SMC Networks

EZ Networking™

5/8-Port 10/100/1000Mbps Auto-Sensing Gigabit Switch

User Guide

SMC8505TX
SMC8508TX

EZ Switch 10/100/1000 User Guide

From SMC's EZ line of low-cost workgroup LAN solutions

SMC® Networks
38 Tesla
Irvine, CA 92618
Phone: (949) 679-8000

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38 Tesla
Irvine, CA 92618.

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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.

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38 Tesla
Irvine, CA 92618

COMPLIANCES

FCC - Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

EC Conformance Declaration - Class B

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 Council Directive 89/336/EEC on the Approximation of the laws of the Member States relating to Electromagnetic Compatibility and 73/23/EEC for electrical equipment used within certain voltage limits and the Amendment Directive 93/68/EEC. For the evaluation of the compliance with these Directives, the following standards were applied:

RFI Emission:
- Limit class B according to EN 55022:1998, IEC 60601-1-2 (EMC, medical)
- Limit class A for harmonic current emission according to EN 61000-3-2/1995
- Limitation of voltage fluctuation and flicker in low-voltage supply system according to EN 61000-3-3/1995

Immunity:
- Product family standard according to EN 55024:1998
- Electrostatic Discharge according to EN 61000-4-2:1995 (Contact Discharge: ±4 kV, Air Discharge: ±8 kV)
- Radio-frequency electromagnetic field according to EN 61000-4-3:1996 (80 - 1000 MHz with 1 kHz AM 80% Modulation: 3 V/m)

- Electrical fast transient/burst according to EN 61000-4-4:1995 (AC/DC power supply: ±1 kV, Data/Signal lines: ±0.5 kV)
- Surge immunity test according to EN 61000-4-5:1995 (AC/DC Line to Line: ±1 kV, AC/DC Line to Earth: ±2 kV)
- Immunity to conducted disturbances, Induced by radio-frequency fields: EN 61000-4-6:1996 (0.15 - 80 MHz with 1 kHz AM 80% Modulation: 3 V/m)
- Power frequency magnetic field immunity test according to EN 61000-4-8:1993 (1 A/m at frequency 50 Hz)
- Voltage dips, short interruptions and voltage variations immunity test according to EN 61000-4-11:1994 (>95% Reduction @10 ms, 30% Reduction @500 ms, >95% Reduction @5000 ms)

LVD: • EN 60950 (A1/1992; A2/1993; A3/1993; A4/1995; A11/1997)

MDD: • IEC 60601-1

Industry Canada - Class B

This digital apparatus does not exceed the Class B 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 B prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques," NMB-003 édictée par le ministère des Communications.

Japan VCCI Class B

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取り扱い説明書に従って正しい取り扱いをして下さい。

Safety Compliance

CSA/NRTL (C22.2.950, UL 1950)

EN60950, (IEC 950)

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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About the EZ Switch 10/100/1000

The EZ Switch™ 10/100/1000, SMC8505T/SMC8508T are high-performance Gigabit Ethernet switches designed for the network core. It provides 5/8 full-duplex 1000BASE-T ports that can significantly improve the performance of your network's backbone, and deliver the throughput needed to support a broad range of advanced network applications. With 10/16 Gigabits of aggregate bandwidth, this EZ Switch 10/100/1000 provides the quickest solution to meeting the growing demands on your network's limited resources.

Description of Hardware

The EZ Switch 10/100/1000 SMC8505T/SMC8508T is an 5/8-port Gigabit Ethernet switch. The 10BASE-T/100BASE-TX/1000BASE-T ports deliver dedicated 10/100/1000 Mbps links to each attached LAN segment. All RJ-45 ports on this switch operate at 10, 100 or 1000 Mbps. 10/100 Mbps connections support auto-negotiation of speed, flow control, and duplex mode. 1000 Mbps connections support auto-negotiation of speed, duplex mode, and flow control, but only operate at full duplex.

