S71650
16-port 10/100 Switch
Installation Guide

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B030730359165

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TRADEMARKS

All brand names are trademarks or registered trademarks of their respective holders.

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 in which case the user will be required to correct the interference at his own expense.

NOTICE:

(1)The changes or modifications not expressively approved by the party responsible for Compliance could void the user authority to operate the equipment.
(2)Shielded interface cables and AC power cord, if any, must be used in order to comply with the emission limits.

CISPR A COMPLIANCE:

This device complies with EMC directive of the European Community and meets or exceeds the following technical standard.
EN 55022 - Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment. This device complies with CISPR Class A.
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.

CE NOTICE

Marking by the symbol CE indicates compliance of this equipment to the EMC directive of the European Community. Such marking is indicative that this equipment meets or exceeds the following technical standards:
EN 55022: Limits and Methods of Measurement of Radio Interference characteristics of Information Technology Equipment.
EN 50082/1:Generic Immunity Standard -Part 1: Domestic Commercial and Light Industry.
EN 60555-2: Disturbances in supply systems caused by household appliances and similar electrical equipment - Part 2: Harmonics.

PROPRIETARY DATA

WARRANTY

All VERSITRON products are warranted for a period of one year from date of delivery. VERSITRON reserves the right to repair or, at our option, replace parts which during normal usage prove to be defective during the warranty period provided that:

1. You call VERSITRON at 302-894-0699 or 800-537-2296 and obtain a Return Maintenance Authorization (RMA) Number. Please reference your RMA number on the outside of the box in which the item is shipped.

2. Shipping charges are pre-paid.

No other warranty is expressed or implied and we are not liable for consequential damages. For repairs outside of the warranty period, the same procedure must be followed.

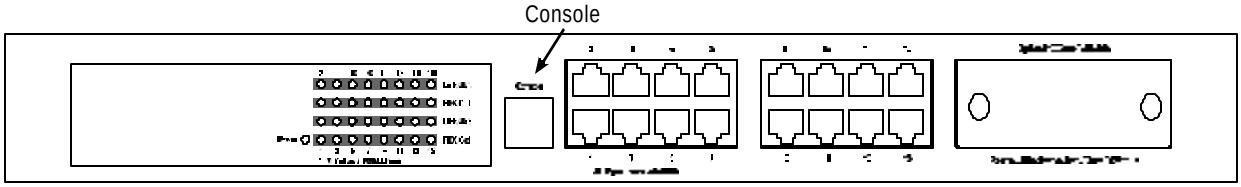
Table of Contents

1. Introduction

The Model S71650 16-port Switch is a 16-port 10/100Mbps Fast Ethernet switch. This switch supports the advanced features for current switch design. This switch can auto detect 10/100Mbps speed, full/half duplex mode, MDI/MDI-X connection and provides an option for one 100BaseFX expansion module port. This feature provides the user a simple way to complete the network connection with the switch.

The Model S71650 16-port Switch provides console management functions. You can configure VLAN, trunking and port configuration from the console which provides more flexible network management and configuration functions.

The Model S71650 16-port Switch supports 4 priority transmit queues per port and long Ethernet packets of up to 1522 bytes for QoS function for advanced network applications.



1.1 Package Contents

- One 16-port Switch
- One AC power cord
- Two rack-mount kits and screws
- This user's guide
- One console cable

