**10/100/1000Mbps**
**Gigabit Ethernet Smart Switch**

**GSW-400S**

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## 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.

**Revision**
**PLANET NOVASwitch User's Manual**
**FOR MODELS:**
**GSW-400S**
**Part No.: EM-GSW4SV1**

**Before Starting**

In this User's Manual, "Switch" is used for GSW-400S, "NovaSwitch" for PLANET's 19"-range Ethernet Switch, where "switch" represent the third part switch.

# Table of Contents

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**Chapter 1**
**Introduction**

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## Checklist

Check the contents of your package for following parts:

- 4 port Switch
- User's manual
- Power cord
- 19" rack mount brackets
- RS-232 cable

If any of these pieces are missing or damaged, please contact your dealer immediately, if possible, retain the carton including the original packing material, and use them against to repack the product in case there is a need to return it to us for repair.

## About the Switch

The Switch, GSW-400S is designed to allow simultaneous transmission of multiple packets via an internal high-speed data channel. This means that it can partition a network more efficiently than bridges or routers in most environments.

The Switch is equipped with Category 5 copper cable for uplinking to a network backbone or network server. It is compatible with all 10Mbps, 100Mbps and 1000Mbps Ethernet environments. The increased speed and extra bandwidth offered by Gigabit Ethernet will support faster and more users applications with generating more traffic.

The Switch is designed for Plug and Play installation, allows the network

administrator to simply connect the network and power cables and the Switching/bridging functions begin automatically.

The front panel of these Switches provides LEDs for easy recognition of the switch operation status and for troubleshooting. These LEDs display the power status for the system and link/ speed/ collision, full-duplex, transmit and receive status for each port.

The built-in console interface can be used to configure the Switch's setting for Priority queuing, VLAN, and Port Trunk Groups, Port Monitoring and Port Speed.

## Features:

- ◆ Complies with the IEEE802.3, IEEE802.3u, IEEE802.3z and IEEE802.3ab Gigabit Ethernet standard, and IEEE802.1p Priority Queues
- ◆ Features Store-and-Forward mode with wire-speed filtering and forwarding rates
- ◆ 10/100/1000Mbps capability on each port, total bandwidth is up to 2Gbps/port
- ◆ Automatic source address learning and aging.
- ◆ Support up to 32K MAC address
- ◆ Support up to total 64Mbit (8Mbyte) buffers with dynamic allocation.
- ◆ IEEE802.3x compliant full-duplex flow control
- ◆ Broadcast storm control, runt and CRC Filtering eliminates erroneous packets to optimize the network bandwidth
- ◆ LED indicators for simple diagnostics and management
- ◆ Provide a reset switch in front panel
- ◆ Internal power supply

- Auto MDI/ MDI-X on each ports
- Optional for Smart function
    - Support one console port for switch configuration change
    - Support per port Port-based VLAN and L2 Trunking with link fail-over
    - Support IEEE802.1p four Priority queues on each port

## Specifications:

- Standard: IEEE802.3, IEEE802.3u, IEEE802.3ab, IEEE802.3x
- Network Media:
    - 10Base-T, UTP/ STP category 3 ~ 5 cable
    - 100Base-TX, UTP/ STP category 5 cable
    - 1000Base-TX, UTP/ STP category 5 cable, 4 pairs
- Connector: STP RJ-45 port TX for 10/100/1000Mbps TX
- LED indicators:
    - System – Power OK, Smart LED
    - Individual port – Link 1000, Link 100, Link 10, FDX/COL, TX, RX
- Dimension: 433mm(L) x 200mm(W) x 44mm(H)
- Temperature: Operating – 0℃ to 50℃ Storage – -20℃ to 70℃
- Humidity: Operating – 10% to 90% RH       Storage – 5% to 90% RH
- Input Power Requirement: 100 - 240VAC, 50 – 60Hz, Auto-sensing
- Registrations: FCC Part 15 Class A, CE

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Ethernet Smart Switch

# Chapter 2
# Hardware Description

This section describes the hardware features of these Switches. For easier management and control of the switch, familiarize yourself with its display indicators, and ports. Front panel illustrations in this chapter display the unit LED indicators. Before connecting any network device to the hub, read this chapter carefully.

