TigerSwitch 100

Stackable Fast Ethernet Switch

◆ 24 100BASE-FX VF-45 ports
◆ Optional 100BASE-FX or 1000BASE-X modules
◆ Optional stack module for linking up to four units
◆ 8.8 Gbps of aggregate switch bandwidth
◆ Support for redundant power unit
◆ Up to five port trunks per switch
◆ Port mirroring for non-intrusive analysis
◆ QoS support for two-level priority
◆ Full support for IEEE 802.1Q VLANs
◆ IP Multicasting with IGMP Snooping
◆ Manageable via console, Web, SNMP/RMON

SMC
N e t w o r k s ®

Installation Guide

SMC6924VF

TigerSwitch 100
Installation Guide

From SMC's Tiger line of feature-rich workgroup LAN solutions

SMC®
N e t w o r k s

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* SMC will provide warranty service for one year following discontinuance from the active SMC price list. Under the limited lifetime warranty, internal and external power supplies, fans, and cables are covered by a standard one-year warranty from date of purchase.

<div align="center">

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6 Hughes
Irvine, CA 92618

</div>

COMPLIANCES

FCC - Class A

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 computing 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 may be required to correct the interference. You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

You may use 50/125 or 62.5/125 micron multimode fiber optic cable for VF-45, SC, or ST-type connections.

Warnings 1. Wear an anti-static wrist strap or take other suitable measures to prevent electrostatic discharge when handling this equipment.

2. When connecting this hub to a power outlet, connect the field ground lead on the tri-pole power plug to a valid earth ground line to prevent electrical hazards.

EC Conformance Declaration - Class A

SMC contact for these products in Europe is:

SMC Networks Europe,
Edificio Conata II,
Calle Fructuós Gelabert 6-8, 2º, 4ª,
08970 - Sant Joan Despí,
Barcelona, Spain.

This information technology equipment complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC, and carries the CE Mark accordingly. It conforms to the following specifications:

EMC:	EN55024 (1998)/CISPR-22 (1995)	Class A
	IEC 61000-4-2 (1995)	4 kV CD, 8 kV AD
	IEC 61000-4-3 (1995)	3 V/m
	IEC 61000-4-4 (1995)	1.0 kV - (power line), 0.5 kV - (signal line)
	IEC 61000-4-5 (1995)	2 kV - (line to line), 1 kV - (line to ground)
	IEC 61000-4-6 (1995)	3 Vrms
	IEC 61000-4-11 (1995)	Voltage dip: >95% - 10 ms
		30% - 500 ms
		60% - 100 ms
		Voltage interruption: >95% - 5000 ms

Industry Canada - 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.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques," NMB-003 édictée par le ministère des Communications.

Japan VCCI Class A

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Taiwan BSMI Class A

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Australia AS/NZS 3548 (1995) - Class A

ACN 069 351 613

SMC contact for products in Australia is:

SMC Communications Pty. Ltd.
Suite 18, 12 Tryon Road,
Lindfield NSW2070,
Phone: 61-2-94160437
Fax: 61-2-94160474

Safety Compliance

Warning: Fiber Optic Port Safety

CLASS I
LASER DEVICE

When using a fiber optic port, never look at the transmit laser while it is powered on. Also, never look directly at the fiber TX port and fiber cable ends when they are powered on.

Avertissment: Ports pour fibres optiques - sécurité sur le plan optique

DISPOSITIF LASER
DE CLASSE I

Ne regardez jamais le laser tant qu'il est sous tension. Ne regardez jamais directement le port TX (Transmission) à fibres optiques et les embouts de câbles à fibres optiques tant qu'ils sont sous tension.

Warnhinweis: Faseroptikanschlüsse - Optische Sicherheit

LASERGERÄT
DER KLASSE I

Niemals ein Übertragungslaser betrachten, während dieses eingeschaltet ist. Niemals direkt auf den Faser-TX-Anschluß und auf die Faserkabelenden schauen, während diese eingeschaltet sind.

Underwriters Laboratories Compliance Statement

Important! Before making connections, make sure you have the correct cord set. Check it (read the label on the cable) against the following:

Operating Voltage	Cord Set Specifications
120 Volts	UL Listed/CSA Certified Cord Set
	Minimum 18 AWG
	Type SVT or SJT three conductor cord
	Maximum length of 15 feet
	Parallel blade, grounding type attachment plug rated 15A, 125V
240 Volts (Europe only)	Cord Set with H05VV-F cord having three conductors with minimum diameter of 0.75 mm^2
	IEC-320 receptacle
	Male plug rated 10A, 250V

The unit automatically matches the connected input voltage. Therefore, no additional adjustments are necessary when connecting it to any input voltage within the range marked on the rear panel.

Wichtige Sicherheitshinweise (Germany)

1. Bitte lesen Sie diese Hinweise sorgfältig durch.

2. Heben Sie diese Anleitung für den späteren Gebrauch auf.

3. Vor jedem Reinigen ist das Gerät vom Stromnetz zu trennen. Verwenden Sie keine Flüssigoder Aerosolreiniger. Am besten eignet sich ein angefeuchtetes Tuch zur Reinigung.

4. Die Netzanschlu ßsteckdose soll nahe dem Gerät angebracht und leicht zugänglich sein.

5. Das Gerät ist vor Feuchtigkeit zu schützen.

6. Bei der Aufstellung des Gerätes ist auf sicheren Stand zu achten. Ein Kippen oder Fallen könnte Beschädigungen hervorrufen.

7. Die Belüftungsöffnungen dienen der Luftzirkulation, die das Gerät vor Überhitzung schützt. Sorgen Sie dafür, daß diese Öffnungen nicht abgedeckt werden.

8. Beachten Sie beim Anschluß an das Stromnetz die Anschlußwerte.

9. Verlegen Sie die Netzanschlußleitung so, daß niemand darüber fallen kann. Es sollte auch nichts auf der Leitung abgestellt werden.

10. Alle Hinweise und Warnungen, die sich am Gerät befinden, sind zu beachten.

11. Wird das Gerät über einen längeren Zeitraum nicht benutzt, sollten Sie es vom Stromnetz trennen. Somit wird im Falle einer Überspannung eine Beschädigung vermieden.

12. Durch die Lüftungsöffnungen dürfen niemals Gegenstände oder Flüssigkeiten in das Gerät gelangen. Dies könnte einen Brand bzw. elektrischen Schlag auslösen.

13. Öffnen sie niemals das Gerät. Das Gerät darf aus Gründen der elektrischen Sicherheit nur von authorisiertem Servicepersonal geöffnet werden.

14. Wenn folgende Situationen auftreten ist das Gerät vom Stromnetz zu trennen und von einer qualifizierten Servicestelle zu überprüfen:

    a. Netzkabel oder Netzstecker sind beschädigt.
    b. Flüssigkeit ist in das Gerät eingedrungen.
    c. Das Gerät war Feuchtigkeit ausgesetzt.
    d. Wenn das Gerät nicht der Bedienungsanleitung entsprechend funktioniert oder Sie mit Hilfe dieser Anleitung keine Verbesserung erzielen.
    e. Das Gerät ist gefallen und/oder das Gehäuse ist beschädigt.
    f. Wenn das Gerät deutliche Anzeichen eines Defektes aufweist.

15. Zum Netzanschluß dieses Gerätes ist eine geprüfte Leitung zu verwenden. Für einen Nennstrom bis 6A und einem Gerätegewicht größer 3kg ist eine Leitung nicht leichter als H05VV-F, 3G, 0.75mm² einzusetzen.

Der arbeitsplatzbezogene Schalldruckpegel nach DIN 45 635 Teil 1000 beträgt 70dB(A) oder weniger.

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CHAPTER 1
ABOUT THE
TIGERSWITCH 100

Overview

SMC's TigerSwitch™ 100 is a stackable switch with 24 100BASE-FX VF-45 ports, plus two slots for optional slide-in 100BASE-FX or 1000BASE-X modules. One of these slots can also be used for an optional stacking module that allows you attach up to four switches to a 9.6 Gbps high-speed backplane. There is also an SNMP-based Network Management Module installed in the rear panel. This module supports both in-band and out-of-band access for managing the switch and the attached stack. (Note that a switch stack, or a switch in a standalone configuration, must have Network Management Module installed to enable all ports. The base unit alone has all ports disabled by default.)
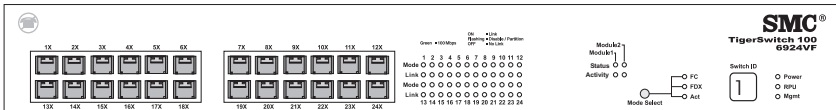
Figure 1-1. Front Panels

Figure 1-2. Rear Panel

100BASE-FX Multimode Fiber Module

100Base-FX-SC Extender Module
TX   RX   TX   RX
SMC6900FSC

100BASE-FX Single-mode Fiber Module

100Base-FX Singlemode SC Module
TX   RX
SMC6900FSSC

1000BASE-SX Gigabit Module

1000Base-SX-SC Extender Module
TX   RX
SMC6900G

1000BASE-LX Gigabit Module

1000Base-LX-SC Extender Module
TX   RX
SMC6900GLSC

1000BASE-T Gigabit Module

1000Base-T Extender Module
SMC6900GT
○ 10
○ 100
○ 1000
TX   RX

Stack Module

Stack Module
UP   DOWN
SMC6900S

Figure 1-3. Optional Modules

Switch Architecture

The TigerSwitch employs a high-speed switching fabric. This design allows for simultaneous transport of multiple packets at low latency on all ports. It also uses store-and-forward switching to ensure maximum data integrity. In this mode, the entire packet must be received into a port buffer and checked for validity before being forwarded. This prevents errors from being propagated throughout the network. This switch also features full-duplex capability on all ports, which effectively doubles the bandwidth of each connection.