2. Installation

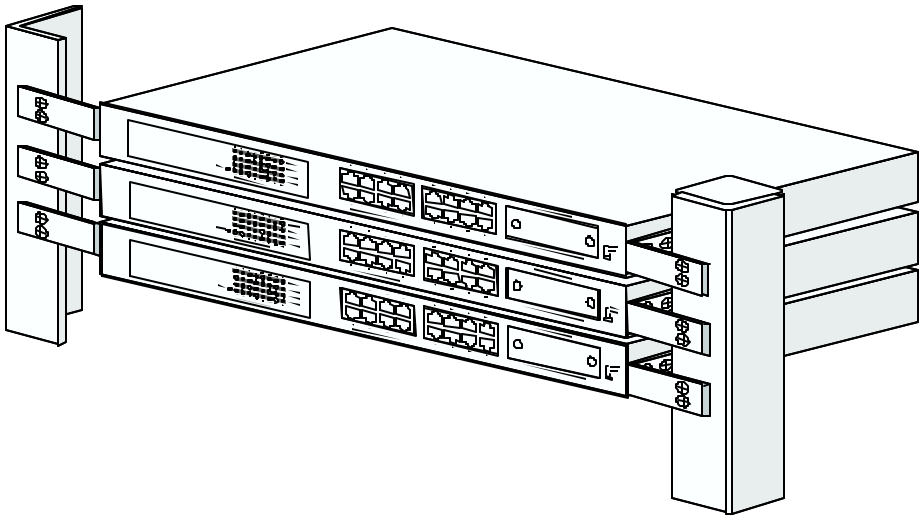
2.1 Where to Place the 16-port Switch

This 16-port Switch can be placed on a flat surface (your desk, shelf or table).

Place the 16-port Switch at a location with these connection considerations in mind:

- The switch configuration does not break the rules as specified in Section 3.
- The switch is accessible and cables can be connected easily to it.
- The cables connected to the switch are away from sources of electrical interference such as radio, computer monitor, and light fixtures.
- There is sufficient space surrounding the switch to allow for proper ventilation (the switch may not function according to specifications beyond the temperature range of 0 to 50 degrees C).

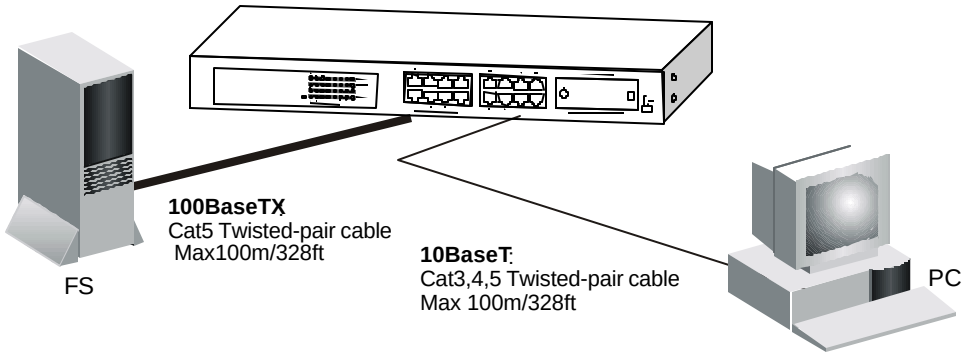
You can also install this 16-port Switch in a 19" rack with rack-mount kits as shown below:



3. Configure the Network Connection

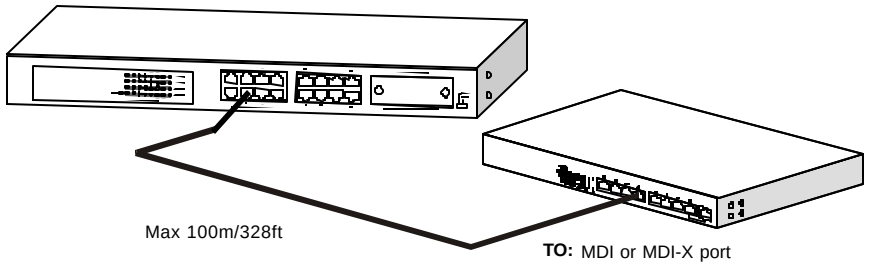
3.1 Connecting Devices to the 16-port Switch

- Use Category 3 or 5 twisted-pair Ethernet cable when connecting 10BaseT devices to the switch (cable pin assignments defined in Appendix A)
- Use Category 5 (straight-through) twisted-pair Ethernet cable when connecting 100BaseTX devices to the switch (cable specifications defined in Appendix B)
- Always limit the cable distance to 100 meters (328 ft) as defined by IEEE specification
- If your switch has a FX port, you can connect long distance fiber optic cable to the switch.
- Because this switch supports **Auto MDI/MDI-X** detection, you can use normal straight through cable for both workstation connection and hub/switch cascading.



