

FCC Warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limitations are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if no installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into a different outlet from that the receiver is connected.
- Consult your local distributors or an experienced radio/TV technician for help.
- Shielded interface cables must be used in order to comply with emission limits.

Changes or modifications to the equipment, which are not approved by the party responsible for compliance could affect the user's authority to operate the equipment.

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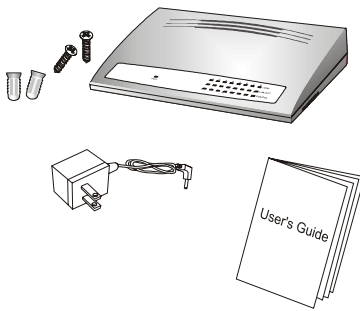
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1. Unpacking Information

Thank you for purchasing the NWay switching hub. Before you start, please check all the contents of this package.

The product package should include the following:

1. One NWay switching hub
2. One external power adapter
3. User's manual
4. Screws and wall-mount plastic



2. Introduction To NWay Switch

2.1 General Description

The device is a powerful, high-performance Fast Ethernet switching hub, with all ports capable of 10 or 100Mbps auto-negotiation operation (NWay) which means the switch could automatically negotiate with the connected partners on the network speed and duplex mode. It is ideal for micro-segmenting large networks into smaller, connected subnets for improved performance, enabling the bandwidth demanding multimedia and imaging applications. Moreover, the 10/100Mbps auto-sensing ability provides an easy way to migrate 10Mbps to 100Mbps network with no pain. Compared to the shared 10Mbps or 100Mbps networks, the switching hub delivers a dedicated 10/100Mbps connection to every attached client with no bandwidth congestion issue. This switch also supports auto MDI-X function. Each port could be used to connect to another switch or hub with no crossover RJ-45 cable.

Store-and-forward switching mode promises the low latency plus eliminates all the network errors, including runt and CRC error packets. To work under full-duplex mode, transmission and reception of the frames can occur simultaneously without causing collisions as well as double the network bandwidth.

The switching hub is plug-n-play without any software to configure and also fully compliant with all kinds of network protocols. Moreover, the rich diagnostic LEDs on the front-panel can provide the operating status of individual port and whole system.

For network connection:

The switching hub can use the following types of cabling:

- 10BASE-T Category 3, 4 or 5 UTP/STP
- 100BASE-TX Category 5 UTP/STP

Category 5 cable is preferred to be used with this product in structured wiring environments. This will ensure correct operation of all ports at 10Mbps or 100Mbps.

2.2 Key Features

The switching hub provides the following key features:

- Complies with 10BASE-T specifications of the IEEE802.3 standard
- Complies with 100BASE-TX specifications of the IEEE802.3u standard
- All RJ-45 ports for 100Base-TX and 10Base-T connectivity
- Supports NWay protocol for speed (10/100Mbps) and duplex mode (Half/Full) auto-detection
- Supports MDI/MDI-X auto crossover
- Supports full and half duplex operation on all ports
- Support back-pressure (half duplex) and flow control (IEEE 802.3x)
- Wire-speed packet filtering and forwarding rate
- Store-and-forward architecture filters fragment & CRC error packets
- Supports 1K MAC address entries in whole system
- 128KBytes buffer memory
- Supports extensive LED indicators for network diagnostics
- External power adapter
- FCC Class A, CE

2.3 The Front Panel

The front panel of the switching hub is shown below.



The auto-negotiation feature of the switching hub allows each port of the device running at one of the following four operation modes:

Speed	Duplex Mode
100 Mbps	Half-duplex
	Full-duplex
10 Mbps	Half-duplex
	Full-duplex

Each 10/100Mbps port supports auto MDI-X capability that is the port could connect either the PC or hub without any cable adjustment.

2.3.1 LEDs

2.3.1.1 Power LED

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

2.3.1.2 100M LED

The 100M LED indicates the link speed of each port. If the LED lights green, the connection speed is 100Mbps, off for 10Mbps.

2.3.1.3 Link/Act LED

Every port has a Link/Activity LED. Steady green (link state) indicates that the port has good linkage to its associated device. Flashing green indicates that the port is receiving or transmitting data between its associated device.

If the port is connected but the Link/Activity LED is dark, check the following items:

1. The switching hub and the connected device's powers are on or not
2. The cable is firmly seated in its connectors in the switching hub and in the associated device.
3. The connecting cable is good and with correct type
4. The connecting device, including any network adapter is functioning.

From the 100M and Link/Activity LED, we could judge the connection speed as following:

100M LED	Link/Activity LED	Status
Off	Off	No Connection
Off	Green	Connect as 10Mbps
Green	Green	Connect as 100Mbps

2.3.1.4 FDX/COL LED

A collision occurs when two stations within a collision domain attempt to transmit data at the same time. Intermittent flashing amber of the LED is normal; the contending adapters resolve each collision by means of a wait-then-retransmit algorithm. Frequency of collisions is a message of heavy traffic on the network.