This TigerSwitch can be used in a standalone configuration, or can be stacked up to four high to form a single logical switch with up to 104 ports. When stacked, the 9.6 Gbps stack backplane provides enough bandwidth for the most demanding environment. Moreover, you can use a 100 Mbps single-mode fiber module for connecting to a remote site, or a Gigabit module for a high-speed backbone connection.

Management Options

This switch contains a comprehensive array of LEDs for "at-a-glance" monitoring of network and port status. It also includes a Network Management Module that allows the entire stack to be managed in-band via SNMP or RMON (Groups 1, 2, 3 and 9) protocols, with a Web browser, or remotely via Telnet. The switch also provides a serial port on the rear panel for out-of-band management.

Note: Only one Network Management Module must be installed in the stack for the current firmware release.

Description of Hardware

100BASE-FX VF-45 Ports

These ports are VF-45 multimode fiber ports that can be connected to workstations and servers with 62.5/125 micron or 50/125 micron multimode fiber cable.

Each of these ports support half- and full-duplex operation at 100 Mbps. Note that 100BASE-FX ports do not support auto-negotiation of duplex mode, so this has to be configured manually. However, the ports do support IEEE 802.3x auto-negotiation of flow control, so the switch can automatically prevent port buffers from becoming saturated.

Status LEDs

The LEDs, which are located on the front panel for easy viewing, are shown below and described in the following table.
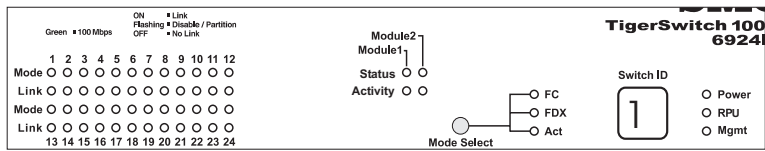

Figure 1-4. Port and System LEDs

Port and System Status LEDs		
LED	**Condition**	**Status**
Power	On	Switch is receiving power.
RPU	On	Redundant power is on, and the RPU is in backup or active mode.
	Off	Redundant power is off or has failed.
Mgmt	On	Agent is operational.
VF-45 Ports		
Link	On	Port has established a valid network connection.
	Green	Valid 100 Mbps connection.
	Flashing	Port has been partitioned due to an abnormal network condition, or manually disabled.
Act*	Flashing	Traffic is passing through the port.
FDX*	On	Port is operating at full duplex.
	Off	Port is operating at half duplex.
FC*	On	Flow control enabled.

* Use the Mode Select button to select the LED display mode.

Port and System Status LEDs		
LED	**Condition**	**Status**
Module Ports		
Status	On	A module is installed in this slot.
Activity	On	Traffic is passing through the module.

Network Management Module
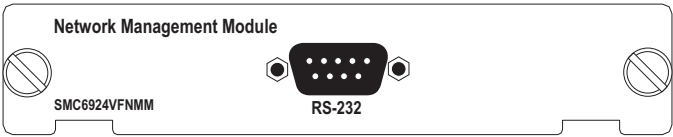
Figure 1-5. Network Management Module

This switch includes a Network Management Module on the rear panel. This module can manage the switch and the attached stack. It offers a variety of management options, including SNMP, RMON and a Web-based interface. This module also includes an RS-232 port for out-of-band management. This is an RS-232 serial port with a DB-9 connector. A PC may be connected to this port for configuration and monitoring purposes out-of band via a full-handshaking null modem cable. You can also make a remote connection to this port via modems. This allows you to access the out-of-band interface. (See Apendix B for a description of wiring options.)

The Network Management Module provides a wide range of advanced performance-enhancing features. Multicast filtering provides support for real-time network applications. Port-based and tagged VLANs provide traffic security and efficient use of network bandwidth. QoS priority queueing ensures the minimum delay for moving real-time multimedia data across the network. Flow control eliminates the loss of packets due to bottlenecks

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caused by port saturation. And broadcast storm control prevents broadcast traffic storms from engulfing the network.

Some of this switch's advanced features are described below. For a detailed description, refer to the Management Guide.

Spanning Tree Protocol

The TigerSwitch 100 supports IEEE 802.1D Spanning Tree Protocol. This protocol adds a level of fault tolerance by allowing two or more redundant connections to be created between a pair of LAN segments. When there are multiple physical paths between segments, this protocol will choose a single path and disable all others to ensure that only one route exists between any two stations on the network. This prevents the creation of network loops. However, if the chosen path should fail for any reason, an alternate path will be activated to maintain the connection.

The default setting for the Spanning Tree Protocol is "enabled." This protocol may be configured out-of-band via the serial console port, or in-band via the Web interface, Telnet, or SNMP network management software.

VLANs

The TigerSwitch 100 supports up to 256 VLANs. A Virtual LAN is a collection of network nodes that share the same collision domain regardless of their physical location or connection point in the network. By segmenting your network into VLANs, you can:

- Eliminate broadcast storms which severely degrade performance in a flat network.

- Simplify network management for node changes/moves by remotely configuring VLAN membership for any port, rather than having to manually change the node's IP address.

- Provides data security by restricting all traffic to the originating VLAN, except where a connection has been configured between separate VLANs using a router or Layer 3 switch.

Multicast Switching

Specific multicast traffic can be assigned to its own VLAN to ensure that it does not interfere with normal network traffic and to guarantee real-time delivery by setting the required priority level for the designated VLAN. The switch uses IGMP Snooping and IGMP to manage multicast group registration.

Traffic Priority

This switch provides Quality of Service (QoS) by prioritizing each packet based on the required level of service, using two distinct categories with Weighted Fair Queuing. It uses IEEE 802.1p and 802.1Q tags to prioritize incoming traffic based on input from the end-station application. These functions can be used to provide independent priorities for delay-sensitive data and best-effort data.
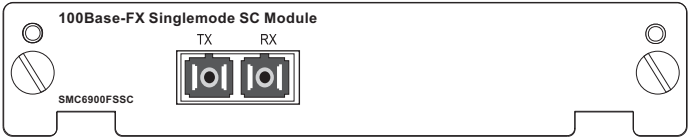
Optional Media Extender Modules

Optional 100BASE-FX Module (SMC6900FSC)
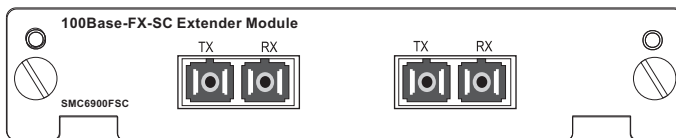
Figure 1-6. 2-Port 100BASE-FX Multimode Fiber Module

Using multimode fiber optic cable, the 100BASE-FX port can be connected to a remote site up to 2 km (1.24 mi.) away. This port operates only at 100 Mbps, full duplex. This module is fitted with an SC connector, but you can attach an ST plug to the switch using the optional SC-ST Converter (Part Number: 99-012034-091).
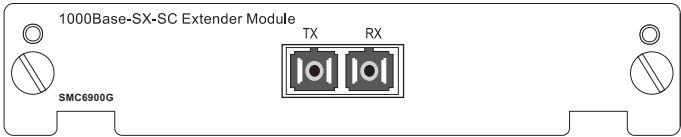
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Optional 100BASE-FX Module (SMC6900FSSC)

Figure 1-7. 1-Port 100BASE-FX Single-Mode Fiber Module

Using single-mode fiber optic cable, the 100BASE-FX port can be connected to a remote site up to 10 km (6.21 mi.) away. This port operates only at 100 Mbps, full duplex.

Optional 1000BASE-SX Module (SMC6900G)

Figure 1-8. Single-Port 1000BASE-SX Gigabit Module

Using multimode fiber optic cable, the 1000BASE-SX port can be connected to a remote site up to 550 m (1805 ft.) away. The 1000BASE-SX Gigabit module operates at 1 Gbps, with support for auto-negotiation of duplex mode and flow control. This module is fitted with an SC connector, but you can attach an ST plug to the switch using the SC-ST Converter (Part Number: 99-012034-091).

Optional 1000BASE-LX Module (SMC6900GLSC)
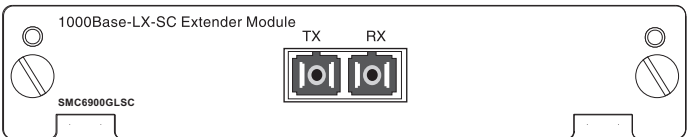
Figure 1-9. Single-Port 1000BASE-LX Gigabit Module

SMC6900GLSC contains one 1000BASE-LX single-mode fiber port that can be connected to a site up to 5 km (16,404 ft) away using

9/125 micron single-mode fiber cable. The 1000BASE-LX Gigabit module operates at 1 Gbps, with support for auto-negotiation of duplex mode and flow control.

Optional 1000BASE-T Module (SMC6900GT)

Figure 1-10. Single-Port 1000BASE-T Gigabit Module

SMC6900GT contains one 1000BASE-T RJ-45 port that can support a link of up to 100 m (328 ft) using Category 5 or 5e twisted-pair cable. The 1000BASE-T Gigabit module operates at 1 Gbps, 100 Mbps, and 10 Mbps with support for auto-negotiation of speed, duplex mode and flow control.

