



**H216D/H216/H224/H232**

**16/24/32-port 10/100Mbps Dual Speed Hubs**

# **User's Manual**

**Ver.: 1.0**

## **FCC Warning**

This device has been tested and found to comply with limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the user's manual, may cause interference in which case user will be required to correct the interference at his own expense.

## **CE Mark Warning**

This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

# ***Table of Contents***

<b>Chapter 1. Introduction .....</b>	<b>1-1</b>
About the Dual Speed Hubs .....	1-1
Package Contents.....	1-2
Key Features .....	1-3
Overview .....	1-3
Front Panel .....	1-3
LEDs Indication .....	1-4
Rear Panel .....	1-5
Ports.....	1-6
<b>Chapter 2. Installation .....</b>	<b>2-1</b>
Hubs Allocation .....	2-1
Installing Rubber Feet.....	2-1
Stacking the Hubs.....	2-2
Connecting Other Network Devices.....	2-3
Connecting Workstations .....	2-3
Connecting the MDI-II Port .....	2-5
Connecting Ethernet Hubs.....	2-6
Connecting Fast Ethernet Hubs .....	2-7
Connecting Ethernet Switching Hubs.....	2-8
<b>Appendix A. Product Specifications .....</b>	<b>A-1</b>
<b>Appendix B. RJ-45 Connector Descriptions .....</b>	<b>B-1</b>

Chapter 1

# Introduction

## About the Dual Speed Hub

The 16/24/32-port 10/100Mbps dual speed hubs are designed as a compact and flexible solution for workgroups or SOHO LANs (small office/home office), while offering an array of features.

The dual speed hubs provide a built-in switch function, sixteen/twenty-four/thirty-two 10/100Mbps shielded twisted-pair (STP) ports, one MDI-II port (for 16/24-port dual speed hub only), and LED for the indications of Power, Link/Rx, Collision, Partition, Utilization and Transmission Speed.

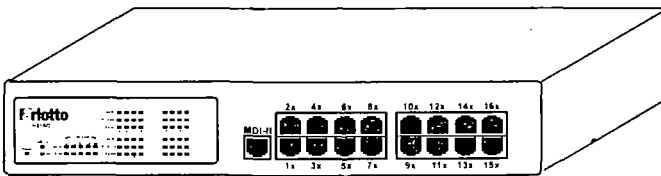


Figure 1.1 H216D 10/100Mbps Dual Speed Hub

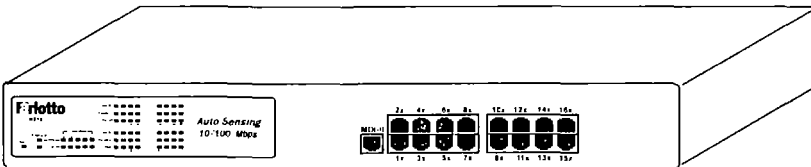
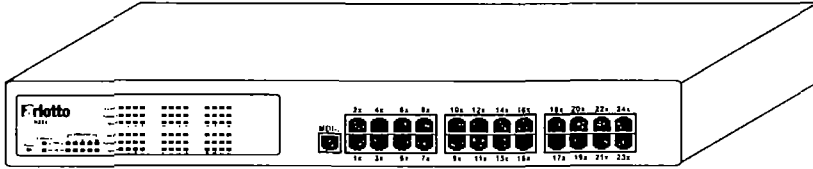
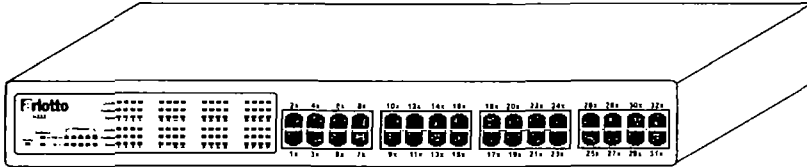