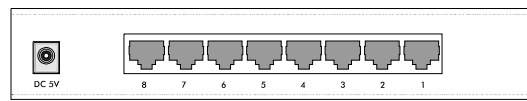
If the FDX/COL light green which means the port is under full-duplex operation or dark for half-duplex mode.

The following table is a summary of Port LEDs.

LED	Status	Operation
Power	Steady Green	Power is on
	Off	Power is off
100M	Steady Green	Connected as 100Mbps
	Off	Connected as 10Mbps
Link/Act	Steady Green	The port is connected
	Blinking Green	The port is transmitting/receiving data.
	Off	No connection
FDX/COL	Steady Amber	Full-duplex mode
	Blinking Amber	Collision
	Off	Half-duplex mode

2.4 The Rear Panel

The rear panel of the switching hub is shown as below



2.4.1 Power Connecting

Plug the circle end of the power adapter firmly into the rear panel of the switching hub, and the other end into an electric service outlet then the system is ready.

3. Installing And Using NWay Switch

3.1 Installing The NWay Switch

The hub does not require software configuration. Users can immediately use any of the features of this product simply by attaching the cables and turning the power on.

3.1.1 Desktop Installation

To locate the switching hub on the desktop and place the hub on a clean, flat desk or table close to a power outlet. Plug in all network connections and the power cord, then the system is ready.

When deciding where to put the switching hub then you must ensure:

- It is accessible and cables can be connected easily
- Cabling is away from:
Sources of electrical noise such as radios, transmitters and broadband amplifiers
Power lines and fluorescent lighting fixtures.
- Water or moisture can not enter the unit
- Air flow around the unit and through the vents in the side of the case is not restricted (company recommend that you provide a minimum of 25mm clearance)

To prolong the operational life of your units:

- Never stack units more than eight high if freestanding.
- Do not place objects on top of any unit or stack
- Do not obstruct any vents at the sides of the case

3.1.2 Installing Network Cables

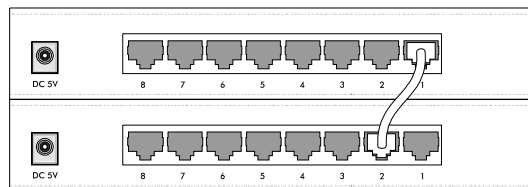
After placing the hub on the desktop, then we need to know how to connect the device to network.

3.1.2.1 Station Connections with Twisted-Pair Cable

Connect each station to the hub by a twisted-pair straight cable (10BASE-T or 100BASE-T cables). Plug one RJ-45 connector into a rear-panel port of the hub, and plug the other RJ-45 connector into the station's network adapter.

3.1.2.2 Switch to Switch Connections with Twisted-Pair Cable

In making a switch to switch connection, you could use any port to connect another switch with straight or cross-over cable. As all the ports support auto MDI-X function, so the connection is independent of cable type and using a straight cable to make a switch to switch connection is allowed.



4. Switch Operation

4.1 MAC Address Table and Learning

The switching hub is implemented with a MAC address table which is composed of many entries. Each entry is used to store the address information of network nodes on the network, including MAC address, port ID, etc. The information is the most important base to do packet filtering and forwarding.

When one packet comes in from any port, the switching hub will learn the source address, port ID, and the other related information in address table. Therefore, the content of the MAC table will update dynamically.

4.2 Filtering and Forwarding

When one packet comes in from any port of the switching hub, it will check the destination address besides the source address learning. The hub will look up the address table for the destination address. If not found, this packet will be forwarded to all the other ports except the port which this packet comes in. If found, and the destination address is located at different port from this packet comes in, the packet will be forwarded to the port where this destination address is located according to the information of address table. But, if the destination address is located at the same port as this packet comes in then this packet will be filtered.

4.3 Store and Forward

Store-and-forward is one kind of packet-forwarding methodology. As a store-and-forward switching hub, it will store the complete packet in the internal buffer and do the complete error checking before transmitting to the network. Therefore, no error packets will disturb the network. It is the best choice when a network needs efficiency and stability.

5. Product Specifications

Standard	IEEE802.3, 10BASE-T IEEE802.3u, 100BASE-TX
Interface	RJ-45 NWay switching ports
Cable Connections	RJ-45 (10BASE-T) : UTP Category 3,4,5 RJ-45 (100BASE-TX) : UTP Category 5
Network Data Rate	Auto-negotiation (10Mbps,100Mbps)
Transmission Mode	Auto-negotiation (Full-duplex, Half-duplex)
LED indications	Power 100M Link/Activity FDX/COL
System Buffer Memory	128k bytes
MAC Address Table	1KB
Filtering/Forwarding Rate	10Mbps: 14,880pps/14,880pps 100Mbps: 148,800pps/148,800pps
Emission	FCC Class A, CE
Operating Temperature	0° - 50°C (32 - 122°F)
Operating Humidity	10% - 90%
Power Type	External switching power adapter(5V)

FS-5408C