Optional Stack Module (SMC6900S)
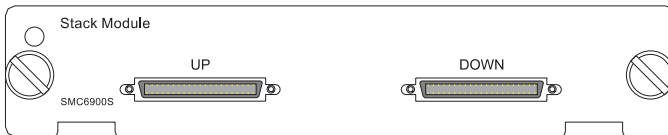
**Figure 1-11. Stack Module**

The uplink and downlink stack ports operate at 4.8 Gbps. These modules can be used to connect up to four switches to the backplane. A stack cable is included with each module.

Optional Redundant Power Unit (SMCRPU150W)

SMC provides an optional Redundant Power Unit (RPU), SMCRPU150W, that can supply power to the switch in the event of failure of the internal power supply.

Power Supply Receptacles

There are two power receptacles on the rear panel of the switch. The standard power receptacle is for the AC power cord. The receptacle labeled "DC Input" is for the optional Redundant Power Unit (RPU).
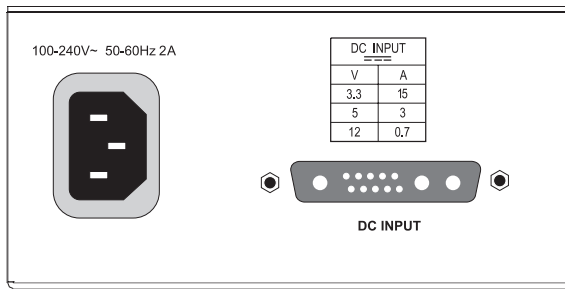
Figure 1-12. Power Supply Receptacles

Features and Benefits

Connectivity

◆ 24 multimode fiber VF-45 ports that offer a cost-effective solution for fiber-to-the-desktop applications

◆ Each VF-45 port operates at 100 Mbps in half- or full-duplex mode (configured manually)

◆ 62.5/125 micron and 50/125 micron multimode fiber cable supported on all VF-45 ports

◆ 802.3u Fast Ethernet compliance ensures compatibility with standards-based hubs, network cards and switches from any vendor

Expandability

◆ Optional 100BASE-FX multimode fiber module (SC connector) that can connect to a remote site up to 2 kilometers away

◆ Optional 100BASE-FX single-mode fiber module (SC connector) that can connect to a remote site up to 10 kilometers away

◆ Optional 1000BASE-SX Gigabit module that supports a connection of up to 550 meters (using 50/125 micron, 500 MHz/km fiber cable), and operates at 1 Gbps, half or full duplex, with auto-negotiation for duplex mode and flow control

◆ Optional 1000BASE-LX Gigabit module that supports a connection of up to 5 kilometers using 9/125 micron single-mode fiber cable, and operates at 1 Gbps, half or full duplex, with auto-negotiation for duplex mode and flow control

◆ Optional 1000BASE-T Gigabit module that supports a connection of up to 100 meters using Category 5 or 5e UTP or STP cable, and operates at 1 Gbps, 100 Mbps, or 10 Mbps, half or full duplex, with auto-negotiation for speed, duplex mode and flow control

◆ Optional Stack modules that can connect up to four switches (104 ports) to the stack's 9.6 Gbps backplane

Performance

◆ Transparent bridging

◆ Aggregate bandwidth up to 8.8 Gbps

◆ Switching table with 8K MAC address entries

◆ Provides Store-and-Forward switching

◆ Filtering and forwarding at line speed

◆ Broadcast storm control

◆ Includes support for an optional Redundant Power Unit

◆ Desktop or rack-mountable

◆ Limited lifetime warranty

Management

◆ Up to 104 ports can be managed under one single IP address

◆ "At-a-glance" LEDs for easy troubleshooting

◆ Network Management Module:

• Supports Telnet, SNMP/RMON and Web-based interface

• One module manages the entire stack in-band or out-of-band

- Spanning Tree Protocol for redundant network connections

- VLAN support for 256 groups, port-based or with IEEE 802.1Q VLAN tagging

- Quality of Service (QoS) supports two levels of priority and Weighted Fair Queueing

- Multicast Switching based on IGMP (Internet Group Management Protocol) Snooping and Multicast Filtering

- Port trunking increases the bandwidth of a network connection and ensures fault recovery

- Port security prevents intruders from gaining access to the network

CHAPTER 2
NETWORK PLANNING

Introduction to Switching

A network switch allows simultaneous transmission of multiple packets via non-crossbar switching. This means that it can partition a network more efficiently than bridges or routers. The switch has, therefore, been recognized as one of the most important building blocks for today's networking technology.

When performance bottlenecks are caused by congestion at the network access point (such as the network card for a high-volume file server), the device experiencing congestion (server, power user or hub) can be attached directly to a switched port. And, by using full-duplex mode, the bandwidth of the dedicated segment can be doubled to maximize throughput.

When networks are based on repeater (hub) technology, the maximum distance between end stations is limited. For Ethernet, there may be up to four hubs between any pair of stations; for Fast Ethernet, the maximum is two. This is known as the hop count. However, a switch turns the hop count back to zero. So subdividing the network into smaller and more manageable segments, and linking them to the larger network by means of a switch, removes this limitation.

A switch can be easily configured in any Ethernet or Fast Ethernet network to significantly boost bandwidth while using conventional cabling and network cards.

Sample Applications

The TigerSwitch 100 is not only designed to segment your network, but also to provide a wide range of options in setting up network connections. Some typical applications are described below.

Collapsed Backbone

The TigerSwitch 100 is an excellent choice for mixed Fast Ethernet installations where significant growth is expected in the near future. You can easily build on this basic configuration, adding direct full-duplex connections to workstations or servers. When the time comes for further expansion, just cascade the TigerSwitch to a Fast Ethernet hub or switch, add another TigerSwitch to the stack, or link to another workgroup using a Gigabit connection.

In the figure below, the TigerSwitch 100 is operating as a collapsed backbone for a small LAN. It is providing dedicated 200 Mbps full-duplex connections to workstations and servers.

Servers
200 Mbps
Full Duplex

**Workstations**
200 Mbps
Full Duplex
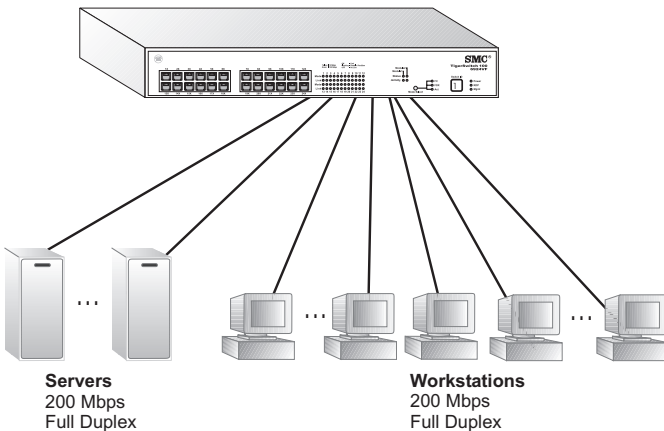
Figure 2-1. Collapsed Backbone

Central Wiring Closet

With up to 104 ports in a stack (i.e., 104 distinct segments), the TigerSwitch 100 can collapse a complex network down into a single efficient bridged node, increasing overall bandwidth and throughput.

In the figure below, the VF-45 ports on the TigerSwitch stack are providing 100 Mbps connectivity for up to 96 end nodes. In addition, the switch is also connecting servers at 2 Gbps.
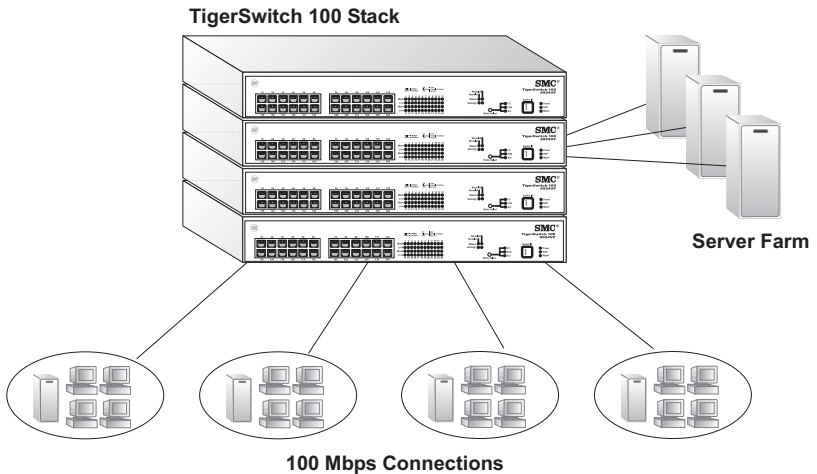
Figure 2-2. Central Wiring Closet

Remote Connections with Fiber Cable

Fiber optic technology allows for longer cabling than any other media type (up to 10 kilometers for 100 Mbps single-mode fiber at full duplex, or up to 5 kilometers for 1 Gbps fiber). The TigerSwitch can serve as a collapsed backbone, providing direct connectivity for a widespread LAN. The 100 Mbps single-mode fiber module can be used to interconnect remote Fast Ethernet segments. While the Gigabit module can be used for a high-speed connection between floors in the same building, or to connect to other buildings in a campus setting. The figure below illustrates a TigerSwitch 100 stack connecting multiple segments with fiber cable.
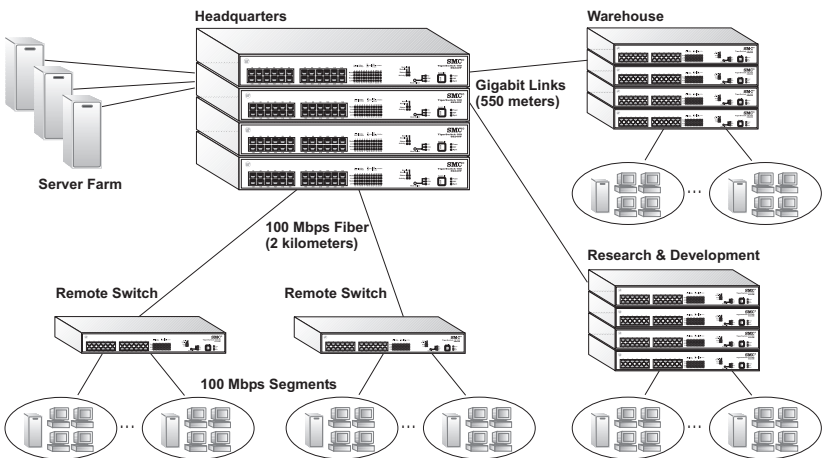
Figure 2-3. Collapsed Backbone Using Fiber Cable

Making VLAN Connections

VLANs can be based on port groups, or each data frame can be explicitly tagged to identify the VLAN group it belongs to. When using port-based VLANs, ports can either be assigned to any number of groups. Port-based VLANs are suitable for small networks. A single switch can be easily configured to support several VLAN groups for various organizational entities (such as Finance and Marketing).

