

D-Link®

DES-815 10/100 Fast Ethernet Switch User's Guide

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TABLE OF CONTENTS

PREFACE	ix
<i>Purpose.....</i>	<i>ix</i>
<i>Audience.....</i>	<i>ix</i>
<i>Manual Organization.....</i>	<i>x</i>
1 OVERVIEW	1
<i>Introduction</i>	<i>1</i>
<i>100Mbps Fast Ethernet Introduction.....</i>	<i>2</i>
<i>100BASE-TX Technology Overview.....</i>	<i>3</i>
Cables and Connectors.....	3
Topology	3
Network	4
Hubs.....	4
Connectivity Rules	5
<i>Switching Technology.....</i>	<i>5</i>
Benefits of Switching	6
10/100 Switching Technology.....	6
<i>Product Features.....</i>	<i>7</i>
<i>Packing List</i>	<i>8</i>
<i>Front Panel.....</i>	<i>8</i>
Ports.....	8
LED Indicators.....	11
<i>Rear Panel.....</i>	<i>13</i>
Duplex Mode Switch	14

2	INSTALLATION	15
	<i>Installation Site</i>	<i>15</i>
	<i>Installing on a Desktop or Shelf</i>	<i>16</i>
	<i>Installing in a Rack</i>	<i>17</i>
	<i>Connecting Power.....</i>	<i>18</i>
	<i>Network Connections.....</i>	<i>18</i>
	10/100Mbps Ports	18
	10Mbps Ports	19
	Cable Types.....	19
	<i>Setting the Duplex Mode.....</i>	<i>20</i>
	<i>Network Configuration Examples.....</i>	<i>21</i>
	Fast Ethernet Server Connection	22
	LAN Microsegmentation.....	23
A	SPECIFICATIONS	25
B	CONNECTOR PINOUTS.....	27
	<i>RJ-45 Connectors</i>	<i>27</i>
	<i>AUI Transceiver Connector.....</i>	<i>28</i>
	<i>MII Transceiver Connector</i>	<i>29</i>

PREFACE

Congratulations on your purchase of the 10/100 Fast Ethernet Switch. This device integrates 100Mbps Fast Ethernet and 10Mbps Ethernet network capabilities in a highly flexible rack mountable package.

Purpose

This manual discusses how to install and use the 10/100 Fast Ethernet Switch.

Audience

This manual is intended for network administrators with:

- Background in LAN bridge concepts.
- Understanding of IEEE 802.3 Ethernet and 100BASE-TX Fast Ethernet networking concepts.
- Understanding of how to install local area networks (LANs).

Manual Organization

Chapter 1 Overview

Describes the product, its features, packing list, and the front and rear panels.

Chapter 2 Installation

Provides detailed instructions on installing the 10/100 Fast Ethernet Switch. Chapter 2 includes information on table and rack mounted installation, connecting power, network connections, setting the communications mode and cascade, and provides some network configuration examples.

Appendix A Specifications

Lists the technical specifications of the product.

Appendix B Connector Pinouts

Describes the connector pinouts of the 10/100 Fast Ethernet Switch ports.

1

OVERVIEW

Introduction

The DES-815 Fast Ethernet Switch is ideal for network managers who want to boost workgroup performance easily by micro-segmenting a 10Mbps LAN while adding 100Mbps links, or it is excellently suited to provide a dedicated Fast Ethernet connection to a key network server or station in an existing 10Mbps network.

The switch integrates 100Mbps Fast Ethernet with 10Mbps Ethernet networks seamlessly. The speed migration design will bridge high bandwidth Fast Ethernet network segments to traditional 10Mbps Ethernet network segments quickly and simply.

The DES-815 complies with IEEE802.3u, 10BASE-TX, IEEE802.3 and 10BASE-T standards. It has 12 10Mbps twisted-pair ports, two 10/100Mbps twisted-pair ports, and one MII port. The DES-815 provides both store-and-forward and cut-through passing schemes, automatically selected to provide the best network performance. Filtering and forwarding rates for the switch run at wire-speed, reducing latency within and across segments.

The Switch provides an easy, affordable, high-performance, seamless, and standard-based migration path to a 100BASE-TX LAN while preserving your initial investment and use of 10Mbps Ethernet LANs.

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 100Mbps Fast Ethernet have been adopted by many vendors. 100Mbps Fast Ethernet technology stands out as the most inexpensive and smoothest migration path for existing 10Mbps Ethernet users.

100Mbps 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 100Mbps Fast Ethernet is compatible with all 10Mbps Ethernet environments, it provides a straight-forward upgrade without wasting the company's existing investment in hardware, software, and trained personnel.