## Front Panel

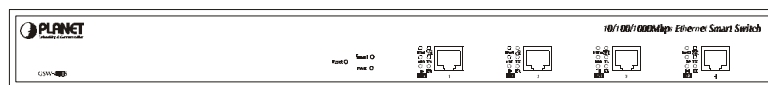The unit front panel provides a simple interface monitoring the switching hub. It includes a power indicator for each port.



Figure 1. Front Panel of 4 copper ports Switch

LED indicators

|  | Color | Description |
|---|---|---|
| PWR | Green | Lit: Power on |
| SMART | Green | Lit: CPU installed |
| LNK 10/100/1000 | Green | Lit: indicate link status and traffic speed (10 for 10M, 100 for 100M, 1000 for 1000M) |
| TX/ RX | Green | Lit: indicate data traffic status (TX for transmitting, RX for receiving) |
| FDX/ COL | Green | Lit: Full-Duplex Flash: Half-Duplex/ Collision Off: Half-duplex or not connected |

### Reset Switch

At the left side of front panel, the reset switch is designed for reconfiguring the

switch hub without turn off and on the power.

## Rear Panel

The rear panel of the Switch indicates an AC inlet power socket, which accepts input power from 100 to 240VAC, 50-60Hz. And a RS-232 console port for setting up the switch via a connection to a console terminal or PC using a terminal emulation program.
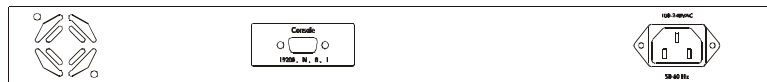


Figure 2. Rear Panel of 4 copper ports Switch

### Power Notice:

1. The device is a power-required device, it means, it will not work till it is powered. If your networks should active all the time, please consider use an UPS (Uninterrupted Power Supply) for your device. It will prevent you from network data loss or network downtime.

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

## Hardware Installation

### Connecting End node or Hub or Switch

1. Place the Switch on a smooth surface or fasten the mounting brackets with

the provided screws in a standard 19" rack

2. Connect the DC jack of AC adapter to the DC inlet socket of Switch and the other end into the local power source outlet

3. Connect hub or PC to one port of the Switch using Category 3/4/5 UTP/STP cabling

4. Connect another hub or PC to the other port of Switch by following the same process as described in Step3.
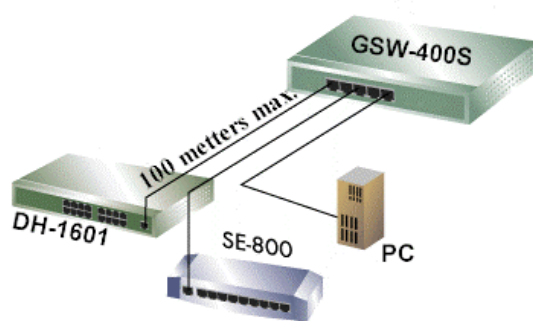


Figure 3. End node or Hub or Switch connection

**Notice:**

**Cable distance for Switch**

The cable distance between Ethernet Switch and hub/PC should not exceed 100 meter.

**Make sure the wiring is correct**

It can be used Category 3/4/5 cable in 10 Mbps operation. To reliably operate your network at 100Mbps and 1000Mbps, you must use an Unshielded Twisted-Pair (UTP) Category 5 cable, or better Data Grade cabling. While a Category 3 or 4 cable may initially seem to work, it will soon cause data loss.

