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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 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 Instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Before Starting

In this User's Manual "NOVASwitch" is used for any/all of the PLANET NOVASwitch models of Ethernet Switches listed on the title page. Important differences between models will be specified.

Reversion

**PLANET NOVASwitch User's Manual
FOR MODELS:**

FNSW-1601, FNSW-2401

Part No.: 2010- 000007- 001

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1 UNPACKING INFORMATION

Thank you for purchasing a PLANET NOVASwitch series Ethernet Switches. Before continuing, please check the contents of the product package. This product package should contain the following items:

One NOVASwitch Ethernet Switch

One Power Cord

Two Rack-Mounting Brackets with Attachment Screws

This User's Manual

Please inform your local dealer/supplier immediately if any item is found to be defective, damaged or missing. Retain the original packaging (carton), including the packing materials, and use them to re-pack the product in the unlikely event there is a need to return it to us for repair.

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2 PRODUCT INTRODUCTION

NOVASwitch Ethernet Switches are multi-speed, versatile network devices combining both standard and "Big-Pipe" ports under the same hood.

2.1 Key Features

Compliant with IEEE802.3 and 802.3u standards for 100Base-TX

16/24-port Fast Ethernet Switch, pure 10/100Base-TX

Wire-speed "Store-and-Forward" filtering/forwarding eliminates bad data packets with minimal delay

100Base-TX ports automatically sense and set optimal line speed from 10/20, 100/200Mbps, All 100Base-TX port support Auto-Negotiation function

Shared buffer memory and up to 8K entry MAC source address table make for fast handling of data packets

Flow control to eliminate packets loss

Internal, full-range power supply suitable for worldwide use

Auto MDI-per port for easy hub cascade

2.2 Front Panel

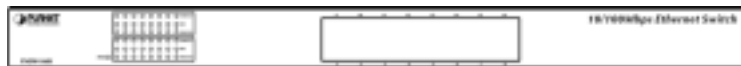


Figure 1: Front View of the FNSW-1601



Figure 2: Front View of the FNSW-2401

2.2.1 Ports Speed

■ 100Base-TX

All 100Base-TX ports come with auto-negotiation capability. They automatically support 100Base-TX and 10Base-T networks. Users only need to plug a working network device into one of the 100Base-TX ports, then turn on the hub. The port will automatically runs in 10Mbps, 20Mbps, 100Mbps or 200Mbps after the negotiation with the connected device.

2.2.2 Cabling

NOVASwitch 100Base-TX ports use RJ-45 sockets -- similar to phone jacks -- for connection of unshielded twisted-pair cable (UTP). The IEEE 802.3u Fast Ethernet standard *requires* Category 5 UTP for 100Mbps 100Base-TX. 10Base-T networks can use Cat.3, 4, or 5 UTP (see table A)

Port Type	Cable Type	Connector
10Base-T	Cat 3, 4, 5	RJ-45
100Base-TX	Cat.5/5e UTP	RJ-45

Table A: Supported port list

2.2.3 Status LEDs

One green LED to show power On/Off is on the front panel. Also, each port has three status LED indicators, as shown below.

Label	Status / Color	Meaning	Description
LOWER Row	<i>Steady Green</i>	Link	Lit to indicate a valid physical UTP/STP connection exists
	<i>Blink Green</i>	Active	Blink to indicate the port is receiving data packets
MIDDLE Row	<i>Steady Green</i>	100M	Lit to indicate that a valid <i>physical</i> UTP/STP connection exists on that port runs in 100Mbps
UPPER Row	<i>Steady Orange</i>	Full-Duplex	Lit to indicate Full-Duplex mode detected on that port
	<i>Blink Orange</i>	Collision	Blinks if a collision is detected when the port is in Half-Duplex mode.

Table B: The Switch's Port-LED Functions

2.3 The Rear Panel

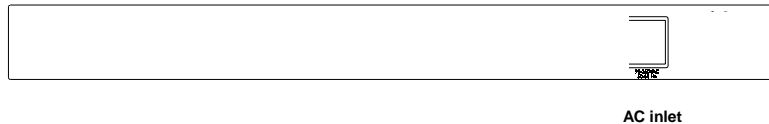


Figure 4: Rear View for the Switch

2.3.1 Power Connector

The Power Connector is designed to be used with the power cord included in the product package. Attach the female end of the cord to the power connector and the male end of the cord to a grounded power outlet. The accepted power range is from 100VAC to 240VAC, 50/60Hz.

Note:

The Switch is a power-required device, it means, the Switch will not work until it is powered. If your networked PCs will need to transmit data all the time, please consider use an UPS (Uninterrupted Power Supply) for your Switch. It will prevent you from network data loss.

In some area, installing a surge suppression device may also help to protect your Switch from being damaged by unregulated surge or current to the Switch or the power adapter

3 INSTALLATION

The NOVASwitch do NOT require software configuration. Users can immediately use any of the features of this product simply by attaching the cables and turning on the power.

