:

- If this installation is a replacement switching module, use the **show module** or **show port** [*mod_num/port_num*] command to verify that the system has acknowledged the new interfaces and brought them up.
- If the interfaces are new, use the **set module** command and the **set module name** command facility to configure the new interface(s). This does not have to be done immediately, but the interfaces will not be available until you configure them. See the *Catalyst 5000 Series Configuration Guide and Command Reference* for information on how to configure new interfaces.

Hot-Swapping Procedure Sample Screen Display

When you remove and replace switching modules, the system provides status messages on the console screen. The messages are for information only. In the following sample display, using the **show system** and **show module** commands, you can follow the events logged by the system when a switching module is removed from slot 2. When the **show port** command is used to query the module, the system reports *notconnect*.When the module is reinserted, the system marks the module as *ok*.

```
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         0,00:21:41     none

PS1-Type   PS2-Type   Modem   Baud  Traffic Peak Peak-Time
---------- ---------- ------- ----- ------- ---- -------------------------
WS-C5101   none       disable  9600   0%      0% Tue May 14 1996, 14:37:31

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

Console> (enable) show module
Mod Module-Name          Ports Module-Type           Model   Serial-Num Status
--- -------------------- ----- --------------------- -------- ---------- -------
1                        2     100BaseTX Supervisor  WS-X5009 002650014 ok
2                        10    FDDI 100BaseFX        WS-X5011 002475046 ok
4                        48    4 Segment 10BaseT Eth WS-X5020 001336146 ok

Mod MAC-Address(es)                           Hw     Fw     Sw
--- ----------------------------------------  ------ ------ ----------------
1   00-40-0b-ac-80-00 thru 00-40-0b-ac-83-ff  1.81   1.5    2.1
2   00-40-0b-4c-92-58 thru 00-40-0b-4c-92-6f  1.0    1.4    2.1
4   00-40-0b-ff-00-00 thru 00-40-0b-ff-00-03  0.2    2.1(1) 2.1
Console> (enable)

Console> (enable) show port 2/10
Port Name                 Status     Vlan       Level  Duplex Speed Type
---- -------------------- ---------- ---------- ------ ------ ----- -----------
2/10                      connected  1          normal   half    10 10BaseT

Port Align-Err  FCS-Err    Xmit-Err   Rcv-Err
---- ---------- ---------- ---------- ----------
2/10          0          0          0          0

Port Single-Col Multi-Coll Late-Coll  Excess-Col Carri-Sens Runts     Giants
---- ---------- ---------- ---------- ---------- ---------- --------- ---------
2/10          0          0          0          0          0         0         0

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

Configuring the Interfaces

After you install the switching module, use the following information to configure the module and the individual interfaces on the Ethernet switching port module. The section “Port Addresses” contains an overview of the port and module numbering scheme used to configure the Catalyst 5000

series switching modules. The section “CDDI/FDDI Configuration” describes how to configure the ports on the Ethernet switching module. And the section “CDDI/FDDI Configuration” describes the procedures you should use to confirm that the Ethernet switching 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 physical location (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 physical 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 layer 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.

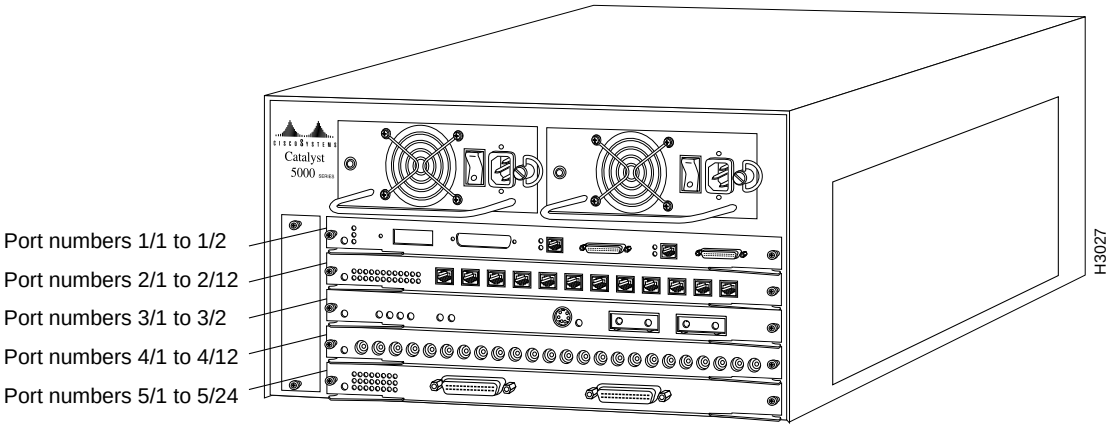
The following sections describe how the Catalyst 5000 series switch assigns and controls both the physical and MAC addresses for interfaces within the chassis.

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 16.) 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 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 (*n*/1, *n*/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 16 Interface Port Address Examples



The Fast Ethernet switching module supports up to 12 interfaces—*n*/1 through *n*/12. 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 module interfaces by physically checking the slot/port location on the back of the switch. Software commands are used to display information about a specific interface 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.