**Connecting to Network Backbone or Server**

Connect to the Gigabit Ethernet ports with Category 5 copper cable for uplinking to a network backbone or network server. These ports operate at 1000Mbps in full-duplex mode. A valid connection is indicated when the Link LED is light.
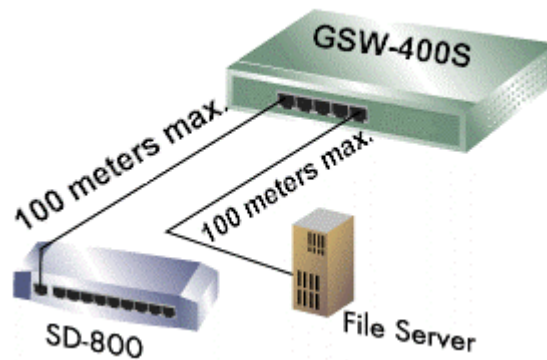


Figure 4. Network Backbone or Server connection

The following sections describe the function of LEDs on the front panel

**CPU LED**

      Color: Green

      Label: Smart

      Function: The LED light up steadily means CPU installed for smart function

**Power LED**

      Color: Green

Label: PWR

Function: The LED light up steadily means Power turned on.

**Link/ Speed LED**

Color: Green

Label: 10/ 100/ 1000

Function: The LED light up steadily to indicate the transmitting speed

10: light up steadily to indicate link up at speed 10M

100: light up steadily to indicate link up at speed 100M

1000: light up steadily to indicate link up speed 1G

**Full/ Half Duplex and Collision LED**

Color: Green

Label: FDX/ COL

Function: The indicator LED flash up whenever there is a collision between a directly attached end node and any other node, and light up steadily for Full-duplex mode.

**TX Activity**

Color: Green

Label: LINK/ ACT

Function: Each RJ45 station port on the hub is assigned one LED for transmitting the data.

**RX Activity**

Color: Green

Label: LINK/ ACT

Function: Each RJ45 station port on the hub is assigned one LED for
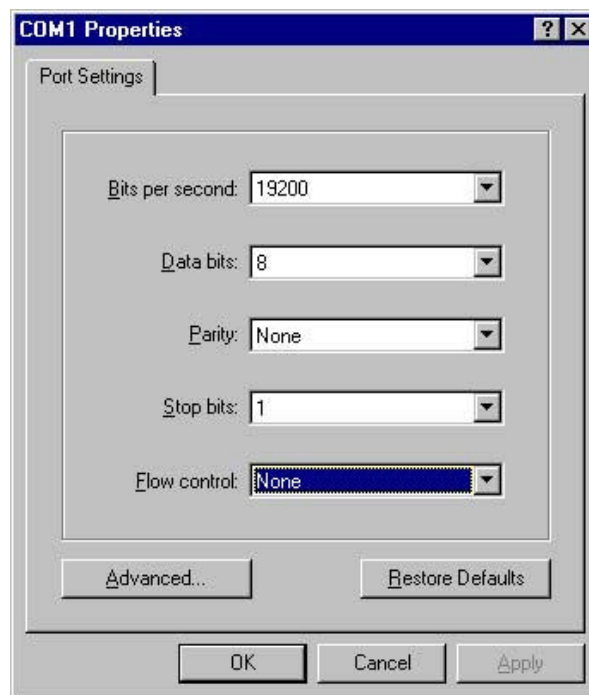
receiving the data.

## Connect to PC

### RS-232 serial cable

Prepare a RS-232 serial cable. Attach the 9-pin female connector to the male connector on the switch. Plug the other side of this cable to your PC.

### Hyper Terminal

In Windows 95/98, launch "HyperTerminal", create a new connection, and adjust settings as below:

**Main Menu**

Launch the new terminal you just set up, and then, turn on the switch.

See the following messages for successful connection.

```
System Initial ,Please Wait...

device : [0]   --> 0
device : [1]   --> 1
device : [2]   --> 2
PLANET GSW-400S Gigabit Ethernet Smart Switch
Menu Configuration [F/W:2.39]
[0] Port Setting
[1] Aging Control
[2] VLAN
[3] Queues Priority
[4] Trunk
[5] Uplink Port
[6] Monitor Port
[7] View Configuration
[8] Restore To Factory Default
Select :>>
```

To enter any of the submenus, simply type the number on the command line.