3.2 Connecting to Another Ethernet Switch/Hub

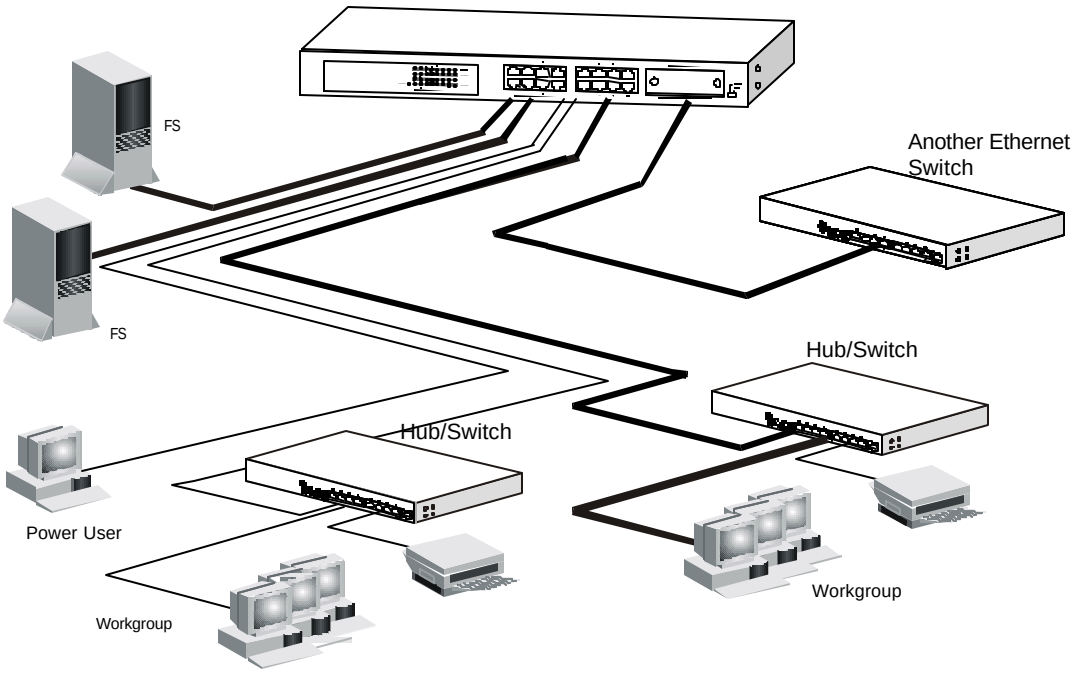
This 16-port Switch can be connected to existing 10 Mbps or 100 Mbps hubs/switches. Because all of the TP ports on the 16-port Switch are Auto MDI/MDI-X, you can connect from any TP port of the 16-port Switch to the MDI or MDI-X port of another hub/switch with Straight Through or crossover cables.



3.3 Application Example

A switch can be used to overcome the hub-to-hub connectivity limitations as well as improve the overall network performance. Switches make intelligent decisions about where to send network traffic based on the destination address of the packet. As a result, the switch can significantly reduce unnecessary traffic.

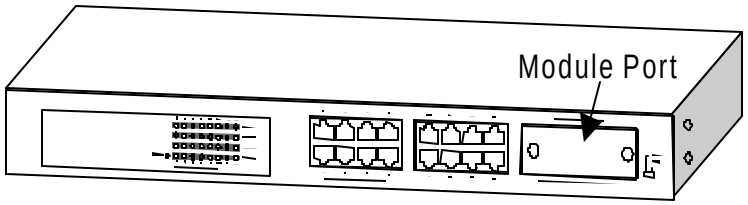
The example below demonstrates the switch ability to segment the network. The number of nodes on each segment is reduced thereby minimizing network contention (collisions) and boosting the available bandwidth per port.



4. For 100BaseFX Module

4.1 Adding 100BaseFX Module

This 16-port switch has a module port for a 100BaseFX connection extension. You can add one 100BaseFX module to the switch for long distance fiber optic cable connection. But *when this module is added, the 16th TP port will be disabled and this FX port becomes the 16th port.*



Please follow the steps to add the module to the switch:

1. Turn off the switch
2. Loosen the screws of the blank cover and remove the cover from the module port of the switch.
3. Slide in the module into the module port.
4. Tighten the screws of the module to the switch.
5. Connect the fiber optic cable to the FX port of the module.
6. Power on the switch.
7. Refer to Section 7 to configure Port 16 to *100Mbps, full duplex*.

5. LEDs Conditions Definition

5.1 Adding 100BaseFX Module

The LEDs provide useful information about the switch and the status of all individual ports.

LED	STATUS	CONDITION
Power	ON	Switch is receiving power.
Link / Act	ON	Port has established a valid link.
	Flashing	Data packets being received or sent.
	Green	Connection speed is 100Mbps.
	Yellow	Connection speed is 10Mbps.
FDX / Col	ON	Connection is Full Duplex.
	Flashing	Packet collisions occurring. A low level of collision is a part of normal Ethernet Operation.