When you expand port-based VLANs across several switches, you need to make a separate connection for each VLAN group. This approach is, however, inconsistent with the Spanning Tree Protocol, which can easily segregate ports that belong to the same VLAN. When VLANs cross separate switches, it is therefore better to use VLAN tagging. This allows you to assign multiple VLAN groups to the "trunk" ports (that is, tagged ports) connecting different switches.
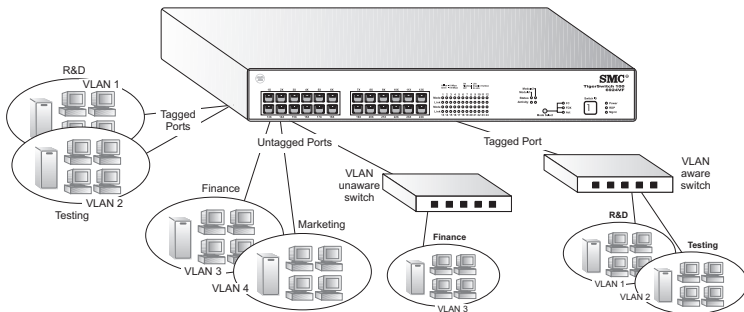
Figure 2-4. Making VLAN Connections

Note: When connecting to a switch that does not support IEEE 802.1Q VLAN tags, use untagged ports.

Connectivity Rules

When adding hubs (repeaters) to your network, please follow the connectivity rules listed below for Ethernet, Fast Ethernet, or Gigabit Ethernet. However, note that because switches break up the path for connected devices into separate collision domains, you should not include the switch or connected cabling in your calculations for cascade length involving other devices.

1000 Mbps Gigabit Ethernet Collision Domain

Maximum 1000BASE-T Optic Cable Distance

1000BASE-T	Cat. 5, 5e 100-ohm UTP	100 m (328 ft)	RJ-45

Maximum 1000BASE-SX Fiber Optic Cable Distance

Fiber Size	Fiber Bandwidth	Maximum Cable Length
62.5/125 micron MMF	160 MHz/km	7-722 ft. (2-220 m)
	200 MHz/km	7-902 ft. (2-275 m)
50/125 micron MMF	400 MHz/km	7-1641 ft. (2-500 m)
	500 MHz/km	7-1805 ft. (2-550 m)

Maximum 1000BASE-LX Fiber Optic Cable Distance

1000BASE-LX Fiber Specifications		
Fiber Diameter	Fiber Bandwidth	Cable Length Range
62.5/125 micron MMF	160 MHz/km	2 - 550 m (7 - 1805 ft)
50/125 micron MMF	400 MHz/km	2 - 550 m (7 - 1805 ft)
	500 MHz/km	2 - 550 m (7 - 1805 ft)
9/125 micron SMF	N/A	2 m - 5 km (7 - 16,404 ft)

Note: Although maximum cable length for 100BASE-FX fiber depends on the duplex mode, the maximum length for 1000BASE-SX fiber is the same for both half and full duplex.

100 Mbps Fast Ethernet Collision Domain

Maximum 100BASE-FX Fiber Optic Cable Distance

100BASE-FX	50/125 or 62.5/125 micron core multimode fiber (MMF)		
	Full duplex	2 km (1.24 miles)	SC or ST
100BASE-FX	9/125 9 micron core single-mode fiber (SMF)		
	Full duplex	10 km (6.21 miles)	SC or ST

SMC 3-2 Rule for Class II Repeaters

Between any two PCs or other stations in the same 100BASE-TX collision domain, there may be:
- up to 3 link segments and
- up to 2 Class II repeaters (hubs)

SMC 2-1 Rule for Class I Repeaters

Between any two PCs or other stations in the same 100BASE-TX collision domain, there may be:
- up to 2 link segments and
- up to 1 Class I repeater (hub)

Maximum Network Diameter Using Repeaters

Repeater Type and Number	Twisted Pair 100BASE-TX
1 Class I	200 m (656 ft.)
1 Class II	200 m (656 ft.)
2 Class II	205 m (672.4 ft.)

Maximum Fast Ethernet Cable Distance

Cable Type	Connecting	Max. Distance
Twisted Pair	Any two devices	100 m (328 ft.)
Fiber	Switch to switch, server or PC	
	Half duplex	412 m (1,351.4 ft.)
	Full duplex	2 km (1.24 mi.)

Application Notes

1. Full-duplex operation only applies to point-to-point access (such as when a switch is attached to a workstation, server or another switch). When the switch is connected to a hub, both devices must operate in half-duplex mode.

2. When a switch is connected to a hub or any kind of shared media, remember to turn off back pressure to prevent the attached port from being frequently partitioned due to the jamming packets.

3. For network applications that require routing (such as when interconnecting dissimilar network types or distinct VLANs), you may have to attach the TigerSwitch 100 units directly to a router or Layer 3 switch (such as the SMC6724L3).

CHAPTER 3
INSTALLING THE SWITCH

Selecting a Site

TigerSwitch 100 units can be mounted in a standard 19-inch equipment rack or on a flat surface. Be sure to follow the guidelines below when choosing a location.

◆ The site should:

- be at the center of all the devices you want to link and near a power outlet.

- be able to maintain its temperature within 0° to 50° C and its humidity within 5% to 95%, non-condensing

- provide adequate space (approximately two inches) on all sides for proper air flow

- be accessible for installing, cabling and maintaining the devices

- allow the status LEDs to be clearly visible

◆ Make sure twisted-pair cable is always routed away from power lines, fluorescent lighting fixtures and other sources of electrical interference, such as radios, transmitters, etc.

◆ Make sure that a separate grounded power outlet that provides 100 to 240 VAC, 50 to 60 Hz, is within 8 feet of each device and is powered from an independent circuit breaker. As with any equipment, using a filter or surge suppressor is recommended.

Equipment Checklist

After unpacking the TigerSwitch 100, check the contents to be sure you have received all the components. Then, before beginning the installation, be sure you have all other necessary installation equipment.

Package Contents

◆ TigerSwitch 100 unit, SMC6924VF

◆ Four adhesive foot pads

◆ Bracket Mounting Kit containing two brackets and four screws for attaching the brackets to the switch

◆ Power Cord—either US, Continental Europe or UK

◆ RS-232 console cable

◆ This Installation Guide

◆ SMC Warranty Registration Card—be sure to complete and return to SMC

Optional Rack-Mounting Equipment

If you plan to rack-mount the switch, be sure to have the following equipment available:

◆ Four mounting screws for each device you plan to install in a rack—these are not included

◆ A screwdriver (Phillips or flathead, depending on the type of screws used)

Mounting

A TigerSwitch 100 unit can be mounted in a standard 19-inch equipment rack or on a desktop or shelf. Mounting instructions for each type of site follow.

Installing Optional Modules: Before mounting the switch, be sure you install any optional modules. If you have purchased an optional slide-in 100BASE-FX or 1000BASE-X media expansion module, or Stack Module, install these modules now, following the instructions included with the package.
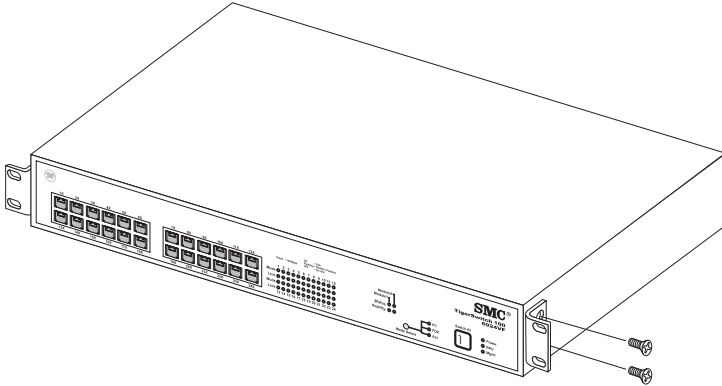
Rack Mounting

Before rack mounting the switch, pay particular attention to the following factors:

◆ Temperature: Since the temperature within a rack assembly may be higher than the ambient room temperature, check that the rack-environment temperature is within the specified operating temperature range. (See page C-2.)