100BASE-TX Technology Overview

Cables and Connectors

Category 5 unshielded twisted-pair (UTP) cables are supported. UTP Category 5 cable uses the same RJ-45 connector used with 10BASE-T, wired in the same configuration. Please note that the punch-down blocks in the wiring closet must also be Category 5 certified. Where these blocks do not meet the standard, an upgrade is necessary.

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 segment or 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).

-
- The EIA/TIA 568 Wiring Standard does not support the use of coaxial cables for horizontal wiring.

Network

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 2500 meters.

Hubs

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 the same collision domain, thus this type of hub cannot be cascaded. 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 to the same collision domain; for example, TX to TX. At most, two Class II hubs can exist within the same collision domain. The cable used to cascade these hubs is called an inter-repeater link (IRL).

As mentioned earlier, stackable hubs can be used to increase the number of available nodes in a collision domain. An entire hub stack counts as a single repeater.

Connectivity Rules

- The maximum length of a twisted-pair segment (that is, distance between a port in the hub to a single-address network device such as a PC, server, or LAN switch) is 100 meters.
- The maximum diameter in a collision domain is about 205 meters using two Class II hubs (hub stacks) and 200 meters using one Class I hub.
- Between any two end-stations in a collision domain, there may be up to three segments and two Class II hubs or two segments and one Class I hub.

Switching Technology

Switching is fast becoming the industry standard for pushing the limits of existing Ethernet networks. A switch bridges Ethernet packets between Ethernet and Fast Ethernet LAN segments at the MAC address level of the Ethernet protocol.

The difference between switched Ethernet (10Mbps, 100Mbps, or both) and traditional Ethernet is analogous to the difference between a private phone line and a party line. With switched Ethernet, each workgroup has a “private line” so that transmitted packets don’t have to wait as long to gain access to the network. When connected to a switched port, each Ethernet segment has full “wire-speed” access, so a switch effectively divides a single Ethernet LAN into bridged multiple LAN segments. Each segment can support a workgroup or even provide a dedicated connection for a key workstation or server. The result of dividing an Ethernet LAN into multiple segments is a multiplication of internal bandwidth available to all stations on the LAN and a reduction in latency rates during peak-use periods.

Benefits of Switching

Ethernet switching technology drastically increases the total bandwidth of a LAN. It also provides configuration flexibility to local workgroups which allows the network administrator to better control how network resources are distributed against network load. Switching helps reduce the congestion problems inherent in the contention-oriented CSMA/CD protocol, thereby improving network response during high utilization periods.

Also, currently popular distributed client/server applications often require higher bandwidth and tighter client-to-server integration. Legacy 10Mbps Ethernet often is unable to provide a sufficiently sophisticated platform for users to be able to take full advantage of such client/server applications.

Fast Ethernet switching not only satisfies both technical and business needs, it also preserves the current investment in the huge 10BASE-T Ethernet installed base. Compatibility with 10Mbps Ethernet ensures that users will be able to migrate to Fast Ethernet at a pace appropriate to their installation and needs.

10/100 Switching Technology

An integral extension of Fast Ethernet, 10/100 switching provides not only a 100Mbps high-speed connection for carrying aggregated 10Mbps traffic, it also handles the necessary conversion of MAC between 10BASE-T and 100BASE-TX. Combining Fast Ethernet and switching technologies provides both bandwidth for local workgroups and a high-speed link to carry local traffic elsewhere in the network.

Product Features

The 10/100 Fast Ethernet Switch has the following key features:

- Ports: 12 10Mbps, three 10/100Mbps.
- High-speed uplink port for connecting to a higher tier switch or other device.
- Dynamic buffer allocation to allow network load balance and prevent packet loss due to congestion.
- Auto polarity correction for all twisted pair ports.
- AUI and MII external transceiver connectors provide flexibility in choice of network media.
- Full-duplex and half-duplex capability on all ports with each user-configurable through the Duplex Mode Switch on the rear panel.
- Flexibility of application: from segmentation of a large LAN to client-server maximization to dedicated connections for high-priority single users.
- Support for IEEE 802.3, 10BASE-2, 10BASE-T, IEEE 802.3u and 100BASE-TX standards.
- Extensive LED indicators to facilitate troubleshooting and monitoring of the product's operating status.
- Auto-selected fast store-and-forward and fragment-free cut-through passing schemes provide low latency.
- Compatibility with standard Ethernet applications, internetworking systems and client-side adapters to minimize infrastructure changes and costs.

Packing List

Unpack the 10/100 Fast Ethernet Switch shipping carton and check for the listed items below. If any items are missing or damaged, notify your authorized reseller immediately.

