

D-Link[®]

DFE-916x DFE-916 Ethernet/Fast Ethernet Dual-Speed Stackable Hubs User's Guide

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RECYCLABLE

Wichtige Sicherheitshinweise

1. Bitte lesen Sie sich diese Hinweise sorgfältig durch.
2. Heben Sie diese Anleitung für den spätern Gebrauch auf.
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<u>Product Type</u>	<u>Warranty Period</u>
Network adapters	Lifetime
Unmanaged and managed hubs (10Mbps)	Lifetime *
Unmanaged hubs (100Mbps)	Lifetime *
Managed hubs (100Mbps)	One year
Unmanaged and managed dual-speed hubs (10Mbps / 100Mbps)	One year
Repeaters, MAUs , transceivers, media converters	One year
Concentrators	One year
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ABOUT THIS GUIDE

This guide discusses how to install and use the D-Link DFE-916 series dual-speed stackable Ethernet/Fast Ethernet hubs.

Conventions

As used in this manual, the expression "DFE-916 series" includes both the DFE-916 and the DFE-916x. Unless a specific model number is given, the term "hub" (or "hubs") refers to any unit (or units) in this series.

Most of the information in this manual applies to all DFE-916 and DFE-916x units. Where a description applies to one model only, the specific model number will be given.

Overview of the User's Guide

- ◆ Chapter 1, *Introduction*. Provides information on Fast Ethernet networks, and introduces the features of the DFE-916 series hubs.
- ◆ Chapter 2, *Unpacking and Setup*. Helps you get started in setting up the hub.
- ◆ Chapter 3, *Understanding Indicators*. Describes all LED indicators on the hub's front panel. Understanding these indicators is essential to effectively using the hub.

- ◆ Chapter 4, *Making Connections*. Provides information on connecting to the hub's twisted-pair and console ports, stacking hubs, and linking with other hubs.
- ◆ Appendix A, *Cables and Connectors*. Provides specifications on the cables and connectors used with the hubs.
- ◆ Appendix B, *Specifications*. Lists the hubs' specifications.

1

INTRODUCTION

This chapter introduces DFE-916 series dual-speed stackable hubs, as well as giving some background information about the technology the hubs use.

Product Description

D-Link DFE-916 series dual-speed stackable Ethernet/Fast Ethernet hubs are designed to allow easy migration and integration between 10Mbps Ethernet and 100Mbps Fast Ethernet, while providing manageability and flexibility in cable connections.

Each hub can operate with both IEEE 802.3 10BASE-T connections (twisted-pair Ethernet operating at 10 megabits per second) and IEEE 802.3u 100BASE-TX connections (twisted-pair Fast Ethernet operating at 100 megabits per second). All of the twisted-pair ports support NWay auto-negotiation, allowing the hub to automatically detect the speed of a network connection. This means you can connect all of your Ethernet and Fast Ethernet hosts to a DFE-916 series hub stack, without any rewiring required when a host is upgraded from 10Mbps to 100Mbps.

DFE-916 series hubs have 16 ports each and can be stacked together to a maximum of five hubs in a stack. A stack of five 16-port hubs gives a total of 80 Ethernet or Fast Ethernet ports. A DFE-916 series hub stack operates as a Class II Fast Ethernet repeater, allowing it to be linked to another Class II Fast Ethernet stack in the same collision domain.

In the basic configuration, 10Mbps and 100Mbps segments are separate and do not intercommunicate. An optional DFE-260S switching module (included with the DFE-916x) can be installed in any hub in the stack, making it possible to transparently bridge between 10Mbps and 100Mbps segments. In a managed hub stack, more than one DFE-260S module can be used to provide automatic redundancy.

Other add-in modules are also available, providing switched 100BASE-TX or switched 100BASE-FX connections. DFE-916x and DFE-916 hubs have one slot each for accepting slide-in modules.

Product Features

The list below highlights the features and specifications of DFE-916 series hubs:

- ◆ Compatible with the IEEE 802.3 10BASE-T Ethernet and 802.3u 100BASE-TX Fast Ethernet industry standards for interoperability with other Ethernet/Fast Ethernet network devices.
- ◆ Ethernet connections support Category 3 or better twisted-pair cables.
- ◆ Fast Ethernet connections support both shielded twisted pair and Category 5 unshielded twisted-pair cables.
- ◆ Fast Ethernet connections support a maximum distance of 100 meters from end-station to hub, and a total network diameter of 205 meters.
- ◆ Sixteen NWay ports per hub for connecting stations to the network.
- ◆ An optional slide-in switching module allows bridging between 10Mbps and 100Mbps segments. Only one switching module is needed per stack, but managed hub stacks can make use of additional switching modules for redundancy.