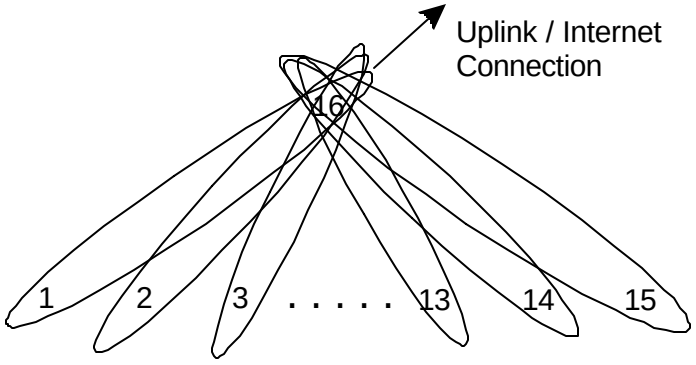
6. About VLAN and QoS

6.1 VLAN

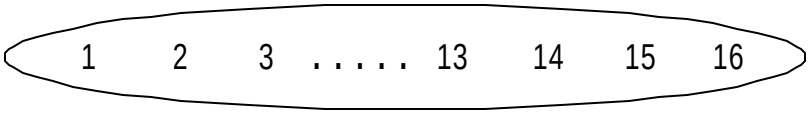
The VLAN setting of a switch can divide the switch to several switching segments. The network connections on different VLANs can not send or receiver data from each other. Even broadcast packets can not be transferred between VLANs. So, the VLAN function is often used for user's security application.

Here are two examples for VLAN applications.

The first one is called *Concentration VLAN* setting. In this case, Port (1,16), (2,16), (3,16), (4,16), …, (13,16), (14,16), (15,16) are in different VLANs and Port 16 is the common port for uplink or Internet connection. But the data transfer between Port 1, 2, 3, 4, …, 13, 14 and 15 are impossible for such configuration.



The second one is the default VLAN setting of the switch. Every port belongs to the same VLAN and can communicate with each other.



Please refer to Section 7 to configure the VLAN from the console port.

6.2 QoS

In new network application, there is a tag in the Ethernet packet. The tag contains VLAN and priority information of the packet. This 16-port Switch can process both tagged and untagged packets at ingress ports. If there is a tag in an Ethernet packet, it can transmit the packet according to the priority of the packet in the tag.

There are 4 transmit queues for each port of the 16-port Switch. This 16-port Switch can transfer packets according to the priority of the packet to meet the "Quality of Service" request in the network. It is very important for multi-media data (for example: movie, music and voice) transfer in a network.

Note: The QoS function is not configurable and is defined in the switch controller.

7. Configure from Console Port

(1) Setup Hardware and Software for Configuration

Hardware setup

Connect from the console port of the Switch to COM port of PC with the console cable.

Software setup

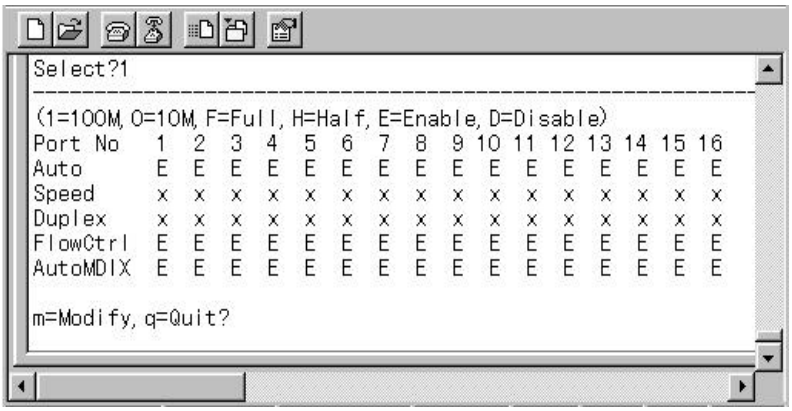
1. PC is running MS Windows.
2. Start -> Program -> Accessory -> Terminal. Execute "Hypertrm" program. If you cannot find the Terminal program, please install it from your MS Windows installation disk.
3. If the connection file has been created, cancel the new connection request and open the connection file. If the connection file has not been created, create a new connection named "SW16" -> Select COM port of PC -> Set COM port parameters as "Baud Rate: *9600*, Data Bits: *8*, Parity Check: *None*, Stop Bit: *1*, Flow Control: *None*". Then OK.
4. Power on the Switch and the setup console will appear as follow.

