

# FriendlyNet Stackable Dual-speed Ethernet Hub

FH208B/FH208/FH216B/FH216

## User's Manual

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# About This Manual

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This manual discusses FriendlyNet Stackable Dual-speed Ethernet Hubs:

- ❑ FH208 8-Port FriendlyNet Expansion Hub
- ❑ FH208B 8-Port FriendlyNet Base Hub (with Bridge)
- ❑ FH216 16-Port FriendlyNet Expansion Hub
- ❑ FH216B 16-Port FriendlyNet Base Hub (with Bridge)

These models are similar in many respects. They differ in the number of Ethernet ports and in their capacity to act as a bridge between domains. Unless otherwise noted, information given in this manual is applicable to all models.

## Chapter Contents

This manual is divided into the following chapters and appendices:

- ❑ Chapter 1, “Introduction,” describes the Dual-speed FriendlyNet FH208, FH208B, FH216, and FH216B Ethernet Hubs and their features
- ❑ Chapter 2, “Installation,” explains how to install, mount, connect, and power on the Dual-speed FriendlyNet FH208, FH208B, FH216, and FH216B Ethernet Hubs
- ❑ Chapter 3, “LED Indicators,” describes how to interpret the Dual-speed FriendlyNet FH208, FH208B, FH216, and FH216B Ethernet Hub’s LEDs
- ❑ Appendix A, “Troubleshooting,” explains how to troubleshoot problems by monitoring the Dual-speed FriendlyNet FH208, FH208B, FH216, and FH216B Ethernet Hub’s LEDs
- ❑ Appendix B, “Specifications,” describes the Dual-speed FriendlyNet FH208, FH208B, FH216, and FH216B Ethernet Hub’s technical specifications
- ❑ Appendix C, “Technical Support” explains how to contact Asanté Technical Support

## Document Conventions

This manual uses the following conventions to convey instructions and information:

- Commands and key words are in boldface font.
- ◆ **Note:** Noteworthy information, which contains helpful suggestions or references to other sections in the manual, is in this format.
- ▲ **Important!** Significant information that calls attention to important features or instructions is in this format. This format is also used for **Caution!**

This chapter introduces the following topics:

- ❑ Package Contents
- ❑ FriendlyNet Stackable Dual-speed Ethernet Hubs
  - ❑ FH208 8-Port FriendlyNet Expansion Hub
  - ❑ FH208B 8-Port FriendlyNet Base Hub (with Bridge)
  - ❑ FH216 16-Port FriendlyNet Expansion Hub
  - ❑ FH216B 16-Port FriendlyNet Base Hub (with Bridge)
- ❑ Performance Features
  - ❑ 10Mbps/100Mbps Auto-sensing
  - ❑ Expansion Features
- ❑ Network Ideas and Concepts

## Package Contents

The package contents include the following items:

- ❑ (1) FH208 8-Port Expansion Hub, or FH216 16-Port Expansion Hub, or FH208B 8-Port Base Hub, or FH216B 16-Port Base Hub
- ❑ AC power cord
- ❑ Connector Cable (DB-25) for connecting hubs
- ❑ (4) Self-adhesive rubber feet
- ❑ Desk Stands
- ❑ Wall-mount kit which includes two screws and two screw anchors
- ❑ Rack-mount kit which includes two rack-mounting brackets and mounting screws
- ❑ User's Manual (this book)

## Introduction

# The FriendlyNet Dual-speed Hub

Dual-speed hubs are a compact, flexible solution for workgroups or SOHO (Small Office/Home Office) LANs (Local Area Networks).

The Asanté hub's compact design makes it ideal for desktop placement or rack mounting.

The *Dual-speed* feature allows unmanaged hubs to operate in either 10Mbps or 100Mbps modes. These transmission speeds are automatically detected or can be set manually on ports one and eight.

The stackable feature allows you to join up to three hubs, thereby forming a network of up to 48 ports.

The FH208B/FH216B Base Hubs allow for simultaneous transmission between 10Mbps and 100Mbps domains. When hubs are stacked, a FH208B or FH216B **must be present in the stack** — as a **base hub**. The FH208 and FH216 are expansion hubs and can be joined through the back panel cascade connectors.



