MC1000-SFP

100/1000 Base-T UTP to 1000 Base-X Fiber SFP Media Converter

User's Guide

Version 1.0

11/2004

ZyXEL

Unleash Networking Power

Copyright

Copyright © 2004 by ZyXEL Communications Corporation.

Disclaimer

ZyXEL does not assume any liability arising out of the application or use of any products, or software described herein. Neither does it convey any license under its patent rights nor the patent rights of others. ZyXEL further reserves the right to make changes in any products described herein without notice. This publication is subject to change without notice.

Trademarks

Trademarks mentioned in this publication are used for identification purposes only and may be properties of their respective owners.

Federal Communications Commission (FCC)

FCC Interference Statement

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference.

(2) This device must accept any interference received, including interference that may cause undesired operations.

FCC Warning

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

CE Mark Warning:

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Taiwanese BSMI (Bureau of Standards, Metrology and Inspection) A Warning:

警告使用者
這是甲類的資訊產品，在居住的環境使用時，
可能造成射頻干擾，在這種情況下，
使用者會被要求採取某些適當的對策.

Certifications

Refer to the product page at www.zyxel.com.

ZyXEL Limited Warranty

ZyXEL warrants to the original end user (purchaser) that this product is free from any defects in materials or workmanship for a period of up to two years from the date of purchase. During the warranty period, and

upon proof of purchase, should the product have indications of failure due to faulty workmanship and/or materials, ZyXEL will, at its discretion, repair or replace the defective products or components without charge for either parts or labor, and to whatever extent it shall deem necessary to restore the product or components to proper operating condition. Any replacement will consist of a new or re-manufactured functionally equivalent product of equal value, and will be solely at the discretion of ZyXEL. This warranty shall not apply if the product is modified, misused, tampered with, damaged by an act of God, or subjected to abnormal working conditions.

Note

Repair or replacement, as provided under this warranty, is the exclusive remedy of the purchaser. This warranty is in lieu of all other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular use or purpose. ZyXEL shall in no event be held liable for indirect or consequential damages of any kind of character to the purchaser.

To obtain the services of this warranty, contact ZyXEL's Service Center for your Return Material Authorization number (RMA). Products must be returned Postage Prepaid. It is recommended that the unit be insured when shipped. Any returned products without proof of purchase or those with an out-dated warranty will be repaired or replaced (at the discretion of ZyXEL) and the customer will be billed for parts and labor. All repaired or replaced products will be shipped by ZyXEL to the corresponding return address, Postage Paid. This warranty gives you specific legal rights, and you may also have other rights that vary from country to country.

Safety Warnings

1. Do not use this product near water, for example, in a wet basement or near a swimming pool.

2. Avoid using this product during a thunderstorm. There may be a risk of electric shock from lightening.

General Syntax Conventions

- For brevity's sake, we will use "e.g." as shorthand for "for instance", and "i.e." as shorthand for "that is" or "in other words" throughout this manual.
- The MC1000-SFP may be referred to as the MC1000, media converter or device in this manual.

ZyXEL Web Site

The ZyXEL download library at www.zyxel.com contains additional support documentation and an online glossary of networking terms.

Table of Contents

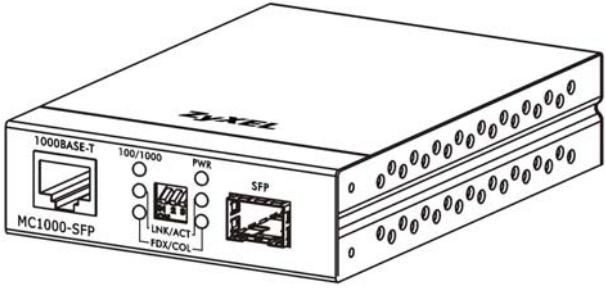
Customer Support

Please have the following information ready when you contact customer support.