```
Console> (enable) show port
Port Name                 Status     Vlan       Level  Duplex Speed Type
---- -------------------- ---------- ---------- ------ ------ ----- -----------
1/1  100BaseTX Supervisor  connected  trunk      normal   half   100  100BaseTX
1/2  100BaseTX Supervisor  connected  1          normal   half   100  100BaseTX
2/1  FDDI 100BasFX         connected  1          normal   half   100  100BaseFX
2/2  10BaseFL 12 Port      connected  1          normal   half   10   10BaseFL
2/3  10BaseFL 12 Port      connected  1          normal   half   10   10BaseFL
2/4  10BaseFL 12 Port      connected  1          normal   half   10   10BaseFL
2/5  10BaseFL 12 Port      connected  1          normal   half   10   10BaseFL
.
.
.
4/45                       notconnect 1          normal   half    10  10BaseT
4/46                       notconnect 1          normal   half    10  10BaseT
4/47                       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
.
.
.
2/18          0          0          0          0
2/19          0          0          0          0
```

```
2/20          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
4/5           0          0          0          0          0          0        0
4/6           0          0          0          0          0          0        0
.
.
.
4/43          0          0          0          0          0          0        0
4/44          0          0          0          0          0          0        0
4/45          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
4/4           0          0          0          0          0         0         0
.
.
.
4/42          0          0          0          0          0         0         0
4/43          0          0          0          0          0         0         0
4/44          0          0          0          0          0         0         0
4/45          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.

Note If the MAC addresses were stored on each module, hot swapping would not function because you could never replace one interface with an identically configured one; the MAC addresses would always be different.

CDDI/FDDI Configuration

This section describes how to use the administrative interface to configure the CDDI/FDDI ports of the Catalyst 5000 series switch.

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

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

- Default Configuration
- Customizing the Configuration
- Customize the Default IPX Protocol Translations
- Setting the FDDI SNAP to Ethernet Translation
- Setting the FDDI 802.2 to Ethernet Translation
- Setting the Ethernet 802.3 RAW to FDDI Protocol
- Set Minimum Time to Transfer the FDDI PHY Line State
- Set Interval Between Neighbor Notification Frames
- Set Timer for Negotiating TRT
- Specify the User-Data String
- Disable IP Fragmentation
- Disable ICMP Unreachable Messages
- Set the Link Error Rate Alarm
- Set the Link Error Rate Cutoff
- Set Port Name
- Set Virtual LANs (VLANs)
- Set Trunks
- Setting Up an FDDI 802.10 Configuration

Default Configuration

The features you can customize have default values that will most likely suit your environment and probably need not be changed. The default values of these features are set as follows:

- All FDDI ports are enabled.
- The default IPX protocol translations are set as follows:

  - FDDI SNAP to Ethernet 802.3 RAW
  - FDDI 802.2 to Ethernet 802.3
  - Ethernet 802.3 RAW to FDDI SNAP
- The TL_MIN parameter is set to 40 microseconds.
- The TNotify parameter is set to 30 seconds.
- The TRequest parameter is set to 165,000 microseconds.
- The user data string, used to identify the FDDI module, is set to "Catalyst 5000."
- IP fragmentation is enabled.
- ICMP unreachable messages are enabled.
- LER-Alarm is set to 8 (10^{-8}).
- LER-Cutoff is set to 7 (10^{-7})

Customizing the Configuration

If needed, you can customize the preceding features to fit your configuration by performing any of the following tasks. Each task is covered in a subsection that follows.

- Customize the Default IPX Protocol Translations
- Set Minimum Time to Transfer the FDDI PHY Line State
- Set Interval Between Neighbor Notification Frames
- Console> (enable)
- Specify the User-Data String
- Disable IP Fragmentation
- Set the Link Error Rate Alarm
- Set the Link Error Rate Cutoff
- Set Port Name
- Setting Up an FDDI 802.10 Configuration
- Rejecting MAC Address Learning (fddicheck)
- Disabling Automatic Packet Recognition and Translation (APART).