Figure 1-1 FH208 8-Port FriendlyNet Expansion Hub



Figure 1-2 FH208B 8-Port FriendlyNet Base Hub



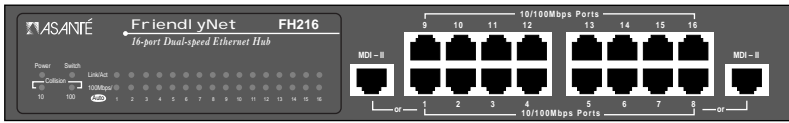


Figure 1-3 FH216 16-Port FriendlyNet Expansion Hub

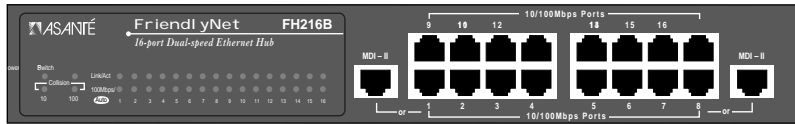


Figure 1-4 FH216B 16-Port FriendlyNet Base Hub

## Performance Features

The Dual-speed FriendlyNet Hubs offer the following features:

### 10/100Mbps Auto-sensing

In Auto-sensing mode, hubs will automatically detect whether the network station is connected for 10Mbps or 100Mbps transmission speed.

### Three-Speed Mode Setup (Ports 1 and 8 Only)

Three-speed mode set up is useful for special network environments such as 10Mbps or 100Mbps only. By setting the DIP switches, the MDI-II ports can operate in one of three speed modes:

- ❑ Auto-sensing mode
- ❑ 100Mbps mode
- ❑ 10Mbps mode

To manually set a speed for your network, refer to “Setting up Forced Speed for the MDI-II Ports” in Chapter 2.

### The Base Unit (Bridge)

The FH208B and FH216B Ethernet Hubs include an internal, automatic switch for *bridging* between 10Mbps and 100Mbps domains throughout the

## Introduction

entire stack. The bridging operation is indicated by the illuminated Switch LED.

- ▲ **Important!** Without the Base Unit, data cannot pass between these two domains.
- ▲ **Important!** Do not connect two Base Units together.

## Network Ideas and Concepts

FriendlyNet Stackable Ethernet Hubs allow for a variety of network design configurations. Here is one example.

### Stand-alone or Single Star Topology

In a stand-alone network, the *resources*, such as workstations, printers, etc., are connected by a single hub. This is called star topology because the resources form multiple *points* emanating from a single hub. In the example shown in Figure 1-5, seven workstations are connected to one FriendlyNet 8-Port Hub.

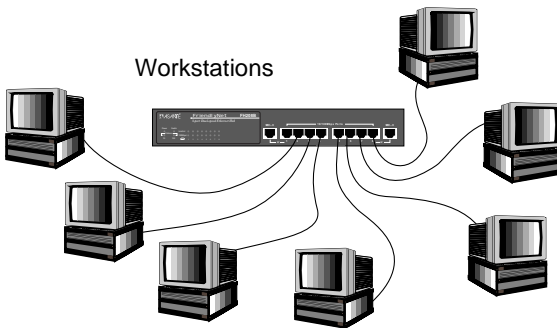


Figure 1-5 Stand-alone or Single Star Topology

The stand-alone design makes troubleshooting easy, since each segment supports only one attachment.

# Installation

This chapter cover the following topics:

- Components
- Cabling and Voltage Requirements
- Placement and Mounting
- Connecting Network Devices
- Powering On the Hub

## Components

This section describes the features of the Dual-speed FriendlyNet Hubs FH208, FH208B, FH216 and FH216B.

### The Front Panel of the FH208 and FH208B Hubs

The Dual-speed FriendlyNet Hubs FH208 and FH208B front panels show:

- Eight dual-speed (UTP) Ethernet ports
- Two MDI-II ports
- LED indicators.