## Speed Mode

**Entry:**

Select "0" from Main Menu.

**Purpose:**

Media Speed Control for each port.

**Default:**

All ports are auto- negotiation.

1. Input port number for which you want to configure, 'A' or 'a' for select all port to configure, type 'E' or 'e' back to Main Menu, than press ENTER. For example, input port 1:

```
which port ? (1 - 4   , E:Exit , A:Select all ports)...
1

Port Setting
[1] Auto-negotiation
[2] 10 Half Duplex
[3] 10 Full Duplex
[4] 100 Half Duplex
[5] 100 Full Duplex

Select :>>
```

2. Type 1-5 to select speed mode.

```
Select :>> 1
Enable flow control ? (Y/N)
```

3. Type 'Y', 'y' or 'N', 'n' to enable or disable flow control. After finish flow control selection, you can configure another port or type    'E' or 'e', press ENTER back to main menu.

```
y
Please Wait !!

Speed/Duplex Setting

which port ? (1 - 4   , E:Exit , A:Select all ports)...

e
```

## Address Learn

**Entry:**

Select "1" from Main Menu.

**Purpose:**

A port's MAC address register is cleared on power-up, or hardware reset.

If this item is enabled, the dynamically learned SA will be leared if it is

not refreshed in less than the aging time.

**Default:**

Enable with aging time 5 minutes.

```
Select :>> 1
Aging Control
[E] Enable
[D] Disable

Select :>>
```

Example: Enable aging control with aging time 2 minutes.

1. Type 'E' or 'e' to enable aging control

```
Select :>> e
Max address-aging timer

Max aging time (1 – 20 minute)…
```

2. Input '2' for aging time and back to main menu

# VLAN

**Entry:**

Select "2" from Main Menu.

**Purpose:**

Each port of the switch can be assigned to one or multiple VLANs (this device can be divided into 4 VLANs maximum). Frames from the source port will only be forwarded to destination ports within the same VLAN domain. A broadcast/multicast frame will be forwarded to all ports within the VLAN(s) of the source port except the source port itself. An unicast frame will be forwarded to the destination port only if the destination port is in the same VLAN as the source port. If the destination port belongs to another VLAN, the frame will be discarded. Each port should be assigned with a dedicated uplink port. Unicast frames with unknown destination addresses will be forwarded to the uplink port of the source port. An uplink port can either be a single port or a trunk.

**Default:**

All ports assigned to one VLAN.

```
Select :>> 2
VLAN
VLAN Group 1 ,assigned ports>>
[S] Port Select
[D] Port Delete
[A] Select All Ports
[C] Setting
[E] Exit

Select :>>
```

Examples: Suppose the Switch assigned port 1,2 to VLAN group 1. port 3,4

belong to VLAN group 2, please follow below steps:

1. Type 'S' or 's' than input '1', press ENTER

```
Select :>> s
Which Port To be Selected (1 - 4)...
1

VLAN

VLAN Group 1 ,assigned ports>>   1
[S] Port Select
[D] Port Delete
[A] Select All Ports
[C] Setting
[E] Exit

Select :>>
```

2. Type 'S' or 's' than input '2' ,press ENTER

```
Select :>> s
Which Port To be Selected (1 - 4)…
2

VLAN

VLAN Group 1 ,assigned ports>>   1 2
[S] Port Select
[D] Port Delete
[A] Select All Ports
[C] Setting
[E] Exit

Select :>>
```

3. Type 'C' or 'c' , than you can see "Group 1 >>   1 2" on the screen, that

means VLAN group 1 with port 1,2 completed

```
Select :>> c
Please Wait !!

VLAN
Group 1 >>   1 2

VLAN Group 2 ,assigned ports>>
[S] Port Select
[D] Port Delete
[A] Select All Ports
[C] Setting
[E] Exit

Select :>>
```