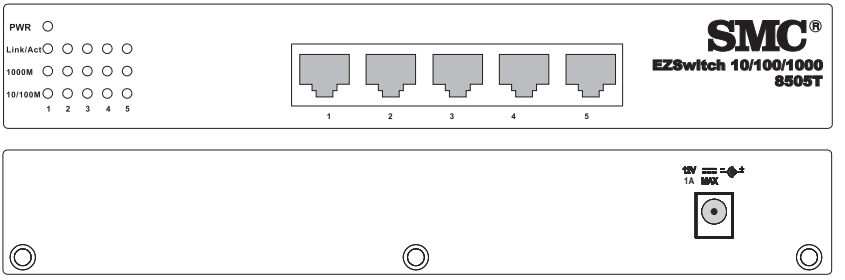
The RJ-45 ports also feature automatic MDI/MDI-X operation. This means that you can use either straight-through or crossover cables to connect to any other network device.

Auto-negotiation is used to select the optimal transmission speed and communication mode for each connection. With store-and-forward switching and flow control, maximum data integrity is always maintained, even under heavy loading. Easy installation and reliability make this plug-and-play switch an ideal choice for delivering high speed Internet access to multiple users.

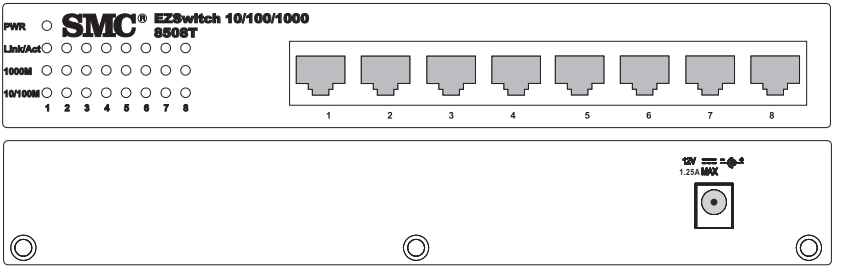
The following figures show the components of this switch:

Front and Rear Panels

SMC8505T



SMC8508T



INSTALLING THE SWITCH

Before installing the switch, verify that you have all the items listed under "Package Contents." Note that this switch can be installed on any suitably large flat surface or in a standard EIA 19-inch rack.

Package Contents

The EZ Switch 10/100/1000 includes:

- EZ Switch 10/100/1000 (SMC8505T or SMC8508T)
- Four rubber foot pads
- Appropriate DC power adapter
- Rack-mount bracket kit
- This User Guide
- SMC Warranty Registration Card

Mounting the Switch

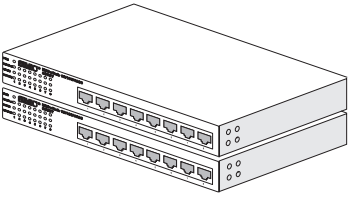
This switch can be placed directly on your desktop, or mounted in a rack.

Before you start installing the switch, make sure you can provide the right operating environment, including power requirements, sufficient physical space, and proximity to other network devices that are to be connected. Verify the following installation requirements:

- Power requirements: 100 to 240 VAC (± 10%) at 50 to 60 Hz (± 3Hz). The switch's power supply automatically adjusts to the input voltage level.
- The switch should be located in a cool dry place, with at least 10 cm (4 in) of space on the sides for ventilation.
- Place the switch out of direct sunlight, and away from heat sources or areas with a high amount of electromagnetic interference.

- If you intend to mount the switch in a rack, make sure you have all the necessary mounting screws, brackets, bolts and nuts, and the right tools.
- Check if network cables and connectors needed for installation are available.

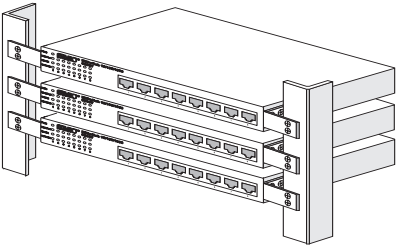
Stacking Switches on a Flat Surface



The switch can be placed anywhere there is enough flat space, such as on a table or desktop.

1. Stick the self-adhesive rubber foot pads (that come with this package) on each of the 4 concave spaces located on the bottom of the first switch.
2. Place the first switch on a firm flat surface where you want to install the stack.
3. Repeat step 1 for each switch before stacking them. The rubber foot pads cushion the switch against shock/vibrations and provide space between each switch for ventilation.