Customize the Default IPX Protocol Translations

As a normal function, the Catalyst 5000 series switch can forward IPX packets received on FDDI ports to Ethernet ports, or it can forward IPX packets received on Ethernet ports to FDDI ports. To do this, the switch must be configured for specific IPX protocol translations. By default, the following IPX protocol translations are configured:

- FDDI SNAP to Ethernet 802.3 RAW
- FDDI 802.2 to Ethernet 802.3
- Ethernet 802.3 RAW to FDDI SNAP

You can customize these settings if your environment requires it.

Setting the FDDI SNAP to Ethernet Translation

The FDDI SNAP frame can be translated into the following Ethernet frames:

- Ethernet 802.3
- Ethernet SNAP
- Ethernet II
- Ethernet 802.3 RAW (default)

To specify the FDDI protocol to which Ethernet 8023RAW packets are translated, perform the following steps in privileged mode:

Task		Command
Step 1	Configure the appropriate translation protocol. See Figure 17 for an example.	**set bridge ipx snaptoether {8023 | SNAP | EII | 8023RAW }**
Step 2	Verify that the correct translation protocol was configured. See Figure 18 for an example.	show bridge

See sections “Checking the Configuration” and “Example of Displaying Bridge Information” in the *Catalyst 5000 Series Installation Guide*.

Setting the FDDI 802.2 to Ethernet Translation

The FDDI SNAP frame can be translated into the following Ethernet frames:

- Ethernet 802.3
- Ethernet SNAP
- Ethernet II
- Ethernet 802.3 RAW (default)

To specify the FDDI protocol to which Ethernet 8023RAW packets are translated, perform the following steps in privileged mode:

Task		Command
Step 1	Configure the appropriate translation protocol. See Figure 17 for an example.	**set bridge ipx snaptoether {8023 | SNAP | EII | 8023RAW }**
Step 2	Verify that the correct translation protocol was configured. See Figure 18 for an example.	show bridge

See sections “Checking the Configuration” and “Example of Displaying Bridge Information” in the *Catalyst 5000 Series Installation Guide*.

Figure 17 set bridge ipx snaptoether 8023 Command Example

```
Console> (enable) set bridge ipx snaptoether 8023
Bridge snaptoether default IPX translation set.
Console> (enable)
```

Figure 18 show bridge Command Example

```
Console> (enable) show bridge
APaRT Enabled
FDDICHECK Enabled
IP fragmentation Enabled
Default IPX translations:
    FDDI SNAP  to Ethernet     8023raw
    FDDI 802.2 to Ethernet     8023raw
    Ethernet 802.3 Raw to FDDI snap
Console> (enable)
```

Setting the Ethernet 802.3 RAW to FDDI Protocol

The FDDI 802.2 frame can be translated into the following Ethernet frames:

- Ethernet 802.3 (default)
- Ethernet SNAP
- Ethernet II
- Ethernet 802.3 RAW

To specify the Ethernet frame to which IPX FDDI SNAP packets are translated, perform the following steps in privileged mode:

Task		Command
Step 1	Configure the appropriate protocol translation. See Figure 19 and Figure 20 for examples.	**set bridge ipx 8022toether {8023 | SNAP | EII | 8023RAW }**
Step 2	Verify that the correct protocol translation was configured. See Figure 21 for an example.	show bridge

The following example sets the IPX translation protocol for FDDI 802.2 to 802.3:

Figure 19 set bridge ipx 8022 toether 8023 Command Example

```
Console> (enable) set bridge ipx 8022toether 8023
Module 4 8022toether translation set.
Console> (enable)
```

The following example sets the IPX translation protocol for FDDI SNAP to Ethernet SNAP:

Figure 20 set bridge ipx snaptoether snap Command Example

```
Console> (enable) set bridge ipx snaptoether snap
Module 4 snaptoether translation set
Console> (enable)
```

Figure 21 show bridge Command Example

```
Console> (enable) show bridge
APaRT Enabled
FDDICHECK Enabled
IP fragmentation Enabled
Default IPX translations:
    FDDI SNAP  to Ethernet     8023raw
    FDDI 802.2 to Ethernet     8023raw
    Ethernet 802.3 Raw to FDDI snap
Console> (enable)
```

Set Minimum Time to Transfer the FDDI PHY Line State

The TL_MIN parameter sets the minimum time to transmit an FDDI physical sublayer (PHY) line state before advancing to the next physical connection management (PCM) state. This setting affects the station and switch interoperability and might hinder the implementation of FDDI repeaters. By default, the TL_MIN parameter is set to 40 microseconds. Normally, you will not need to adjust this parameter. However, you can customize the TL_MIN setting if needed. To do this, perform the following steps in privileged mode:

Task		Command
Step 1	Set TL_MIN to a value between 40 and 1340006 microseconds. See Figure 22 for an example.	**set fddi tlmin** *mod_num/port_num usecs*
Step 2	Verify that TL_MIN was configured correctly. See Figure 23 for an example.	show fddi

Figure 22 set fddi tlmin Command Example

```
Console> (enable) set fddi tlmin 4/1 40
Port 4/1 tlmin set to 40.
Console> (enable)
```

Figure 23 show fddi Command Example

```
Console> (enable) show fddi
Mod  SMT User-Data               T-Notify  TReq
---  --------------------------  --------  -------
4    Engineering                 15        3500
5    abc                         20        150000

Port   Tlmin     Ler-CutOff  Ler-Alarm
-----  --------  ----------  ---------
4/1    40        10          11
4/2    40        10          11
5/1    40        10          11
5/2    40        9           12
Console>(enable)
```

Set Interval Between Neighbor Notification Frames

The TNotify parameter sets the interval (in seconds) between neighbor notification frames. These frames are sent out to notify neighboring devices of FDDI module MAC addresses. Usually, the default setting of 30 seconds is sufficient. By shortening the interval, you cause more notification frames to be sent. However, if you need to adjust this setting, perform the following steps in privileged mode:

Task		Command
Step 1	Set TNotify to a value between 2 and 30 seconds. See Figure 24 for an example.	**set fddi tnotify** *mod_num time*
Step 2	Verify that TNotify was configured correctly. See Figure 25 for an example.	show fddi

Figure 24 set fddi tnotify Command Example

```
Console> (enable) set fddi tnotify 4/1 15
Module 4 tnotify set to 15.
Console> (enable)
```

Figure 25 show fddi Command Example

```
Console> (enable) show fddi
Mod  SMT User-Data               T-Notify  TReq
---  --------------------------  --------  -------
4    Engineering                 15        3500
5    abc                         20        150000

Port   Tlmin     Ler-CutOff  Ler-Alarm
-----  --------  ----------  ---------
4/1    40        10          11
4/2    40        10          11
5/1    40        10          11
5/2    40        9           12
Console> (enable)
```

Set Timer for Negotiating TRT

The TRequest parameter specifies the FDDI switch's desired value for the Token Ring Timer (TRT) for negotiating the TRT with other stations. The TRT is used to control ring scheduling during normal operation and to detect and recover from serious ring error situations. Whenever the TRT value expires, the station uses the TRequest value to negotiate with other stations for the lowest value. The default setting of 16,5000 microseconds is sufficient for most networks. However, if you need to modify this setting, perform the following steps in privileged mode:

Task		Command
Step 1	Set TRequest to a value between 2502 and 16,5000 microseconds. See Figure 26 for an example.	**set fddi treq** *mod_num time*
Step 2	Verify that TNotify was configured correctly. See Figure 27 for an example.	show fddi

Figure 26 set fddi trequest Command Example

```
Console> (enable) set fddi trequest 4 3500
Mac 4/1 treq set to 3500.
Console> (enable)
```

Figure 27 show fddi Command Example

```
Console> (enable) show fddi
Mod  SMT User-Data               T-Notify  TReq
---  --------------------------  --------  -------
4    Engineering                 15        3500
5    abc                         20        150000

Port   Tlmin     Ler-CutOff  Ler-Alarm
-----  --------  ----------  ---------
4/1    40        10          11
4/2    40        10          11
5/1    40        10          11
5/2    40        9           12
Console> (enable)
```

Specify the User-Data String

The **user-data** string identifies the user data string in the SMT MIB of an FDDI module. The default value is "Catalyst 5000." This value should be modified to a more meaningful description. To modify this parameter, perform the following steps in privileged mode:

Task		Command
Step 1	Enter a module number and a unique description or name to identify the FDDI module. Refer to Figure 28 for an example. See for an example.	**set fddi userdata** *mod_num userdata_string*
Step 2	Verify that the description or name was entered correctly. See Figure 29 for an example. See for an example.	show fddi

Figure 28 set fddi Command Example

```
Console> (enable) set fddi userdata 4 Engineering
Module 4 userdata set to Engineering.
Console> (enable)
```

Figure 29 show fddi Command Example

```
Console> (enable) show fddi
Mod  SMT User-Data               T-Notify  TReq
---  --------------------------  --------  -------
4    Engineering                 15        3500
5    abc                         20        150000

Port   Tlmin     Ler-CutOff  Ler-Alarm
-----  --------  ----------  ---------
4/1    40        10          11
4/2    40        10          11
5/1    40        10          11
5/2    40        9           12
Console> (enable)
```