5. The default password is "1234" (you can change it in the console setting). The main screen will appear if the password is correct.

[Notes:] If you can not get the console screen, please reboot the switch or close the terminal program and start again.

(2) Configure Connection Ports of the Switch

1. Users can enable/disable auto-negotiation, flow control and auto-MDIX functions of the connection ports with this function. If auto-negotiation is disabled, users can set the connection speed, full/half duplex of the connection ports. The default setting is auto-negotiation enable.
2. Follow the direction in the setup menu to setup the configuration of the connection ports.

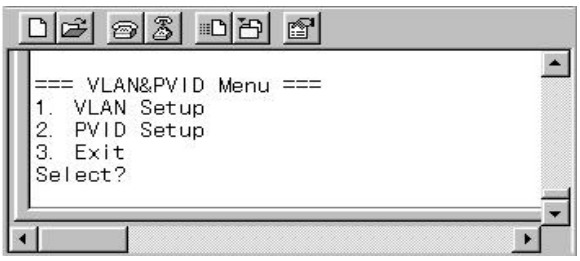


(3) Setup VLAN Groups of the Switch

1. Select VLAN setup function in the main menu as follows:

Note: Before starting to set VLAN, the trunking function will be disabled first. After VLAN setup is completed, you may set the trunking function if you need trunking connection on the switch.

2. You can select the quick setup item for Concentration VLAN or the other VLAN configuration. If you want to use concentration VLAN, use function 1 and select which port is the common port for the concentration VLAN. The software will create concentration VLAN configuration automatically. (You may refer to Section 6.1 for concentration VLAN configuration.)
3. If you want to configure VLAN by yourself, use function 2 to setup VLAN group and PVID of ports. Use "VLAN Setup" to create VLAN groups first. Then set PVID and tag/untagged of ports.



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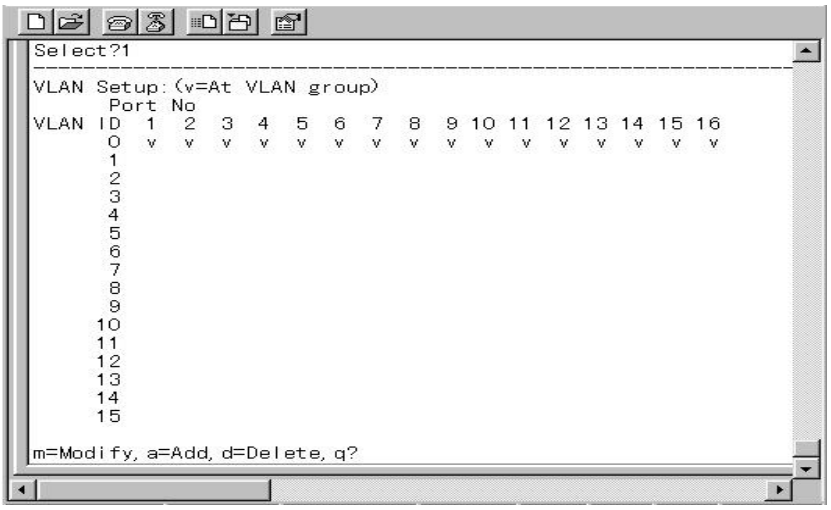
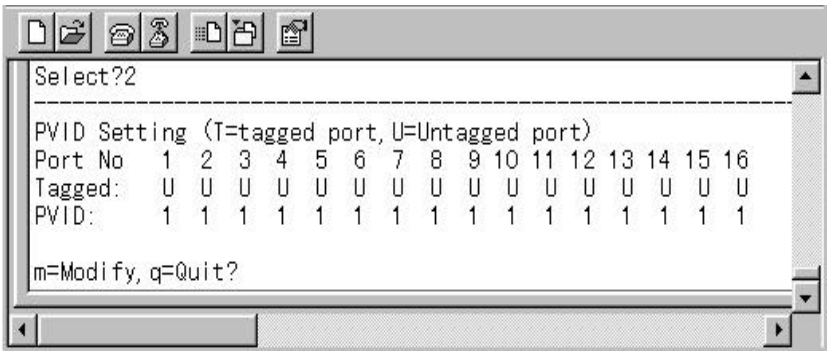


m: modify setting of VLAN group. Select the VLAN group first and the connection port. Then select the operation - add or remove the port to/from the VLAN.
a: add ports to VLAN. Select the VLAN group first and then select the ports to add to the VLAN group.
d: delete VLAN group. This function will delete one VLAN group.
q: quit from this function. "Save & Update (Y/N)" message will be prompted to ask you if you want to save and update to this new setting.