Figure 2-1 FH208 Front Panel



Figure 2-2 FH208B Front Panel

## Installation

### The Front Panel of the FH216 and FH216B Hubs

The Dual-speed FriendlyNet Hubs FH216 and FH216B front panels show:

- Sixteen dual-speed (UTP) Ethernet ports
- Two MDI-II ports
- LED Indicators

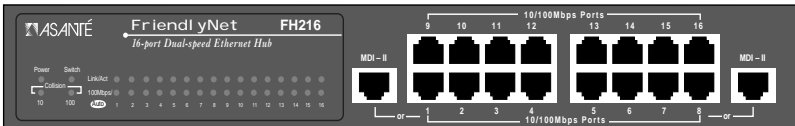


Figure 2-3 FH216 Front Panel

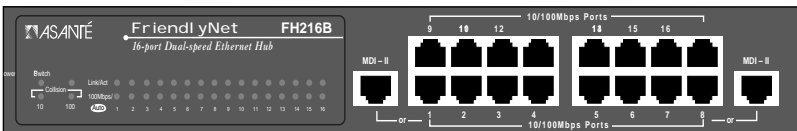


Figure 2-4 FH216B Front Panel

### LED Indicators

The Dual-speed FriendlyNet Hubs contain LEDs, which indicate the power, port activity and status. The LED nomenclature, color, and function are described below:

- Power (green): Illuminates when AC power is applied to the Hub.
- Switch (green): The FH208B and the FH216B have an internal switch (or bridge) module which enables simultaneous 10Mbps and 100Mbps transmission.
- Collision (yellow): A collision occurs when two or more stations in the Ethernet network attempt to transmit data at the same time. The LEDs will indicate a collision while the stations re-transmit. There are two Collision LEDs:
  - 10Mbps segment
  - 100Mbps segment

- ❑ Link/Act (green): The hubs have one Link/Act LED group — one LED for each port indicates if the port is connected and active.
- ❑ 100Mbps/Auto (green): Each port has an LED which indicates one of the following speed settings:
  - ❑ 10Mbps
  - ❑ 100Mbps
  - ❑ Auto-sensing

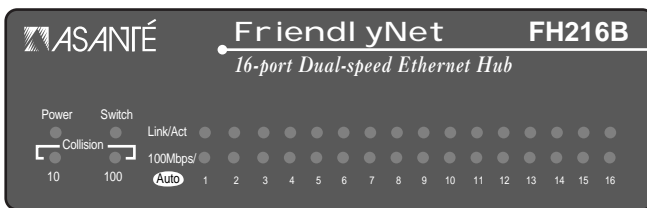


Figure 2-5 LED Indicators, typical

## The Rear Panel

The rear panels for Dual-speed FriendlyNet Hubs FH208 and FH208B as shown in Figure 2-6, include:

- ❑ Cascade In/ Cascade Out connectors. Used to join the hubs in a stack through DB-25 cables. Up to three hubs may be connected together within a collision domain. Three 16-port units will provide a maximum of 48 ports
- ❑ Fan
- ❑ AC Power socket
- ❑ DIP Switches. The DIP switches located at the rear of the unit enable two MDI-II ports (one and eight) to be set to one of three modes:
  - ❑ 10M
  - ❑ 100M
  - ❑ Auto-sensing. This is the factory default setting

## Installation



Figure 2-6 Rear Panel of FH208 and FH208B

The rear panels for the Dual-speed FriendlyNet Hubs FH216 and FH216B are similar but also include an additional MII connector as shown in Figure 2-7.

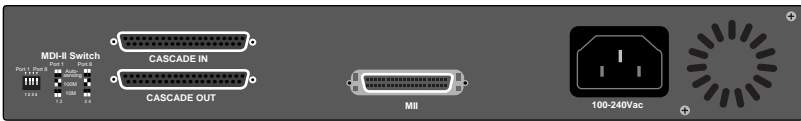


Figure 2-7 Rear Panel of FH216 and FH216B with MII Connector

## Cabling and Voltage Requirements

This section describes cabling and voltage requirements for the Dual-speed FriendlyNet Hubs FH208, FH208B, FH216, and FH216B.

### Cabling Requirements

#### 10Base-T

10Base-T transmission connection requires UTP (Unshielded Twisted Pair) Category 3 cables.

#### 100Base-TX

100Base-TX transmission connection requires UTP (Unshielded Twisted Pair) Category 5 cables. 100Base-TX requires that all wiring and accessories meet EIA/TIA 568B specifications for proper operation. When wiring a 100Base-TX network, make sure that the *entire* cable plant meets specifications.

