C H A P T E R   1

Overview

The FastHub 100+ Series includes two stackable, manageable, 100-Mbps Class II repeaters:

- FastHub 116T+: 16 100BaseTX ports (with alternative uplink port)

- FastHub 116C+: 15 100BaseTX ports and one 100BaseFX port

A 16-port expansion module can be added to expand each FastHub unit to 32 100BaseT ports. Up to 4 FastHub units can be interconnected through a proprietary expansion cable to form a hub stack with a maximum of 128 ports. The four-unit hub stack operates as a single logical repeater with one network management module (NMM) per hub stack. Two hub stacks can be connected through the 100BaseT ports to support up to 254 ports in a single collision domain.

Cisco documentation and additional literature are available on a CD-ROM called Cisco Connection Documentation, Enterprise Series, which ships with your chassis. The CD is updated and shipped monthly, so it might be more up to date than printed documentation. To order additional copies of the Cisco Connection Documentation, Enterprise Series CD, contact your local sales representative or call Customer Service. The CD is available both as a single CD and as an annual subscription. You can also access Cisco technical documentation on the World Wide Web URL http://www.cisco.com.

Feature Summary

Table 1-1 summarizes FastHub features.

Table 1-1   **Feature Summary**

Feature	Description
Compatibility	• IEEE 802.3u Class II repeater compliant. • Compatible with the 100BaseT (100BaseTX, 100BaseFX) standard for interoperability with other 100BaseT products.
Performance	• 100-Mbps peak and aggregate throughput. • 10 times the performance of a 10BaseT hub.
Stackability	• Base unit slot supports a 16-port 100BaseTX module for a total of 32 managed ports within a single unit. • Up to 128 ports in a 4-unit hub stack, which functions as one logical repeater. • Up to 254 ports in a 2-hub stack configuration creates a single collision domain. • Adding or removing modules in a hub stack does not disrupt network activity.
Manageability	• A single NMM for port configuration and status. • The NMM supports Simple Network Management Protocol (SNMP), Telnet, terminal-based out-of-band management, and Remote Monitoring (RMON) for management and troubleshooting. • Manageable by CiscoWorks and other SNMP-compatible management systems on a per port, per unit, and per hub stack basis. • Each port has a multifunction LED that shows link integrity, receive activity, and port enabled or disabled status. Bandwidth utilization for the entire hub stack is also shown through the port LEDs. • A group collision LED shows collisions for the entire hub stack. • A group activity LED gauges network load.

Feature	Description
Redundancy	• In a hub stack with more than one NMM, failure of the primary NMM results in an automatic transfer to the secondary module.
	• Supports connection to the optional Cisco redundant power supply (RPS).

Base Units

This section provides physical and functional descriptions of the two FastHub 100+ Series repeaters.

Port Connections

The FastHub 116T+ base unit (see Figure 1-1) provides 16 100Base-TX ports for connecting to devices using Category 5 unshielded twisted-pair (UTP) cabling. The uplink port (port 16 to the right of port 16x) is not internally crossed, providing a means of cascading hubs using standard straight-through cables.

All 100BaseTX ports use RJ-45 twisted-pair connectors.

Caution   Do not connect to *both* the uplink port (port 16) and port 16x; this disables both ports.

The FastHub 116C+ base unit (see Figure 1-2) provides 15 100BaseTX ports and 1 100BaseFX port. The 100BaseFX port provides for connecting to a device using two-strand, multimode fiber-optic cabling.