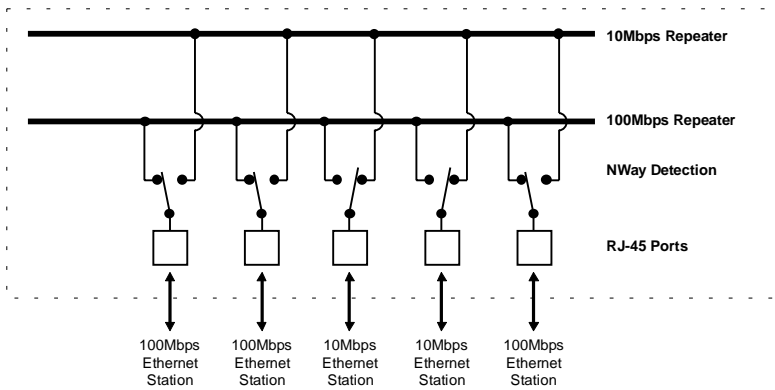
- ◆ A stack can contain various DFE-916 series models and DFE-2624 and DFE-2616 series models. For SNMP management, DFE-916 and DFE-916x units can be managed through a DFE-2616i/DFE-2616ix or DFE-2624i/DFE-2624ix master hub.
- ◆ LED indicators for power, collisions, link, network activity, partitioning status, disable, operating speed (10 or 100Mbps) and network utilization.
- ◆ Digital hub ID number front panel display.
- ◆ Auto-partitioning for network protection.
- ◆ Data collision detection and handling.
- ◆ Preamble regeneration, signal retiming.
- ◆ Two proprietary daisy-chain ports for cascading up to five hubs to form one logical hub; management capability is provided via a master hub.
- ◆ Uplink port allows easy linking of two hub stacks to further expand your network.
- ◆ Optional brackets for mounting in standard 19-inch equipment rack.
- ◆ Internal universal power supply and automatic voltage selection (100V to 240V, 50 or 60HZ).
- ◆ Optional slide-in modules: 100BASE-TX, 100BASE-FX (see Chapter 4 , *Making Connections*).

Dual-Speed Ethernet Hub Technology Overview

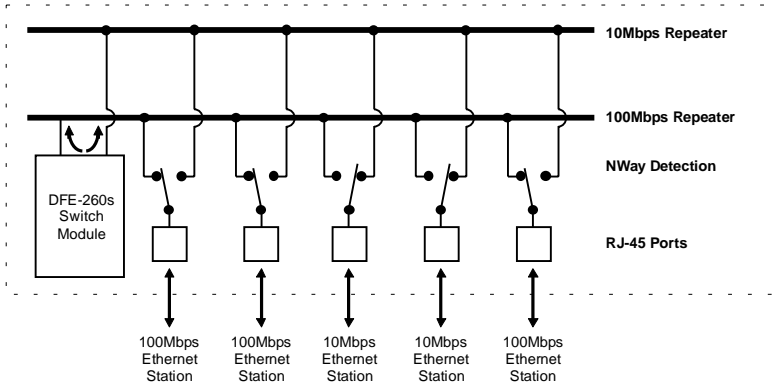
Dual-speed Ethernet hubs have been developed to make it simpler to plan networks containing both 10Mbps Ethernet and 100Mbps Fast Ethernet

technologies, especially when network hosts are being gradually migrated to new Fast Ethernet connections.

A dual-speed hub is actually two repeaters in one enclosure. The 10Mbps repeater receives Ethernet transmissions from any of its ports, and retransmits them to all other ports operating at 10Mbps. Similarly, the 100Mbps repeater retransmits Fast Ethernet transmissions from ports operating at 100Mbps to all other ports operating at the same speed.



If there is a DFE-260S module, or a DFE-916x hub present in the stack, the switching module will serve as a bridge between the two independent repeaters.



100BASE-TX Technology Overview

100Mbps Fast Ethernet Introduction

Computers today have become increasingly powerful, with the capability to accommodate very sophisticated uses such as multimedia applications, video-conferencing, and CAD/CAM. To utilize these technologically advanced applications more efficiently, there is also a growing demand for faster networks that can handle heavy network traffic.

Recognizing this need for greater bandwidth and lower latency, a variety of technologies such as FDDI, ATM, and Fast Ethernet (100Mbps) have been adopted by many vendors. Fast Ethernet technology stands out as the most inexpensive and smoothest migration path for existing 10Mbps Ethernet users in part because it doesn't require a protocol translation when sharing data with 10Mbps Ethernet.

Fast Ethernet is a relatively new standard specified by the IEEE 802.3 LAN committee. It is an extension of the 10Mbps Ethernet standard with the ability to transmit and receive data at 100Mbps, while maintaining the

CSMA/CD Ethernet protocol. Since Fast Ethernet is compatible with all 10Mbps Ethernet environments, it provides a straightforward upgrade without wasting the company's existing investment in hardware, software, and trained personnel.

Cables and Connectors

Category 5 unshielded twisted-pair (UTP) cables and shielded twisted-pair (STP) cables are both supported. Category 5 UTP cables use the same RJ-45 connector used with 10BASE-T, wired in the same configuration.

Topology

A Fast Ethernet workgroup is configured in a star topology and is built around a maximum of two repeaters. Each workgroup forms a separate LAN (also known as a collision domain), and these workgroups can be easily interconnected through switches, bridges, or routers to form one LAN large enough to encompass a high-rise building or campus environment. Recent innovations in LAN hub technology such as stackable hubs, coupled with the decreasing cost of switches, bridges, and routers, allow the design of low-cost, efficient Fast Ethernet workgroups and enterprise LANs.

The following factors strongly influence the architecture of Fast Ethernet networks:

- The EIA/TIA 568 Wiring Standard imposes a 100 meter limit on horizontal runs of twisted-pair cables; that is, connections from the wiring closet to the end-station.
- Fast Ethernet's increased operational speed reduces the maximum distance between all elements of the LAN (see below).

Network Diameter

Network diameter, which is the distance between two end-stations in the same collision domain, is the primary difference between traditional Ethernet and Fast Ethernet. Due to the increased speed in Fast Ethernet and adherence to the EIA/TIA 568 wiring rules, the network diameter of a Fast Ethernet collision domain is limited to 205 meters; in contrast, the maximum 10BASE-T Ethernet collision domain diameter can be up to 500 meters.