◆ Mechanical Loading: Do not place any equipment on top of a rack-mounted unit

◆ Circuit Overloading: Be sure that the supply circuit to the rack assembly is not overloaded.

◆ Grounding: Rack-mounted equipment should be properly grounded. Particular attention should be given to supply connections other than direct connections to the mains.
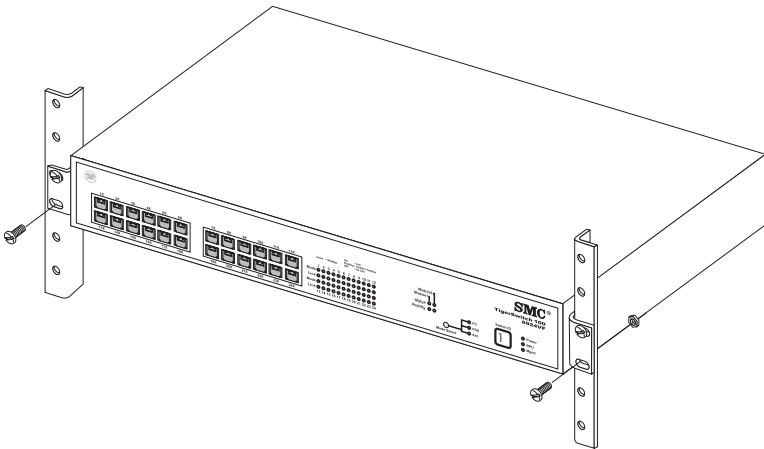
To rack-mount devices:

1. Attach the brackets to the device using the screws provided in the Bracket Mounting Kit.

Figure 3-1. Attaching the Brackets

2. Mount the device in the rack, using four rack-mounting screws (not provided).
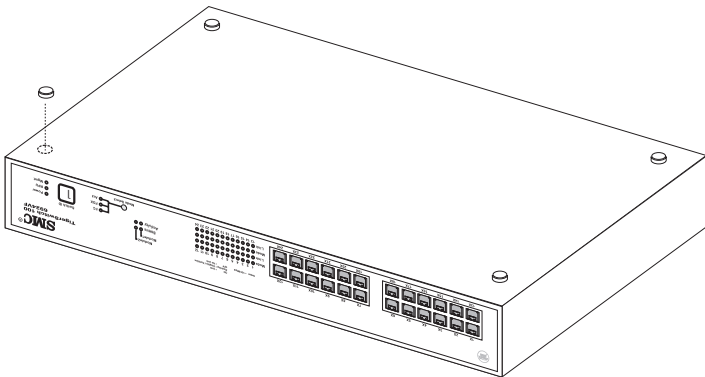

Figure 3-2. Installing the Switch in a Rack

3. If installing a single switch only, turn to "Connecting to a Power Source" at the end of this chapter.

4. If installing multiple switches, mount them in the rack, one below the other, in any order.

5. If also installing RPUs, mount them in the rack below the other devices.

Desktop or Shelf Mounting

1. Attach the four adhesive feet to the bottom of the first switch.

Figure 3-3. Attaching the Adhesive Feet

2. Set the device on a flat surface near an AC power source, making sure there are at least two inches of space on all sides for proper air flow.

3. If installing a single switch only, go to "Connecting to a Power Source" at the end of this chapter.

4. If installing multiple switches, attach four adhesive feet to each one. Place each device squarely on top of the one below, in any order.

5. If also installing RPUs, place them close to the stack.

Installing an Optional Module into the Switch

Optional modules are available for media expansion, stacking and management. These modules can be installed into the modular slots on the rear panel of the switch. The Network Management Module must be installed in the upper slot, and the Stack Module in the lower-left slot. The media expansion modules can be installed in either of the two lower slots.

Caution: DO NOT install slide-in modules with the switch powered on. Be sure you power off the switch before installing any module.

To install an optional module into the switch, do the following:

1. Disconnect power to the switch.

2. Remove the blank metal plate (or a previously installed module) from the appropriate slot by removing the two screws with a flat-head screwdriver. A media module can be installed in either of the two lower slots on the rear panel of the switch. A Network Management Module can be installed in the upper slot on the rear of the switch.

3. Before opening the package that contains the module, touch the bag to the switch casing to discharge any potential static electricity. Also, use the ESD wrist strap included with the package.

4. Remove the module from the anti-static shielded bag.

5. Holding the module level, guide it into the carrier rails on each side and gently push it all the way into the slot, ensuring that it firmly engages with the connector.
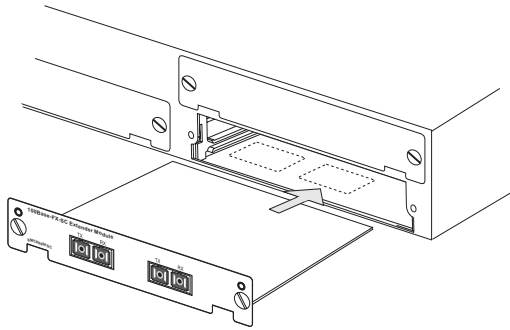
Figure 3-4. Installing a Module

6. If you are sure the module is properly mated with the connector, tighten the retainer screws by hand to secure the module in the slot.

7. Connect power to the switch.

Stacking

A stack may have as many as four switches.

Note: A stacking cable is included with the Stack Module.

Caution: DO NOT stack TigerSwitch 100 units with other devices. Doing so may damage the switch.

To stack the devices:

1. Locate the stack connectors labeled "UP" and "DOWN" on the stack modules (see Figure 3-4).

2. Attach one end of the stacking cable to the stack connector labeled "DOWN" on the top device, and the other end to the connector labeled "UP" on the next lower device.

3. Repeat this step until all the devices have been connected.

4. Turn to the next section, "Connecting to a Power Source."
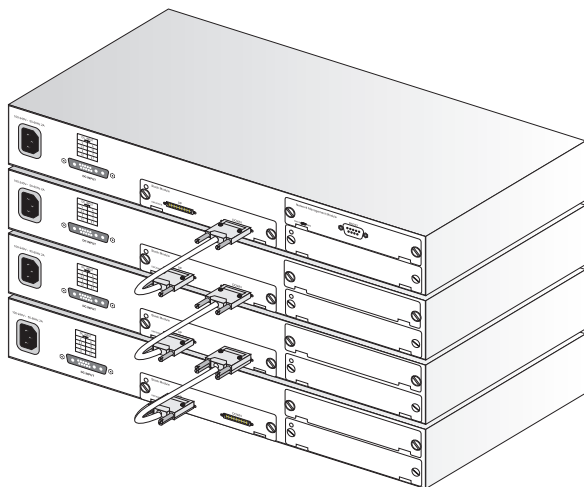

Figure 3-5. Stacking the Switches

Connecting to a Power Source

To connect a device to a power source:

Note: It is recommended that the switches be stacked before being connected to a power source. However, a device can be added to the top or bottom of a stack that is on and operating without first powering down the stack. Be sure to stack the new device before connecting it to a power source. All switches in a stack must be powered on to allow traffic to pass across the stack's backplane.

To connect each device to a power source:

1. Insert the power cable plug directly into the receptacle located at the back of the device.

100-240V~ 50-60Hz 2A
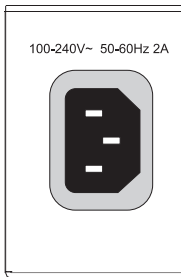
Figure 3-6. Power Receptacle

2. Plug the other end of the cable into a grounded, 3-pin socket.

Note: For International use, you may need to change the AC line cord. You must use a line cord set that has been approved for the receptacle type in your country.

3. Check the front-panel LEDs as the device is powered on to be sure the Power LED is lit. If not, check that the power cable is correctly plugged in. The Mgmt LED on the unit with the Network Management Module installed will be lit.

4. If you have a purchased Redundant Power Unit, connect it to the device and to an AC power source now, following the instructions included with the package.

CHAPTER 4
MAKING NETWORK
CONNECTIONS

Connecting Network Devices

The TigerSwitch 100 is designed to interconnect multiple segments (or collision domains). It may be connected to 100 Mbps network cards in PCs and servers, as well as to Fast Ethernet hubs, switches or routers. It may also be connected to remote devices using the optional 100BASE-FX or 1000BASE-X modules.

Note: Before connecting cables, you may want to first configure the Spanning Tree Protocol to avoid network loops. Refer to the Management Guide for more information.

VF-45 Fiber Connections

Each device requires a 62.5/125 micron or 50/125 micron multimode fiber optic cable with VF-45 connectors at both ends.

1. Remove and keep the VF-45 port's plastic cover. When not connected to a fiber cable, the cover should be replaced to protect the optics.

2. Check that the fiber terminators are clean. You can clean the cable plugs using an appropriate VF-45 cleaning kit. Dirty fiber terminators on fiber optic cables will impair the quality of the light transmitted through the cable and lead to degraded performance on the port.

3. Connect one end of the cable to the VF-45 port on the switch and the other end to the VF-45 port on the other device. Since VF-45 connectors are keyed, the cable can be attached in only one orientation.

4. As each connection is made, check the Link LED on the switch's front panel for the corresponding port to be sure that the connection is valid.

You can run a fiber link up to 2 km (1.24 mi.) in full-duplex mode, and 412 m (1351 ft.) in half-duplex mode. However, note that power budget and timing constraints must also be considered when calculating the maximum cable length for your specific environment.

SC Fiber Connections

An optional slide-in 100BASE-FX module may be used for backbone and long distance connections. A 1000BASE-X module may also be used for a backbone connection between switches, or for connecting to a high-speed server.