5. Then, we use "**PVID Setup**" function to set the PVID of ports.

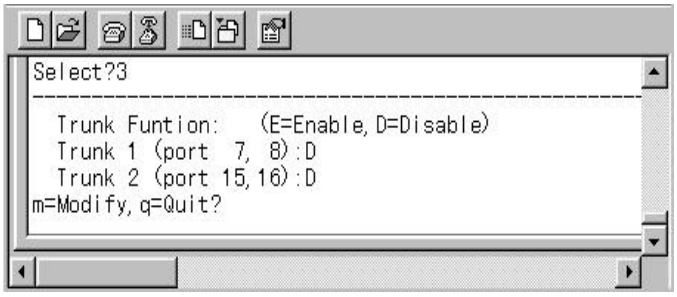


After you complete the VLAN groups setup, you have to set the PVID of ports to the VLAN ID of their VLAN group. If port overlapping happens, please assign the PVID of the overlapped port to the VLAN ID that it will use for packet transmitting VLAN grouping.
If tagged packets, VLAN ID is in the tag of the packets. If untagged packets, the switch will assign PVID to the packet as its VLAN ID. And the switch will check the VLAN group setting with the VLAN ID. If they belong to the same VLAN, the packets will be forwarded. If they belong to different VLANs, the packets will be filtered out.
Note: Because this switch supports VLAN ID 0~15 only, the switch will use bit 0~3 of the VLAN ID as its VLAN ID if the VLAN ID in the tagged packets are larger than 15.

5. You can use command "**m**" to set ports to tag or untagged and set PVID of ports. The output packets from a tag port will always be tagged packets. If untagged packets, tag will be added before these packets are transmitted. And the output packets from untagged port will always be untagged packets. If tagged packets, the tag will be removed before these packets are transmitted.
   The tag or untagged setting depends on your applications in the network. If you are not sure about your network application, you may set all of them to untagged because many old network devices do not support long Ethernet packets with a tag (tag is another 4 bytes added to normal Ethernet packets).
   Notes**:** Data will only be forwarded to ports in the same VLAN group. Data will not be forwarded to ports in different VLAN groups, as if they were not connected together. The factory default setting of the switch is all ports are in the same VLAN group.

(4) Setup Trunking Connection of the Switch

1. Enter the Trunk setup function in the main menu as follows:



2. This switch supports two trunks and two ports per trunk maximum. You can select the trunk and enable or disable it in this setup function.
   Notes: Before you enable the trunk, please check the VLAN setting of the ports used for the trunk. They must belong to the same VLAN group and have the same PVID and tag/untagged setting. If they are different on some items, please make them have the same configuration first.

(5) Change Password

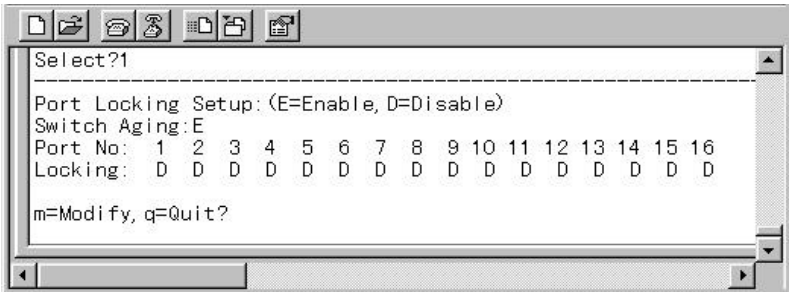
1. You can change password with this function.

(6) Advanced Setup

There are three advanced functions for switch you can setup here:

1. Port Locking

   In the Port Locking function, you can allow only one user to use the network connection of some port through the switch. There could be two different lock operations for the switch.