- The 10/100 Fast Ethernet Switch
- This *User's Guide*
- An AC Power Cord
- Two Rack Mount Brackets and screws
- Four adhesive-backed rubber feet

Front Panel

The 10/100 Fast Ethernet Switch front panel includes network connectors and LED indicators for ease-of-use.



Figure 1 10/100 Fast Ethernet Switch Front Panel

Ports

The product comes with twisted-pair ports. These ports can be used to connect to individual stations in need of faster access, to

segment heavily utilized LANs, and/or to provide higher bandwidth access to a key server in a client-server environment.

10Mbps Ports

The 10Mbps twisted-pair ports are standard RJ-45 connectors for use with unshielded or shielded twisted-pair (UTP/STP) wiring. The 10Mbps ports operate at an user-selectable effective speed of 10Mbps for half-duplex mode or 20Mbps for full-duplex mode. In either mode, the twisted-pair connector can operate over 100 meters of Category 3, 4, or 5 UTP/STP cable.

Possible uses for the 10Mbps switch ports:

- Segment an existing LAN to improve bandwidth utilization.
- Connect single users either to provide power users with greater access and thus speed, or multiple users for high bandwidth access to a shared network server.
- Uplink connections for lower-tier switches.

10/100Mbps Ports

The 10/100Mbps twisted-pair ports are standard RJ-45 connectors for use with unshielded or shielded twisted-pair (UTP/STP) wiring. These ports are auto-negotiating between 10Mbps and 100Mbps, which means that they detect the speed of devices connected to them and auto-configure to run at that speed. The 10/100Mbps ports also operate in half-duplex mode or full-duplex mode at either speed. In either duplex mode, the twisted-pair ports can operate over 100 meters of Category 5 UTP or STP cable.

Possible uses for the 10/100Mbps switch ports:

-
- Add Fast Ethernet segments to an existing 10Mbps LAN.
 - Provide a dedicated 100Mbps Ethernet connection for a shared LAN server in a 10Mbps LAN.
 - Uplink to a higher-tier hub or switch.

Table 1-1: Port and Cable Specifications

Port	Connector	Half/Full Duplex	Cable
10Mbps	RJ-45	10/20Mbps	100m, Category 3,4, or 5 UTP/STP
10/100Mbps	RJ-45	10/20Mbps 100/200 Mbps	100m, Category 5 UTP/STP

Uplink Port

The uplink port is used for higher-tier connections to more advanced switches or other network devices. Please note that if you are using the uplink port, you will be unable to use port one as these two ports are logically linked.

Note: *A crossover cable must be used when connecting from the uplink of another switch or a hub to the uplink port on the 10/100 Fast Ethernet Switch.*

AUI Transceiver Connector

The AUI transceiver connector is a 10Mbps port for connecting a thin or thick Ethernet segment via a transceiver. Please note that this connector is logically related to twisted-pair Port 3 so they cannot be used simultaneously, and the twisted-pair port has priority over the AUI connector. Also, the AUI port only operates at half duplex. Pinouts for the AUI connector are listed in Appendix B.

MII Transceiver Connector

The MII transceiver connector is a 10/100Mbps port for connecting a fiber optic or additional Fast Ethernet segment via a transceiver. The MII connector, like ports 1 and 2, can auto-detect the speed of a device connected and auto-adjust to operate at either 10Mbps or 100Mbps. Pinouts for this connector are listed in Appendix B.

LED Indicators

The 10/100 Fast Ethernet Switch has extensive LED indicators to facilitate monitoring and troubleshooting. They include a Power LED, a System Load meter, and Status LEDs for all ports. The Status LEDs have indicators that report on Link, Duplex, Activity, Collision, and 100Mbps Operation states. There are also AUI and MII LED indicators.

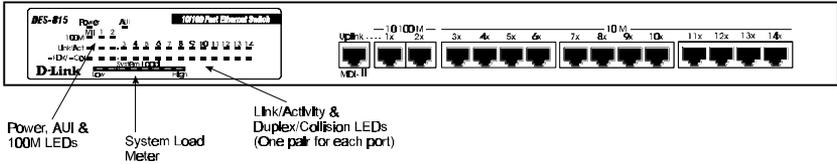


Figure 2 LED Indicators

The following section describes these indicators in detail.

- **Power LED**

This indicator is green when power is supplied to the device. The Power LED lights when you connect the power cable to the power receptacle at the rear of the device, and then plug it in to a power outlet.

- **Link/Act LED**

This indicator is green when the respective port is properly connected to a powered-on device and blinks green when packets are being transmitted or received.

- **FDX/Collision (Col) LED**

This indicator is green when the respective port is operating in full-duplex mode. Otherwise it is off for half-duplex operation. This indicator blinks yellow when there are collisions occurring on the respective port.