Hub Types

Unlike 10BASE-T hubs, which are all functionally identical, Fast Ethernet hubs are divided into two distinct types: Class I and Class II. A Class I hub repeats all incoming signals on one port to the other ports by first translating them to digital signals and then retranslating them back to line signals. These translations are necessary when connecting various network media to the same collision domain, such as when combining two-wire-pair 100BASE-TX media with four-wire-pair 100BASE-T4 media. Only one Class I hub can exist within a collision domain; thus, this type of hub cannot be directly interlinked. A Class II repeater, on the other hand, immediately repeats all incoming line signals on one port to the other ports; no translations are performed. This type of hub connects identical media within the same collision domain; for example, TX to TX. At most, two Class II hubs can exist within the same collision domain.

As mentioned earlier, stackable Class II hubs can be used to increase the number of available nodes in a collision domain. An entire hub stack counts as a single repeater. DFE-916 series hubs are Class II devices.

2

UNPACKING AND SETUP

This chapter provides information on the unpacking and initial installation of your hub stack.

Unpacking

Open the shipping carton of your hub and carefully unpack the contents. The carton should contain the following items:

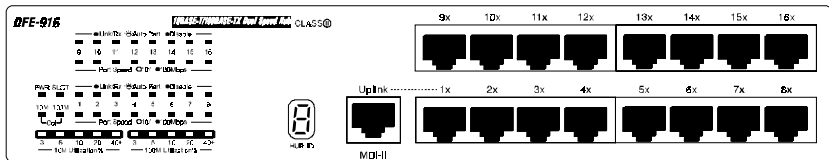
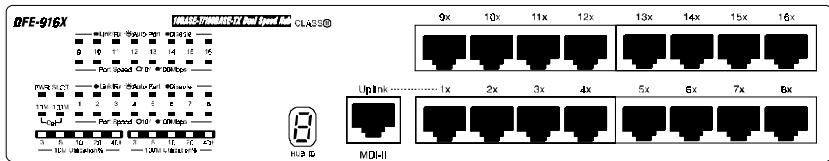
- ◆ One dual-speed stackable hub
- ◆ One AC power cord, suitable for your area's electrical power connections
- ◆ One daisy-chain cable
- ◆ Four rubber feet to be used for cushioning
- ◆ This *User's Guide*

Inspect the hub and all accompanying items. If any item is damaged or missing, report the problem immediately to your D-Link dealer.

Identifying External Components

This section identifies all the major external components of the hub. Both the front and rear panels are shown, followed by a description of each panel feature. The indicator panel is described in detail in the next chapter.

Front Panel



◆ LED Indicator Panel

Refer to the next chapter, *Understanding Indicators*, for detailed information about each of the hub's LED indicators.

◆ Twisted-Pair Ports

Use any of these ports to connect stations to the hub. The ports are MDI-X ports, which means you can use ordinary straight-through twisted-pair cables to connect the hub to PCs, workstations, or servers through these ports. If you need to connect another device with MDI-X ports, such as another hub or an Ethernet switch, you should use a crossover cable, or connect using the Uplink port (described below).

For more information about crossover connection, see the section entitled *Crossover Cables* section on page 30.

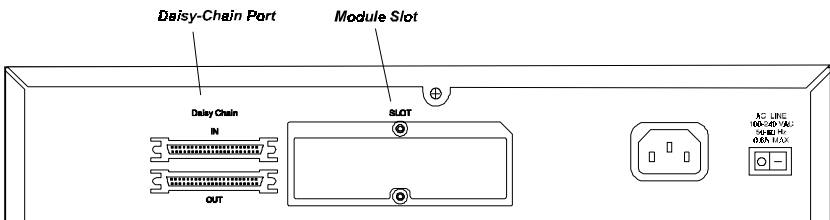
◆ Uplink Port

The Uplink port is an MDI-II port, which means you can connect the hub (or hub stack) to another device with MDI-X ports using an ordinary straight-through cable, making a crossover cable unnecessary.

Port 1 and the Uplink port are really the same port, except that their pinouts are different. **Do not use both Port 1 and the Uplink port at the same time.**

Rear Panel

Rear Panel



◆ Module Slots

Used to install module options for various kinds of additional connections, as well as the DFE-260S 10Mbps/100Mbps bridge module. (In the DFE-916x, the module slot is already occupied by the switching module which is standard on these models.)

◆ Daisy-Chain IN Port

When cascading a set of D-Link's stackable dual-speed hubs, this port should be connected to the Daisy-Chain OUT port of the previous hub in the stack (usually placed immediately above it). A cascade of five

hubs can be created in this way. The first and last hubs in the stack use only one of the daisy-chain ports, while the others use both.

◆ **Daisy-Chain OUT Port**

Works in conjunction with the Daisy-Chain IN Port (see above). Connect this port to the Daisy-Chain IN Port of the next hub in the stack (usually placed immediately below it), using the enclosed daisy-chain cable.

◆ **Fan**

Provides air circulation and heat dissipation.

◆ **AC Power Connector**

For the power cord.