Mounting Switches in a Rack



Please comply with the following instructions to ensure that your switch is securely mounted in the rack.

1. Use a standard EIA 19-inch rack.
2. Use the brackets and screws supplied in the rack mounting kit.
3. Use a cross-head screwdriver to attach the brackets to the side of the switch.

4. Position the switch in the rack by lining up the holes in the brackets with the appropriate holes on the rack, and then use the rack-mount screws to mount the switch in the rack.

Connecting the Switch System

The EZ Switch 10/100/1000 provides 5/8 RJ-45 ports on this device. Each of these ports supports connection to 10 Mbps Ethernet, 100 Mbps Fast Ethernet, or 1000 Mbps Gigabit Ethernet. In addition, they are capable of operating at either half or full-duplex at 10 or 100 Mbps. At 1000 Mbps, only full-duplex operation is supported. The transmission speed for each port is automatically set by the switch to match the highest speed supported by the connected device. The transmission mode can be set for each port using auto-negotiation (if also supported by the attached device).

Making a Connection to an RJ-45 Port

Because all RJ-45 ports on these switches 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. Note that auto-negotiation must be enabled for automatic MDI/MDI-X pinout configuration.

1. Prepare the network devices you wish to network. Make sure you have installed 1000BASE-T network interface cards for connecting to the switch's RJ-45 ports.
2. Prepare straight-through shielded or unshielded twisted-pair cables with RJ-45 plugs at both ends. Use 100-ohm Category 3, 4 or 5 cable for standard 10 Mbps Ethernet connections, 100-ohm Category 5 cable for 100 Mbps Fast Ethernet connections, or 100-ohm Category 5 or 5e cable for 1000 Mbps Gigabit Ethernet.

3. Connect one end of the cable to the RJ-45 port of the network interface card, and the other end to any available RJ-45 port on the switch. All RJ-45 ports support 10 Mbps, 100 Mbps and 1000 Mbps

Ethernet connections. When inserting an RJ-45 plug, be sure the tab on the plug clicks into position to ensure that it is properly seated. Using the switch in a stand-alone configuration, you can network up to 8 end nodes.

Caution: Do not plug a phone jack connector into any RJ-45 port. This may damage the switch. Instead, use only twisted-pair cables with RJ-45 connectors that conform with FCC standards.

Notes: 1. Make sure each twisted-pair cable does not exceed 100 meters (328 feet).

2. We advise using Category 5e cable for all network connections or testing existing Category 5 cable to be sure that it complies with the IEEE 802.3ab standards. (See "1000BASE-T Cable Requirements" on page 17.)

Restrictions on Cascade Length - The IEEE 802.3 standard recommends restricting the number of hubs (i.e., repeaters) cascaded via twisted-pair cable to four; while IEEE 802.3u provides even stricter recommendations for Fast Ethernet. Therefore, when cascading devices other than this switch, please refer to the accompanying documentation for cascade restrictions. 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.

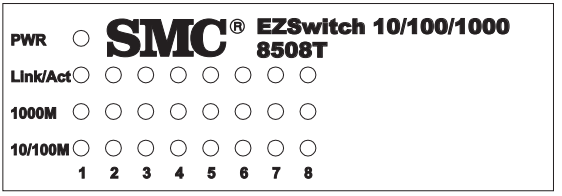
Powering On the Switch

1. Plug the power cord into the power socket at the rear of the switch, and the other end into a power outlet.
2. Check the LED marked Power on the front panel to see if it is on. The unit will automatically select the setting that 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.
3. The switch performs a self-diagnostic test upon power-on. (Note that this test takes several seconds to complete.)

Note: The unit supports a "hot remove" feature which permits you to connect or disconnect twisted-pair cables without powering off the switch and without disrupting the operation of the devices attached to the switch.