- **System Load LED Meter**

This LED meter indicates the current system load (from “Low” to “High”). The meter functions to indicate that the switch is currently operating and at what level of aggregated traffic.

- **AUI LED**

This indicator is green when the AUI transceiver port is connected to a 10Mbps Ethernet device via an AUI transceiver.

- **MII LED**

These indicators for Link/Act and FDX/Col work just like their counterparts for the other ports (see above). They are only lit and active when an MII transceiver is connected to the switch.

- **100M LEDs**

These indicators are green when port 1, port 2, or the MII connector are connected to a device operating at 100Mbps. If any of these LEDs are off, then the port it corresponds to is either not connected or is connected to a device operating at 10Mbps.

Rear Panel

The rear panel of the 10/100 Fast Ethernet Switch includes the power cable connector and the Duplex Mode Switch.

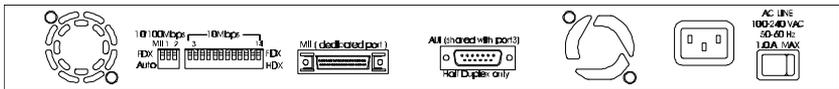


Figure 3 Rear Panel

Duplex Mode Switch

The 10/100 Fast Ethernet Switch must be set to the proper duplex mode for all ports. The switch can be set to auto-detect the duplex mode for ports 1 and 2, and for the MII connector; All other ports must be set to either full or half duplex.

To change the duplex mode, change the Duplex Mode DIP switch setting on the back of the 10/100 Fast Ethernet Switch. On the DIP switch, for ports 1, 2, and the MII connector, down is auto-detect, up is full-duplex. For ports 1 and 2 (the 10/100Mbps variable speed ports), “Auto” means that the appropriate duplex mode is set by the hub according to the capabilities of the device connected, and “FDX” manually sets the ports to full duplex mode. Regardless of the duplex mode setting, the speed setting of ports 1 and 2 is automatically detected.

For all other ports up is full duplex, down is half duplex, and the switch numbers correspond with the port numbers. Note that it is not necessary to turn off the device when changing the duplex mode setting.

2

INSTALLATION

This chapter describes the installation procedure for the 10/100 Fast Ethernet Switch. The chapter includes information on installation locations, connecting power, connecting network cables, setting the port duplex mode, and has some network configuration examples.

Installation Site

You have the option to install the product on a table or mount it in a standard network rack. When installing, choose a sturdy, level surface in a ventilated area that is dust free and away from heat vents, warm air exhaust from other devices and direct sunlight. Avoid proximity to large electric motors or other electromagnetic equipment.

Observe the following guidelines when choosing a location for the 10/100 Fast Ethernet Switch:

- The surface must support at least 3.0 kg (6.5 lbs).
- Air temperature should range from 32° to 122° F (0° to 50° C).
- Humidity should be less than 90%, non-condensing.

-
- Site should not exceed the electromagnetic field (RF) standards for IEC 801-3, Level 2 (3V/M) field strength.
 - The power outlet should be within 6 feet of the device.

For a detailed list of the product's technical specifications, refer to Appendix A, *Specifications*.

Installing on a Desktop or Shelf

When installing the product on a table you need to attach the rubber feet included with the device. Attach these cushioning feet on the bottom at each corner of the device. Allow enough ventilation space between the device and the objects around it.

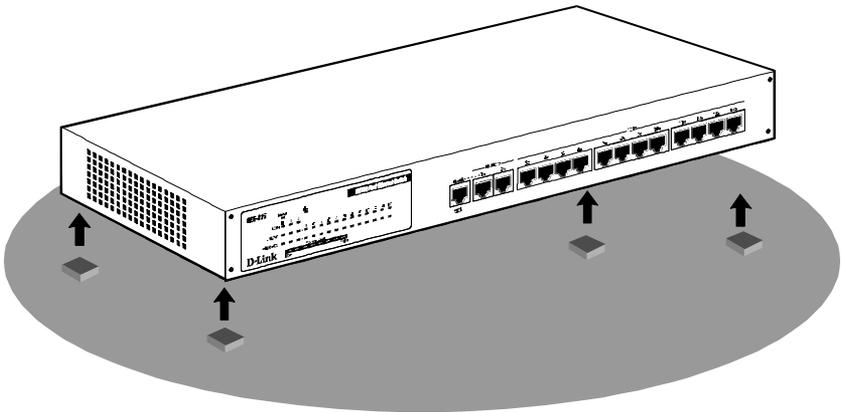
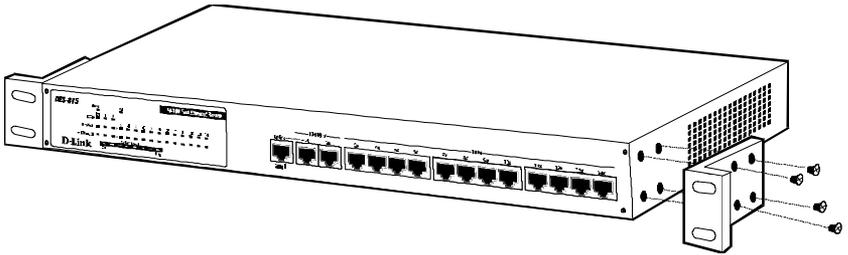