Installing the Hub

Installation

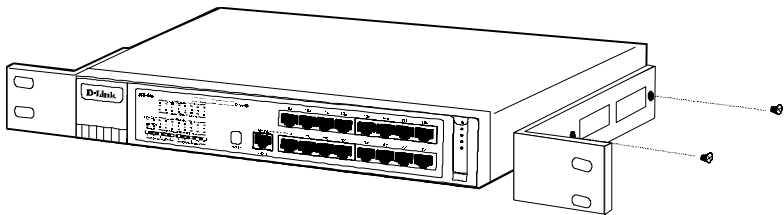
The site where you install the hub stack may greatly affect its performance. When installing, consider the following pointers:

- ◆ Install the hub stack in a fairly cool and dry place. See Appendix B, *Specifications*, for the acceptable temperature and humidity operating ranges.
- ◆ Install the hub stack in a site free from strong electromagnetic field generators (such as motors), vibration, dust, and direct exposure to sunlight.

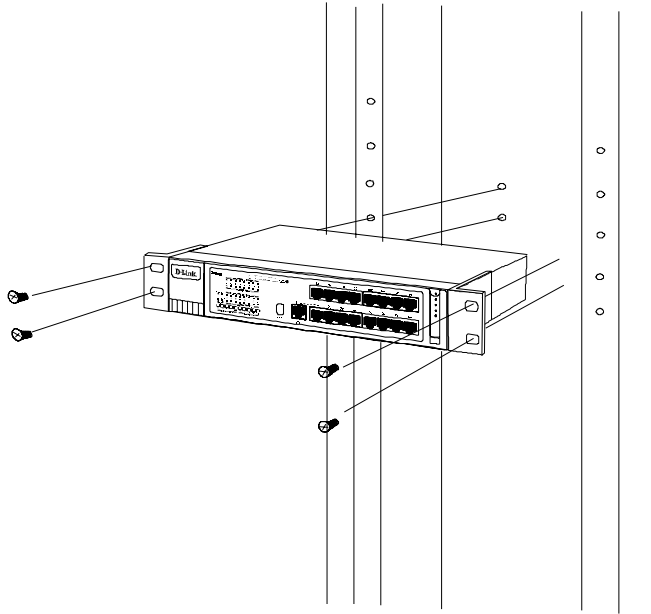
- ◆ Leave at least 10cm of space at the front and rear of the hub for ventilation.
- ◆ Install the hub on a sturdy, level surface that can support its weight. When installing the hub stack on a level surface, attach the rubber feet to the bottom of each device. The rubber feet cushion the hub and protect the hub case from scratches.

Rack Mounting

The hub can be mounted in an EIA standard-size, 19-inch rack, which can be placed in a wiring closet with other equipment. For information about D-Link's DFE-700B Rack Mounting Brackets, consult your D-Link dealer. If you already possess the brackets, attach the mounting brackets at the hub's front panel (one on each side), and secure them with the provided screws.



Then, use screws provided with the equipment rack to mount each hub in the rack.



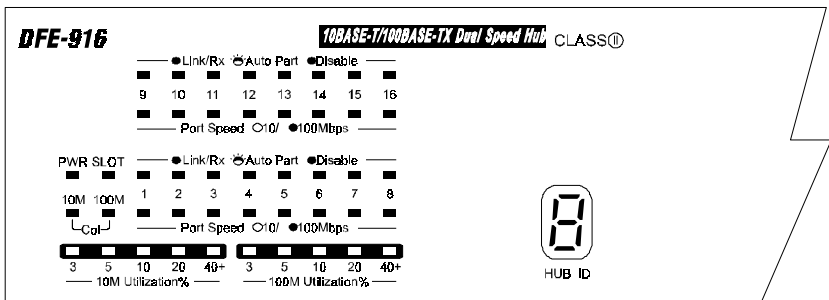
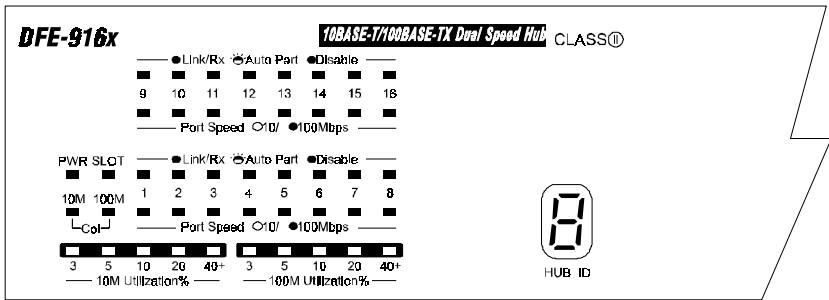
Connecting the Power Supply

Power is supplied to the stackable Fast Ethernet hub through an AC power cord. The AC power input voltage ranges from 100 to 240 VAC. A power cord is included with the device.

3

UNDERSTANDING INDICATORS

Before connecting network devices to the hub, take a few minutes to look over this section and familiarize yourself with the front panel LED indicators of your dual-speed hub, depicted below.



Hub State Indicators

◆ Power Indicator

This indicator lights green when the hub is receiving power; otherwise, it is off.

◆ Collision Indicators (COL10M and COL100M)

These indicators indicate data collisions on the respective 10Mbps Ethernet or 100Mbps Fast Ethernet segments of the hub. (If several hubs are stacked or linked together, all of them should detect and indicate the same collision, since collisions span the entire network segment.) Whenever a collision is detected, the respective COL indicator will briefly blink amber.