Figure 1.2 H216 10/100Mbps Dual Speed Hub



*Figure 1.3 H224 10/100Mbps Dual Speed Hub*



*Figure 1.4 H232 10/100Mbps Dual Speed Hub*

## Package Contents

- A 10/100Mbps dual speed hub
  - An AC power Cord
  - A cascade cable (DB25)
  - Four Rubber Foot Pads
  - A rack-mount kit which includes two rack-mount brackets and six mounting screws
  - One TP cross-over connector (For H232 10/100Mbps dual speed hub only)
  - This User's Manual
-

# Key Features

Any of 16/24/32-port dual speed hub provides the following key features,

- Auto-sensing for 10/100Mbps transmission speed.
- Sixteen/twenty-four/thirty-two 10Mbps or 100Mbps Fast Ethernet ports for Category 5 UTP cables.
- One MDI-II uplink port for easy expansion. (For 16/24-port dual speed hubs only)
- Power, Collision, Link/Rx, Partition, Speed indicators.
- In compliance with IEEE 802.3 and IEEE 802.3u standards.
- Built-in switch function.
- 16/24-port 10/100Mbps dual speed hubs—Five hubs per stack.
- 32-port 10/100Mbps dual speed hubs –Three hubs per stack.
- Auto-configuring the switch function to prevent “Looping” in a stack.

## Overview

### Front Panel

The front panels of the 16/24/32-port 10/100Mbps dual speed hubs are shown below.

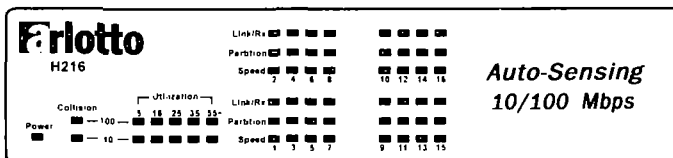


Figure 1.5 H216D Front Panel

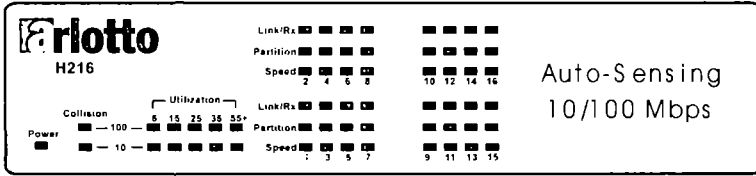


Figure 1.6 H216 Front Panel

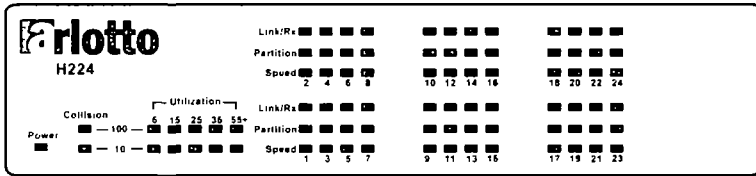


Figure 1.7 H224 Front Panel

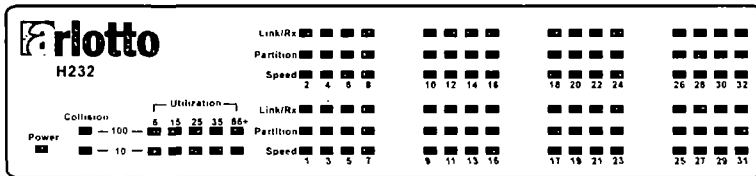


Figure 1.8 H232 Front Panel

## LEDs Indication

LED	Status	Indication
Power	Green	The hub is receiving electrical power.
Collision	Yellow	There are two Collision LEDs. One is for 10Mbps segment, and the other is for 100Mbps segment. When there is Collision in a segment, the LED for that segment will blink.

LED	Status	Indication
Utilization	5%, 15%, 25%— Green	There are two rows of 5 gradient Utilization LEDs. One is for 100Mbps segment, and the other is for 10Mbps segment. The Utilization LEDs show the combined utilization of the ports in each segment.
	35%, 55% Yellow	
Link/Rx	Green	A port has established a valid 10/100Mbps network connection.
	Green (Blinking)	10/100Mbps traffic is traversing the port.
Partition	Yellow	A port has been partitioned from the network.
Speed	ON—Green	A port has established a valid 100Mbps network connection.
	OFF	A port has established a valid 10Mbps network connection.