4. Repeat step 1 through 3 but input '3' and '4' to assigned [port 3 ,4 ] to next

```
VLAN
Group 1 >>   1 2
Group 2 >>   3 4
VLAN Group 3 ,assigned ports>>
[S] Port Select
[D] Port Delete
[A] Select All Ports
[C] Setting
[E] Exit
Select: >>
```

5. Type 'E' or 'e' will assigned others to VALN group 3 and back to main
   menu.

6. Assigned with a dedicated uplink port for each VLANs, please refer to
   section of  "Uplink Port"

## Queues Priority

**Entry:**

Select "3" from Main Menu.

**Purpose:**

The switch can support priority either from tagged frame or based on the input ports. This entry is for port-based priority, level 0 stand for the lowest priority, level 7 as highest priority. Flow control will be disable if priority level 7 was selected.

**Default:**

All ports are cleared to priority zero on power-up, or hardware reset.

```
Select :>> 3

which port ? (1 - 4   , E:Exit )...
```

Example: Set port 1 to priority level 7.

1. Input '1' for select port

```
1

Priority level ? (0 - 7   , E:Exit )…
```

2. Input '7' priority level

```
7

which port ? (1 - 4   , E:Exit )…
```

3. Type 'E' or 'e' back to main menu

## Trunk

**Entry:**

Select "4" from Main Menu.

**Purpose:**

This switch can assigned port 1– 2 to trunk 0, port 3 – 4 to trunk 1, with L2 Trunking automatically load-balances among its member ports through the use of unique and statistical methods, and provides link resiliency (link-fail-over function) when one or more of the link in a trunk group fails.

**Default:**

All trunks disable.

```
Select :>> 4
Trunk

Which Trunk
[0] Trunk 0 (Disable)
[1] Trunk 1 (Disable)
[E] Exit


Select :>>
```

Examples: Suppose the Switch, assigned Trunk 0 with 2 ports member,. Follow below steps:

1. Type '0' to start trunk 0 setting

```
Select :>> 0
Trunk 0 ,member >>
[A] Add
[D] Delete
[C] Setting
[E] Exit


Select :>>
```

2. Type 'A' or 'a' two times to assigned trunk port member

```
Trunk 0 ,member >>port   1 2
[A] Add
[D] Delete
[C] Setting
[E] Exit

Select :>>
```

3. Type 'C' or 'c' to finish setting

```
Select :>> c
Please Wait !!

Which Trunk
[0] Trunk 0 (1 2 3 )
[1] Trunk 1 (Disable)
[E] Exit

Select :>>
```

## Uplink Port

**Entry:**

Select "5" from Main Menu.

**Purpose:**

The uplink port provides a way to connect the switch with a repeater hub, a workgroup switch, a router, or any type of interconnecting device compliance with IEEE 802.3 standards. Switch will send all frames with unmatched DA and multicast/broadcast frames to the uplink port. It is very important that each port is assigned to an uplink port, or data frames might be lost. The uplink port should be configured to be within the same VLAN as the source port. If the uplink port is not a member of the VLAN, the broadcast or multicast frames will not be forwarded to its designated uplink port. Multiple VLANs can share the same uplink port.

**Default:**

Disable

```
Select :>> 5
Uplink Port

UpLink Group 1 ,assigned ports>>
[S] Port Select
[D] Port Delete
[A] Select All Ports
[C] Continue
[E] Exit


Select :>>
```

Example: assume already configure a VLAN, this VLAN have port 1, 2.