- ▲ **Important!** Some installations have UTP Category 5 cabling, but do not have wall outlets and/or wiring closet punchdown blocks that meet Category 5 requirements.

### Voltage Requirements

Voltage requirements for all models:

- 100 to 240Vac, 50/60Hz, 1.2A maximum
- ▲ **Important!** Check the AC power line voltage used in your area.

### Placement and Mounting

#### Hub Location

The location chosen for the Dual-speed FriendlyNet Hub should be less than 100 meters from servers, workstations, or switches.

- ▲ **Caution!** Category 5 cables are environment-sensitive. Make sure that the cable route is not too close to electromagnetic noise sources such as power lines or fluorescent lights.

#### Self-adhering Rubber Feet

To place the hub on a the desktop, apply the self-adhering rubber feet to the bottom four corners as shown in Figure 2-8.

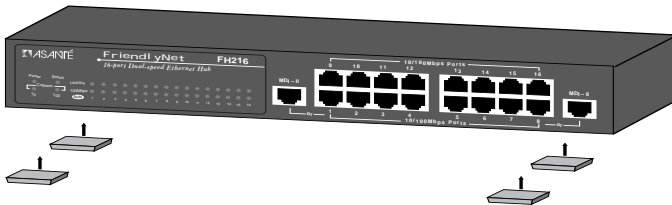


Figure 2-8 Self-adhering Rubber Feet

#### Desk Stands

Desk stands easily attach to a hub without screws, bolts or tools. See Figure 2-9.

To stack hubs using desk stands:

- 1 Attach two stands to each side of the first hub.

## Installation

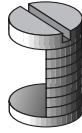


Figure 2-9 Desk Stands

- 2** Slide additional stands into the slots on top of each stand on the first hub as shown in Figure 2-10.
- 3** Slide the second hub between the stands.
- 4** Press the stands tightly against the hub.

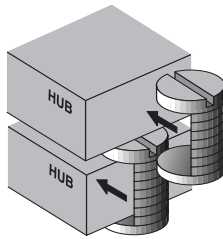


Figure 2-10 Using Desk Stands

### Rack Mounting

A rack mount bracket is an optional way to mount hubs in standard EIA 19-inch racks.

- 1** Align the mounting brackets on the sides of the unit with the slit over the holes as shown in Figure 2-11.
- 2** Secure the screws tightly to fix the brackets to the device.
- 3** Place the device into the 19-inch rack and attach it properly.  
Ensure that the ventilation holes do not get blocked.



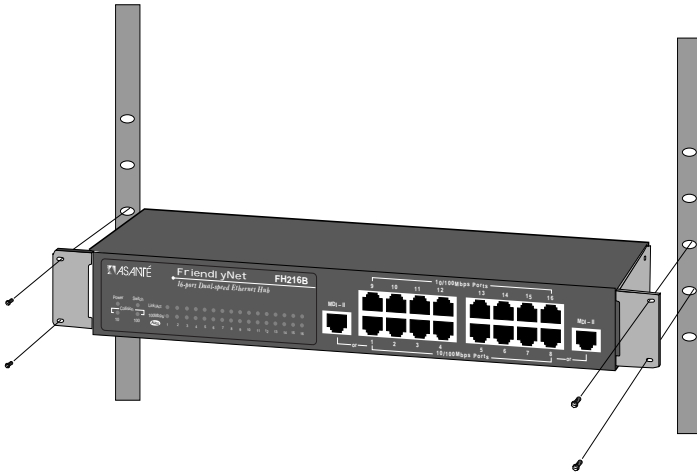


Figure 2-11 Rack Mounting

## Connecting Network Devices

The Auto-sensing capability allows Asanté Hubs to connect to 10Mbps and/or 100Mbps devices in your network. This section describes setting up network configurations using a variety of devices.

### 10Mbps/100Mbps Speed Sources

By default, each port is set to Auto-sensing mode. The Asanté Hubs will detect the correct 10Mbps/100Mbps speed to transmit information to connected 10Base-T or 100Base-TX devices.

The FH208 and the FH216 need two different speed sources to transmit 10Mbps or 100Mbps within two different domains. Therefore, two ports connected to 10Mbps and 100Mbps are required.