## Rear Panel

The rear panels of 16/24/32-port 10/100Mbps dual speed hubs are shown below.

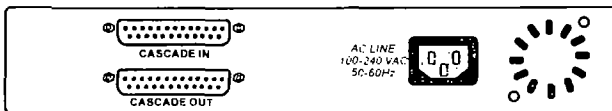


Figure 1.9 H216D Rear Panel

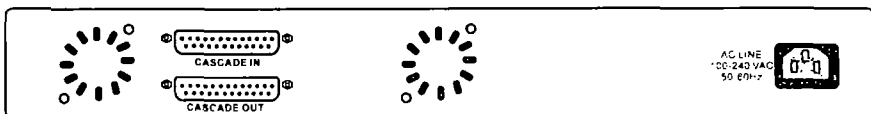


Figure 1.10 H216/H224 Rear Panel



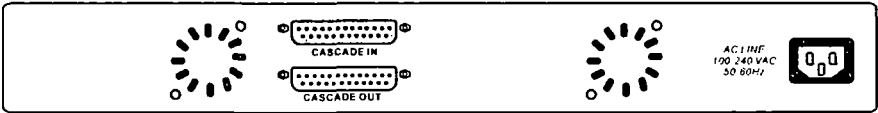


Figure 1.11 H224 Rear Panel

## Ports

H216D and H216 front panels support sixteen dual speed ports and one MDI-II ports.

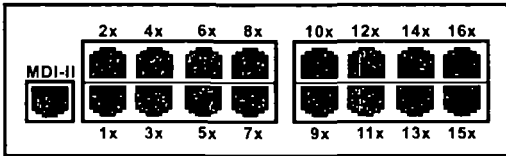


Figure 1.12 H216D/H216 Ports

H224 front panel supports twenty-four dual speed ports and one MDI-II ports.

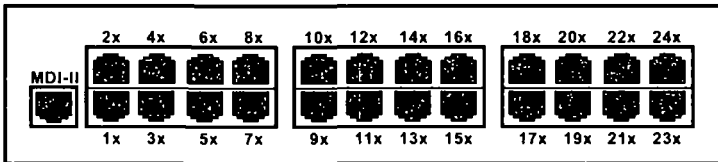


Figure 1.13 H224 Ports

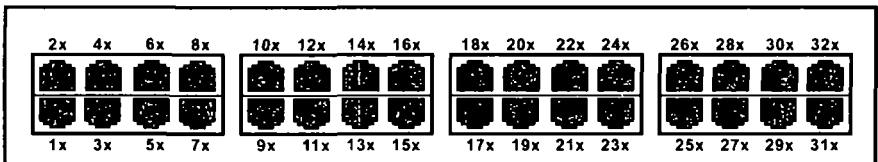


Figure 1.14 H232 Ports

Chapter 2

# Installation

## Hubs Allocation

The location chosen for a hub should be less than 100 meters from servers, workstations, or switches.

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**Caution:** Category 5 UTP/STP cables are environment-sensitive. Make sure that the cable route is not too close to electrical noise sources such as power lines or fluorescent lights.

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## Installing Rubber Feet

You may place the hub on a table or wiring closet shelf. In this case, stick the four self-adhesive rubber feet which come with the package at the four corners on the bottom surface of the hub as shown on Figure 2.1 so as to reduce impact.