Each multimode fiber optic port requires 50/125 or 62.5/125 micron multimode fiber optic cabling with an SC connector at both ends. If you need to connect to a device with 62.5/125 micron cable that has ST-type connectors, SMC provides an optional SC-ST Converter (Part Number: 99-012034-091).

Each single-mode fiber port requires 9/125 micron single-mode fiber optic cable with an SC connector at both ends.

Warning: This switch uses lasers to transmit signals over fiber optic cable. The lasers are compliant with the requirements of a Class 1 Laser Product and are inherently eye safe in normal operation. However, you should never look directly at a transmit port when it is powered on.

1. Remove and keep the SC port's rubber cover. When not connected to a fiber cable, the rubber cover should be replaced to protect the optics.

2. Check that the fiber terminators are clean. You can clean the cable plugs by wiping them gently with a clean tissue or cotton ball moistened with a little ethanol. Dirty fiber terminators on fiber optic cables will impair the quality of the light transmitted through the cable and lead to degraded performance on the port.

3. Connect one end of the cable to the SC port on the switch and the other end to the SC port on the other device. Since SC connectors are keyed, the cable can be attached in only one orientation.

SC fiber connector
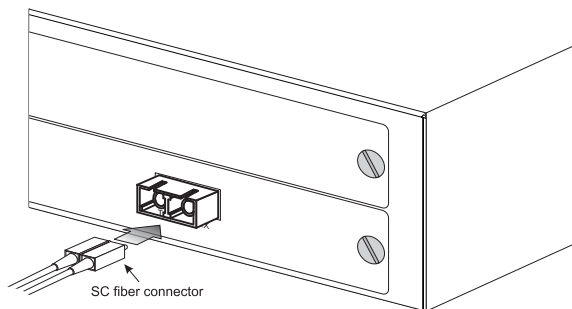
Figure 4-1. Making SC Port Connections

4. As a connection is made, check the Activity LED on the switch's front panel for the corresponding module to be sure that the connection is valid.

Note: If you use the optional SC-ST Converter, be sure to connect the converter's Tx (Rx) port to the Rx (Tx) port on the other device.

The 100BASE-FX fiber optic ports operate only at 100 Mbps, full duplex. You can run a single-mode fiber link up to 6.21 miles (10 kilometers). However, note that power budget constraints must also be considered when calculating the maximum cable length for your specific environment.

The 1000BASE-SX fiber optic ports operate at 1 Gbps full duplex, with auto-negotiation of flow control. The maximum length for fiber optic cable operating at Gigabit speed will depend on the fiber type as listed under "1000 Mbps Gigabit Ethernet Collision Domain" on page 2-6.

1000BASE-T Twisted-Pair Connections

A 1000BASE-T connection requires a shielded or unshielded twisted-pair (STP or UTP) cable with RJ-45 connectors at both ends. For all connections, Category 5 or 5e (recommended) cable is required with all four wire pairs connected. You should also test the cable installation for IEEE 802.3ab compliance. See "1000BASE-T Cable Requirements" on page B-4.

Cabling Guidelines

The RJ-45 port on the SMC6900GT module supports 1000, 100, and 10 Mbps Ethernet operation, with auto-negotiation of speed, duplex mode, and flow control. Because 1000BASE-T ports support automatic MDI/MDI-X operation, you can use straight-through cables for all network connections to PCs or servers, or to other switches or hubs.

Caution: Do not plug a phone jack connector into an RJ-45 port. This will damage the switch. Use only twisted-pair cables with RJ-45 connectors that conform to FCC standards.

Connecting to PCs, Servers, Hubs and Switches

1. Attach one end of a twisted-pair cable segment to the device's RJ-45 connector.
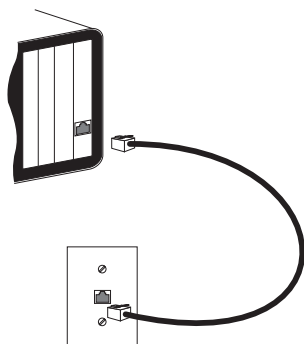
Figure 4-2. Making Twisted-Pair Connections

2. If the device is a network card and the TigerSwitch is in the
    wiring closet, attach the other end of the cable segment to a
    modular wall outlet that is connected to the wiring closet (see
    "Wiring Closet Connections" on the next page). Otherwise,
    attach the other end to the port on the 1000BASE-T module.

   Make sure the twisted pair cable does not exceed 100 meters
    (328 ft.) in length.

    Note: When connected to a shared collision domain (such as a
    hub with multiple workstations), switch ports must be
    set to half-duplex mode and back pressure flow control
    disabled.

3. As the connection is made, the green Activity LED (on the
    TigerSwitch) corresponding to the module port will start to
    flash, indicating that the connection is valid and traffic is
    passing through the port.

Wiring Closet Connections

Today, the punch-down block is an integral part of many of the newer equipment racks. It is actually part of the patch panel. Instructions for making connections in the wiring closet with this type of equipment follows.

1. Attach one end of a patch cable to the port on the 1000BASE-T module, and the other end to the patch panel.

2. If not already in place, attach one end of a cable segment to the back of the patch panel where the punch-down block is located, and the other end to a modular wall outlet.

3. Label the cables to simplify future troubleshooting.
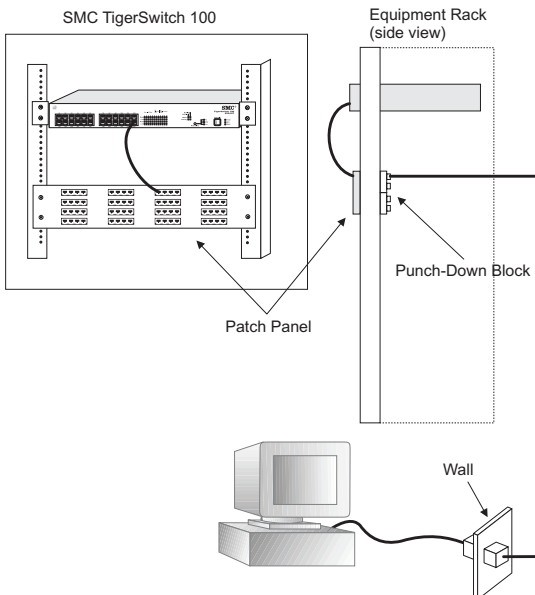
Figure 4-3. Wiring Closet Connections

APPENDIX A
TROUBLESHOOTING

Diagnosing Switch Indicators

Troubleshooting Chart	
Symptom	**Action**
Power LED is Off	• Internal or redundant power supply has failed or is disconnected. • Check connections between the switch, the power cord, the wall outlet, and the RPU if you are using one. • If the switch is installed in a rack, check the connections to the punch-down block and patch panel. • Contact SMC Technical Support.
Power LED is Flashing	• The switch is either downloading firmware or running the Power-On Self-Diagnostics Test (POST). If this LED does not stop flashing, then POST has failed, and you should contact SMC Technical Support.
Link LED is Off	• Verify that the switch and attached device are powered on. • Be sure the cable is plugged into both the switch and corresponding device. • Verify that the proper cable type is used and its length does not exceed specified limits. • Check the adapter on the attached device and cable connections for possible defects. Replace the defective adapter or cable if necessary.

Power and Cooling Problems

If the power indicator does not turn on when the power cord is plugged in, you may have a problem with the power outlet, power cord, or internal power supply. However, if the unit powers off after running for a while, check for loose power connections, power losses or surges at the power outlet, and verify that the fans on the unit are unobstructed and running prior to shutdown. If you still cannot isolate the problem, then the internal power supply may be defective. In this case, contact SMC Technical Support for assistance.

Installation

Verify that all system components have been properly installed. If one or more components appear to be malfunctioning (such as the power cord or network cabling), test them in an alternate environment where you are sure that all the other components are functioning properly.

In-Band Access

You can access the management agent in the switch from anywhere within the attached network using Telnet, a Web browser, or other network management software such as EliteView. However, you must first configure the switch with a valid IP address, subnet mask, and default gateway. If you have trouble establishing a link to the management agent, check to see if you have a valid network connection. Then verify that you entered the correct IP address. Also, be sure the port through which you are connecting to the switch has not been disabled. If it has not been disabled, then check the network cabling that runs between your remote location and the switch.

Note: You can configure the management agent to accept from one to four simultaneous Telnet sessions. If the maximum number of sessions already exists, an additional Telnet connection will not be able to log into the system.

APPENDIX B
CABLES

Specifications

Cable Types and Specifications			
Cable	**Type**	**Max. Length**	**Connector**
100BASE-FX	50/125 or 62.5/125 micron core multimode fiber (MMF)		
	Half Duplex	412 m (1,351 ft)	VF-45
	Full duplex	2 km (1.24 miles)	VF-45, SC or ST
100BASE-FX	9/125 9 micron core single-mode fiber (SMF)		
	Full duplex	10 km (6.21 miles)	SC or ST
1000BASE-SX	50/125 or 62.5/125 micron core MMF	See the following table	SC or ST
1000BASE-LX	MMF or SMF	See the following table	SC or ST
1000BASE-T	Cat. 5, 5e 100-ohm UTP	100 m (328 ft)	RJ-45

1000BASE-SX Fiber Specifications		
Fiber Diameter	**Fiber Bandwidth**	**Cable Length Range**
62.5/125 micron MMF	160 MHz/km	2-220 m (7-722 ft.)
	200 MHz/km	2-275 m (7-902 ft.)
50/125 micron MMF	400 MHz/km	2-500 m (7-1641 ft.)
	500 MHz/km	2-550 m (7-1805 ft.)

