

Installation Guide
10/100 Fast Ethernet Switch
KS-516 KS-524



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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.

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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.

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1. Introduction

Driven by recent advances in desktop computing technology, today's network applications have increased in speed, power and the ability to process information. To meet the demands of these more powerful applications, two affordable switch devices provides significant increase in performance for your Ethernet or Fast Ethernet network. The switches come with high number of switched ports, each capable of transferring information simultaneously at full wire speed to control and allocate the network bandwidth.

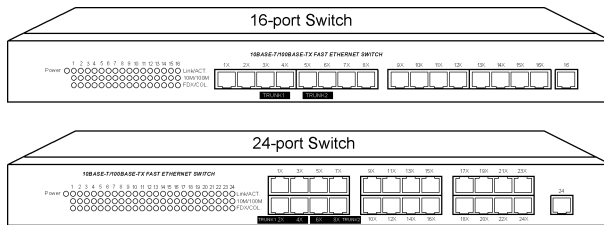


Figure 1-1 Fast Ethernet Switches

The key features of this switch units are:

- **High Port-count and Bandwidth** : Combining large number of 10/100Mbps-based Fast Ethernet switched ports, the switches deliver up to 3.2 Gbps or 4.8 Gbps aggregated network bandwidth for your Fast Ethernet network
- **Easy Migration** : With 10BASE-T support on each port, the switches provide a non-disruptive and smooth migration path from Ethernet to Fast Ethernet network.
- **Easy Installation** : With the functions of auto-speed-sensing and auto-negotiation on each port, the switches support plug-and-play installation which eliminates configuration problems.

1.1 Features

Designed for resolving congestion problems caused by bandwidth-hungry devices and bandwidth-intensive applications as well as a high number of users, the switches not only adhere to the IEEE 802.3 10BASE-T and IEEE 802.3u 100BASE-TX standards, but also feature:

- High port-count of 10/100BASE-TX auto-negotiation switched ports for flexible connections to desktop PCs, servers and hubs.
- The 10/100BASE-TX switched ports support:
 - auto speed sensing for 100Mbps or 10Mbps connection
 - auto configuration with auto-negotiation devices
- Self learning for network configuration
- Store and forward switching to ensure only good packets are forwarded
- Full-duplex or half-duplex operation support for all switched ports
- Forwarding and filtering at full wire speed
- Support IEEE 802.3x flow control for full-duplex operation
- Support back-pressure flow control for half-duplex operation
- Comprehensive LED indicators provide quick, easy to read port and switch information
- Additional uplink jack allows easy connection to different types of devices with a straight-through cable instead of a modified crossover cable
- Port-based VLAN support
- Trunking support

1.2 Specifications

Specifications	16-port switch	24-port switch
Network Ports	16	24
TP MDI-X Jacks	16	24
TP MDI Jacks	1	1
VLAN Configurations	2	2
Trunking Configurations	2	2
RAM Buffer Size	2MB	3MB
MAC Addresses	1K	1K
Dimension (mm)	440x152x44.5	440x200x44.5
Dimension (inch)	17.32x5.98x1.75	17.32x7.87x1.75
Power Consumption	35W	40W

Common Specifications

Standard	IEEE 802.3 IEEE 802.3u
Cables	10BASE-T Cat. 3, 4, 5 UTP cable (100 meters max.) 100BASE-TX Cat. 5 UTP cable (100 meters max.)
Unit LED	Power status
TP Port LED	Link/Activity, Speed, Duplex/Collision status per port
Filtering rate	14,880 pps for Ethernet (10BASE-T) 148,800 pps for Fast Ethernet (100BASE-TX)
Forwarding rate	14,880 pps for Ethernet (10BASE-T) 148,800 pps for Fast Ethernet (100BASE-TX)
Filtering address	Multicast/Broadcast/Unicast address
Aging Time	256 seconds
Environment	Temperature 0°C to 40°C Relative humidity 10% to 90% non-condensing
Power	Universal power supply 115-230VAC, 50/60Hz

2. Installing the Switch

The switch is designed to operate in workgroup environments without a complicated configuration procedure. It also features an auto-select 100-240V, 50/60Hz power supply unit, which works in most countries around the world.

Before connecting the supplied power cord into the switch, check to see that the cord voltage and current rating conform to the standards of the country of operation.