Figure 4 Installing the 10/100 Fast Ethernet Switch on a Table

Installing in a Rack

The switch can be mounted in an EIA standard-size, 19-inch rack, which can be placed in a wiring closet with other equipment. Attach the mounting brackets on the switch's front panel (one on each side), and secure them with the screws provided.



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

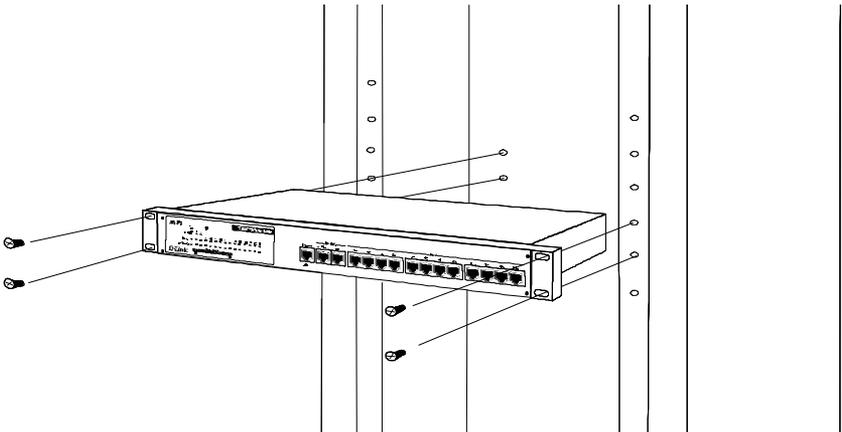


Figure 5A & 5B Installing the 10/100 Fast Ethernet Switch in a Rack

Connecting Power

Power is supplied to the 10/100 Fast Ethernet Switch through an AC power cord. The AC power input voltage ranges from 100 to 240 VAC. A power cable is included with the device.

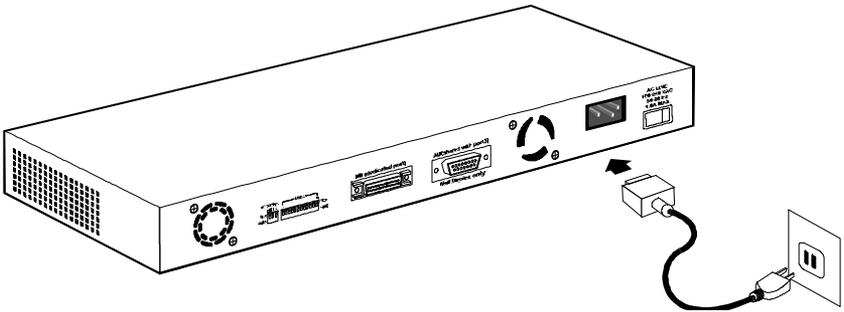


Figure 6 Connecting Power

Network Connections

If any port on the 10/100 Fast Ethernet Switch is set for full-duplex operation, the device (or LAN) connected to that port should also be set for full-duplex operation. The following sections discuss the requirements for each operating mode.

10/100Mbps Ports

Port 1 and port 2 are variable-speed ports and require Category 5 unshielded twisted-pair or shielded twisted-pair (UTP/STP) cable to run at 100Mbps. The attached station must be within 100 meters of the 10/100 Fast Ethernet Switch. When connecting a

workstation or a server running at 100Mbps, a standard 100BASE-TX adapter must be installed. When running at 10Mbps, ports 1 and 2 are functionally identical to the 10Mbps ports described below.

The MII transceiver connector is also a 10/100Mbps port. External transceivers for a standard Ethernet, Fast Ethernet or a fiber optic connection will work with the MII connector.