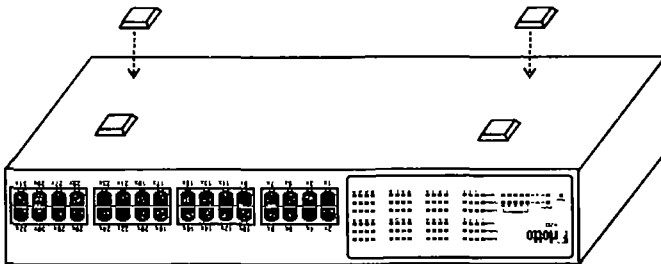


Figure 2.1 Installing the rubber feet

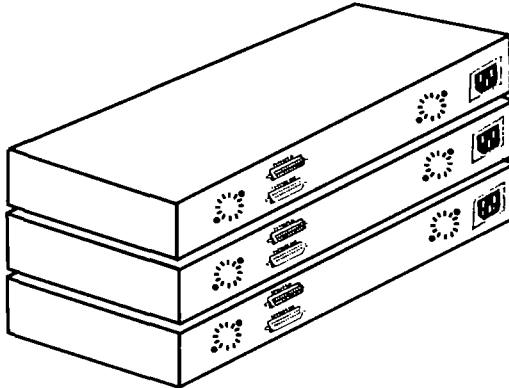
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## Stacking the Hubs

You may stack the hubs using the DB-25 connector on the rear panels.

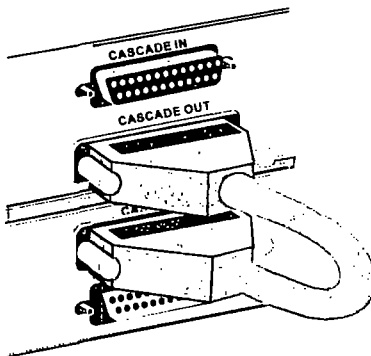
Please refer to the following illustrators for stacking.

Step 1: Place the hubs on a smooth and horizontal surface.



*Figure 2.2 Stacking Hubs on a Flat Surface*

Step 2: Connect the first and second hub with the supplied stacking cable by plugging one end of the cable into the CASCADE OUT port of the first hub, the other end into the CASCADE IN port of the second hub.



*Figure 2.3 Daisy Chain Ports*

Step 3: Make sure the each hub is connected properly. Fix the connectors by fastening the bolts at both sides.

Step 4: Repeat step2 and step3 until all hubs are combined together in a stack.

Step 5: Attach the AC power cord to hubs and connect the AC plugs.

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**Caution:** To connect daisy chain cable, the CASCADE IN port should connect to the CASCADE OUT port of another hub.

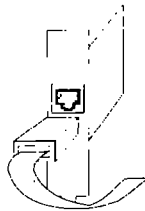
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## Connecting Other Network Devices

The 16/24/32-port 10/100Mbps dual speed hubs can be connected to either 10Mbps or 100Mbps devices due to its auto-sensing capability. This section will describe Hub's applications to help you setting up your network topology.

### Connecting Workstations

Install either 10BASE-T or 100BASE-TX Fast Ethernet Network Interface Card into each computer if not installed yet. Then connect one end of each UTP 5 cable to the Ethernet card's RJ-45 port in each computer and plug the other end into one of the RJ-45 ports on the dual speed hub as shown.



*Figure 2.4 Connecting Cables to a PC*

Maximum length of a cable between a hub and devices is 100 meters.



*Figure 2.5 Connecting Cables to the Hub*

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As shown in Figure 2.6, computers are connected to a 32-port 10/100Mbps dual speed hub to form a simple network.

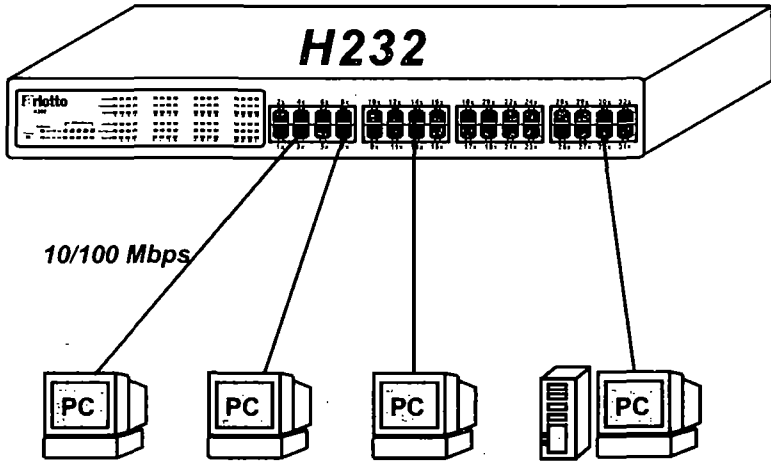


Figure 2.6 Connecting Workstations

## Connecting the MDI-II Port

The MDI-II port is built to connect an additional hub to enlarge the network.