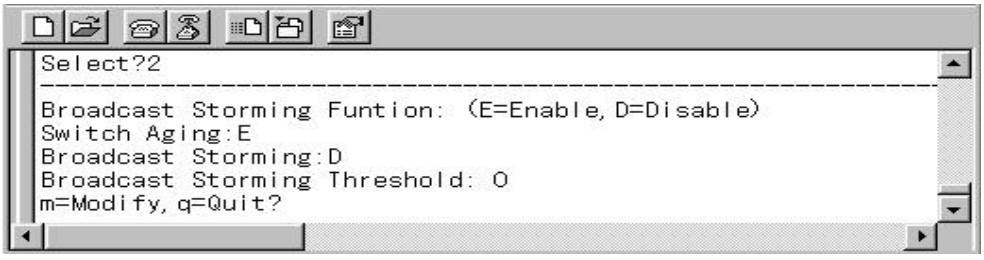


   Static Lock: If the "Switch Aging" function of the switch in "Broadcast Storm Filter" setup is set to disable, only the user that the switch learns firstly on that port can use this connection port even if the user turns OFF his PC.

   Dynamic Lock: If the "Switch Aging" setting is enable, another user with other Mac ID could be the "only-one" user for the port after last user is OFF and his MAC ID is aged out.

2. Broadcast Storm Filter

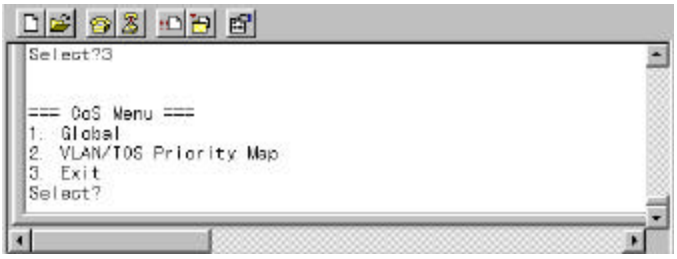
   You can enable/disable the aging and broadcast storm filtering functions of the switch from this function.



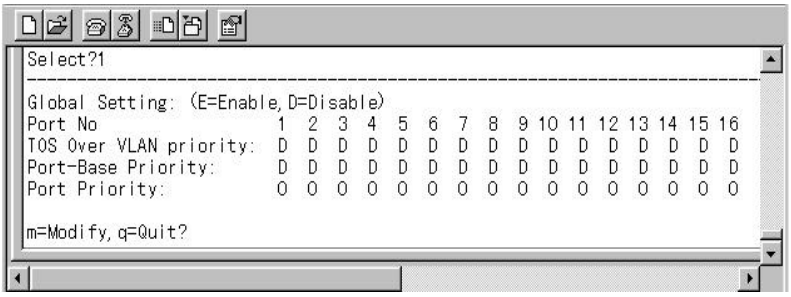
   If the broadcast storm filtering function is enable, the broadcast packets over the rising threshold within 50ms will be discarded. You can set three threshold levels (per port) for broadcast storm.

   1: 10% for all 100TX, 1% for not all 100TX
   2: 20% for all 100TX, 2% for not all 100TX
   3: 40% for all 100TX, 4% for not all 100TX

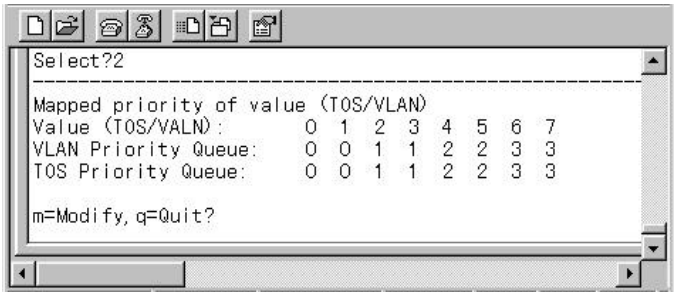
3. CoS (Class of Service)
   There are 4 transmit queues per port in the switch to support CoS function and you configure the CoS function of the switch with this function.



   1. Global
      Because this switch can perform CoS function with Port-base, VLAN-base or TOS-base, you can configure it with this function.



      TOS Over VLAN priority: If enabled, the priority information in TOS will be processed first then priority information in VLAN tag. If disabled, the priority information in VLAN tag will be processed first.
      Port-Base Priority: If enabled, all the packets received from this port will be always sent with the assigned priority and the priority information in VLAN tag and TOS will be ignored.
      Port Priority: Assign the transmit priority of packets received from the port if "Port-Base Priority" is enabled.
   2. VLAN/TOS Priority Map
      You can map the priority value in VLAN/TOS to the four transmit queues with this function.