WORLDWIDE	NORTH AMERICA	GERMANY
Tel: +886-3-578-3942 Fax: +886-3-578-2439 Email: sales@zyxel.com.tw http://www.zyxel.com http://www.zyxel.com.tw	Tel: +1-800-255-4101 Tel: +1-714-632-0882 Fax: +1-714-632-0858 Email: sales@zyxel.com http://www.us.zyxel.com	Tel: +49 2405 6909 0 Fax: +49 2405 6909 99 Email: sales@zyxel.de http://www.zyxel.de
SPAIN	**FRANCE**	**DENMARK**
Tel: +34 902 195 420 Fax: +34 913 005 345 Email: sales@zyxel.es http://www.zyxel.es	Tel: +33 (0)4 72 52 97 97 Fax: +33 (0)4 72 52 19 20 Email: info@zyxel.fr http://www.zyxel.fr	Tel: +45 39 55 07 00 Fax: +45 39 55 07 07 Email: sales@zyxel.dk http://www.zyxel.dk
NORWAY	**SWEDEN**	**FINLAND**
Tel: +47 22 80 61 80 Fax: +47 22 80 61 81 Email: sales@zyxel.no http://www.zyxel.no	Tel: +46 31 744 7700 Fax: +46 31 744 7701 Email: sales@zyxel.se http://www.zyxel.se	Tel: +358-9-4780 8400 Fax: +358-9-4780 8448 Email: sales@zyxel.fi http://www.zyxel.fi

Introduction

The 100/1000 Base-T UTP to 1000 Base-X Fiber SFP Media Converter allows seamless integration between a Fast/Gigabit Ethernet network using unshielded twisted pair (UTP) copper cabling and a Gigabit fiber network.



Use the LEDs to quickly check status and the DIP switches to set transmission settings and "link loss forwarding".

There is a slot for an SFP (Small Form-factor Pluggable) transceiver module with an LC-type connector.

Key Features

The media converter has the following key features:

- Converts speed and media type
- Auto-crossover Ethernet port (auto MDI/MDI-X detection allows use of either straight-through or crossover Ethernet cables)
- Auto-negotiating Ethernet port (can detect and adjust to the optimum speed (100/1000Mbps) and mode (full duplex or half duplex) of the connected device)

- Can insert an SFP (Small Form-factor Pluggable) transceiver module with LC-type connector
- DIP switches to configure fiber link negotiating defaults and Link Loss Forwarding
- Link Loss Forwarding to notify the peer link if a link goes down
- LED status display

Fiber Modes

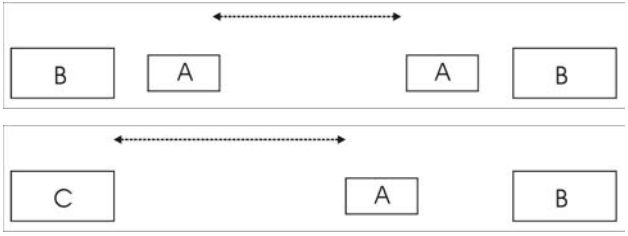
Multi-Mode Fiber (MMF) allows more than one mode of light to propagate through the cable at one time. It is usually used as horizontal cable (cable from your equipment room to each designated outlet or work area) and sometimes as backbone cable (between equipment closets or rooms).

Light in a Single-Mode Fiber (SMF) travels straight down the fiber and does not bounce off the surrounding cladding as it travels. This is most commonly used by telephone companies and as backbone cable.

Example Applications

In the following figures, "A" is the media converter, "B" is a 100/1000 Mbps Ethernet switch and "C" is a layer-3 switch with 1000Mbps fiber module.

Maximum distance obtained on the fiber link between media converters depends on the transceiver module you install.

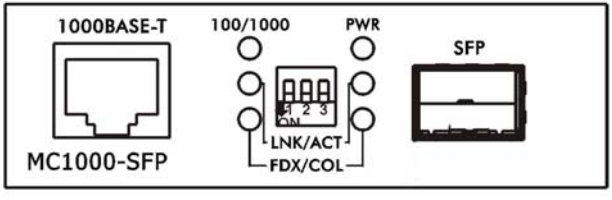


Hardware

The media converter can be placed on a desktop. Make sure that there is proper heat dissipation from and adequate ventilation around the device. Do not place heavy objects on the media converter.

Front Panel

The front panel consists of an RJ-45 port for 100/1000 Mbps UTP connections, LED indicators, DIP switches and an SFP slot for an SFP transceiver module with an LC-type connector.



1000Base-T Port

Connect an Ethernet cable from a switch to this port. This port is auto-negotiating and auto-crossover.

An auto-negotiating port can detect and adjust to the optimum Ethernet speed (100/1000Mbps) and duplex mode (full duplex or half duplex) of the connected device. An auto-crossover (auto-MDI/MDI-X) port automatically works with a straight-through or crossover Ethernet cable.