This MDI-II port can be connected using straight through cable to other network device such as 10Mbps Ethernet hub or 100Mbps Fast Ethernet hub.

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**Note:** Port 1 is individually shared with the MDI-II port. When one is in use, the other should not be used.

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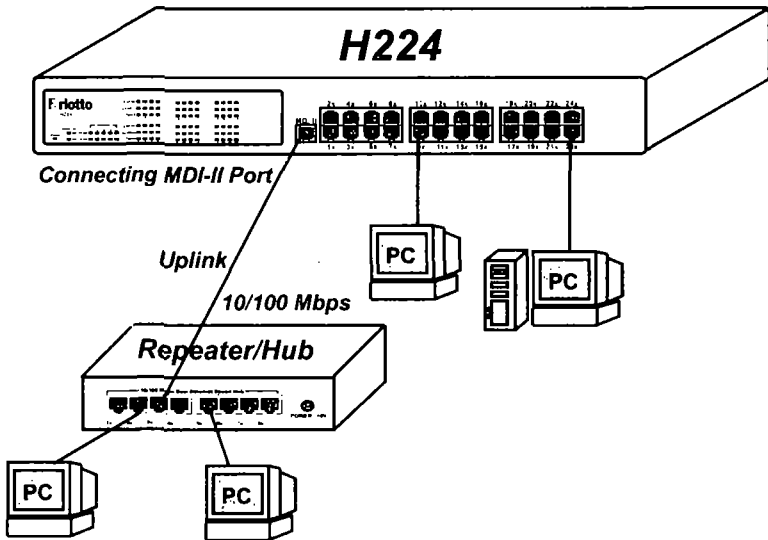


Figure 2.7 Connecting MDI-II ports

## Connecting Ethernet Hubs

The 16/24/32-port dual speed hub works as an Ethernet hub if all the devices connected to it are at the speed of 10Mbps.

You may connect 10Mbps devices using UTP cables with RJ-45 plugs, which enables sending/receiving to or from other 10Mbps devices. Each port on the dual speed hub has auto-sensing ability. A 16/24/32-port dual speed hub can detect and transmit correct 10Mbps information on a connected 10Base-T.

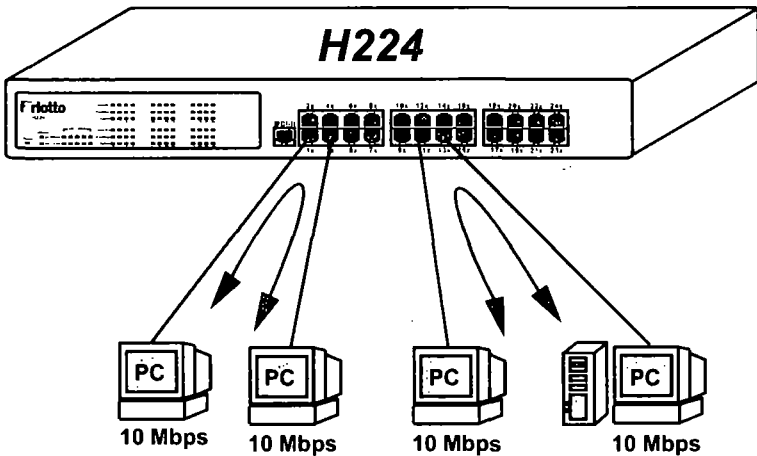


Figure 2.8 Connecting Ethernet Hubs

## Connecting Fast Ethernet Hubs

The 16/24/32-port 10/100Mbps dual speed hub works as a fast Ethernet hub if all the devices connected to it are at the speed of 100Mbps.

