Installation Guide
16-port 10/100 Fast Ethernet Switch
with 1 Fiber Connection
Model Name : KS-316F

KTI
NETWORKS

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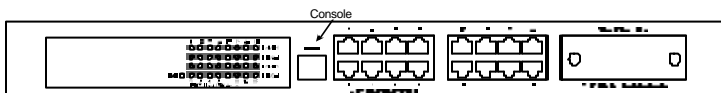
Contents

P/N : 17000083

1. Introduction

This 16port 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 one 100BaseFX expansion module port.   This feature provides user the simplest way to complete the network connection with the switch.

This 16port switch provides console management function. You can configure VLAN, trunking, port configuration, . . . from console to provide more flexible network management and configuration functions.

This 16port Switch supports 4 priority transmit queues per port and long Ethernet packet up to 1522 bytes for QoS function for advanced network

application.

1.1 Package Contents

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

2. Where To Place the 16port Switch

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

Place the 16port 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 16port switch on a 19" rack with the rack-mount kits as the picture.
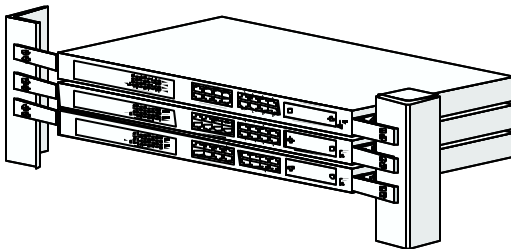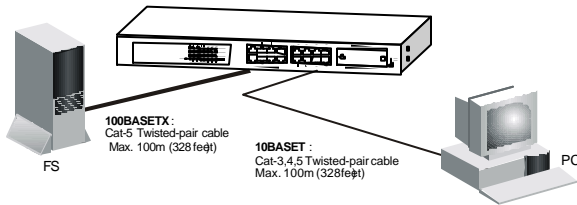
3. Configure the Network Connection

## 3.1 Connecting Devices to the 16port Switch
[Connection Guidelines:]

● 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 are 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.

100BASETX :
Cat-5 Twisted-pair cable
Max. 100m (328 feet)

10BASET :
Cat-3,4,5 Twisted-pair cable
Max. 100m (328feet)

FS

PC

3.2 Connecting to Another Ethernet Switch/Hub

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

Max. 100m (328 feet)

TO: MDI or MDI-X port
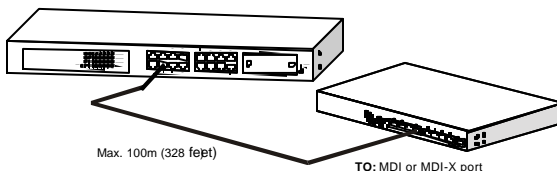
3.3 Application

A switch can be used to overcome the hub to hub connectivity limitations as well as improve 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.
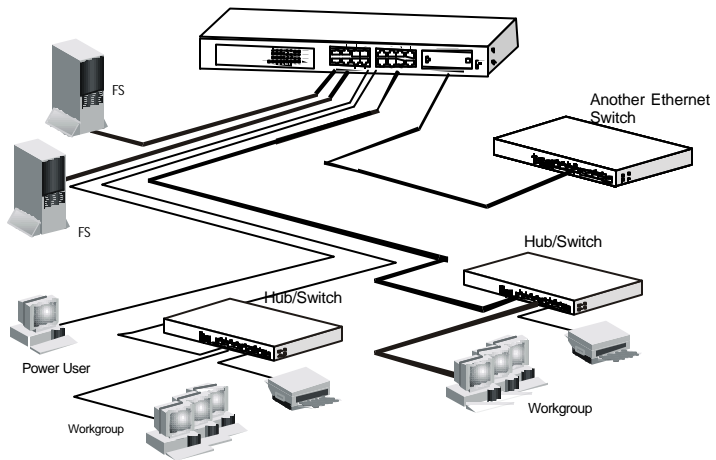
4. For 100BaseFX Connection

4.1 Adding 100BaseFX Module

This 16port switch has a module port for 100BaseFX connection extension.
You can add a 100BaseFX module to the switch and this switch gets a
100BaseFX port for long distance fiber optic cable connection. But *when this
module is added, the 16th TP port will be disable and this FX port become the
16th port.*
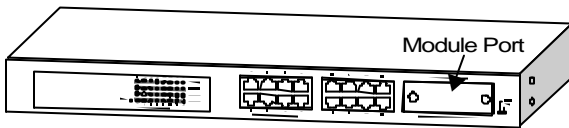
Please follow the steps to add the module to the switch.
1. Turn off the switch.
2. Loosen the screws of the blank cover and remove the cover from the module
   port of the switch.
3. Slide in the module into the module port.
4. Tighten the screws of the module to the switch.
5. Connect the fiber optic 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 LEDs Defined