Note: *D-Link also provides the following media converters that can be used with the MII connector on this Switch: DFE-853 MII-TX, DFE-854 MII-FX, DFE-855 TX-FX. The 854 and 855 converters include fiber optic capabilities and can use fiber optic cables up to 2 km long.*

10Mbps Ports

These ports require Category 3, 4, or 5 unshielded twisted-pair or shielded twisted-pair (UTP/STP) cable. They can be used to connect to individual workstations, servers or other 10BASE-T devices. The attached station must be within 100 meters of the 10/100 Fast Ethernet Switch. When connecting a workstation or a server, a standard 10BASE-T adapter must be installed.

The AUI transceiver connector is also a 10Mbps port. External transceivers for a standard Ethernet connection (thin or thick) will work with the AUI connector.

Cable Types

Under most conditions, the ports on the 10/100 Fast Ethernet Switch may use normal straight-through cables. Some circumstances, however, may require the use of crossover cables

(i.e., cables in which the twisted-pair outputs have been crossed). See Appendix B for more information on crossover cable pinouts. The table below describes when to use which cable type.

Table 2-1: Using Straight-Through and Crossover Cables

SWITCH PORT USED	DEVICE	PORT TYPE	CABLE TO USE
Normal	Server (or PC)		Straight-Through ()
	Switch or Hub	Non-Uplink	Crossover (X)
		<i>Uplink</i>	Straight-Through ()
<i>Uplink</i>	Server (or PC)		Crossover (X)
	Switch or Hub	Non-Uplink	Straight-Through ()
		<i>Uplink</i>	Crossover (X)

Setting the Duplex Mode

Each port of the device can be set for half-duplex or full-duplex operation. The two 10/100Mbps ports and the MII connector can be set to either full-duplex or auto-detect duplex mode. At half-duplex operation, packet transmission and reception do not occur simultaneously, thus communication speed is limited to 100Mbps using 100BASE-TX mode and 10Mbps using 10BASE-T mode. At full-duplex operation, packet transmission and reception occur simultaneously, thus communication speed is doubled to 200Mbps using 100BASE-TX mode and 20Mbps using 10BASE-T mode. Full-duplex operation can be used on links between the 10/100

Fast Ethernet Switch and any device that supports full-duplex operation.

Set the duplex mode through the duplex mode switch at the rear of the device. To set a port to full-duplex operation, slide the corresponding duplex switch **up**. To set for half-duplex, set the duplex switch **down**. To set port 1, port 2, or the MII connector to auto duplex mode detect, set the corresponding switch **down**.

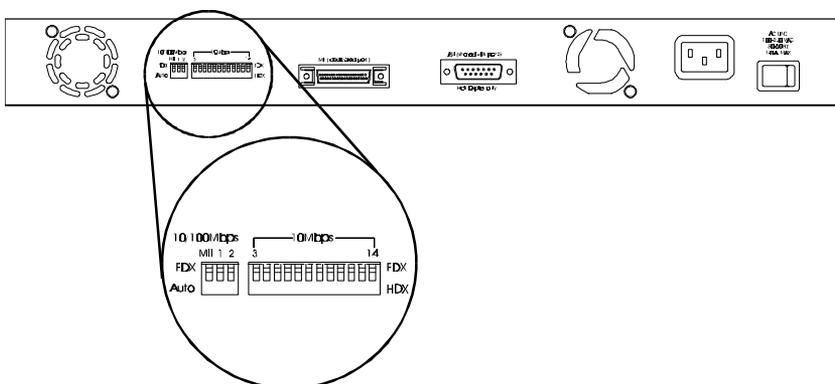


Figure 7 Setting the Duplex Mode

Network Configuration Examples

This section provides sample configurations showing ways you might use the 10/100 Fast Ethernet Switch.

Fast Ethernet Server Connection

The 10/100 Fast Ethernet Switch is an ideal device for connecting a dedicated server via a 100Mbps line to a 10Mbps network. Increasing the bandwidth speed of a server connection can provide significant improvements in network performance.