You may connect 100Mbps devices using UTP cables with RJ-45 plugs, which enables sending/receiving to other 100Mbps devices. Each port on HB-208PB has auto-sensing ability. A 16/24/32-port dual speed hub can detect and transmit correct 100Mbps information on a connected 100BASE-TX.

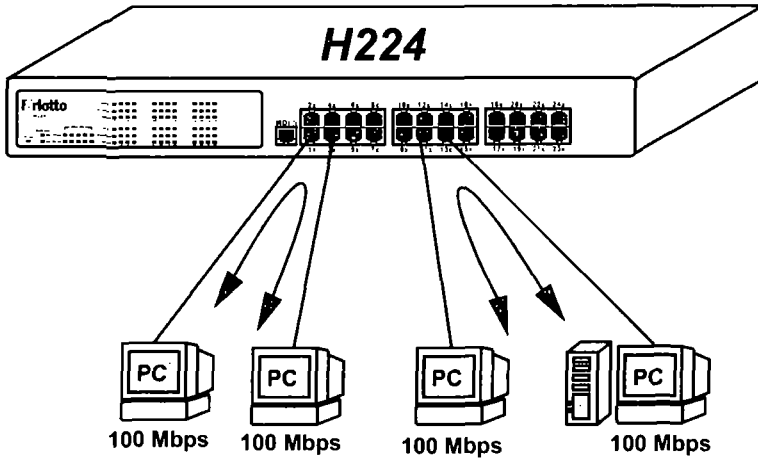


Figure 2.8 Connecting Fast Ethernet Hubs



## Connecting Ethernet Switching Hubs

The 16/24/32-port dual speed hub plays as an Ethernet switching hub, if you want to implement 10BASE-T and 100BASE-TX simultaneously. Two ports connecting to both 10Mbps and 100Mbps device are also required.

### Internal Switch Application

16/24/32-port dual speed hub inhabits with switching function, which effectively communicates between two individual domains -- 100Mbps and 10Mbps transmissions throughout the entire links. Without this switching ability, information cannot pass between the two different speed domains.

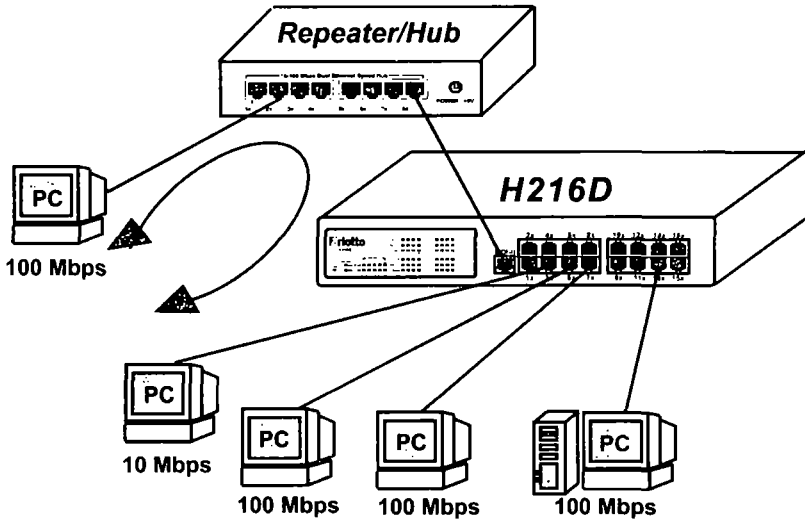


Figure 2.9 Connecting Ethernet Switching Hubs  
(Internal Switch Application)

## Appendix A

# Product Specifications

**Standards Compliance**

IEEE 802.3 10BASE-T Ethernet

IEEE 802.3u 100BASE-TX Ethernet

**Number of Ports****16-port dual speed hub**

Sixteen 10/100 Mbps Auto-sensing RJ-45 Ethernet ports

**24-port dual speed hub**

Twenty-four 10/100Mbps Auto-sensing RJ-45 Ethernet ports

**32-port dual speed hub**

Thirty-two 10/100Mbps Auto-sensing RJ-45 Ethernet ports

**Media Exchange Interface**

1 MDI-II Uplink port shared with port 1 (For 16/24-port dual speed hub only)

**Number of Segments**

Two independent segments of 10Mbps and 100Mbps

**LEDs Display****Per Device:**

Power

Collision indications for each 10Mbps and 100Mbps segments

Bandwidth utilization, %

**Per Port:**

Link/Rx

Partition

Speed

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**Switching function**

Build-in switching function for 10Mbps and 100Mbps Segment communication  
Packet forwarding between two collision domains (10/100Mbps): Store and Forward mode.