The 100BaseFX port uses an SC connector.
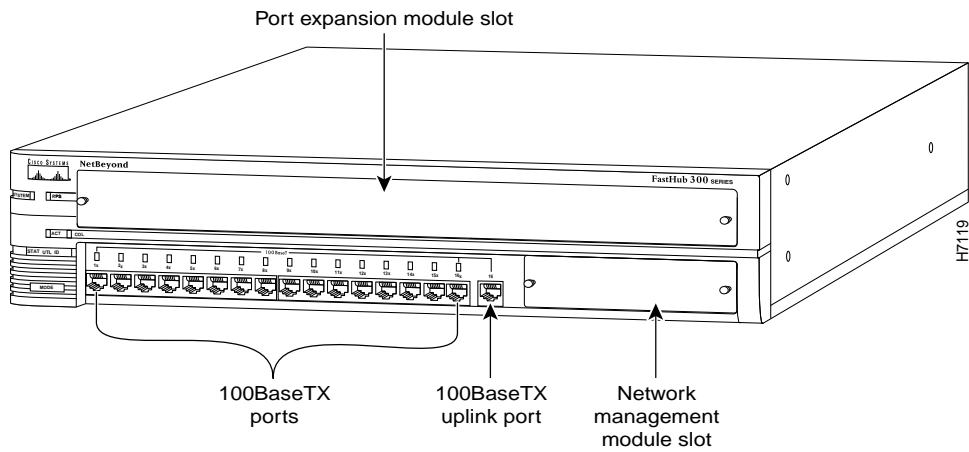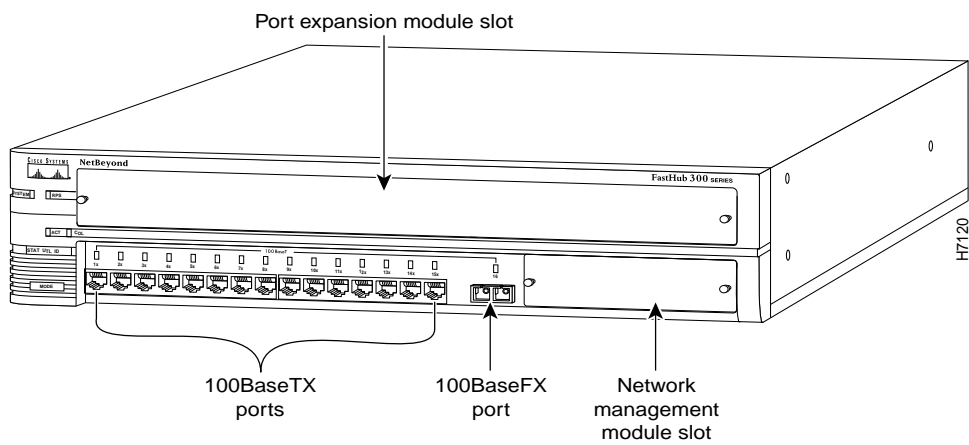
Figure 1-1   FastHub 116T+ Base Unit

Port expansion module slot

100BaseTX
ports

100BaseTX
uplink port

Network
management
module slot

Figure 1-2   FastHub 116C+ Base Unit

Port expansion module slot

100BaseTX
ports

100BaseFX
port

Network
management
module slot

Understanding the Front Panel LEDs

The FastHub LEDs enable you to monitor network activity and performance. Figure 1-3 shows the location of the LEDs (for simplicity, only the FastHub 116T+ base unit is shown; both base-unit LED locations and functions are identical).

Figure 1-3   FastHub LEDs
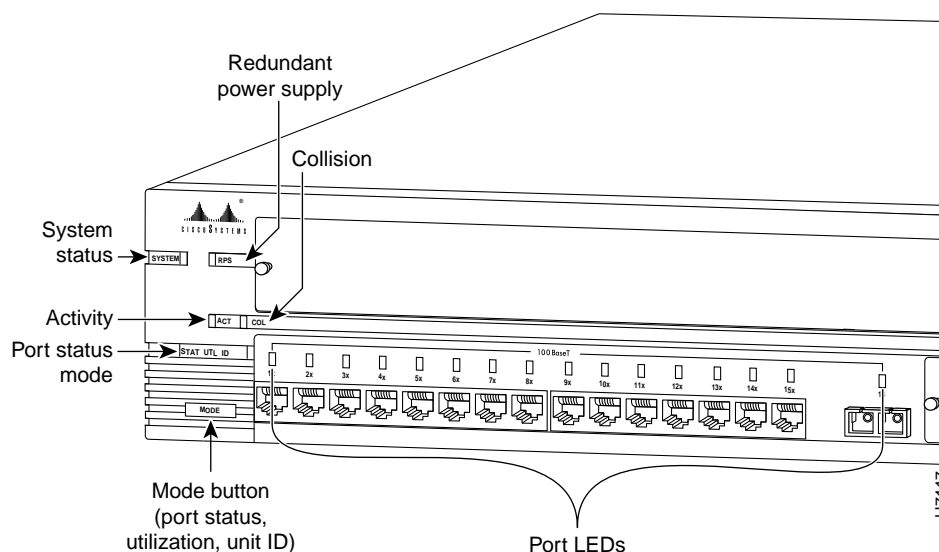
System Status LED

The system status LED (see Table 1-2) shows whether a unit is powered and provides an indication of a problem with a unit's main system board.