◆ Segment Utilization % (10M Utilization % and 100M Utilization %)

The utilization bar graphs provide a quick reference on the current traffic load relative to the total available 10Mbps or 100Mbps network bandwidth. The graphs display a measure of the percentage of bandwidth in use on the respective network segment. All data packets are counted, whether valid or not.

◆ HUB ID Indicator

The HUB ID readout shows the ID (group) number of the hub within the hub stack. The hub's ID is automatically set when the hub is placed in a hub stack and powered on. In an unmanaged stack (all slave models), all IDs will read "0." In a stack with a master (intelligent) model, the master hub will detect the other hubs in the stack and automatically assign ID numbers.

Module Indicators (SLOT)

The module indicator indicates a good link to a module installed in the respective slot. For the DFE-260S switching module, the indicator will come on when the module is installed. For the DFE-260FX and DFE-260TX modules, the slot link indicator should light whenever the module is installed and there is a valid link.

Note: DFE-916x/DFE-916 can be stacked with DFE-2600 series products and can be managed through a DFE-2616i/DFE-2616ix or DFE-2624i/DFE-2624ix master hub.

Port State Indicators

There is one port state indicator for each of the twisted-pair ports on the hub. Each port's LED status indicator reports the port's link and activity status, and shows whether or not the port has been partitioned.

The following describes each indicator and the meaning of each condition:

◆ **Link (green)**

The indicator of a port lights green when the port is connected to a powered Ethernet or Fast Ethernet station. If the station to which the hub is connected is powered off, or if there is a problem with the link, the LED will remain off.

◆ **Receive (blinking green)**

When information is received on a port, its indicator will blink off briefly. Upon reception, the data will be transmitted to all other connected ports.

◆ **Auto-partition (blinking amber)**

The indicator of a port blinks amber when the port is automatically partitioned due to an abnormal network condition.

The hub will temporarily partition a port when too many line errors or too many collisions are detected on the port. While the segment is automatically partitioned, the port will be isolated from the rest of the network segment. When the problem is corrected or a valid data packet is received through the port, the port is automatically reconnected.

◆ **Disabled (steady amber)**

The indicator of a port is amber when the port has been manually disabled. No packet transmission or reception can occur on the port. Ports can be manually disabled and enabled from the management station if a stack is being managed via a DFE-2616i/DFE-2616ix or DFE-2624i/DFE-2624ix master hub.

Port Speed Indicators

There is also a port speed indicator for each of the twisted-pair ports on the hub. A port's speed indicator should light green when a 100BASE-TX device is connected to the port, and remain dark if the port is unconnected or if a 10BASE-T device is connected.

4

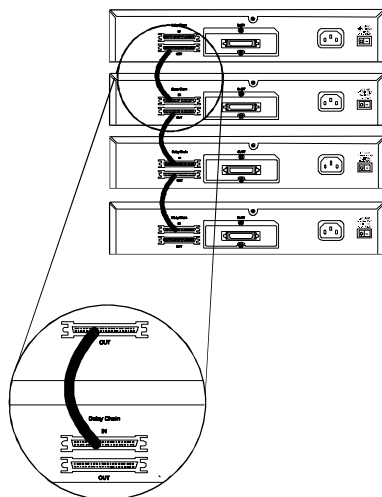
MAKING CONNECTIONS

This chapter discusses how to make connections to the hub's twisted-pair ports, cascading hubs to create a stack, and linking with other hubs (or hub stacks).

Hub Cascading/Building a Stack

You can stack up to five hubs using the daisy-chain ports to form one logical hub. In this configuration, the interconnected hubs constitute a single logical unit, providing a maximum of 80 twisted-pair ports.

Use the provided daisy-chain cable to connect the Daisy-Chain OUT port on the rear panel of one hub to the Daisy-Chain IN port on the hub below it, as shown in the figure below. Repeat this procedure for each hub to be included in the stack.



Hubs should not be added to the stack or removed from the stack while the power is on to any hub in the stack. **Always turn off power to the entire stack before adding or removing hubs.**

Connectivity Rules

Ethernet (10Mbps) networks have the following connectivity rules:

- ◆ The maximum length of a twisted-pair cable segment is 100 meters. Cabling should be Category 3 or better.
- ◆ Between any two end-stations in a collision domain, there may be up to five cable segments and four intermediate repeaters (hubs, hub stacks, or other repeaters).
- ◆ If there is a path between any two end-stations containing five segments and four repeaters, then at least two of the cable segments must be point-to-point link segments (e.g., 10BASE-T or 10BASE-

FL), while the remaining segments may be populated (mixing) segments (e.g., 10BASE-2 or 10BASE-5).

Fast Ethernet (100Mbps) networks have the following connectivity rules:

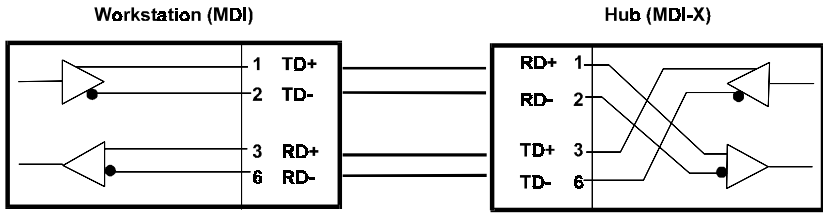
- ◆ The maximum length of a twisted-pair segment (that is, the distance between a port in the hub to a single-address network device such as a PC, server, or Ethernet switch) is 100 meters. Cabling and other wiring should be certified as Category 5 UTP or shielded twisted-pair (STP).
- ◆ The maximum diameter in a collision domain is approximately 205 meters using two Class II hubs (or hub stacks).
- ◆ Between any two end-stations in a collision domain, there may be up to three cable segments and two Class II hubs or hub stacks.