Verifying Port Status

The front panel of the switch provides status LEDs for "at-a-glance" system monitoring. The following table details the functions of the various indicators:



Port and System Status LEDs		
LED	**Condition**	**Status**
Power	On	The switch is receiving power.
Ports		
Link/Act	On	The port has established a valid network connection.
	Off	The port has not established any network connection.
	Flashing	Traffic is passing through the port.
1000M	On	Indicates that the port is transmitting or receiving data at 1000 Mbps.
	Off	No link up at 1000M.
10/100M	On	Indicates that the port is transmitting or receiving data at 100 Mbps.
	Off	Indicates that the port is transmitting or receiving data at 10 Mbps.

Verifying System Operation

Verify that all attached devices have a valid connection. The switch monitors the link status for each port. If any device is properly connected to the switch and transmitting a link signal, the port

LED indicator will light up for the corresponding port. If the port LED indicator fails to light when you connect a device to the switch, check the following items:

- Be sure all network cables and connectors are properly attached to the connected device and the switch.
- See if your cable is functioning properly by using it for another port and attached device that displays valid indications when connected to the network.
- Be sure no twisted-pair cable exceeds 100 meters (328 feet).

Applications

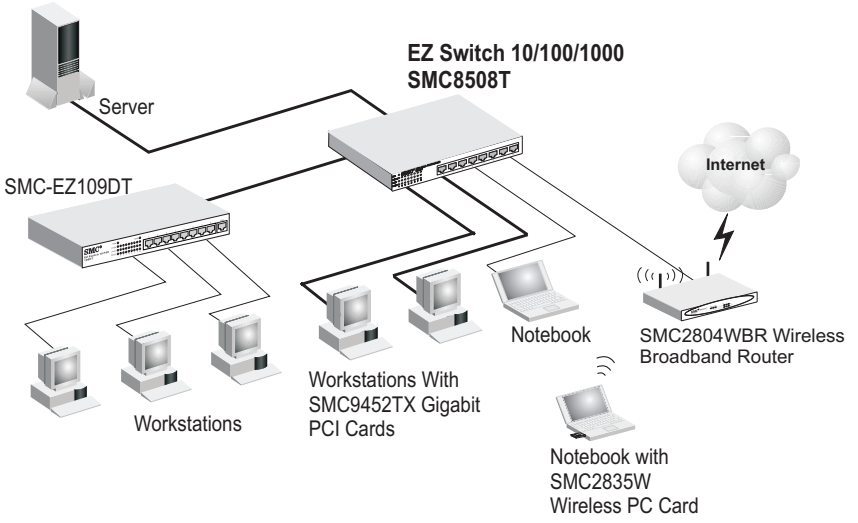
This switch segments your network, significantly increasing both bandwidth and throughput. Each port on the switch can be attached to any IEEE 802.3ab-compliant Gigabit Ethernet device, such as another switch, full-duplex repeater, or a server's network adapter. All switch ports operate at 1 Gbps, full duplex, providing 2 Gbps of bandwidth to the attached device.

Bridging Functions – This switch provides fully transparent bridging functions. It automatically learns node addresses that are subsequently used to filter and forward all traffic based on the destination address. When traffic passes between devices attached to the same shared collision domain, those packets are filtered from the switch. But when traffic must be passed between unique segments (i.e., different ports on the switch), the high-speed switching fabric forwards the packets at near zero latency.

Switching Functions – Store-and-forward switching is used to forward traffic to other ports. This scheme ensures data integrity and provides a clean data stream.

Sample Application – This switch is designed to operate as a high-bandwidth backbone switch. It segments the core of the network,

providing full-duplex switched links to workgroup switches, full-duplex repeaters, or high-speed servers.



PRODUCT SPECIFICATIONS

Physical Characteristics

Standards Conformance
IEEE 802.3
IEEE 802.3u
IEEE 802.3x
IEEE 802.3ab

Communication Rate
10/100/1000 Mbps

Communication Mode
Full or half duplex at 10/100 Mbps
full duplex at 1000 Mbps

Media Supported
10BASE-T - 100-ohm Category 3, 4, 5 twisted-pair
100BASE-TX - 100-ohm Category 5 twisted pair
1000BASE-T - 100-ohm Category 5 or 5e twisted-pair

Number of Ports
SMC8505T:
5 RJ-45 1000BASE-T ports
SMC8508T
8 RJ-45 1000BASE-T ports