- ▲ **Caution!** 10Mbps and 100Mbps information *cannot* be transmitted between 10Mbps and 100Mbps domains.

If you want to transmit information between 10Mbps and 100Mbps domains, a switching hub or a hub with an internal switch module such as the FH208B

## Installation

or FH216B is required. See “Connecting Ethernet Hubs and Switches” on page 2-12 for further information.

Forced speed also can be set to expand your network options. See “Setting Up Forced Speed for the MDI-II Ports” on page 2-10.

## Connecting Workstations

To connect your hub to workstations or *nodes*:

- 1** Be sure each computer has either a 10Base-T or 100Base-TX Ethernet Network Interface Card installed.
- 2** Connect one end of each UTP cable to the Ethernet Card's RJ-45 port in each computer.
  - for 10Base-T use UTP Category 3 cable or better
  - for 100Base-TX use UTP Category 5 cable
- 3** Plug the other end into one of the RJ-45 ports on the hub as shown in Figure 2-12.

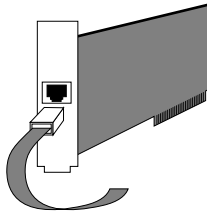


Figure 2-12 Connecting a Cable to a PC

- ◆ **Note:** The maximum length of cable between a hub and device is 100 meters, including all patch cables and cross-connect wires.
- 4** Continue connecting workstations to the hub using UTP cables to create a network as shown in the example in Figure 2-13. Additional devices can be connected through the MDI-II ports using straight through (UTP) cables.

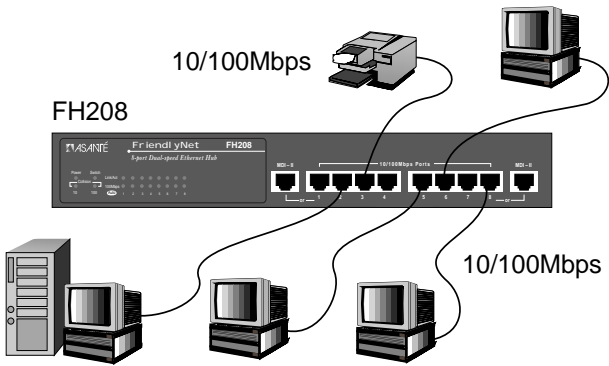


Figure 2-13 Connecting Workstations

## Connecting Devices to MDI-II Ports

The Asanté Hub offers two MDI-II ports. Using straight through cables, these ports can be connected to other network devices such as a 10Mbps Ethernet hub, a 100Mbps Fast Ethernet hub, or a switching hub. See Figure 2-14.

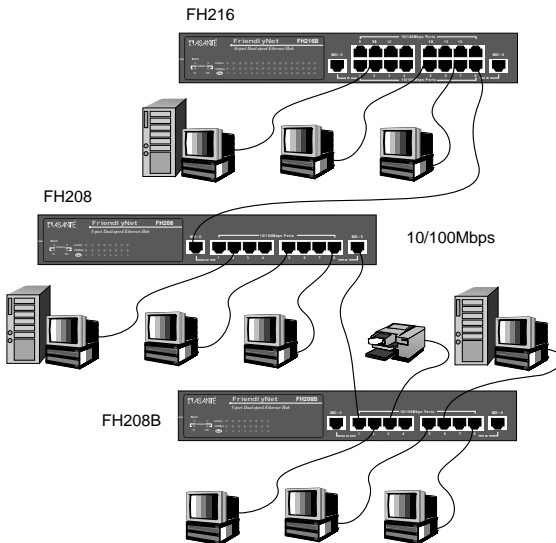


Figure 2-14 Connecting MDI-II ports

## Installation

### Setting Up Forced Speed for the MDI-II Ports

Auto-sensing is the default mode. If the devices connected to the hub using the MDI-II ports *do not* support Auto-sensing or if for other reasons you wish to force the speed, set the DIP switches to one of the positions shown in Figure 2-15. Note that forced speed can only be applied to the MDI-II ports. The DIP switches will force either or both of the MDI-II ports into one of three modes:

- Auto-sensing — set the Port 1 switches and/or Port 2 switches to the down position
  - 100M — set the Port switches 1 and/or Port 2 switches to the up position
  - 10M — set Port 1 switch 1 up, 2 down; and/or Port 2 switch 3 up, 4 down
- ▲ **Important!** After changing the DIP switch settings, the AC power to the unit must be cycled.
- ▲ **Important!** Ports 1 and 8 are individually shared with the MDI-II ports. Therefore, when an MDI-II port is in use, its nearest port (1 or 8) will be disabled.