Disable IP Fragmentation

IP fragmentation allows the Catalyst 5000 series switch to fragment large FDDI IP frames (frames greater than 1514 bytes) into multiple smaller packets so that they can be transmitted on an Ethernet segment. By default, IP fragmentation is enabled. If you want the large packets to be dropped instead of fragmented, disable fragmentation:

Task		Command
Step 1	Disable IP fragmentation. See Figure 30 for an example.	**set ip fragmentation disable**
Step 2	Verify that IP fragmentation is set correctly. See Figure 31 for an example.	**show ip route**

To reenable IP fragmentation, perform the following steps in privileged mode:

Task		Command
Step 1	Enable IP fragmentation.	**set ip fragmentation enable**
Step 2	Verify that IP fragmentation is set correctly.	**show ip route**

Figure 30 set ip fragmentation disable Command Example

```
Console> (enable) set ip fragmentation disable
IP fragmentation disabled for module 4
Console> (enable)
```

Figure 31 show ip route Command Example

```
Console> (enable) show ip route
Fragmentation   Redirect   Unreachable
-------------   --------   -----------
enabled         enabled    disabled

Destination     Gateway         Flags   Use         Interface
--------------- --------------- ------  ----------  ---------
default         atlas           UG            6090  sc0
lnf             cat7-lnf        U                0  sc0
default         default         UH               0  sl0
Console> (enable)
```

Disable ICMP Unreachable Messages

When enabled, the switch returns an ICMP unreachable message to the Internet source host whenever it receives an IP datagram that it cannot deliver. When disabled, the switch does not notify the Internet source host when it receives an IP datagram that it cannot deliver. You can disable *unreachable messages enabled* if desired. To do this, perform the following steps in privileged mode:

Task		Command
Step 1	Disable IP unreachable messages. See Figure 32 for an example.	**set ip unreachable disable**
Step 2	Verify that IP unreachable messages are disabled. Refer to Figure 33 for an example.	**show ip route**

To reenable IP unreachable messages, perform the following steps in privileged mode:

Task		Command
Step 1	Enable IP unreachable messages.	**ip unreachable enable**
Step 2	Verify that IP unreachable messages are enabled.	**show ip route**

Figure 32 set ip unreachable disable Command Example

```
Console> (enable) set ip unreachable disable
Console> (enable)
```

Figure 33 show ip route Command Example

```
Console> (enable) show ip route
Fragmentation   Redirect   Unreachable
-------------   --------   -----------
enabled         enabled    disabled

Destination     Gateway         Flags   Use         Interface
--------------- --------------- ------  ----------  ---------
default         atlas           UG            6090  sc0
lnf             cat7-lnf        U                0  sc0
default         default         UH               0  sl0
Console> (enable)
```

Set the Link Error Rate Alarm

The LER-Alarm value defines the link error rate (LER) at which a link connection exceeds a preset alarm threshold. This value is used in the link error rate threshold test. The default setting of 8 (10^{-8}) link errors per second is sufficient for most networks. However, if you need to modify this setting, perform the following steps in privileged mode:

Task		Command
Step 1	Change the LER-Alarm setting. See Figure 34 for an example.	**set fddi alarm** *mod_num/port_num value*
Step 2	Verify that the LER-Alarm setting is correct. See Figure 35 for an example.	**show fddi**

Figure 34 set fddi alarm Command Example

```
Console> (enable) set fddi alarm 4/1 11
Port 4/1 alarm value set to 11.
Console> (enable)
```

Figure 35 show fddi Command Example

```
Console> (enable) show fddi
Mod  SMT User-Data               T-Notify  TReq
---  --------------------------  --------  -------
4    Engineering                 15        3500
5    abc                         20        150000

Port   Tlmin     Ler-CutOff  Ler-Alarm
-----  --------  ----------  ---------
4/1    40        10          11
4/2    40        10          11
5/1    40        10          11
5/2    40        9           12
Console> (enable)
```

Set the Link Error Rate Cutoff

The LER-Cutoff value determines the link error rate (LER) at which a connection will be flagged as faulty. This value is used in the link error rate threshold test. The default setting of 7 (10^{-7}) is sufficient for most networks. However, if you need to modify this setting, perform the following steps in privileged mode:

Task		Command
Step 1	Change the LER-Cutoff setting. See Figure 36 for an example.	**set fddi cutoff** *mod_num/port_num value*
Step 2	Verify that the LER-Alarm setting is correct. See Figure 37 for an example.	**show fddi**

Figure 36 set fddi cutoff Command Example

```
Console> (enable) set fddi cutoff 4/1 10
Port 4/1 cutoff value set to 10.
Console> (enable)
```