2.1 Packing List

The switch has the following components shipped with it:

- One switch unit
- One AC power cord
- 19-inch rack mount kit
- Installation guide

2.2 Panels

The following figure illustrates the major components on front and rear panels:

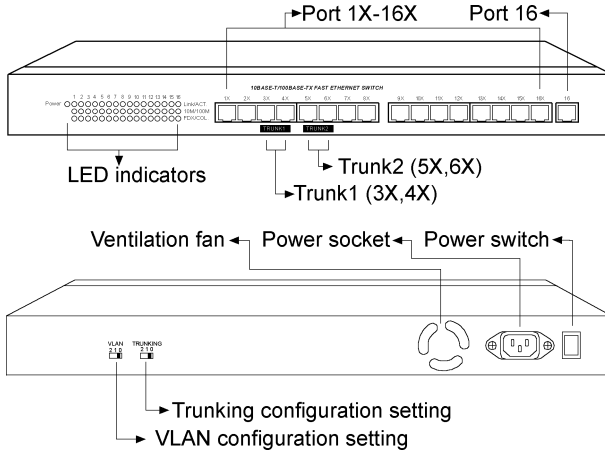


Figure 2-1 The 16-Port Switch Model

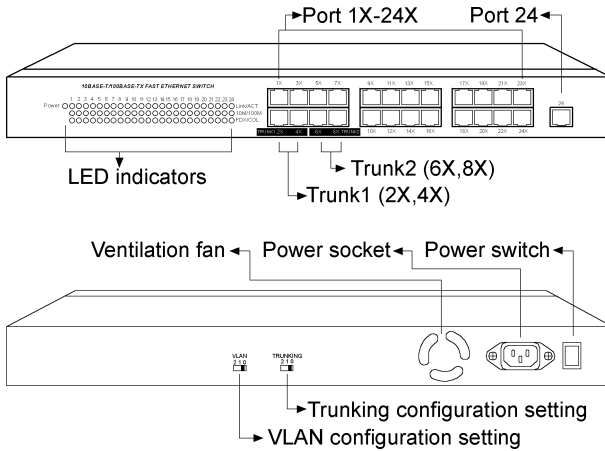


Figure 2-2 The 24-port Switch Model

2.3 Mounting the Switches

Desktop Mounting

The switches can be placed on a desktop as a stand-alone unit. Allow enough ventilation space between the hub and the objects around it.

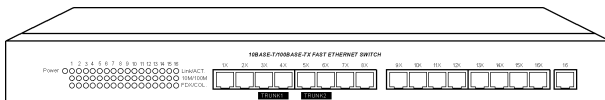


Figure 2-3 Desktop Mounting

Rack Mounting

For mounting the switch into a 19-inch rack, a pair of mounting brackets is included in the pack.

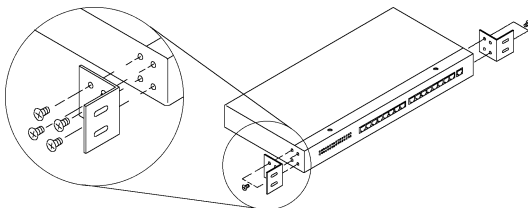


Figure 2-4 Install Rack Mount Brackets

Install the switch into a 19-inch rack as illustrated in the following figure:

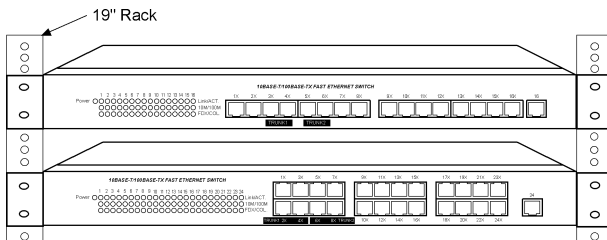
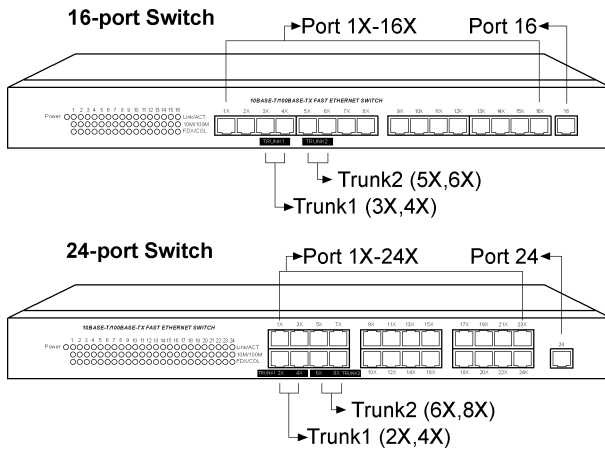


Figure 2-5 Install the Switch into a 19-inch Rack

3. Making Network Connections

3.1 Network Switched Ports

16 switched ports and 24 switched ports are provided on these two switch models respectively. Each port is equipped with one RJ-45 connector at least. Both models provide one additional uplink RJ-45 connector on Port 16 and Port 24 respectively. Some switched ports are designed with trunking function optionally.