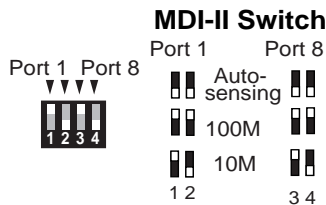


Figure 2-15 MDI-II DIP Switch Settings

### Connecting Ethernet and Fast Ethernet Hubs

If your transmission speed is 10Mbps, connect 10Mbps devices using UTP Category 3 cables. This enables sending/receiving to other 10Mbps devices.

The FH216 and FH216B include a Fast Ethernet MII connector on the rear panel. You can connect a Fast Ethernet MII transceiver to this port. It is fixed at 100Mbps and half-duplex.

### Connecting Fast Ethernet Hubs

If your transmission speed is 100Mbps, using the same method, connect 100 Mbps devices using UTP Category 5 cables with RJ-45 plugs. This enables sending/receiving to other 100Mbps devices.

- ▲ **Caution!** Hubs FH208 and FH216 function as ordinary dual-speed hubs. Using these hubs, 10Mbps information can only pass to other 10Mbps devices and 100Mbps can only pass to 100Mbps devices. To transmit information between 10Mbps and 100Mbps simultaneously, use the FH208B or FH216B.

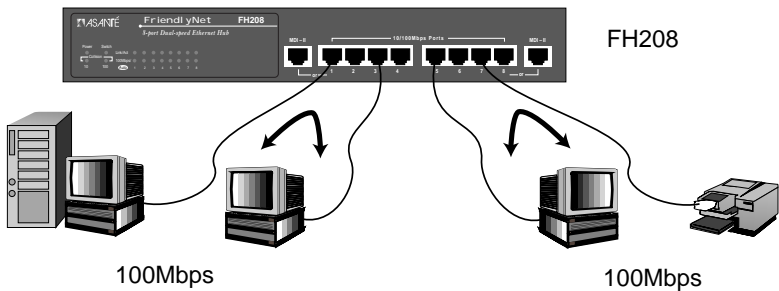


Figure 2-16 Connecting FH208 Fast Ethernet Hub

### Stacking Hubs and Cascade Connections

Up to three hubs may be connected within a stack. Three 8-port units will provide up to 24 ports; three 16-port units will provide up to 48 ports.

#### Cascade Connectors

Connect hubs in a stack using Cascade Connector cables as shown in Figure 2-17. When stacking hubs:

- Use a Cascade Connector cable to join hubs
- Maximum length of the Cascade Connector cables is eight inches
- No DIP switches should be set while joining hubs together

## Installation

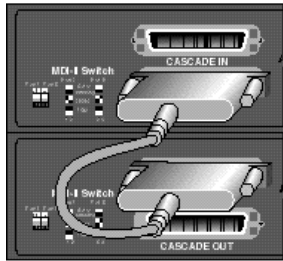


Figure 2-17 Cascade Connector Cables

- ▲ **Important!** The Cascade In port should connect to the Cascade Out port of another hub.

## Connecting Ethernet Hubs and Switches

Switches enable simultaneous 10Mbps/100Mbps transmission. If you wish to transmit information between 10Mbps and 100Mbps *domains* simultaneously, use a hub with an internal switch module, also known as a *bridge*, such as the Asante´ FH208B or FH216B. As an option, you may wish to use a stand-alone or external switch in your network.

The requirements for implementing 10Base-T and 100Base-TX in a hub are:

- Separate 10Mbps and 100Mbps sources
- Two ports connecting to 10Mbps and 100Mbps

### Dual-speed FriendlyNet Hub with Bridge

The Dual-speed FriendlyNet Bridge is a cost-effective alternative to external switches. The Bridge serves as a transparent connection between hubs, devices and workstations of different transmission speeds.