Figure 37 show fddi Command Example

```
Console> (enable) show fddi
Mod  SMT User-Data               T-Notify  TReq
---  --------------------------  --------  -------
4    Engineering                 15        3500
5    abc                         20        150000

Port   Tlmin     Ler-CutOff  Ler-Alarm
-----  --------  ----------  ---------
4/1    40        10          11
4/2    40        10          11
5/1    40        10          11
5/2    40        9           12
Console> (enable)
```

Set Port Name

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

Task	Command
Configure a name for a port. Figure 38 shows an example **set port name** command.	**set port name** *mod_num/port_num [name_string]*
Verify that the port name is correct. Figure 39 shows an example **show port** command. Port names are listed in the Name column.	**show port** *mod_num/port_num*

Figure 38 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.
```

Figure 39 Sample show port Command Display

```
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  FDDI 100BasFX        connected  1          normal   half   100  100BaseFX
2/2  10BaseFL 12 Port     connected  1          normal   half   auto 10BaseFL
2/3  10BaseFL 12 Port     connected  1          normal   half   auto 10BaseFL
2/4  10BaseFL 12 Port     connected  1          normal   half   auto 10BaseFL
2/5  10BaseFL 12 Port     connected  1          normal   half   auto 10BaseFL
.
.
4/45                      notconnect 1          normal   half    10  10BaseT
4/46                      notconnect 1          normal   half    10  10BaseT
4/47                      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
.
.
.
2/18          0          0          0          0
2/19          0          0          0          0
2/20          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
4/5           0          0          0          0          0          0        0
4/6           0          0          0          0          0          0        0
.
.
.
4/43          0          0          0          0          0          0        0
4/44          0          0          0          0          0          0        0
4/45          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
4/4           0          0          0          0          0         0         0
.
.
.
4/42          0          0          0          0          0         0         0
4/43          0          0          0          0          0         0         0
4/44          0          0          0          0          0         0         0
4/45          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)
```

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 42 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 41 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 100000 VLANs can be active at any time. Figure 42 shows an example of the **set vlan** command. Figure 43 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 43, 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 44 shows a sample display of the **show vlan** command.	show vlan

Figure 40 set vtp Command Example

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

Figure 41 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 42 set vlan Command Example

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

Figure 43 VLAN Configuration Across a Management Domain

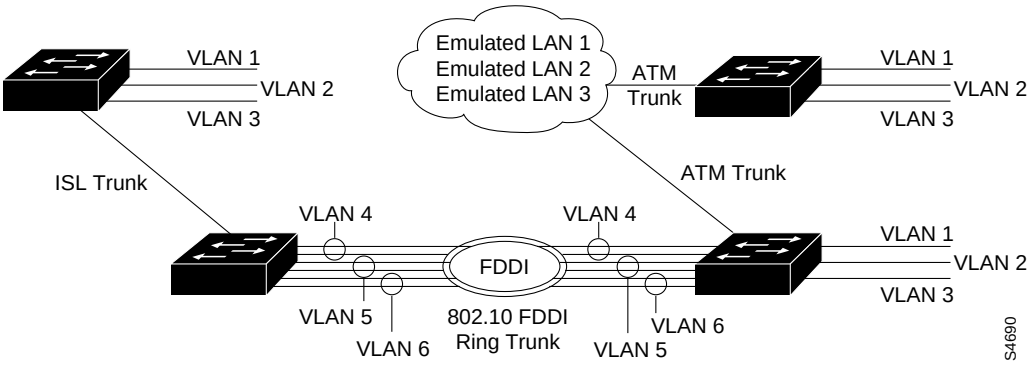


Figure 44 show vlan Command Display Sample

```
Console> (enable) show vlan
VLAN Name                              Status    Mod/Ports
---- --------------------------------- --------- ---------------------------
1    default                           active    1/1-2
                                                 2/1-24
2    VLAN0002                          active
3    VLAN0003                          active
5    VLAN0005                          active
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
3    enet  100003     1500  -      -      -        -    0      0
5    enet  100005     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, perform the following tasks in privileged mode:

Task	Command
Define the VLAN and indicate the included ports. Figure 45 shows an example of the **set vlan** command. Figure 46 show a diagram of the established VLANs. VLAN 10, the engineering department, includes module 2, Ethernet ports 1 through 4. VLAN 20, the accounting department, includes module 2, Ethernet ports 5 through 24. The accounting and engineering departments are totally isolated from each another in this configuration.	**set vlan** *vlan mod/port*s
Verify that the VLAN configuration is correct. Figure 47 shows a sample display of the **show vlan** command.	show vlan