Hub to End-Station Connection

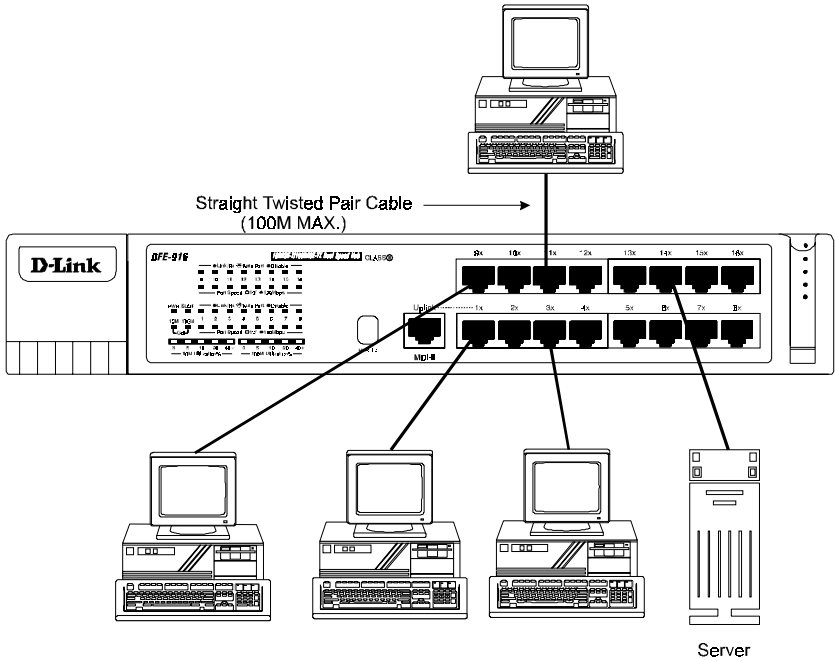
After installing the hub properly, it can support up to sixteen (DFE-916x/DFE-916) end-station connections. Fast Ethernet connections require either a Category 5 UTP cable or an STP cable. These cables can be up to 100 meters long.

Each Ethernet connection requires a Category 3 or better UTP cable. It is recommended that you use Category 5 cabling for all connections, in order to make it easier to transition all stations to 100Mbps.

You can connect any combination of PCs, servers, and other single-address network devices to the twisted-pair ports using straight-through twisted-pair cables. These cables should not be crossed over. The following figure illustrates the pin assignments for a straight-through cable:



When connecting a PC or a server, the system being connected should have an Ethernet or Fast Ethernet network interface card with a twisted-pair port. The following figure shows typical connections between the hub and end-stations:



Hub-to-Hub Uplink

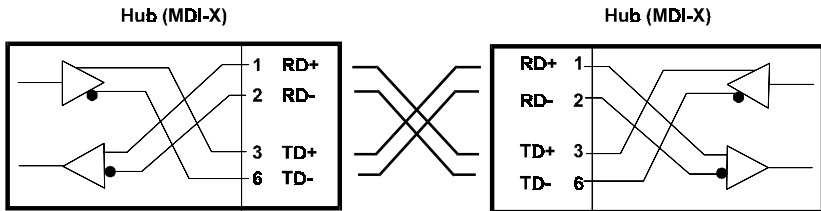
You can link two hubs or hub stacks to each other using any of the twisted-pair ports or the Uplink port. Linking hubs using ordinary twisted-pair ports requires crossover twisted-pair cables; linking using one ordinary twisted-pair port and the Uplink port requires an ordinary straight-through twisted-pair cable. The Uplink port is shared with Port 1, and you should not use both Port 1 and the Uplink port at the same time.

When connecting two hubs or hub stacks in this fashion, the maximum distance between any two end-stations in a collision domain is 205 meters. If each link between the hub and an end-station is 100 meters, then the hub-to-hub connection is limited to 5 meters. However, if the longest hub-to-end-station connection is less than 100 meters, then the hub-to-hub connection can be up to 100 meters long as long as the 205-meter total network diameter rule is followed.

The following table describes different methods of linking hubs (or hub stacks):

HUB PORT USED	DEVICE	PORT TYPE	CABLE TO USE
Normal	Switch or Hub	Non-Uplink	Crossover (X)
		Uplink	Straight-Through ()
	Server (or PC)	Straight-Through ()	
Uplink	Switch or Hub	Non-Uplink	Straight-Through ()
		Uplink	Crossover (X)
	Server (or PC)	Crossover (X)	

A crossover cable is a straight-through twisted-pair cable in which the wires have been crossed. The figure below shows the pin assignments for an Ethernet or Fast Ethernet crossover cable:



NOTE: *The first twisted-pair port (Port 1) is shared with the Uplink port. If you connect a hub to the Uplink port, then do not use Port 1.*

Optional Module Connections

There are three optional modules that may be added to any of the DFE-916 series hubs. Each hub can accommodate one module. Each of the modules offers a different additional network interface that allows for greater flexibility in how these hubs may be used in a network.