### Stacking Hubs with the Bridge (Base Unit)

When including a base unit such as the FH208B or FH216B within a stack of hubs the base unit may be placed anywhere within the stack. See Figure 2-18. In this configuration, the devices in the network connected to MDI-II ports and RJ-45 ports may be bridged. Non-bridged units in the stack configuration serve as expansion hubs for the base unit.

- ▲ **Important!** Do not stack two bridge hubs together.

Up to three hubs may be connected together within a collision domain. When stacking hubs:

- ❑ Use a Cascade Connector cable to join hubs
- ❑ Maximum length of the Cascade Connector cables is eight inches
- ▲ **Caution!** Place only one base unit in a network. More than one bridge or switch in a network will generate network looping.

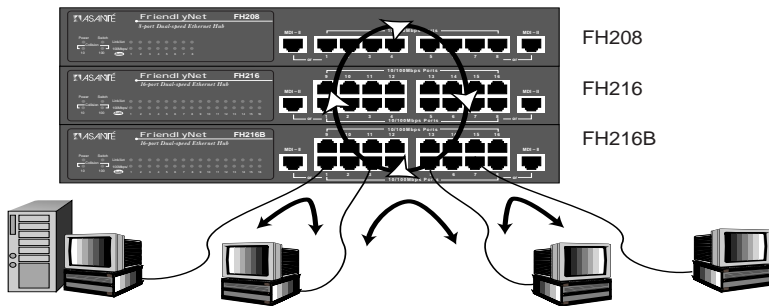


Figure 2-18 Stacked Hubs with Bridge and Devices

## Powering On the Hub

This section describes how to apply power to the Dual-speed FriendlyNet Hubs. The FH208, FH208B, FH216, and FH216B may be turned on with or without LAN segment cables connected.

To power on the Hub:

- 1 Connect one end of the power cord (supplied) into the AC power connector on the back panel of the Hub.
- 2 Plug the cord into a suitable AC power outlet.

# Installation



## LED Indicators

The front panel LEDs visually indicate the power, port activity and status. If the LED indicators do not correspond to the activities listed in this chapter, refer to Appendix A: Troubleshooting.

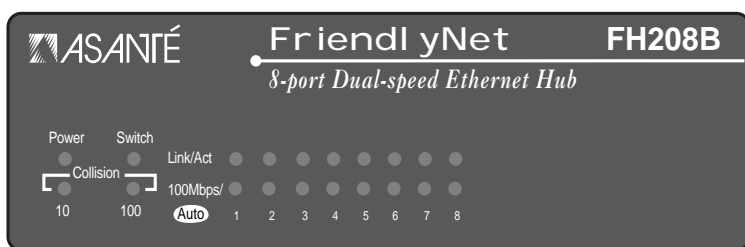


Figure 3-1 FH208B Front Panel LED  
(Similar to FH208 front panel)

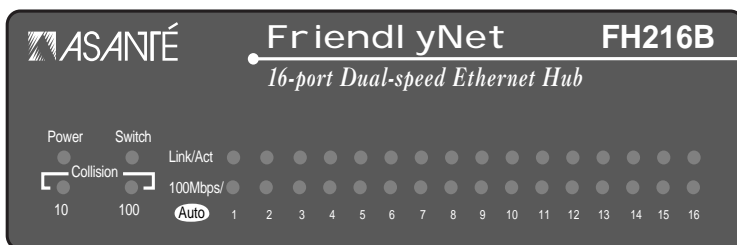


Figure 3-2 FH216B Front Panel LED  
(Similar to FH216 front panel)

## LED Indicators

### Power (green)

The Power LED light will be **ON** when any model Asanté Hub is supplied with the required power.

### Collision (yellow)

There are two Collision LEDs on the Dual-speed FriendlyNet Hub. One is for 10Mbps and the other is for 100Mbps. If the network is experiencing excessive collisions, see Appendix A: Troubleshooting.