Figure 45 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)
Console> (enable) set vlan 20 2/5-24
VLAN 20 modified.
VLAN 1 modified.
VLAN    Mod/Ports
20      2/5-24
Console> (enable)
```

Figure 46 VLAN Configuration

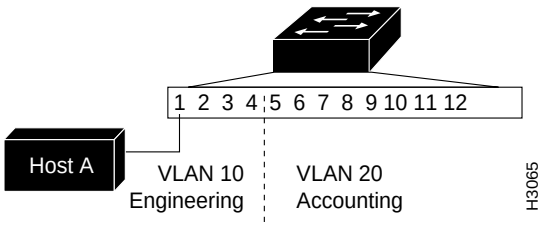


Figure 47 Sample show vlan Command Display

```
Console> (enable) show vlan
VLAN Name                             Status    Mod/Ports
---- -------------------------------- --------- ----------------------------
1    default                          active    1/1-2
                                                2/1-24
2    VLAN0002                         active
3    VLAN0003                         active
5    VLAN0005                         active
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
3    enet  100003     1500  -      -      -        -    0      0
5    enet  100005     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)
```

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 48 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*]

Task	Command
Verify that the trunk configuration is correct. Figure 49 shows a sample display of the **show trunk** command.	**show trunk**

Figure 48 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 49 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)
```

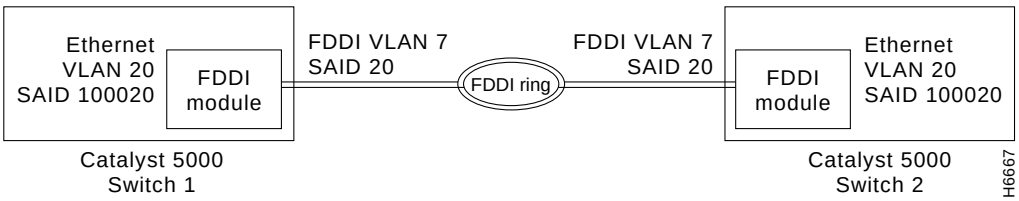
Setting Up an FDDI 802.10 Configuration

The FDDI module is basically an FDDI-Ethernet translation bridge. It translates packets on the external FDDI ring into Ethernet packets within the Catalyst 5000. That is, inside the Catalyst 5000 Ethernet VLAN packets are translated into FDDI VLAN packets and encoded in 802.10 format with a SAID value before they are transmitted across an external FDDI trunk to another Catalyst 5000. The Catalyst 5000 that receives the packets from the trunk decodes the 802.10 format using the SAID value and internally translates the FDDI VLAN packets into Ethernet VLAN packets. Each Ethernet VLAN requires a unique FDDI VLAN translation.

For example, to connect Ethernet VLAN 20 in switch 1 to Ethernet VLAN 20 in switch 2, as shown in Figure 50, you would use a VTP server to set up the configuration as follows:

- FDDI VLAN 7 with a SAID value of 20
- Ethernet VLAN 20 with a translation to FDDI VLAN 7
- Switch 1 and 2 to allow Ethernet VLAN 20 on the FDDI trunk

Figure 50 FDDI 802.10 Configuration Example



The Catalyst 1200 series switch is hardcoded with a specific VLAN-to-SAID configuration. Therefore, if you are connecting a Catalyst 5000 Ethernet VLAN to a Catalyst 1200 Ethernet VLAN, the SAID value of the FDDI VLAN must be the same value as the Ethernet VLAN. For example, if a Catalyst 1200 Ethernet VLAN value is 20, the translation FDDI VLAN SAID value must be 20.

Before setting up an FDDI 802.10 VLAN configuration, refer to the section“Set Virtual LANs” to set up a VTP domain. After completing these tasks, perform the following steps in privileged mode to set up the FDDI 802.10 VLAN configuration:

Task	Command
Provide a VLAN number and activate a VLAN in the management domain. Refer to Figure 51 for an example. This creates a VLAN but does not assign it to a port. VTP advertises the VLAN to all available trunks of all types (such as Ethernet or FDDI) that are set to **on**, for all Catalyst 5000s in the same management domain.	set vlan *vlan_num*
Assign the VLAN to an FDDI port. Provide the VLAN number, module number, and port number. Additionally use this commend to set up the native FDDI VLAN. Refer to Figure 52 for an example.	**set vlan** *vlan_num mod_num/port_num*
Create a VLAN with type FDDI. See Figure 53 for an example.	**set vlan *vlan_num* type fddi**
Map the Ethernet VLAN translation to an FDDI VLAN. Refer to Figure 54 for an example.	**set vlan *ether_vlan_num* translation *fddi_vlan_num*** **set vlan *fddi_vlan_num* translation *ether_vlan_num***
Turn trunking on for the FDDI port. (See Figure 55.)	**set trunk *mod_num*** /*port_num* **on**
Verify that the VLAN configuration is correct, including the mapping between Ethernet, FDDI, and token ring. If you use the **show trunk** command after a 30 second delay, you will see a display of the new VLAN that have been added to all Catalyst 5000 series switches. Figure 56 shows a sample display of the **show vlan** command.	show vlan [trunk | no trunk] show trunk

Note The native VLAN overrides any "trunking-allowed" VLANs. For example, if the VLAN range allowed for trunking is 1-1000 and the **native** VLAN is 1, then VLAN 1 is not 802.10-encapsulated on the FDDI link.