Switch Model	MDI-X	MDI	Switched ports	Optional Trunking
16-port switch	1X-16X	16	Port 1 - 16	Port 3, 4, 5, 6
24-port switch	1X-24X	24	Port 1 - 24	Port 2, 4, 6, 8

Figure 3-1 Network Switched Ports

- **Switched Ports**

Each switched port supports one connection to a LAN segments. Each segment is an independent shared network in one collision-domain. The connection can be to either a 10BASE-T or 100BASE-TX device.

- **MDI-X RJ-45 Connectors**

MDI-X jack is labeled [X] normally to indicate the jack is designed with internal crossover function. It allows a connection to an end station using straight-through UTP cable.

- **Uplink MDI RJ-45 connectors**

One additional MDI RJ-45 connector of each switch is provided for easy uplink via standard straight-through UTP to other device that supports MDI-X RJ-45 connector.

- **Trunking Ports**

Some switched ports can be optionally used for supporting trunking function. This option depends on the trunking configuration setting on rear panel. Refer to section 3.7 for more information.

3.2 Pin Assignments of MDI-X and MDI RJ-45

The following table shows the pin assignments of MDI-X and MDI RJ-45 connector respectively:

PIN#	MDI-X Jacks	MDI Jack
1	Rx+	Tx+
2	Rx-	Tx-
3	Tx+	Rx+
6	Tx-	Rx-
4,5,7,8	NC	NC

3.3 UTP Cables

When making a connection to another device using straight-through UTP cable, make sure MDI-X to MDI connection rule is followed. The following figure illustrates the pin assignments of a straight-through UTP and a crossover UTP cable:

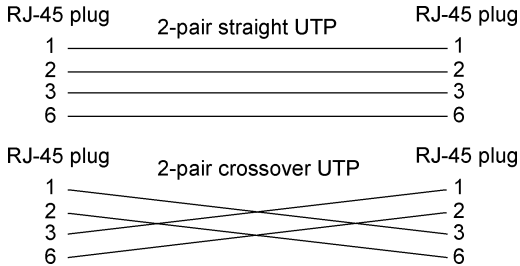


Figure 3-2 Straight-through and Crossover UTP Cable

It is suggested to use straight-through UTP cables for all UTP connections. The maximum length and UTP cable categories used for the connections to a 10BASE-T device and 100BASE-TX device are:

CONNECTED DEVICE	UTP CABLE USED & MAXIMUM LENGTH
10BASE-T device	Cat. 3, 4, 5 UTP (100 meters)
100BASE-TX device	Cat. 5 UTP (100 meters)

3.4 UTP Connections

The switch can support connections to the following devices:

- 10BASE-T or 10/100BASE-TX network cards
- 10BASE-T hub ports
- 100BASE-TX hub ports
- 10/100BASE-TX dual speed hub ports
- 10/100BASE-TX switch ports

The following figure illustrates some connection examples:

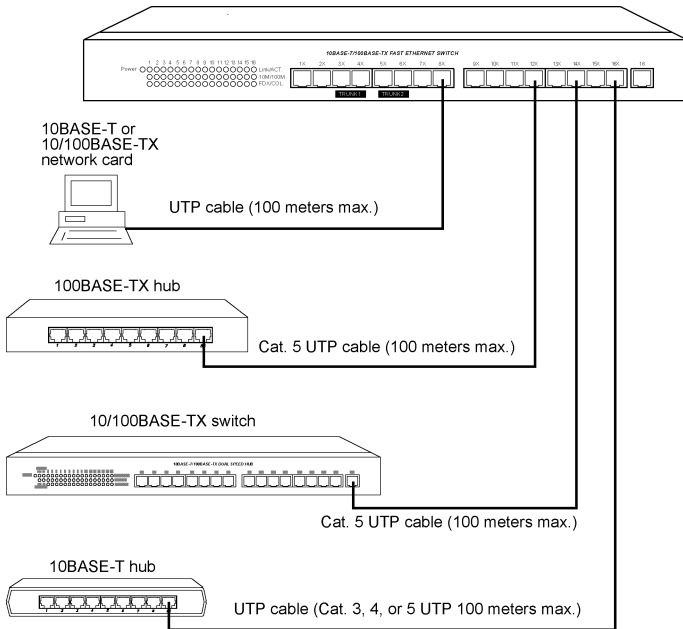


Figure 3-3 Example of Connections to Different Devices

3.5 Operating Mode

All switched ports are designed as auto-negotiation capable switched ports. Each port can determine the speed and duplex type used automatically through an auto-negotiation process with the remote connected auto-negotiation capable device. The auto-negotiation process is performed upon the connection is made.