To get the best use of these NOVASwitch models, many things need to be considered first. See Section 4, *OPTIMIZING CONFIGURATION* for details.

3.1 Rack-Mount Installation

Most users prefer to attach the power cord to the hub before installation in a network rack. Do not plug the other end of the cord into a power outlet until after the Switch is installed.

For mounting the NOVASwitch in a network rack, first attach the rack-mount brackets to the side of the hub with screws. (Both brackets and screws are included in the product package.) Slide the hub into the rack and align the holes in the bracket with the corresponding holes in the network rack. Attach the bracket to the rack with the enclosed screws.

3.2 Desktop Installation

To locate the NOVASwitch models on a desktop, first attach the four rubber feet to the bottom of the hub, one in each corner. Place the hub on a clean, flat desk or table-top close to a power outlet. Make sure there is no hindrance behind the fan of the hub

Plug in all network connections, then turn the switch on via plug in the power cord.

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4 OPTIMIZING CONFIGURATION

4.1 Prior to Installation

Before installing the NOVASwitch models and connecting network devices, it is important to plan the new network layout. Consider:

Dedicated Bandwidth: File servers and other high-traffic hardware can improve if they have their own direct connection with dedicated 10 or 100Mbps bandwidth.

Full-Duplex: Determine which devices would benefit from a Full Duplex connection and check that they support it.

Fast Ethernet: 100Base-TX and 100Base-FX have different rules for cable and distance. Make sure these are followed.

Auto-Negotiation: Devices with different speeds may be easily swapped when the other end of the cable is fixed to a port with auto-negotiation.

4.2 Half- and Full-Duplex

The NOVASwitch support both Half- and Full-Duplex modes for 10Base-T and 100Base-TX. Half-Duplex mode is the traditional data transfer mode: one station sends data while other devices wait for the first to finish.

Full-Duplex is the simultaneous transmission and receiving of data. It is only possible between two devices with a dedicated link (e.g., switch-to-switch, switch-to-PC). Both of the devices must be capable of, and set to, Full-Duplex

100Base-TX ports use auto-negotiation to detect and set the line's operating mode.

4.3 Fast Ethernet

100Base-TX and 100Base-FX are called "Fast Ethernet." This is because they use the Ethernet CSMA/CD access rules and data packet structure, but data travels ten times faster (100Mbps) than traditional 10Mbps Ethernet.

Below is a list of the cable types and connectors that supported by NovaSwitch models for 10Base-T, 100Base-TX, and 100Base-FX networks.

PORT TYPE	Cables Type	Connector
100BASE-TX	Cat. 5 UTP only	RJ-45
10BASE-T	Cat.3, 4, 5 UTP	RJ-45

Table C: Cables & Connectors Supported by the Switch

In many cases, 10Base-T LANs can quickly and easily upgrade to 100Base-TX networks.

4.4 Auto-Negotiation

The 100Base-TX ports on the NovaSwitch have built-in "Auto-Negotiation". This technology automatically sets the best possible bandwidth when a connection is established with another network device (usually at Power On or Reset). This is done by detect the mode and speed at the second device is capable of. The 100Base-TX devices can connect with the 100Base-TX port in either Half- or Full-Duplex mode.

If attached device is:	100Base-TX port will set to:
100Mbps, no auto-negotiation	100Mbps (100Base-TX, Half-Duplex)
100Mbps, with auto-negotiation	200Mbps (100Base-TX, Full-Duplex)
10Mbps, no auto-negotiation	10Mbps (10Base-T, Half-Duplex)

10Mbps, with auto-negotiation	20Mbps (10Base-T, Full-Duplex)
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4.5 MAC Address Table

This 6-byte ID is called the MAC (Media Access Control) Address. Every Ethernet data packet includes both source and destination addresses.

These NOVASwitch models can automatically learn and store up to 8K MAC addresses. The MAC address table is volatile: it disappears when the switch is powered off or reset.

Note: *When the network needs reconfiguration, we recommend turning off the power first. After all nodes have been moved, power on the switch to rebuild the internal MAC address table.*

4.6 Sample Application

The optimal application for the NOVASwitch, no matter with the extension module or not, is as a "big pipe" backbone interconnecting file servers with bandwidth-hungry workgroups, departments, and offices.

In the figure, the first FNSW-1601(or FNSW-2401) links to another hub's Uplink (MDI-II) port, some ports connect to 100Mbps Workstations, and attached to file servers at 200Mbps.