The following examples add a new Ethernet and FDDI VLAN to the existing configuration.

Figure 51 set vlan Command Example to Create a VLAN

```
Console> (enable) set vlan 33
VTP: vlan addition successful
Console> (enable)
```

Figure 52 set vlan Command Example to Assign a VLAN to an Ethernet Port

```
Console> (enable) set vlan 33 2/13
VLAN 33 modified.
VLAN 1 modified.
VLAN  Mod/Ports
---- ----------------------
33    1/2
      2/13
      4/1-2
Console> (enable)
```

Figure 53 set vlan Command Example to Create an FDDI VLAN

```
Console> (enable) set vlan 333 type fddi
VTP: vlan addition successful
Console> (enable)
```

Figure 54 set vlan Command Example to Translate an Ethernet VLAN to an FDDI VLAN

```
Console> (enable) set vlan 33 translation 333
VTP: vlan modification successful
Console> (enable)
```

Figure 55 set trunk Command Example

```
Console> (enable) set trunk 1/1 on
Port 1/1 mode set to on.
Console> (enable)
```

Figure 56 show vlan Command Example

```
Console> (enable) show vlan
VLAN Name                        Type  Status    Mod/Ports
---- --------------------------- ----- --------- ----------------
1    default                     enet  active    1/1
                                                 2/3-4,2/7-12,2/14-16,2/18-24
11   VLAN0011                    enet  active    2/1-2
22   VLAN0022                    enet  active    2/5-6
33   VLAN0033                    enet  active    2/13,2/17
111  VLAN0111                    fddi  active
222  VLAN0222                    fddi  active
333  VLAN0333                    fddi  active
1002 fddi-default                fddi  active
1003 token-ring-default          tring active
1004 fddinet-default             fdnet active
1005 trnet-default               trnet active


VLAN SAID       MTU   RingNo BridgeNo StpNo Parent Trans1 Trans2
---- ---------- ----- ------ -------- ----- ------ ------ ------
1    100001     1500  0      0        0     0      0      0
11   100011     1500  0      0        0     0      111    0
22   100022     1500  0      0        0     0      222    0
33   100033     1500  0      0        0     0      333    0
111  100111     1500  0      0        0     0      11     0
222  100222     1500  0      0        0     0      22     0
333  33         1500  0      0        0     0      33     0
1002 101002     1500  0      0        0     0      0      0
1003 101003     1500  0      0        0     0      0      0
1004 101004     1500  0      0        0     0      0      0
1005 101005     1500  0      0        0     0      0      0
CAT4> (debug-eng)
Console> (enable)
```

Checking the Configuration

This section describes procedures to use to confirm that your Ethernet (10BaseT 24 port) module 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 2,000 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, 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> (enable)
```

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-C5101   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 system 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 floater         172.20.25.130
set ip alias brooks          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  Fred Flintstone
set port name      1/2
!
#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  FDDI 100BaseFX       connected  1          normal   half   100  100BaseFX
2/2  10BaseFL 12 Port     connected  1          normal   half   auto 10BaseFL
2/3  10BaseFL 12 Port     connected  1          normal   half   auto 10BaseFL
2/4  10BaseFL 12 Port     connected  1          normal   half   auto 10BaseFL
2/5  10BaseFL 12 Port     connected  1          normal   half   auto 10BaseFL
.
.
.
4/45                      notconnect 1          normal   half    10  10BaseT
4/46                      notconnect 1          normal   half    10  10BaseT
4/47                      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
.
.
.
2/18          0          0          0          0
2/19          0          0          0          0
2/20          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
4/5           0          0          0          0          0          0        0
4/6           0          0          0          0          0          0        0
.
.
.
4/43          0          0          0          0          0          0        0
4/44          0          0          0          0          0          0        0
4/45          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
4/4           0          0          0          0          0         0         0
.
.
.
4/42          0          0          0          0          0         0         0
4/43          0          0          0          0          0         0         0
4/44          0          0          0          0          0         0         0
4/45          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.

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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.