LED Indicators

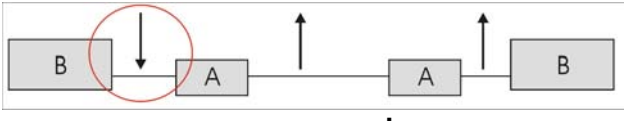
The following table describes the LEDs in detail.

LED	STATUS	DESCRIPTION
PWR	Green	The media converter is on.
	Off	The media converter is off.
100/1000	Green	The media converter has a 1000Mbps Ethernet connection.
	Orange	The media converter has a 100Mbps Ethernet connection.
	Off	The media converter has a 10Mbps Ethernet connection or no connection.
LNK/ACT (Ethernet)	Green	The media converter Ethernet link is up.
	Blinking	The media converter Ethernet port is transmitting or receiving.
	Off	The media converter Ethernet link is down.
FDX/COL (Ethernet)	Orange	The Ethernet port is operating in full-duplex mode.
	Off	The Ethernet port is operating in half-duplex mode or the Ethernet link is down.

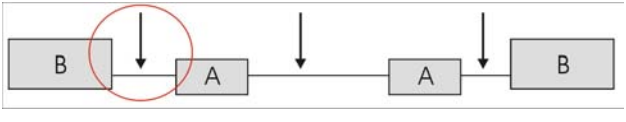
LNK/ACT (Fiber)	Green	The media converter fiber link is up.
	Blinking	The media converter is transmitting or receiving on the fiber link.
	Off	The media converter fiber link is down.
FDX/COL (Fiber)	Orange	The fiber port is operating in full-duplex mode.
	Off	The fiber port is operating in half-duplex mode or the fiber link is down.

Link Loss Forwarding

Without **Link Loss Forwarding,** if one side of a link fails (🡻), the other side will keep on transmitting packets (🡹) and wait for responses that will never arrive.



With **Link Loss Forwarding**, a link down (🡻) detected on the Ethernet port will force a link down on the fiber port and vice-versa. The up link (🡹) will stop transmitting and turn "off" as soon as the remote link is down.



DIP Switches

The DIP switches are all off by default.

DIP Switch 1	The fiber link is auto-negotiating when the switch is off. Turn it on to force the fiber link to be up at only 1000Mbps in full duplex mode.
DIP Switch 2	Turn this switch on to have the Ethernet port send a Link Loss Forwarding message to the fiber port in the event that the Ethernet link goes down (that would then force the fiber link down).
DIP Switch 3	Turn this switch on to have the fiber port send a Link Loss Forwarding message to the Ethernet port in the event that the fiber link goes down (that would then force the Ethernet link down).

Do not turn a DIP switch on or off when a port is transmitting or receiving data as it may cause data error or loss.

SFP Transceiver Slot

Insert a 3.3V SFP (Small Form-factor Pluggable) transceiver module with an LC-type connector into the SFP slot.

Use DIP switch 1 to change the default fiber connection settings.

SFP transceiver modules are static sensitive. To prevent damage from electrostatic discharge (ESD), it is recommended you attach an ESD preventive wrist strap to your wrist and to a bare metal surface when you install or remove an SFP transceiver module.

SFP transceiver modules are dust sensitive. Avoid getting dust and other contaminants into them.

SFP transceiver modules are equipped with a Class 1 laser, which emits invisible radiation. To avoid possible eye injury, do not look into an operating fiber-optic module's connectors. Laser radiation is also present when the media converter is turned on.

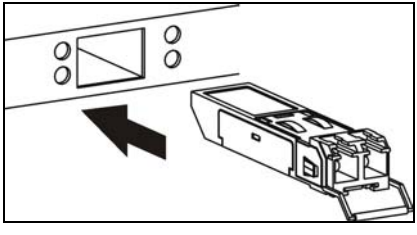
Installing and Removing a Module

Disconnect all fiber-optic cables from an SFP transceiver module before installing or removing it. Do NOT remove and install an SFP transceiver module more often than is absolutely necessary. Doing so may shorten the useful life of the SFP transceiver module.

Installing an SFP Transceiver Module

Refer to your SFP transceiver module user's guide for specific installation and removal instructions. The instructions outlined here are meant as an example.

1. Attach an ESD preventive wrist strap to your wrist and to a bare metal surface.
2. Remove the SFP transceiver module from its protective packaging.
3. Locate the transmit (Tx) and the receive (Rx) markings on the SFP transceiver module.
4. Align the SFP transceiver module in front of the slot opening on a device.
5. Insert the SFP transceiver module into the slot until the SFP transceiver module snaps into place.