1000BASE-LX Fiber Specifications		
Fiber Diameter	**Fiber Bandwidth**	**Cable Length Range**
62.5/125 micron MMF	160 MHz/km	2-50 m (7-1805 ft)
50/125 micron MMF	400 MHz/km	2-550 m (7-1805 ft)
	500 MHz/km	2-550 m (7-1805 ft)
9/125 micron SMF	N/A	2 m - 5 km (7-16,404 ft)

Note: If you need to connect to a device with 62.5/125 micron cable that has ST-type connectors, SMC provides an optional SC-ST Converter (Part Number: 99-012034-091).

RJ-45 Port and Cable Assignments

CAUTION: **DO NOT** plug a phone jack connector into any RJ-45 port. Use only twisted-pair cables with RJ-45 connectors that conform with FCC standards.

The RJ-45 port on the SMC6900GT module supports 1000, 100, and 10 Mbps Ethernet operation, with auto-negotiation of speed, duplex mode, and flow control.

1000BASE-T Pin Assignments

1000BASE-T ports switch support automatic MDI/MDI-X operation, so you can use straight-through cables for all network connections to PCs or servers, or to other switches or hubs. In straight-through cable, pins 1-8, at one end of the cable, are connected straight through to pins 1-8 at the other end of the cable.
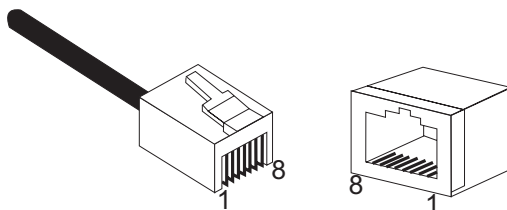
Use 100-ohm Category 5 or 5e unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cable for 1000BASE-T connections. Also be sure that the length of any twisted-pair connection does not exceed 100 meters (328 feet).

The table below shows the 1000BASE-T MDI and MDI-X port pinouts. These ports require that all four pairs of wires be connected. Note that for 1000BASE-T operation, all four pairs of wires are used for both transmit and receive.

Pin	MDI Signal Name	MDI-X Signal Name
1	Transmit Data plus (TD1+)	Transmit Data plus (TD2 +)
2	Receive Data minus (RD1-)	Receive Data minus (RD2-)
3	Transmit Data plus (TD2+)	Transmit Data plus (TD1+)
4	Transmit Data plus (TD3+)	Transmit Data plus (TD4+)
5	Receive Data minus (RD3-)	Receive Data minus (RD4-)
6	Receive Data minus (RD2-)	Receive Data minus (RD1-)
7	Transmit Data plus (TD4+)	Transmit Data plus (TD3+)
8	Receive Data minus (RD4-)	Receive Data minus (RD3-)

1000BASE-T Cable Requirements

All Category 5 UTP cables that are used for 100BASE-TX connections should also work for 1000BASE-T, providing that all four wire pairs are connected. However, it is recommended that for all critical connections, or any new cable installations, Category 5e (enhanced Category 5) cable should be used. The Category 5e specification includes test parameters that are only recommendations for Category 5. Therefore, the first step in preparing existing Category 5 cabling for running 1000BASE-T is a simple test of the cable installation to be sure that it complies with the IEEE 802.3ab standards.

Cable Testing for Existing Category 5 Cable

Installed Category 5 cabling must pass tests for Attenuation, Near-End Crosstalk (NEXT), and Far-End Crosstalk (FEXT). This

cable testing information is specified in the ANSI/TIA/EIA-TSB-67 standard. Additionally, cables must also pass test parameters for Return Loss and Equal-Level Far-End Crosstalk (ELFEXT). These tests are specified in the ANSI/TIA/EIA-TSB-95 Bulletin, "The Additional Transmission Performance Guidelines for 100 Ohm 4-Pair Category 5 Cabling."

Note that when testing your cable installation, be sure to include all patch cables between switches and end devices.

Adjusting Existing Category 5 Cabling

If your existing Category 5 installation does not meet one of the test parameters for 1000BASE-T, there are basically three measures that can be applied to try to correct the problem:

1. Replace any Category 5 patch cables with high-performance Category 5e cables.

2. Reduce the number of connectors used in the link.

3. Reconnect some of the connectors in the link.

Console Port Pin Assignments

The DB-9 serial port on the switch's rear panel is used to connect to the switch for out-of-band console configuration. The on-board menu-driven configuration program can be accessed from a terminal, a PC running a terminal emulation program, or from a remote location via a modem connection. The pin assignments used to connect to the serial port are provided in the following tables.
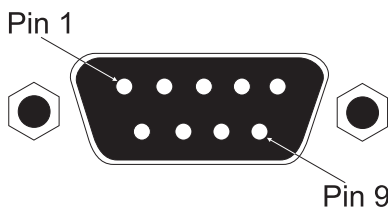
Figure B-1. DB-9 Console Port Pin Numbers

DB-9 Port Pin Assignments

EIA Circuit	CCITT Signal	Description	Switch's DB9 DTE Pin #	PC DB9 DTE Pin #	Modem DB25 DCE Pin #	Signal Direction DTE-DCE
CF	109	**DCD** (Data Carrier Detected)	1	1	8	<------
BB	104	**RxD** (Received Data)	2	2	3	<------
BA	103	**TxD** (Transmitted Data)	3	3	2	------>
CD	108.2	**DTR** (Data Terminal Ready)	4	4	20	------>
AB	102	**SG** (Signal Ground)	5	5	7	-------
CC	107	**DSR** (Data Set Ready)	6	6	6	<------
CA	105	**RTS** (Request-to-Send)	7	7	4	------>
CB	106	**CTS** (Clear-to-Send)	8	8	5	<------
CE	125	**RI** (Ring Indicator)	9	9	22	<------

Console Port to 9-Pin COM Port on PC

Switch's 9-Pin Serial Port	CCITT Signal	PC's 9-Pin COM Port
1 DCD	---------- DCD ------------	1
2 RXD	<-------- TXD ------------	3
3 TXD	---------- RXD ---------->	2
4 DTR	---------- DSR ---------->	6
5 SGND	---------- SGND ----------	5
6 DSR	---------- DTR ------------	4
7 RTS	---------- CTS ---------->	8
8 CTS	<-------- RTS ------------	7
9 RI	---------- RI --------------	9

Console Port to 25-Pin DCE Port on Modem

Switch's 9-Pin Serial Port	CCITT Signal	Modem's 25-Pin DCE Port
1	<-------- DCD ------------	8
2	<-------- RXD ------------	3
3	---------- TXD ---------->	2
4	---------- DTR ---------->	20
5	---------- SGND ----------	7
6	<-------- DSR ------------	6
7	---------- RTS ---------->	4
8	<-------- CTS ------------	5
9	<-------- RI --------------	22

Console Port to 25-Pin DTE Port on PC

Switch's 9-Pin Serial Port	Null Modem		PC's 25-Pin DTE Port
1 DCD	1	1	8 DCD
2 RXD	2	3	3 TXD
3 TXD	3	2	2 RXD
4 DTR	4	8	20 DTR
5 SGND	5	20	7 SGND
6 DSR	6	7	6 DSR
7 RTS	7	4	4 RTS
8 CTS	9	5	5 CTS
9 RI	20	6	22 RI

APPENDIX C
SPECIFICATIONS

Physical Characteristics

Ports
24 100BASE-FX fiber
1 slot for an optional media expansion module
1 slot for an optional media expansion module or stacking module

Network Interface
100BASE-FX: VF-45 connector
  Multimode fiber cable; 62.5/125 or 50/125 microns

Stack Interface
Connects up to 4 units
  4.8 Gbps, full duplex, uplink/downlink ports
  9.6 Gbps stack backplane bandwidth

Buffer Architecture
32 Kbytes per 100 Mbps ports
2 Mbytes per 1000 Mbps ports

Aggregate Bandwidth
8.8 Gbps

Switching Database
8K MAC address entries

LEDs
System: Power, RPU, Mgmt
Port: Mode (flow control, full duplex, activity),
      Link (speed, link, disable/partition)

Weight
10.63 lbs (4.82 kg)

Size
17.37 x 11.22 x 2.53 in (44.0 x 28.5 x 6.4 cm)

Temperature
Operating: 32 to 122°F (0 to 50°C)
Storage: -40 to 158°F (-40 to 70°C)

Humidity
Operating: 5% to 95%

AC Input
100 to 240 V, 50 to 60 Hz

Power Supply
Internal, auto-ranging transformer: 100 to 240 VAC, 50 to 60 Hz
Redundant DC input

Power Consumption
70 Watts maximum

Heat Dissipation
273 BTU/hr maximum

Maximum Current
0.80A @ 110VAC
0.50A @ 240VAC

Switch Features

Spanning Tree Protocol

Forwarding Mode
Store-and-forward

Throughput
Wire speed

Flow Control
Full Duplex: IEEE 802.3x
Half Duplex: Back pressure

Broadcast Storm Control
Configurable threshold on a per-port basis.