**Number of Hubs per Stack**

Dedicated DB-25 stack ports

DB-25 cable daisy-chain

**16/24-port dual speed hub**

Five hubs per stack

**32-port dual-speed hub**

Three hubs per stack

**Power Requirements**

90-240 VAC, 50/60 Hz

Internal universal power supply

**Environment**

Operating Temperature: 0° to 50°C

Storage Temperature: -30° to 60°C

Operating Humidity: 5% to 95% non- condensing

**Safety Regulations**

cUL

**EMI Certifications**

CE Mark

FCC Class A

**Dimensions****Desktop**

W x D x H: 300 x 190 x 44mm

**Rack-mount**

W x D x H: 440 x 213 x 55mm

**Weight**

H216D: 1.3 Kg                      H216: 2.8 Kg

H224: 2.9 Kg                      H232: 3 Kg

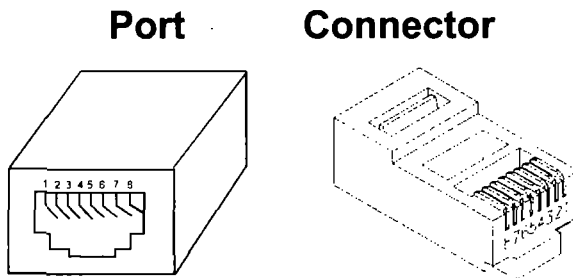
**Mounting**

Optional 19" rack-mount bracket

## Appendix B

# RJ-45 Connector Descriptions

The pin arrangement of the hub's RJ-45 connector is shown in Figure B.1.



*Figure B.1 RJ-45 Connector and Cable Pins*

RJ-45 station ports can be attached to any devices, which use a standard network interface (e.g., a workstation, server, bridge or router). Use unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cables for RJ-45 connections: 100 $\Omega$  Category 3,4 or 5 cable for 10Mbps connections or 100 $\Omega$  Category 5 cable for 100Mbps connection. Also be sure that the length of any twisted-pair connection does not exceed 100 meters (328 feet).

Pin	Regular Ports	MDI-II Port (Uplink)
1	Input Receive Data +	Output Transmit Data +
2	Input Receive Data -	Output Transmit Data -
3	Output Transmit Data +	Input Receive Data +
4	Not Used	Not Used
5	Not Used	Not Used
6	Output Transmit Data -	Input Receive Data +
7	Not Used	Not Used
8	Not Used	Not Used

Table B.1 RJ-45 Connector Pin Assignment

Schematics for both straight-through and cross-over twisted-pair cable are shown below.

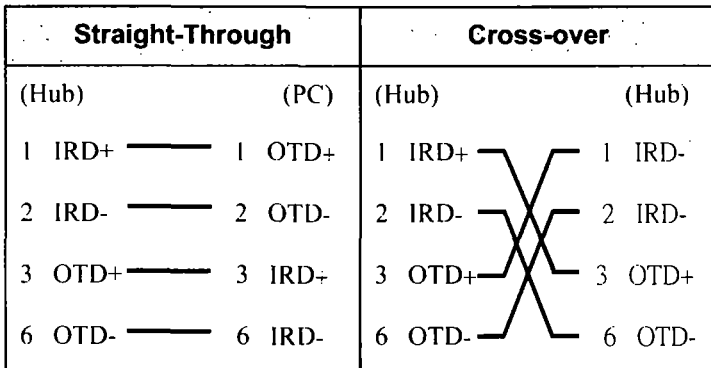


Table B.2 Straight-through cable and cross-over cable to hub or other devices connection