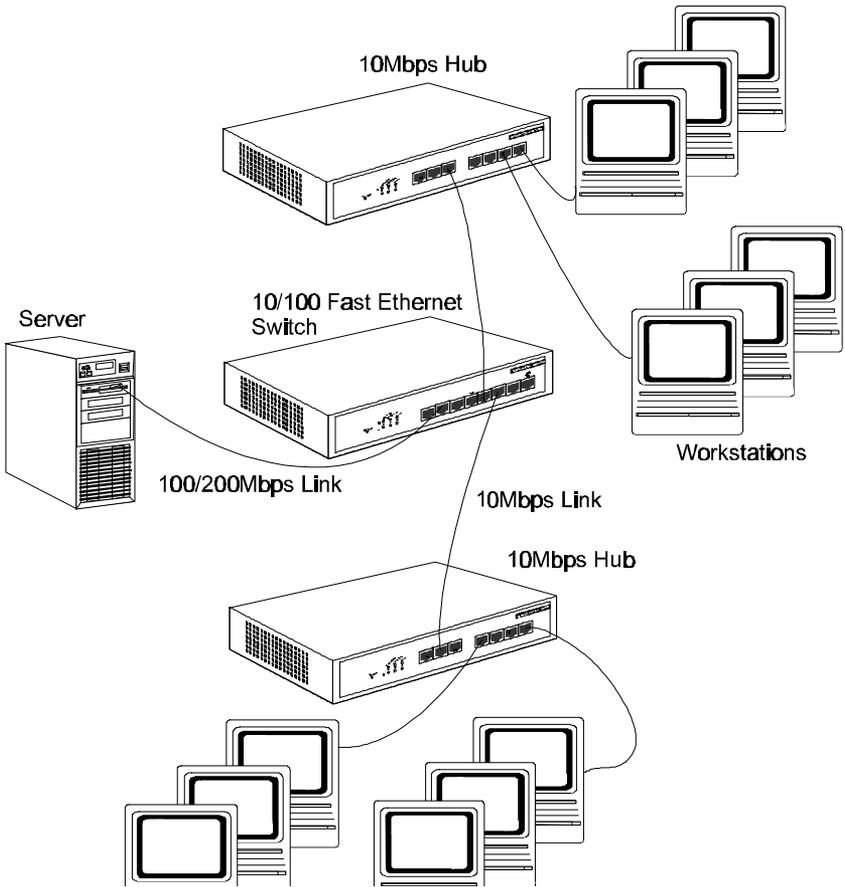


Figure 8 Fast Ethernet Connection for a Server

LAN Microsegmentation

Perhaps the principal purpose for the 10/100 Fast Ethernet Switch is to microsegment an existing LAN to improve network latency rates and increase overall performance. The 100Mbps ports on the switch can be used to connect those segments which require greater throughput.

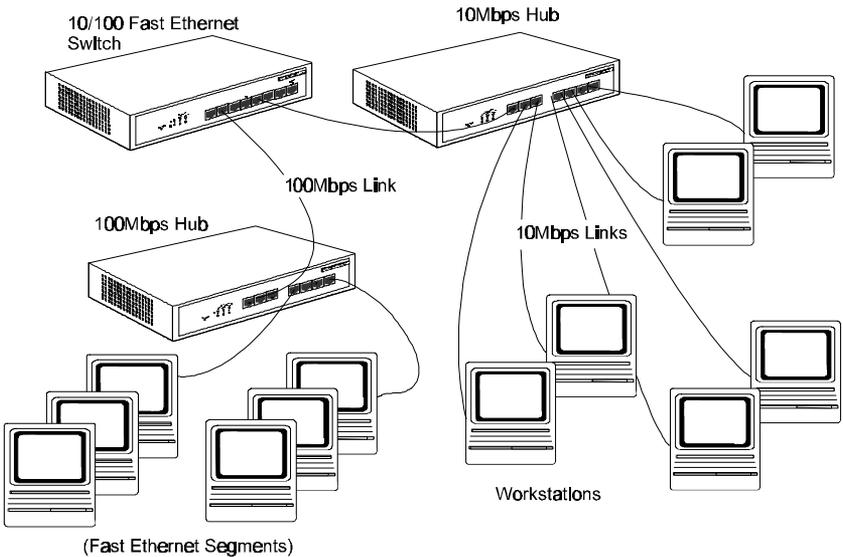


Figure 9 Microsegmenting a LAN and Adding 100Mbps Segments



SPECIFICATIONS

This appendix lists the technical specifications for the device.

Standards Compliance	10BASE-2, 10BASE-T, IEEE 802.3, 100BASE-TX, IEEE 802.3u
100Mbps (100BASE-TX)	RJ-45 , Full or Half Duplex – 100/200Mbps
10Mbps (10BASE-T)	RJ-45 , Full or Half Duplex – 10/20Mbps
Performance	<p><i>Filtering Rate:</i></p> <ul style="list-style-type: none"> • 10Mbps Port – 14880 pps • 100Mbps Port – 148800 pps <p><i>Forwarding Rate:</i></p> <ul style="list-style-type: none"> • 10Mbps Port – 14880 pps • 100Mbps Port – 148800 pps
LED Indicators	Power, AUI, MII, Link/Act, FDX/Col, 100M, System Load Meter
Dimensions	441 x 207 x 45 mm (W x D x H)

Weight	3.0 kg/6.5 lbs
Power Input	100 ~ 240 VAC, 50/60Hz, 1A
Power Consumption	40 Watt (maximum)
Operating Temperature	32° ~ 122° F (0° ~ 50° C)
Humidity	5 ~ 90%, Storage
Altitude	10,000 ft (3048 m)
Emissions	FCC part 15 Class A, VCCI-1, CE Mark
Safety	UL, CSA and TUV/GS

B

CONNECTOR PINOUTS

This appendix describes the connector pinouts including those for:

- RJ-45 ports (100BASE-TX and 10BASE-T);
- AUI transceiver connector;
- MII transceiver connector.