VLAN Support
Up to 256 groups; port-based or with 802.1Q VLAN tagging

Multicast Switching
IGMP Snooping

Quality of Service
Supports two levels of priority and Weighted Fair Queueing

Management Features

In-Band Management
Telnet, Web-based HTTP, or SNMP manager
(EliteView Network Management software provided for free)

Out-of-Band Management
RS-232 DB-9 console port

Software Loading
TFTP or Web (HTTP) in-band or XModem out-of-band

MIB Support
MIB II (RFC 1213), Bridge MIB (RFC 1493), Ethernet-Like MIB
(RFC 1643), RMON MIB (RFC 1757), SMC's private MIB

RMON Support
Groups 1, 2, 3, 9 (Statistics, History, Alarm, Event)

Additional Features
Port Trunks
Port Security
Port Mirroring

Standards

IEEE 802.3u Fast Ethernet
IEEE 802.3z Gigabit Ethernet
IEEE 802.1D Spanning Tree Protocol and traffic priorities
IEEE 802.1Q VLAN Bridge Management
IEEE 802.3x full-duplex flow control
ISO/IEC 8802-3
SNMP (RFC 1157), RMON (RFC 1757), ARP (RFC 826),
IGMP (RFC 1112), MIB II (RFC 1213), Interfaces Evolution MIB
(RFC 1573), Ethernet-Like MIB (RFC 1643), Bridge MIB (RFC 1493)

Compliances

CE Mark

Emissions
FCC Class A
Industry Canada Class A
EN55022 (CISPR 22) Class A
VCCI Class A
C-Tick - AS/NZS 3548 (1995) Class A

Immunity
IEC 1000-4-2/3/4/6

Safety
CSA/NRTL (CSA 22.2.950 & UL 1950)
EN60950 (TÜV/GS)

Warranty

Limited Lifetime

Slide-in Module

100BASE-FX Extender Module

Model
SMC6900FSC, SMC6900FST, SMC6900FSSC

Ports
SMC6900FSC, SMC6900FST: 2 100BASE-FX multimode
SMC6900FSSC: 1 100BASE-FX single-mode

Network Interface
SMC6900FSC, SMC6900FST:
   50/125 or 62.5/125 micron multimode fiber cable
   (SMC6900FST includes SC-ST Converter)
SMC6900FSSC:
   9/125 micron single-mode fiber cable

Communication Mode
Full duplex

Communication Rate
100 Mbps

Standards
IEEE 802.3u Fast Ethernet
ISO/IEC 8802-3

1000BASE-SX Extender Module

Model
SMC6900G

Ports
1 1000BASE-SX

Network Interface
SC connector, 50/125 or 62.5/125 micron multimode fiber cable

Communication Mode
Full and half duplex, auto-negotiation

Communication Rate
1000 Mbps

Standards
IEEE 802.3z Gigabit Ethernet

1000BASE-LX Extender Module

Model
SMC6900GLSC

Ports
1 1000BASE-LX

Network Interface
SC connector, 9/125 micron single-mode fiber cable

Communication Mode
Full and half duplex, auto-negotiation

Communication Rate
1000 Mbps

Standards
IEEE 802.3z Gigabit Ethernet

1000BASE-T Extender Module

Model
SMC6900GT

Ports
1 1000BASE-T

Network Interface
RJ-45 connector, 100-ohm Category 5 or 5e UTP or STP cable
(using all four wire pairs)

Communication Mode
Full and half duplex, auto-negotiation

Communication Rate
1000, 100, and 10 Mbps

Standards
IEEE 802.3ab Gigabit Ethernet

Agent Module

Model
SMC6924VFNMM

Ports
1 RS-232 serial port

Connector Interface
Standard straight-through wired RS-232 cable

Standards
IEEE 802.3u Fast Ethernet
ISO/IEC 8802-3

Stack Module

Model
SMC6900S

Ports
4.8 Gbps uplink/downlink ports

Connector Interface
68-pin SCSI connector, copper cable

Standards
IEEE 802.3z Gigabit Ethernet

APPENDIX D
ORDERING INFORMATION

TigerSwitch 100 Products and Accessories	
Product Number	**Description**
SMC6924VF	24-port Fast Ethernet switch with two media expansion slots
SMC6924VFNMM	Network Management Module with one RS-232 serial port
SMC6900S	Stacking Module with 4.8 Gbps uplink/ downlink ports
SMC6900FSC	Extender Module with two 100BASE-FX multimode fiber ports (SC-type Connector)
SMC6900FST	SMC6900FSC + SC-ST Converter
SMC6900FSSC	Extender Module with one 100BASE-FX single-mode fiber port (SC-type connector)
SMC6900G	Extender Module with one 1000BASE-SX port (SC-type connector)
SMC6900GLSC	Extender Module with one 1000BASE-LX port (SC-type connector)
SMC6900GT	Extender Module with one 1000BASE-T port (RJ-45 connector)
99-012034-091	SC to ST plug converter for fiber optic module
SMCRPU150W*	Redundant Power Unit with cables, supports one device

* Also available in models for Continental Europe and the UK.

GLOSSARY

10BASE-T

IEEE 802.3 specification for 10 Mbps Ethernet over two pairs of Category 3, 4, or 5 UTP cable.

100BASE-FX

IEEE 802.3u specification for 100 Mbps Fast Ethernet over two strands of 50/125 or 62.5/125 micron core fiber cable.

100BASE-TX

IEEE 802.3u specification for 100 Mbps Fast Ethernet over two pairs of Category 5 UTP cable.

1000BASE-LX

IEEE 802.3z specification for Gigabit Ethernet over two strands of 9/125 micron core fiber cable.

1000BASE-SX

IEEE 802.3z specification for Gigabit Ethernet over two strands of 50/125 or 62.5/125 micron core fiber cable.

1000BASE-T

IEEE 802.3ab specification for Gigabit Ethernet over four pairs of Category 5 UTP cable.

Auto-Negotiation

Signalling method allowing each node to select its optimum operational mode (e.g., 100 Mbps and half or full duplex) based on the capabilities of the node to which it is connected.

Bandwidth

> The difference between the highest and lowest frequencies available for network signals. Also synonymous with wire speed, the actual speed of the data transmission along the cable.

Class I Repeater

> Fast Ethernet repeater that is principally used to connect different physical signaling systems (e.g., 100BASE-TX, 100BASE-FX) and that has an internal delay such that only one repeater of this type can reside within a single collision domain when maximum cable lengths are used.

Class II Repeater

> Fast Ethernet repeater that typically supports a single physical signaling system (e.g., 100BASE-TX, or 100BASE-FX) and that has a smaller internal delay so that two such repeaters can reside within a single collision domain when maximum cable lengths are used.

Collision

> A condition in which packets transmitted over the cable interfere with each other. Their interference makes both signals unintelligible.

Collision Domain

> Single CSMA/CD LAN segment.

CSMA/CD

> Carrier Sense Multiple Access/Collision Detect is the communication method employed by Ethernet and Fast Ethernet.

End Station

> A workstation, server, or other device that does not act as a network interconnection.

Fast Ethernet

A 100 Mbps network communication system based on Ethernet and the CSMA/CD access method.

Fast Ethernet Switch

Device that provides a full 100 Mbps bandwidth (or either 10 or 100 Mbps bandwidth with Auto-Negotiation) to each port (LAN segment).

Full Duplex

Transmission method that allows switch and network card to transmit and receive concurrently, effectively doubling the bandwidth of that link.

Gigabit Ethernet

A 1000 Mbps network communication system based on Ethernet and the CSMA/CD access method.

IEEE 802.1D

Specifies a general method for the operation of MAC bridges, including the Spanning Tree Protocol.

IEEE 802.1Q

VLAN Tagging—Defines Ethernet frame tags which carry VLAN information. It allows switches to assign endstations to different virtual LANs, and defines a standard way for VLANs to communicate across switched networks.

IEEE 802.3

Defines carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications.

IEEE 802.3ab

> Defines CSMA/CD access method and physical layer specifications for 1000BASE-T Gigabit Ethernet.

IEEE 802.3u

> Defines CSMA/CD access method and physical layer specifications for Fast Ethernet.

IEEE 802.3x

> Defines Ethernet frame start/stop requests and timers used for flow control on full-duplex links.

IEEE 802.3z

> Defines CSMA/CD access method and physical layer specifications for 1000BASE Gigabit Ethernet.

LAN Segment

> Separate LAN or collision domain.

LED

> Light emitting diode used for monitoring a device or network condition.

Link Segment

> Length of twisted-pair or fiber cable joining a pair of repeaters or a repeater and a PC.

Local Area Network (LAN)

> A group of interconnected computer and support devices.

Media Access Control (MAC)

A portion of the networking protocol that governs access to the transmission medium, facilitating the exchange of data between network nodes.

MIB

An acronym for Management Information Base. It is a set of database objects that contains information about the device.

MII

Media Independent Interface, the standard interface for Fast Ethernet—similar to the AUI interface for traditional Ethernet.

Network Diameter

Wire distance between two end stations in the same collision domain.

RJ-45 Connector

A connector for twisted-pair wiring.

Redundant Power Supply (RPS)

A backup power supply that automatically takes over in case the primary power supply should fail.

Spanning Tree Protocol (STP)

A technology that checks your network for any loops. A loop can often occur in complicated or backup linked network systems. Spanning Tree detects and directs data along the shortest available path, maximizing the performance and efficiency of the network.

Switched Ports

Ports that are on separate collision domains or LAN segments.

Transmission Control Protocol/Internet Protocol (TCP/IP)

Protocol suite that includes TCP as the primary transport protocol, and IP as the network layer protocol.

UTP

Unshielded twisted-pair cable.

Virtual LAN (VLAN)

A Virtual LAN is a collection of network nodes that share the same collision domain regardless of their physical location or connection point in the network. A VLAN serves as a logical workgroup with no physical barriers, and allows users to share information and resources as though located on the same LAN.

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