When connecting to a non-auto-negotiation device, each port also features the capability to auto-sense the connection speed.

The following table lists the operation mode used for the switched port when it connects to different devices. The operating mode includes the connection speed and duplex type.

Device Connected	Operation Mode Used
10BASE-T hub	10Mbps, half-duplex
100BASE-TX hub	100Mbps, half-duplex
Auto-negotiation device	Auto-negotiation *2
Non-auto*1 half-duplex device	auto-speed-sensing *3, half-duplex
Non-auto full-duplex device	Not supported

*1 Non-auto : non-auto-negotiation

*2 determined through auto-negotiation process

*3 speed is determined by auto-sensing function

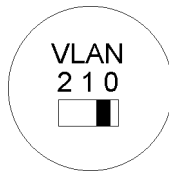
Most of 10BASE-T hubs and 100BASE-TX hubs are non-auto-negotiation devices and operate on half-duplex mode.

3.6 Port-based VLAN Support

Each port of the switch unit connects to one individual LAN segment. There can be many Ethernet nodes located on each segment. The switch performs network data forwarding between different LAN segments. It allows Ethernet nodes located on different segments to communicate with each other. Basically, all Ethernet nodes are in one single LAN.

For the purposes of security need or to minimize broadcasting messages, the switches support a port-based VLAN (Virtual LAN) function. It allows you to divide the switched ports into 2 groups via a VLAN configuration setting. Each port is associated with one LAN segment. As long as the setting is made, the Ethernet nodes located in same group compose one individual virtual LAN and the nodes located in different groups are unable to communicate with each other.

The VLAN configuration slide switch is located on the rear panel of the switch. Three setting positions are provided for selection.



VLAN Setting	16-port Switch	24-port Switch
0	VLAN function is disabled.	
1	Enable Group1 : port 1 - 8 Group2 : port 9 - 16	Enable Group1 : port 1 - 16 Group2 : port 17 - 24
2	Enable Group1 : port 1 - 9 Group2 : port 8 - 16	Enable Group1 : port 1 - 16 Group2 : port 13 - 24

Figure 3-4 VLAN Configuration Setting Switch

Two groups are defined when VLAN function is enabled. The setting 1 defines two groups without any overlapping. These two groups are independent and isolated. No network data can be forwarded between two groups. However, the setting 2 defines two groups with some overlapping ports. The overlapping ports belong to two groups at the same time. They are able to communicate with any Ethernet nodes globally. Depending on your application need, choose the appropriate setting for your installation.

3.7 Trunking Support

Two switch units can be cascaded together through any regular switched port on each unit when an expansion is required. However, the transfer bandwidth between the two cascaded ports is limited to 200Mbps full duplex.

To increase the bandwidth for the connection between two switch units, a trunking function is implemented on the switch unit for this purpose. Some ports can be configured optionally as trunking ports. A pair of trunking ports composes one trunk. Two switch units can be cascaded through one trunk (two ports and two cables). The aggregated bandwidth of one trunk can be up to 400Mbps.

The port pairs which are equipped with trunking function are:

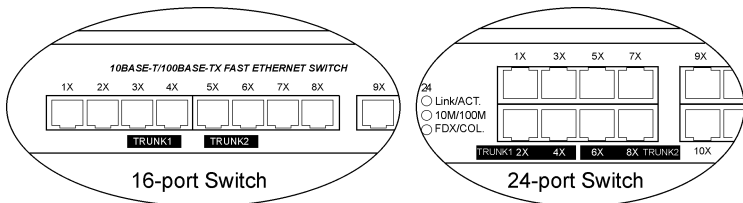


Figure 3-5 Trunking Ports

The trunking configuration setting switch is located on the rear panel and the settings are:



Trunk Setting	16-port Switch	24-port Switch
0	Trunking is disabled.	
1	Enable Trunk1 : port 3 and 4	Enable Trunk1 : port 2 and 4
2	Enable Trunk1 : port 3 and 4 Trunk2 : port 5 and 6	Enable Trunk1 : port 2 and 4 Trunk2 : port 6 and 8

Figure 3-6 Trunking Configuration Setting Switch

The following figure illustrates an example of trunk connection between two switches:

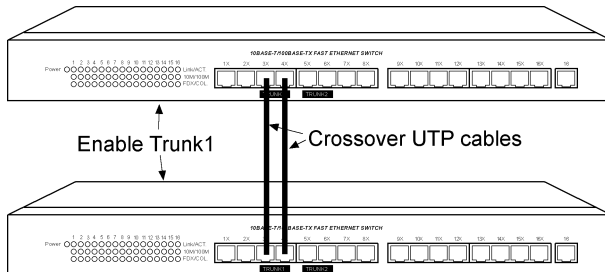


Figure 3-7 Example of One Trunk Connection

Note :

1. A pair of crossover UTP cables should be used at the same time for one trunk connection. The length of each cable can be up to 100 meters.
2. When the switched ports are enabled as trunking ports, they can only serve trunking function, but no other function.
3. The 16-port switch and 24-port switch can trunk to each other.
4. Since the trunking is proprietary, the switches do not support trunk connection to other brand's switches.

The following figure illustrates another example of trunk connections between three switches:

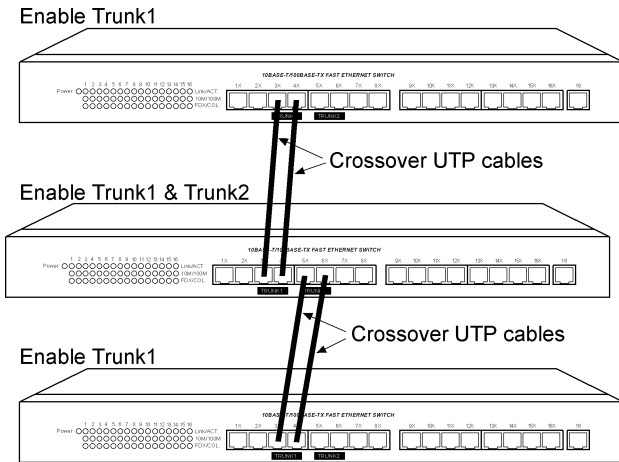


Figure 3-8 Example of Two-Trunk Connections

4. LED Indicators

4.1 LED Panels

The switch provides comprehensive LED indicators for diagnosing and monitoring the operation of the unit as illustrated below:

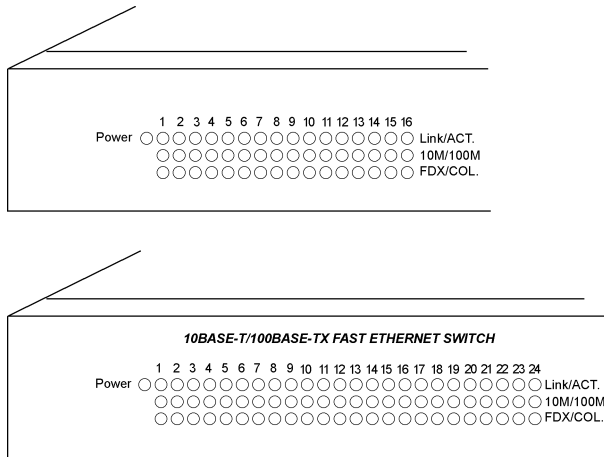


Figure 4-1 LED Panels

4.2 Interpretation

Each switched port has three LED indicators to indicate its own port status. The interpretations of each LED are:

POWER LED : indicates the status of the power supplied to the switch.

Link/ACT. LED : indicates the port cable link and traffic activity.

10M/100M LED : indicates the connection speed used

FDX/COL. LED : indicate the duplex mode used and collision status

The states and indications are:

LED	STATE	INDICATION
POWER	Off	No power is supplied to the device.
POWER	On	Power is supplied to the device.
Link/ACT.	On	An active link is established.
Link/ACT.	Off	No active link is established.
Link/ACT.	Blink	There are Tx or Rx activities.
10M/100M	On	100Mbps speed is used.
10M/100M	Off	10Mbps speed is used.
FDX/COL.	On	Full duplex mode is used.
FDX/COL.	Off	Half duplex mode is used.
FDX/COL.	Blink	Collision occurrences