Table 3-1 10Mbps/100Mbps Collision LED

Hub	LED Status	Description
FH208	ON	Collision in 10Mbps segment
FH208B	ON	Collision in 100Mbps segment
FH216		
FH216B	OFF	No Collision

### 10Mbps/100Mbps/Auto-sensing LED (green)

There is a single speed (10Mbps/100Mbps/Auto) LED for each port on the Dual-speed FriendlyNet Hub. Port status is determined by the current mode setting.

Table 3-2 100Mbps/Auto-sensing LED

Hub	LED Status	Description
FH208	ON	100Mbps connection
FH208B	OFF	10Mbps link connection
FH216		
FH216B	Blinking	10Mbps/100Mbps Auto-sensing mode is active

## Link/Act LED (green)

The Dual-speed FriendlyNet Hub has one Link/Activity LED group, one LED for each port.

Table 3-3 Link/Act LED

Hub	LED Status	Description
FH208	ON	Port is connected to a device
FH208B FH216	OFF	Port is not connected to a device
FH216B	Blinking	Port is receiving data

## Switch LED on FH208B or FH216B (green)

When 10Mbps and 100Mbps data are forwarding through the FH208B or FH216B, the Switch LED will be ON.

# LED Indicators

# Troubleshooting

## Troubleshooting the Dual-speed FriendlyNet Hub

Symptom	Indication	Solution
No power	Power LED OFF	Check the power cord. Make sure the power outlet is functional. Make sure the power cord is properly connected to the outlet and is securely connected to the hub.
Port connection not functioning	Link/Act LED OFF	Make sure the cable is functioning and is properly connected at both ends. Check the crimp of the RJ-45. Make sure the UTP cable is Category 5 for 100Base-TX. Make sure the UTP cable is Category 3 for 10Base-T. Make sure the cable length does not exceed 100 meters.
Excessive collisions	Collision LED ON	Make sure the workstation cable does not exceed 100 meters. The total network diameter should not exceed 205 meters Make sure all the devices on the network are functioning properly.
Failed system		Network Looping There can be only one FH208B Hub or one FH216B Hub in a stack. More than one hub will cause infinite network looping, which can bring down the entire system.



# Product Specifications

## Dual-speed FriendlyNet Hub Specifications

Specification	FH208/FH216	FH208B/FH216B
Standards Compliance	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Ethernet	
Number of Ports	Eight or 16, 10/100Mbps/Auto-sensing, RJ-45 Two MDI-II	
Number of Segments	Two independent segments - 10Mbps and 100Mbps	
LED Display	<input type="checkbox"/> Power <input type="checkbox"/> 10Mbps Collision <input type="checkbox"/> 100Mbps Collision <input type="checkbox"/> Link/Act <input type="checkbox"/> 10M/100M/Auto-sensing	
		Switch
Media Dependant Interface	Two MDI-II Uplink ports shared with ports 1 and 8	
Stackable Hubs	Up to three hubs dedicated DB-25 stack ports	
Port Partitioning	Automatic partitioning per port	
Dual-speed Setting	Four DIP switches may be set for 10Mbps, 100Mbps or Auto-sensing on MDI-II ports only	
Switch Module		Built-in module for 10Mbps, 100Mbps segment communication
Power Requirements	100 to 240Vac, 50/60Hz	
Environment	Operating Temp: 0 to 50 C Storage Temp: -30 to 60 C Operating Humidity: 5% to 90% (non-condensing)	
Safety Regulations	CUL (UL & CSA) LVD	

<b>Specification</b>	<b>FH208/FH216</b>	<b>FH208B/FH216B</b>
EMI Certificate	FCC Class A, CE Mark VCCI Class 1	
Dimensions: W x D x H	330L x 190W x 44H mm	
Weight	1.2 Kg	
Placement and Mounting	Optional: 19" Rack mount bracket Desk stands Self-adhering feet	



## Technical Support

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### Contacting Technical Support

To contact Asanté Technical Support:

Telephone	(800) 622-7464
Fax	(801) 566-3787
Internet Mail	support@asante.com
World Wide Web Site	<a href="http://www.asante.com">http://www.asante.com</a>
Bulletin Board Service (BBS)	(408) 432-1416
ARA BBS (guest log-in)	(408) 894-0765
FTP Archive	ftp.asante.com

### Technical Support Hours

6:00 a.m. to 5:00 p.m. Pacific Standard Time USA, Monday - Friday.







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