RJ-45 Connectors

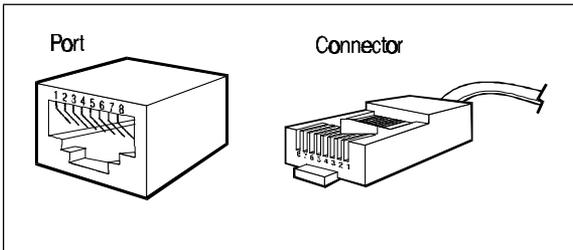


Figure B-1 RJ-45 Connector

The above figure shows the arrangements of the pins, while Table B-1 lists the pinouts.

Table B-1: RJ-45 Connector Pinouts

RJ-45 Connector Pinouts	
Pin	MDI Signal
1	TD+ (Transmit)
2	TD- (Transmit)
3	RD+ (Receive)
4	NC
5	NC
6	RD- (Receive)
7	NC
8	NC

A sketch for crossover cable pinouts is shown in the following figure.

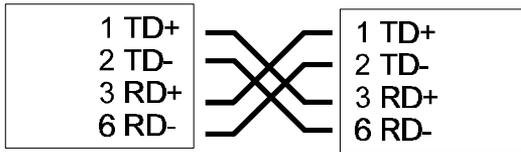


Figure B-2 Crossover Cable

AUI Transceiver Connector

The following table gives the pinouts for the AUI connector.

Table B-2: AUI Connector Pinouts

Pin	Circuit	Use
1	CI-S	Control IN Circuit Shield

2	CI-A	Control IN Circuit A
3	DO-A	Data OUT Circuit A
4	DI-S	Data IN Circuit Shield
5	DI-A	Data IN Circuit A
6	VC	Voltage Common
7	CO-A	Control OUT Circuit A
8	CO-S	Control OUT Circuit Shield
9	CI-B	Control IN Circuit B
10	DO-B	Data OUT Circuit B
11	DO-S	Data OUT Circuit Shield
12	DI-B	Data IN Circuit B
13	VP	Voltage Plus
14	VS	Voltage Shield
15	CO-B	Control OUT Circuit B

MII Transceiver Connector

The MII transceiver connector allows users to connect most MII compatible transceivers to the switch. Any device connected must use a physical-layer address that falls within the 00h-10h range. The following table gives the pinouts for the MII connector.

Table B-3: MII Connector Pinouts

PIN No.	SIGNAL	PIN No.	SIGNAL
1	+5V	18	COL
2	MDIO	19	CRS
3	MDC	20	+5V
4	RXD3	21	+5V
5	RXD2	22	COMMON
6	RXD1	23	COMMON
7	RXD0	24	COMMON
8	RX_DV	25	COMMON
9	RX_CLK	26	COMMON
10	RX_ER	27	COMMON
11	TX_ER	28	COMMON
12	TX_CLK	29	COMMON
13	TX_EN	30	COMMON
14	TXD0	31	COMMON
15	TXD1	32	COMMON
16	TXD2	33	COMMON
17	TXD3	34	COMMON

35	COMMON
36	COMMON
37	COMMON

38	COMMON
39	COMMON
40	+5V

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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)

Product was purchased from:
 Reseller's name: _____
 Telephone: _____ Fax: _____
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Answers to the following questions help us to support your product:

1. **Where and how will the product primarily be used?**
Home Office Travel Company Business Home Business Personal Use
2. **How many employees work at installation site?**
1 employee 2-9 10-49 50-99 100-499 500-999 1000 or more
3. **What network protocol(s) does your organization use ?**
XNS/IPX TCP/IP DECnet Others _____
4. **What network operating system(s) does your organization use ?**
D-Link LANsmart Novell NetWare NetWare Lite SCO Unix/Xenix PC NFS 3Com 3+Open
Banyan Vines DECnet Pathwork Windows NT Windows NTAS Windows '95
Others _____
5. **What network management program does your organization use ?**
D-View HP OpenView/Windows HP OpenView/Unix SunNet Manager Novell NMS
NetView 6000 Others _____
6. **What network medium/media does your organization use ?**
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100BASE-TX 100BASE-T4 100VGAnyLAN Others _____
7. **What applications are used on your network?**
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