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	The connection speed is 100Mbps.
	Yellow	The connection speed is 10Mbps.
FDX / Col	ON	The 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, 15 are impossible for such
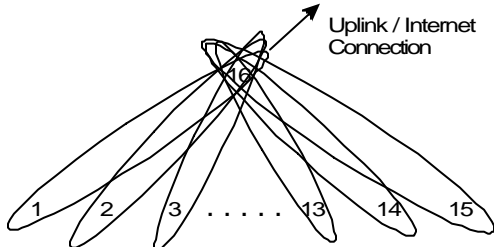
configuration.

The second one is the default VLAN setting of the switch. Every port belongs to the same VLAN and can communicate with each other.
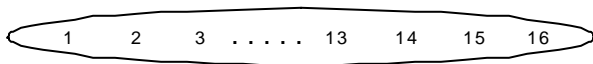
Please refer to Section 7 to configure the VLAN from console port.

6.2 QoS

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

There are 4 transmit queues for each port of the 16port Switch. This 16port 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 network.

Note: The QoS function is not configurable and it 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 can not 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.
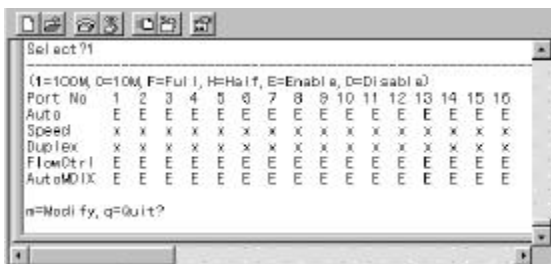4. Power on the Switch and the setup console will appear as follow.

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.

```
Select?1

(1=100M, 0=10M, F=Full, H=Half, E=Enable, D=Disable)
Port No    1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16
Auto       E   E   E   E   E   E   E   E   E   E   E   E   E   E   E   E
Speed      x   x   x   x   x   x   x   x   x   x   x   x   x   x   x   x
Duplex     x   x   x   x   x   x   x   x   x   x   x   x   x   x   x   x
FlowCtrl   E   E   E   E   E   E   E   E   E   E   E   E   E   E   E   E
AutoMDIX   E   E   E   E   E   E   E   E   E   E   E   E   E   E   E   E

n=Modify, q=Quit?
```

[3] Setup VLAN Groups of the Switch

1. Select VLAN setup function in the main menu as follow.

```
Select?2

=== VLAN Menu ===
1. Port Base Concentration Setup
2. VLAN&PVID Setup
3. Exit
Select?
```