1.  Type 'S' or 's' to select port

```
Select :>> s
Which Port To be Selected (1 - 4)...
```

2.  Input '1' and press ENTER

```
1
Uplink Port
UpLink Group 1 ,assigned ports>>   1
[S] Port Select
[D] Port Delete
[A] Select All Ports
[C] Continue
[E] Exit

Select :>>
```

3.  Repeat step 1,2 to select port 2 ,then see the result below.

```
UpLink Group 1 ,assigned ports>>   1 2
[S] Port Select
[D] Port Delete
[A] Select All Ports
[C] Continue
[E] Exit

Select :>>
```

4.  Type 'C' or 'c' to continue

```
Select :>> c
Please Wait !!
Uplink Port Select
[A] port  1   [B] port  2   [C] port  3   [D] port  4

Select:>>
```

5.  Type 'I' or 'i' to select uplink port ,as you can see bellow, "Group 1 >>

1 2 --> uplink to port 2" means port 1,2, ,have uplink to port 2.

```
Select :>> e
Uplink Port
Group 1 >>   1 2 --> uplink to port 2

UpLink Group 2 ,assigned ports>>
[S] Port Select
[D] Port Delete
[A] Select All Ports
[C] Continue
[E] Exit

Select :>>
```

## Monitor Port

**Entry:**

Select "6" from Main Menu.

**Purpose:**

The switch supports port monitoring. This feature provides complete
network monitoring capability at 100 Mbit/s. A copy of egress (TX) data
and ingress (RX) data of the monitored port is sent to their respective

snooping ports.

**Default:**

Disable

```
Select :>> 6
Monitor Port
[M] Monitored Port
[I] Monitoring Port for Incoming Packets
[O] Monitoring Port for Outgoing Packets
[D] Disable Port Monitor
[E] Exit

Select :>>
```

Example: Monitored Port 1 , Monitoring for incoming packets port 2, Monitoring for outgoing packets port 3.

1.  Type 'M' or 'm' to select Monitored Port

```
Select :>> m
Which port to be monitored (1 - 4)…
```

2.  Input '1' and press ENTER
3.  Repeat step1 –2 for monitoring port incoming packets and outgoing packets.
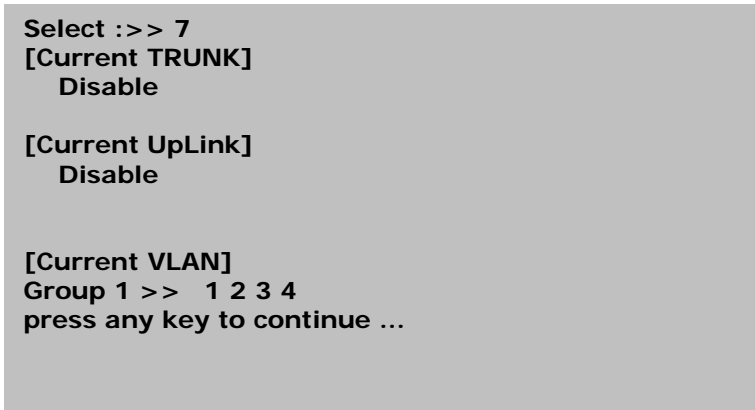4.  Type 'E' or 'e' back to main menu.

## View Configuration

**Entry:**

Select "7" from Main Menu.

**Purpose:**

Display configuration of trunk , uplink and VLAN.

```
Select :>> 7
[Current TRUNK]
   Disable

[Current UpLink]
   Disable


[Current VLAN]
Group 1 >>   1 2 3 4
press any key to continue …
```

## Restore To Factory Default

**Entry:**

Select "8" from Main Menu.

**Purpose:**

Restore to the default setting as mention before.

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# Switch Operation

## Address Table

The Switch is implemented with an address table. This address table composed of many entries. Each entry is used to store the address information of some node in network, including MAC address, port no, etc. This information comes from the learning process of Ethernet Switch..

## Learning

When one packet comes in from any port. The Switch will record the source address, port no. and the other related information in address table. This information will be used to decide either forwarding or filtering for future packets.