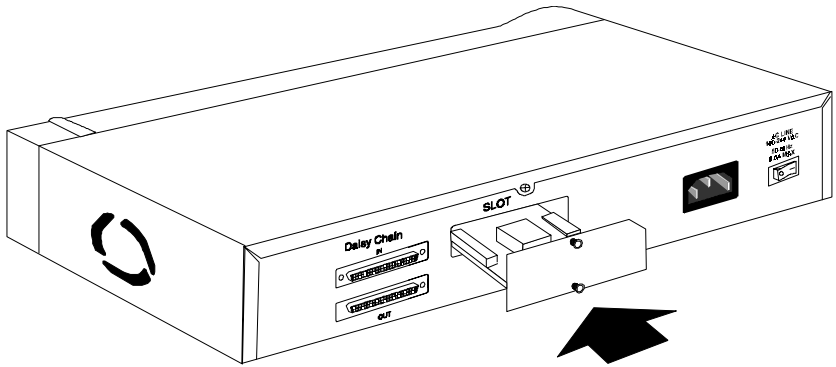
The sections that follow provide a brief overview of the module and basic instructions on various settings and indicators.

Module Installation

The installation procedure for each module is the same. Additional information about each module is provided below.

To install any of the modules:

1. Locate the module slot in the hub's rear panel.
2. Using a screwdriver, undo the two screws and remove the dust cover on the module slot.
3. Holding the module component-side up and connector-side in, gently slide the module along the guides and seat it in the internal connector.
4. Using a screwdriver, replace the two screws and tighten until snug.



We recommend that you retain the dust cover in case you need to remove the module for an extended period sometime in the future.

Switching Module (DFE-260S)

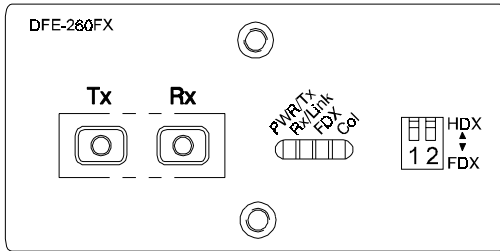
The DFE-260S switching module is used to allow interconnection between the 10Mbps and 100Mbps segments in the hub or hub stack. Each hub stack should have one DFE-260S module (such as the one included in the DFE-916x) if you wish to allow 10Mbps and 100Mbps stations to intercommunicate.

Fiber Optic Module (DFE-260FX)

A fiber optic module provides a standard Fast Ethernet 100BASE-FX fiber optic connector. A fiber optic connection is particularly useful for creating a link between two DFE-916 series hub stacks, placing them in separate collision domains. A link of this sort eliminates the need for a separate switch to separate stacks into separate domains. Separating the stacks into separate collision domains overcomes the Fast Ethernet two-repeater limitation, and effectively doubles overall bandwidth.

The fiber optic module includes the following LED indicators:

- **Power/Tx**—This LED is lit when the hub is on and blinks when packets are being transmitted by the module.
- **Link/Rx**—This LED is lit when the fiber optic ports are properly connected to a powered-on device and blinks when packets are being received by the module.



- **Collision**—This LED blinks when there are packet collisions on the fiber optic link.
- **FDX**—This LED is lit when the fiber optic port is set for full duplex transmit and receive. When the LED is off, the fiber optic port is in half duplex mode.

The duplex mode DIP switch allows you to set the fiber optic link to full duplex mode operation. Only the right-hand switch (number 2) is active. Use it to set the duplex mode.

Fast Ethernet Module (DFE-260TX)

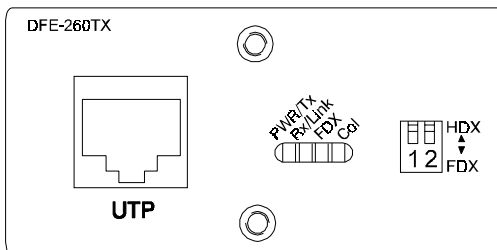
A Fast Ethernet module provides one additional twisted-pair Fast Ethernet connection. A twisted-pair connection of this kind is particularly useful for creating a link between two DFE-916 series hub stacks, placing them in separate collision domains. A link of this sort eliminates the need for a separate switch to separate stacks into separate domains. Separating the stacks into separate collision domains overcomes the Fast Ethernet two-repeater limitation, and effectively doubles overall bandwidth.

The recommended use for this module is to connect to another module of this kind in a second stack.

The Fast Ethernet module uses a MDI-X connector (not a straight MDI-II); therefore, a crossover cable must be used when connecting the module to another module (and under most other circumstances). See Appendix A for pinout information.

The Fast Ethernet module includes the following LED indicators:

- **Power/Tx**—This LED is lit when the hub is on, and blinks when packets are being transmitted by the module.
- **Link/Rx**—This LED is lit when the port is properly connected to a powered-on device, and blinks when packets are being received by the module.



-
- **Collision**—This LED blinks when there are packet collisions on the module link.
 - **FDX**—This LED is lit when the port is set for full duplex transmit and receive. When the LED is off, the port is in half duplex mode.

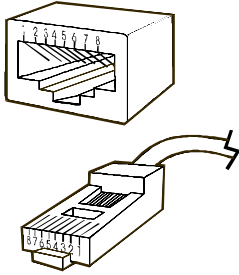
The duplex mode DIP switch allows you to set the port to full duplex mode operation. Only the right-hand switch (number 2) is active. Use the DIP switch to set the duplex mode.