Note: Before start to set VLAN, the trunking function will be disable 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&PVID Menu ===
1. VLAN Setup
2. PVID Setup
3. Exit
Select?
```

VLAN group and PVID of ports. Use "VLAN Setup" to create VLAN groups first. Then set PVID and tag/untagged of ports.

4. All of the connection ports are in the same VLAN group default. There are three commands for this function.
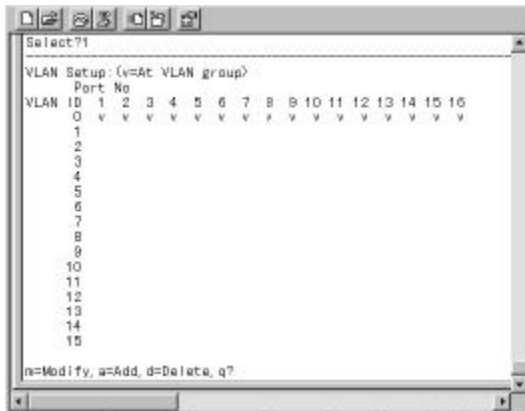

m : modify setting of VLAN group. Select the VLAN group first and the connection port. Then select the operation - add or remove the port to/from the VLAN.

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.
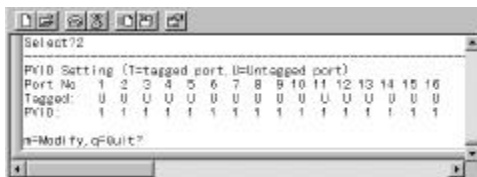
After you complete the VLAN groups setup, you have to set the PVID of ports to the VLAN ID of their VLAN group. If port overlapping happens, please assign the PVID of the overlapped port to the VLAN ID that it will use for packet transmitting VLAN grouping.

If tagged packets, there is VLAN ID in the tag of 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 VLAN ID as its VLAN ID if the VLAN ID in tagged
packets are larger than 15.

6. 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 network. If
you are not sure about your network application, you may set all of
them to untagged because lots of old network devices do not support
long Ethernet packets with 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, just like 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 follow.
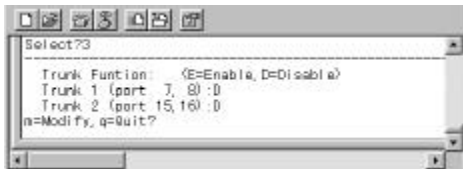
2. This switch supports two trunks and two ports per trunk maximum.
You can select the trunk and enable or disable it in this setup function.
**Notes: Before you enable the trunk, please check the VLAN setting of the ports used
for trunk. They must belong to the same VLAN group and have the same PVID and
tag/untagged setting. If they are different on some items, please make them have
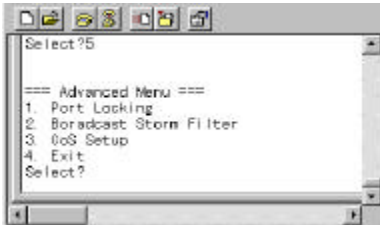the same configuration first.**

[5] Change Password
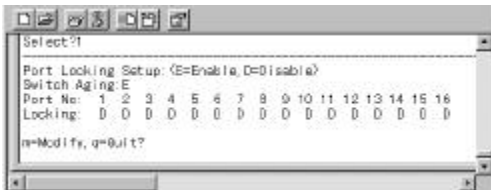1. You can change password with this function.
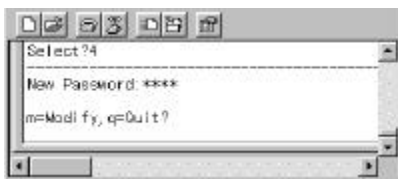
[6] Advanced Setup

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 operation 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 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
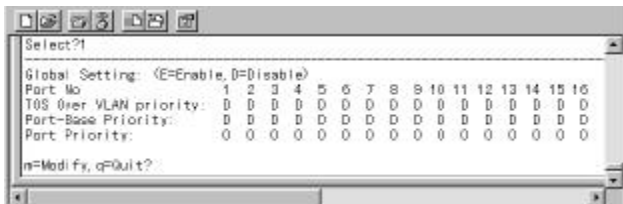
3. CoS (Class of Service)

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
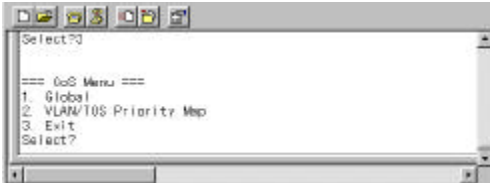
function.

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 enable, the priority information in TOS will be processed first then priority information in VLAN tag. If disable, the priority information in VLAN tag will be processed first.

Port-Base Priority : If enable, 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 enable.

2. VLAN/TOS Priority Map

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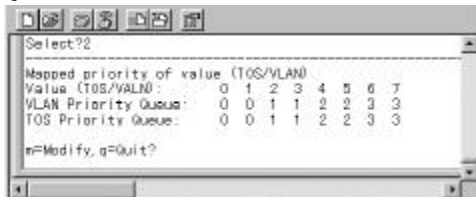
There could be eight different priority values in VLAN tag and TOS and these values will be mapped to the four transmit queues in each port of the switch.   You can arrange the mapping here.

[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	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
	Storage: -40 to 70
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 ports
VLAN	16 VLAN groups max.
Trunking	2 port/trunk max., 2 trunks are allowed

B. Cable Specification

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

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

Cable Schematics
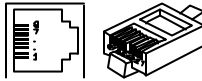
Straight-Through Cable					
Hub / Switch side				**Adapter side**	
Pin #	**Pair #**		**Pin #**	**Pair #**	
1	RX+	White-Green	------------------ 1	RX+	White-Green
2	RX-	Green	------------------ 2	RX-	Green
3	TX+	White-Orange	------------------ 3	TX+	White-Orange
4	Not Used	Blue	------------------ 4	Not 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. Compliances

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.

D. Warranty

We warrant to the original owner that the product delivered in this package will be free from defects in material and workmanship for a period of warranty time from the date of purchase from us or the authorized reseller. The warranty does not cover the product if it is damaged in the process of being installed. We recommend that you have the company from whom you purchased this product install it.