      There could be eight different priority values in VLAN tag and TOS and these values will be mapped to the four transmit queues in each port of the switch. You can arrange the mapping here.

(7) Restore Default Setup
You can restore the configuration to the default setting with this function.

(8) Exit
You can exit this setup interface with this function and it will go back to the login screen.

A. Product Specifications

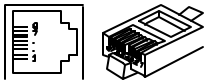
Access Method	CSMA/CD, 10 Mbps or 100 Mbps
Standards Conformance	IEEE 802.3 10BASE-T, IEEE 802.3u 100BASETX/FX
Communication Rate	10/100Mbps on RJ-45 ports, 100Mbps on FX port
Communication Mode	Full / Half duplex
Media Supported	*10BASE-T* - 100 Ohm Category 3,4,5 twisted-pair *100BASE-TX* - 100 Ohm Category 5 twisted-pair *100BASE*-FX - fiber optic cable
Indicator Panel	LEDs for Power (each unit), Link/Act, FDX/Col. (each port)
Number of Ports	16* RJ45 TX ports, 1* module port 1* RJ45 console port
MDI-X/MDI Selection	Auto detect
Dimensions	16.93 x 4.13 x 1.73 in. (430 x 105 x 44 mm.)
Certification	CE Mark
Emissions	FCC Class A
Immunity	IEC 1000-4-2/3/4
Power Consumption	15Watts max.
Input Power	Full range: 100 to 240V, 50 to 60 Hz
Temperature	Standard Operating: 0 to 50^0C Storage: -40 to 70^0C
Humidity	5% to 95% (Non-condensing)
Network Bridging Function	Filtering, forwarding and learning
Switching Method	Store-and-forward
Address Table	2K entries
Filtering/Forwarding Rate	Line speed
CoS	4 queues per port
VLAN	16 VLAN groups max.
Trunking	2 ports/trunk max., 2 trunks are allowed

B. Cable Specification

Two different types of cable could be used on this 16-port Switch:

- Straight through cable
- Cross-over cable
- Fiber Optic cable if this 16-port Switch has a FX port

Cable Schematics



Straight-Through Cable						
Hub / Switch side				Adapter side		
Pin #		Pair #		Pin #		Pair #
1	RX+	White-Green	----------	1	RX+	White-Green
2	RX-	Green	----------	2	RX-	Green
3	TX+	White-Orange	----------	3	TX+	White-Orange
4	Not Used	Blue	----------	4	Not Used	Blue
5	Not Used	White-Blue	----------	5	Not Used	White-Blue
6	TX-	Orange	----------	6	TX-	Orange
7	Not Used	White-Brown	----------	7	Not Used	White-Brown
8	Not Used	Brown	----------	8	Not Used	Brown
Cross-Over Cable						
Hub / Switch side				Hub / Switch side		
Pin #		Pair #		Pin #		Pair #
1	RX+	White-Green	---- ----	1	RX+	White-Green
2	RX-	Green	---- ----	2	RX-	Green
3	TX+	White-Orange	---- ----	3	TX+	White-Orange
4	Not Used	Blue		4	Not Used	Blue
5	Not Used	White-Blue		5	Not Used	White-Blue
6	TX-	Orange	---- ----	6	TX-	Orange
7	Not Used	White-Brown		7	Not Used	White-Brown
8	Not Used	Brown		8	Not Used	Brown

C. Compliance

EMI Certification

FCC Class A Certification (USA)

Warning: This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A digital device pursuant to Subpart B of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures are required to correct the interference.

Canada Department of Communications - Class A

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus", ICES-003 of the Department of Communications.

CE Mark Declaration of Conformance for EMI and Safety (EEC)

This is to certify that this product complies with ISO/IEC Guide 22 and EN45014.
It conforms to the following specifications:

EMC:	EN55022 (1988)/CISPR-22 (1985)	class A
	EN60555-2 (1995)	class A
	EN60555-3	
	IEC1000-4-2 (1995)	4kV CD, 8kV AD
	IEC1000-4-3 (1995)	3V/m
	IEC1000-4-4 (1995)	1kV - (power line), 0.5kV - (signal line)

This product complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.

Warning! Do not plug a phone jack connector in the RJ-45 port. This may damage this device.