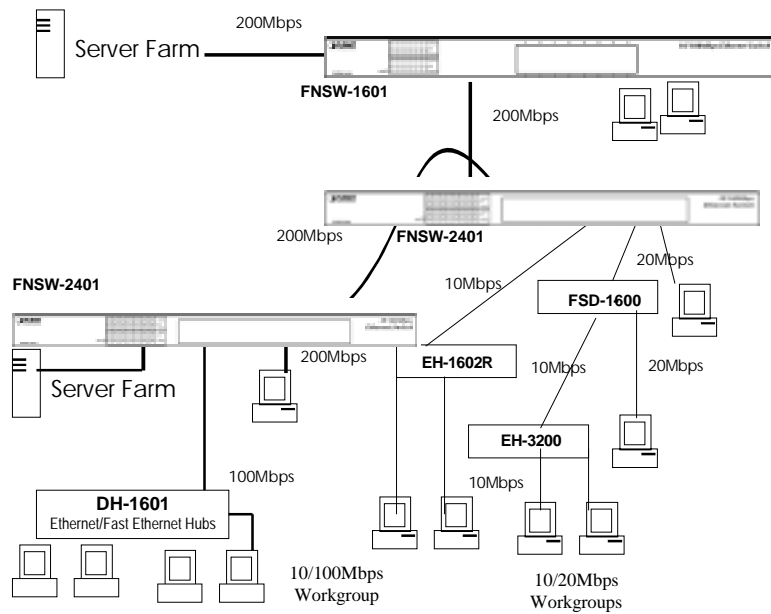


Figure 5: Sample Application

5 TROUBLESHOOTING

- SYMPTOM** Link LED does not lit after cable is connected to the port..
- CHECKPOINT** Verify that the other end of the cable is connected to a device that is powered on and on-line..
- For UTP cable connection to another hub, verify that only one end of the cable is connected to a "MDI-II" Uplink port.
- SYMPTOM** 100Base-TX port Link LED is lit, Collision LED is blinking, but traffic is irregular.
- CHECKPOINT** Check that the attached device is not set to dedicated full-duplex. (Some devices use a physical or software switch to change duplex modes. Auto-negotiation may not recognize this type of full-duplex setting.

ALWAYS CHECK THAT THE CABLE, LINK DISTANCES, AND OVERALL NETWORK DIAMETER ARE WITHIN SPEC. FOR THE NETWORK TYPE.

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6 PRODUCT SPECIFICATIONS

PRODUCT	FNSW-1601	FNSW-2401
PORTS	16	24
	10/10Base-TX RJ-45	10/100Base-TX RJ-45
MAC ADDRESSES	8K-entry	8K-entry
BANDWIDTH	100Base-TX, 200/100/20/10Mbps, Auto-Negotiation	
FILTER/ FORWARD RATE	148,800 packets/second per port @ 100Mbps, max.	
LEDs	1 for Power On/Off 3 per port for 100Mbps, Full-Duplex, Act/Link, Collision	
MEDIA SUPPORT	100Base-TX Cat. 5 UTP, RJ-45 10Base-T Cat. 3, 4, 5 UTP RJ-45	
POWER SUPPLY	Auto-switching. Input voltage: 100~240 VAC, 50 ~ 60Hz	
POWER CONSUMPTION	6 watt / 20 BTU	8 watt / 27 BTU
ENVIRONMENT	<i>Operating</i> Temp: 0 ~ 50°C (32 ~ 122°F) <i>Storage</i> Temp: -30 ~ 70°C (-22 ~ 158°F) <i>Humidity</i> 0 ~ 90% non-condensing	
DIMENSIONS	440 x 200 x 44 mm	
STANDARD COMPLIANCE		
NETWORK	IEEE802.3 (10Base-T), IEEE802.3u (100Base-TX) IEEE802.3x (Flow-Control)	
EMISSION	FCC Class A, CE	
SAFETY	UL, TUV/GS (EN60950)	

Table E: Product Specifications

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7 RJ-45 PIN ASSIGNMENT

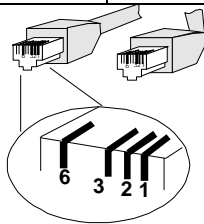
Pin	Numbered Ports (MDI-X port)	Uplink Port (MDI-II port)
1	Input Receive Data +	Output Transmit Data+
2	Input Receive Data -	Output Transmit Data-
3	Output Transmit Data+	Input Receive Data +
6	Output Transmit Data-	Input Receive Data -
4,5,7,8	Not used	Not used

Schematics for both straight and crossover twisted-pair cable are shown below. (Note that crossover cable is only required if you cascade hubs via the RJ-45 station ports; i.e. the Uplink port is not used.)

7.1 Straight-Through/Crossover Cable

The pin assignment of the cables both ends should be as below:

Straight-through		Crossover	
Hub (MDI-X)	Adapter(MDI-II)	Hub (MDI-X)	Hub (MDI-X)
Pin 1	Pin 1	Pin 1	Pin 3
Pin 2	Pin 2	Pin 2	Pin 6
Pin 3	Pin 3	Pin 3	Pin 1
Pin 6	Pin 6	Pin 6	Pin 2



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