Note   The system status LED and RPS LED are used together to isolate internal power supply or RPS problems. See the "Troubleshooting" chapter for detailed information.

Table 1-2   **System Status LED Description**

Color	System Status
Off	Unit powered off.
Solid green	Unit powered and operational; no power problems.
Solid amber	Unit powered but not operational; problem related to FastHub main system board (not the internal power supply or RPS).

Group Collision LED

The group collision LED (see Table 1-3) shows the frequency of collisions for all ports on a unit, including port expansion module ports. The LED flashes if one or more ports on the unit are involved in a collision.

In a hub stack, the group collision LEDs on individual units show the frequency of collisions across the entire collision domain. For example, if a port on unit 1 and a port on unit 2 both have collisions, the group collision LEDs on both units flash.

Note   The flash rate of the group collision LED increases with an increase in collisions; a high number of collisions causes the LED to appear solid amber.

Table 1-3   **Group Collision LED Description**

Color	System Status
Off	No collision
Flashing amber	Collision
Solid amber	High number of collisions

Group Activity LED

The group activity LED (see Table 1-4) shows network activity for all ports on a unit.

Table 1-4   **Group Activity LED Description**

Color	System Status
Off	No activity
Flashing green	Activity

RPS LED

The RPS LED (see Table 1-5) shows the status of the RPS.

Table 1-5   **RPS LED Description**

Color	RPS Status
Off	RPS off or not installed.
Solid green	RPS operational.
Flashing green	RPS and FastHub power supplies are *both* powered on. Only one power source can be supplying power to a unit. If you are using the RPS, the FastHub power cord must not be plugged in. If you are using the FastHub power supply, the RPS can be connected but must be powered off.
Solid amber	RPS not operational.

NMM Status LED

The NMM LED (see Table 1-6), located on the NMM front panel, shows the status of the NMM module.

Table 1-6   **NMM Status LED Description**

Color	NMM Status
Off	FastHub not powered or NMM not properly seated.
Flashing green	NMM power-on self-test (POST) in progress.
Solid green	Primary NMM operational (enabled).
Solid amber	Secondary NMM operational (in standby).
Flashing amber	NMM failed POST.

Port LEDs

Each FastHub port has an LED that operates in three modes:

- STAT (port status)
- UTL (bandwidth utilization)
- ID (unit ID)

Note   Port 16 (the uplink port) uses the port 16x LED.

Changing the Mode of the Port LEDs

To change the mode being displayed by a port LED, press the Mode button to highlight in sequence each of the modes: STAT, UTL, and ID. When the desired mode is on, release the button to make the change. As long as you hold the Mode button down, the on mode does not change.

The selected mode remains on for 30 seconds before returning to the default mode of STAT (port status).

Note   On a port expansion module, port LEDs do not indicate system bandwidth utilization (UTL) or unit ID (ID).

STAT Mode

In STAT mode, port LEDs show individual port status (see Table 1-7).

Table 1-7   Port Status LED Description

Color	Port Status
Off	No link (link down).
Green	Link operational (with no activity).
Flashing green	Link operational (with activity).
Rapidly alternating green/amber	Faulty link[1].
Alternating green/amber	FastHub reset in progress.
Solid amber	Port disabled (through in-band or out-of-band management).

1. This indication remains until the link fault is corrected. Possible causes are autopartition, jabber, and isolated (carrier integrity error). Note that this state should not be confused with the "no link status" (link down) indication where the link is not operational.

UTL Mode

Invoke the utilization mode by pressing the Mode button and releasing it when UTL is highlighted. In utilization mode, bandwidth usage is shown for the entire hub stack. The port LEDs show current bandwidth and the peak bandwidth usage that occurred since the last reset.

The far-right solid green LED denotes the peak bandwidth that was recorded since the last reset.

All LEDs to the left of the solid green LED operate in a scalable pattern, flashing green from left to right, to show the current bandwidth utilization. Table 1-8 lists the port LEDs and the bandwidth associated with each LED.