## Forwarding & Filtering

When one packet comes from some port of the Ethernet Switching, it will also check the destination address besides the source address learning. The Ethernet Switching will lookup 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. And these ports will transmit this packet to the network it connected. If found, and the destination address is located at different port from this packet comes in, the Ethernet Switching will forward this packet to the port where this destination address is located according to the information from address table. But, if the destination address is located at the same port with this packet comes in, then this packet will be filtered. Thereby increasing the

network throughput and availability

## Store-and-Forward

Store-and-Forward is one type of packet-forwarding techniques.    A Store-and Forward Ethernet Switching stores the incoming frame in an internal buffer, do the complete error checking before transmission.    Therefore, no error packets occurrence, it is the best choice when a network needs efficiency and stability.

The Ethernet Switch scans the destination address from the packet-header, searches the routing table provided for the incoming port and forwards the packet, only if required. The fast forwarding makes the switch attractive for connecting servers directly to the network, thereby increasing throughput and availability. However, the switch is most commonly used to segment existing hubs, which nearly always improves overall performance. An Ethernet Switching can be easily configured in any Ethernet network environment to significantly boost bandwidth using conventional cabling and adapters.

Due to the learning function of the Ethernet switching, the source address and corresponding port number of each incoming and outgoing packet are stored in a routing table. This information is subsequently used to filter packets whose destination address is on the same segment as the source address. This confines network traffic to its respective domain, reducing the overall load on the network.

The   Switch   performs "Store and forward" therefore, no error packets occur. More reliably, it reduces the re-transmission rate.    No packet loss will occur.

## Auto-Negotiation

The STP ports on the Switch 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 modes and speeds at the second of both device is connected and capable of, Both 10Base-T and 100Base-TX devices can connect with the port in either Half- or Full-Duplex mode. 1000Base-TX and 1000Base-SX can only connected Full-duplex mode.

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# Chapter 5
# Troubleshooting

This chapter contains information to help you solve problems.    If Switch is not functioning properly, make sure the    Ethernet Switch was set up according to instructions in this manual..

## The Link LED is not lit

Solution:

Check the cable connection and remove duplex mode of the Switch

## Some stations can not talk to other stations located on the other port

Solution:

The address table may contain older information than of the address table of that node. Please power down to refresh the address information.

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# Appendix A

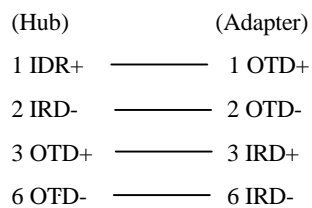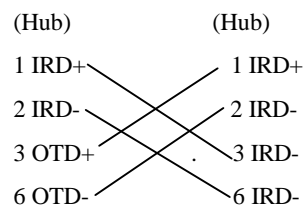## Hub's RJ-45 Pin Assignments

**1. 10/100Mbps-TX**

| Pin | Station Ports 1-8 | Uplink 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.)

**Straight-Through**                    **Crossover**

(Hub)              (Adapter)          (Hub)              (Hub)

1 IDR+  ———— 1 OTD+          1 IRD+            1 IRD+

2 IRD-  ———— 2 OTD-          2 IRD-            2 IRD-

3 OTD+  ———— 3 IRD+          3 OTD+       .    3 IRD-

6 OTD-  ———— 6 IRD-          6 OTD-            6 IRD-

**2. 1000Mbps (or 1000Base-T)**

| Contact | MDI | MDI-X |
|---------|-------|-------|
| 1 | BI_DA+ | BI_DB+ |
| 2 | BI_DA- | BI_DB- |
| 3 | BI_DB+ | BI_DA+ |
| 4 | BI_DC+ | BI_DD+ |
| 5 | BI_DC- | BI_DD- |
| 6 | BI_DB- | BI_DA- |
| 7 | BI_DD+ | BI_DC+ |
| 8 | BI_DD- | BI_DC- |

Implicit implementation of the crossover function within a twisted-pair cable, or at a wiring panel, while not expressly forbidden, is beyond the scope of this standard.