Indicator Panel
Power
Ports: Link/Act, 1000M, 10/100M

Dimensions
19.64 x 11.65 x 3.66 cm, (7.76 x 4.6 x 1.44 in)

Weight
SMC8505T: 0.59 kg (1.309 lbs)
SMC8508T: 0.62 kg (1.378 lbs)

MAC Address Table
8 K entries

Memory Buffer
768 Kbits per unit

Power Consumption
SMC8505T: 12 Watts
SMC8508T: 15 Watts

Power Requirement
DC input
SMC8505T: 12 V, 1 A
SMC8508T: 12 V, 1.25 A

Temperature
Operating: 0 ~ 40 ºC / 32 ~ 98 ºF
Storage: -40 ~ 70 ºC / -40 ~ 158 ºF

Humidity
10% to 90% non-condensing

EMC/Safety Compliances

CE Mark

Immunity
EN 61000-4-2/3/4/5/6/8/11

Emissions
FCC Class B, CISPR Class B, EN 61000-3-2/3

Safety
CSA (UL1950, CSA 22.2.950), TUV/GS (EN60950)

TROUBLESHOOTING

Diagnosing Switch Indicators

Symptom
Power LED does not light after power on.

Probable Causes
Power outlet or power cord may be defective.

Possible Solutions

- Check for loose connections.
- Check the power outlet by using it for another device.
- Replace the power cord.

Symptom
Port (link) LED does not light after connection is made.

Probable Causes
Switch port, network card or cable may be defective.

Possible Solutions

- Check that the switch and attached device are both powered on.
- Be sure the network cable is connected to both devices.
- Verify that Category 5 cable is used for 100 Mbps connections, Category 5 or 5e cable for 1000 Mbps connections, and that the length of any cable does not exceed 100 meters (328 feet).
- Check the network card and cable connections for defects.
- Replace the defective card 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 as explained in the previous section. 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 right side of the unit are unobstructed and running prior to shutdown. If you still cannot isolate the problem, then the internal power supply may be defective.

Installation

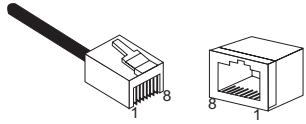
Verify that all system components have been properly installed. If one or more components appear to be malfunctioning (e.g., the power cord or network cabling), test them in an alternate environment where you are sure that all the other components are functioning properly.

CABLES

Cable Specifications

Cable Types and Specifications			
Cable	**Type**	**Max. Length**	**Connector**
10BASE-T	Cat. 3, 4, 5 100-ohm UTP	100 m (328 ft)	RJ-45
100BASE-TX	Cat. 5 100-ohm UTP	100 m (328 ft)	RJ-45
1000BASE-T	Cat. 5 or Cat. 5e 100-ohm UTP	100 m (328 ft)	RJ-45

10BASE-T/100BASE-TX Pin 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.

Use unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cable for RJ-45 connections: 100-ohm Category 3, 4 or 5 cable for 10 Mbps connections or 100-ohm Category 5 cable for 100 Mbps connections. Also be sure that the length of any twisted-pair connection does not exceed 100 meters (328 feet).

Because all ports on this switch 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. In straight-through cable, pins 1, 2, 3, and 6, at one end of the cable, are connected straight through to pins 1, 2, 3 and 6 at the other end of the cable.

The table below shows the 10BASE-T/100BASE-TX MDI-X and MDI port pinouts.

Pin	MDI-X Signal Name	MDI Signal Name
1	Receive Data plus (RD+)	Transmit Data plus (TD+)
2	Receive Data minus (RD-)	Transmit Data minus (TD-)
3	Transmit Data plus (TD+)	Receive Data plus (RD+)
6	Transmit Data minus (TD-)	Receive Data minus (RD-)
4,5,7,8	Not used at 10/100 Mbps	Not used at 10/100 Mbps

1000BASE-T Pin Assignments

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.

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).

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+)	Receive Data minus (RD3+)
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.

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SMC Networks
38 Tesla
Irvine, CA 92618
Phone: (949) 679-8000

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