Table 1-8   **Utilization LEDs Scale**

LED	Mbps Activity
Port 1	0 to 6.25
Port 2	12.5
Port 3	18.75
Port 4	25
Port 5	31.25
Port 6	37.5
Port 7	43.75
Port 8	50
Port 9	56.25
Port 10	62.50
Port 11	58.75
Port 12	75
Port 13	81.25
Port 14	87.5
Port 15	93.75
Port 16	100

ID Mode

Invoke the ID mode by pressing the Mode button and releasing it when ID is highlighted. In ID mode, port LEDs show the ID number of each unit within the hub stack. For example, the FastHub with unit ID 3 has its port 3 LED on (green); all other port LEDs on unit 3 are off. The unit numbers coincide with the unit numbers displayed in the NMM management console screens.

Rear Panel Connections

Figure 1-4 shows the location of the rear panel connectors.

Figure 1-4   FastHub Rear Panel Connectors
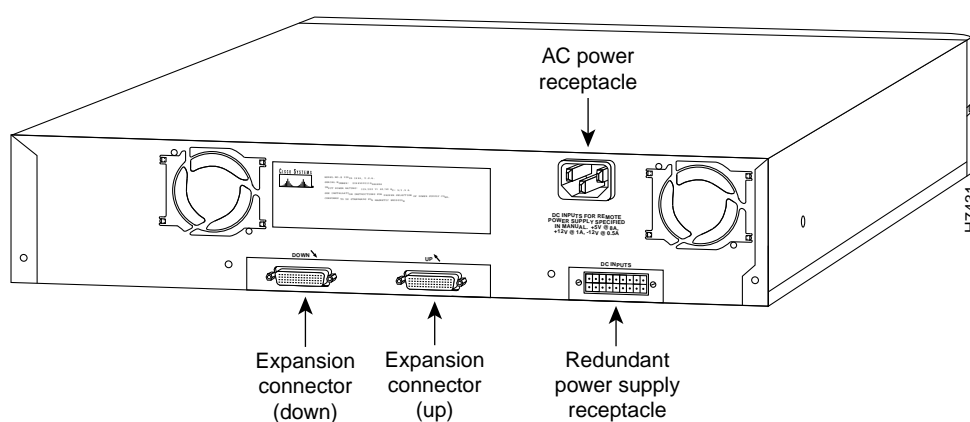
- Expansion connectors

  The FastHub can be *interconnected* to another FastHub through the rear panel expansion connectors using an expansion cable. Interconnecting up to four units in a hub stack creates a 128-port logical repeater.

  See the "Building a Hub Stack" section in the "Installing the FastHub" chapter for more details.

- AC power receptacle

  The power supply is an autoranging unit supporting input voltages between 110 to 230 VAC.

- Redundant power supply receptacle

  See the Cisco RPS documentation for detailed information on connecting to the RPS.

Port Expansion Module

The FastHub has a slot for an optional 100BaseTX/16 port expansion module. This hot-insertable module (see Figure 1-5) provides an additional 16 100BaseTX ports, creating a 32-port repeater within a single unit.

Figure 1-5   100BaseTX/16 Port Expansion Module
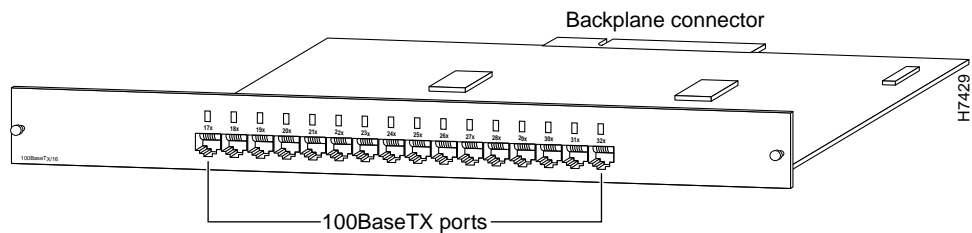
Note   Hot-insertable modules can be added to the base unit without powering down or adversely affecting network performance.

Network Management Module

The FastHub has a second, smaller slot in the bottom-right corner of the unit for an optional NMM. This hot-insertable module (see Figure 1-6) provides manageability for a hub stack on a per port, per unit, and per hub-stack basis. A single NMM can reside in any unit in the hub stack and manage all units in the hub stack.

Figure 1-6 shows the location of NMM front-panel components.