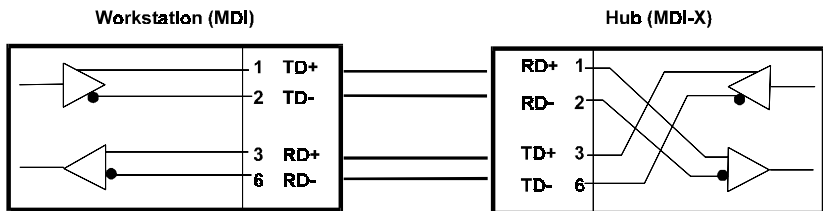
CABLES AND CONNECTORS

100BASE-TX Ethernet Cable and Connectors

- ◆ Cable characteristics: Category 5 unshielded twisted-pair or EIA/TIA-568 compliant, 100-ohm shielded twisted-pair data cable with 0.4 to 0.6 mm (22 to 26 AWG) wires in two or four twisted pairs (only two pairs/four wires are used for 100BASE-TX).
- ◆ Maximum segment length: 100 meters
- ◆ Maximum network diameter: 205 meters
- ◆ Connectors: RJ-45



Straight Twisted-Pair Cable Pinouts		
Contact	MDI-X Signal	MDI-II Signal
1	RD+ (receive)	TD+ (transmit)
2	RD- (receive)	TD- (transmit)
3	TD+ (transmit)	RD+ (receive)
4	Not used	Not used
5	Not used	Not used
6	TD- (transmit)	RD- (receive)
7	Not used	Not used
8	Not used	Not used

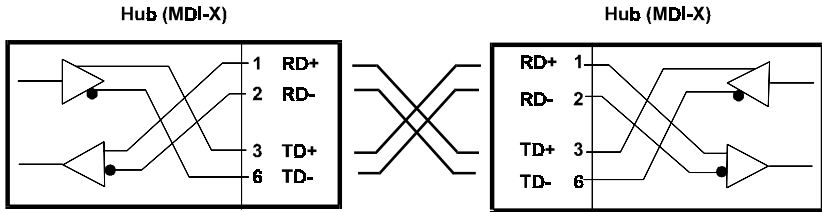


Crossover Cables

When cascading or connecting the hub to another hub, or to a switch or bridge, through a UTP port, a modified crossover cable is necessary. With a crossover cable, two pairs of wires are switched at one connector end. Carry out the following steps to create a customized, crossover twisted-pair cable:

1. Leave one end of the cable as is, with the RJ-45 connector intact. The wiring at just one end of the cable needs to be modified.

- At the other end of the cable, connect wires 1 and 2 to contacts 3 and 6, respectively. Likewise, connect wires 3 and 6 to contacts 1 and 2. Refer to the following diagram:





SPECIFICATIONS

General

Standards: IEEE 802.3 10BASE-T Ethernet repeater, IEEE 802.3u 100BASE-TX Fast Ethernet repeater (Class II); ANSI X3T9.5 Twisted-Pair Transceiver

Topology: Star

Protocol: CSMA/CD

Network Data Transfer Rate: Fast Ethernet, 100Mbps; Ethernet, 10Mbps

Number of Ports: 16, all dual-speed (10Mbps/100Mbps)

Network Media: Ethernet: Category 3 or better UTP cable, 100m maximum; Fast Ethernet: Cat 5 UTP/STP, 100-ohm twisted-pair (100m maximum) for hub-to-station links; Cat 5 UTP, 100-ohm UTP/STP (5m maximum) for hub-to-hub linking

Hub-to-Hub Cascading

Number of Daisy-Chained Hubs: Maximum of 5 hubs per stack

Daisy-Chain Port: MiniSCSI-type connector × 2

Daisy-Chain Cable: SCSI-type cable (supplied)

LED Indicators

Hub Status: Power, 10Mbps collision, 100Mbps collision, 10Mbps utilization, 100Mbps utilization, module link

Port Status (per port): Link/Activity/Auto Partition/Manual Disable, Speed (10/100Mbps)

Environmental and Physical

Power Supply: 100 to 240 VAC, 50 or 60 Hz internal universal power supply

Power Consumption: DFE-916x = 28 watts maximum

DFE-916 = 28 watts maximum

Dimensions: 324mm (W) × 55mm (H) × 231 mm (D)
(12.75 × 216 × 9.09 inches)

Weight: 2.5 kg (5.5 lb.) (1.25U height)

Operating Temperature: -10 to 55°C

Storage Temperature: -25 to 55°C

Humidity: 5% to 95% non-condensing

DC Fan: 40mm × 40mm × 10mm

Emissions: FCC Class A, CE, VCCI Class A, C-Tick

Safety: UL, CSA, CE Mark, TÜV/GS

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 Date of purchase (Month/Day/Year): _____

Product Model	Product Serial No.	* Product installed in type of computer (e.g., Compaq 486)	* Product installed in computer serial No.

(* Applies to adapters only)

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Answers to the following questions help us to support your product:

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2. **How many employees work at installation site?**
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4. **What network operating system(s) does your organization use ?**
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Banyan Vines DECnet Pathwork Windows NT Windows NTAS Windows '95
Other _____
5. **What network management program does your organization use ?**
D-View HP OpenView/Windows HP OpenView/Unix SunNet Manager Novell NMS
NetView 6000 Other _____
6. **What network medium/media does your organization use ?**
Fiber-optics Thick coax Ethernet Thin coax Ethernet 10BASE-T UTP/STP
100BASE-TX 100BASE-T4 100VGAnyLAN Other _____
7. **What applications are used on your network?**
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Database management Accounting Other _____
8. **What category best describes your company?**
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