- Reset button

  The reset button is used to initiate a hub or hub stack reset. The reset button is recessed within the front panel to prevent an accidental reset. Use a small screwdriver or other pointed object to press the reset button.
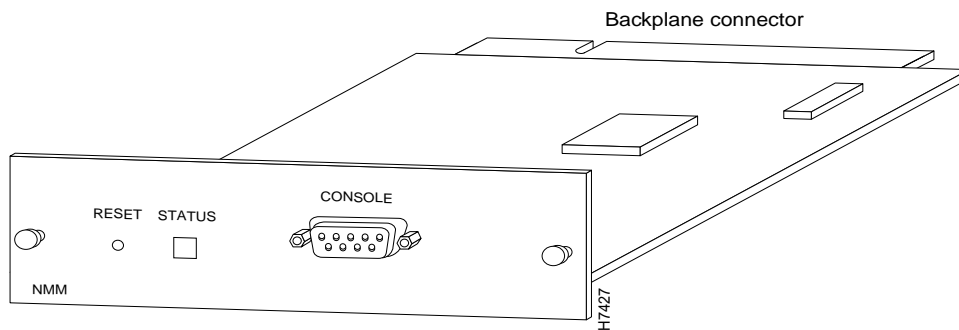
- Status LED

  The status LED shows NMM status as described in the "Understanding the Front Panel LEDs" section in this chapter.

- Console port

  The console port is used to connect to a terminal or modem providing access to NMM network management.

Figure 1-6   Network Management Module

For management redundancy, install a second NMM in the same hub stack. One module serves as the primary NMM, and the other operates in a standby role.

The NMM provides support for Simple Network Management Protocol (SNMP), Telnet, terminal-based out-of-band management, and Remote Monitoring (RMON).

See the "Out-of-Band Management" chapter for detailed information on using the NMM management console.

FastHub Applications

This section describes several possible network configurations.

Workgroups

You can create 100-Mbps workgroups by interconnecting up to 4 FastHubs. The network can be further scaled by connecting two FastHub stacks together, as shown in Figure 1-7.

Figure 1-7   Example Configuration: Workgroups
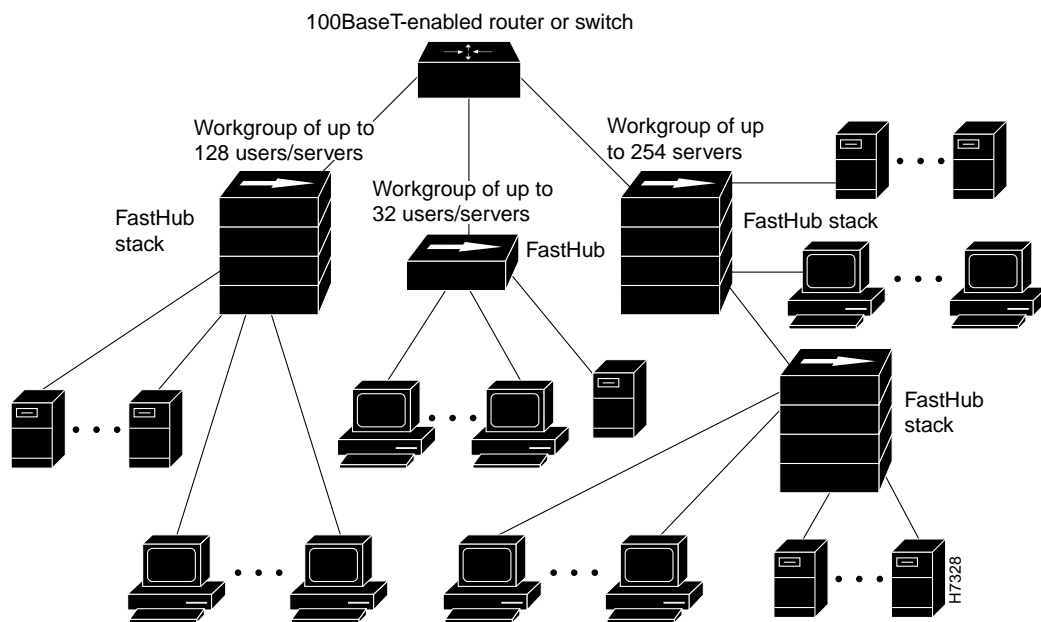
Server Farms

You can create 100-Mbps server farms to increase centralized and decentralized server performance, as shown in Figure 1-8.

Figure 1-8   Example Configuration: Server Farms