SFP transceiver module installation orientation varies depending on your device. Your SFP transceiver module comes with a mechanism that prevents incorrect insertion.

Do NOT force or twist the SFP transceiver module into a slot.

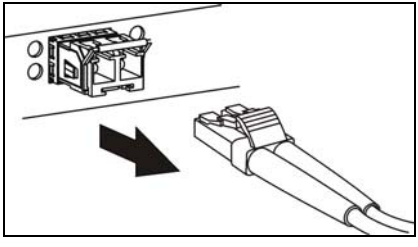
Connecting a Fiber-optic Cable

Follow the steps described to connect a fiber-optic cable to the SFP transceiver module.

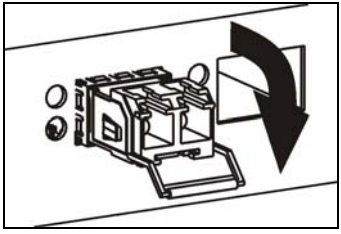
1. Remove the dust plugs from the SFP transceiver module and the cables.
2. Identify the signal transmission direction of the fiber-optic cable and the SFP transceiver module. Insert one end of the fiber-optic cable into the SFP transceiver module.
3. Insert the other end of the fiber-optic cable into a remote device.

Removing an SFP transceiver module

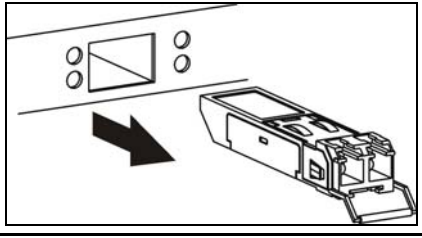
1. Attach an ESD preventive wrist strap to your wrist and to a bare metal surface on the chassis.
2. Disconnect all fiber-optic cables from the SFP transceiver module.



3. Insert the dust plug into the ports on the SFP transceiver module.
4. Pull out the latch and down to unlock the SFP transceiver module.



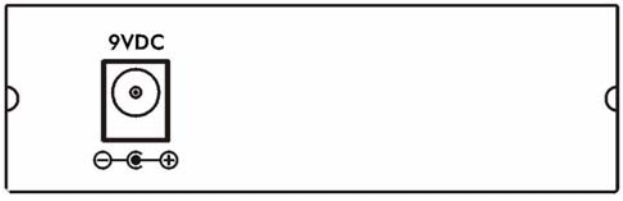
5. Using your thumb and index finger, grasp the tabs on both sides of the module and carefully slide it out of the slot.



Do NOT force or twist the module out of a slot.

Rear Panel

The rear panel contains a power port. Connect the included power adapter (9V DC voltage with minimum 0.7A current) to the port labeled **9VDC** and connect the power adaptor to a power supply (outlet).



Specifications

ITEM	SPECIFICATION
Ethernet Standards	IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX IEEE 802.3ab 1000Base-T IEEE802.3x Flow Control and Back pressure
Ethernet Port	CAT-5 (100/1000Mbps) unshielded twisted pair cable. Auto-crossover (MDI/MDI-X) and auto-negotiation support.
Fiber Port	SFP 3.3V with LC connector.
LEDs	PWR, 100/1000, 2 LNK/ACT, 2 FDX/COL
Power	External adapter: 9V DC at minimum 0.7A
Dimensions	119 x 85 x 26 Millimeters 4.68504 x 3.34646 x 1.02362 Inches
Safety	UL; cUL

ITEM	SPECIFICATION
Temperature	Operating: 0 ~ 45°C (32 ~ 113 °F) Storage: -10 ~ 70 °C (14 ~ 158 °F)
Humidity	Operating: 10 ~ 90% (non-condensing) Storage: 10 ~ 90% (non-condensing)
EMC	FCC Part15 (Class A) CE EMC (Class A)

Troubleshooting

Use the LEDs to identify possible problems and then take corrective action.

PROBLEM	POSSIBLE CAUSES AND REMEDIES
The **PWR** LED is off	Make sure you are using the supplied power adaptor and that it is plugged in to an appropriate power source. Check that the power source is turned on. If the problem persists, you may have a hardware problem. In this case, you should contact your local vendor.
The **100/1000M** LED is off	Check if the media converter has a connection with a 10Mbps Ethernet device. Check the Ethernet cable connection between the media converter and the Ethernet device. The distance between them should not be more than 100 meters Check for faulty Ethernet cables. Check that the Ethernet device supports auto-negotiating at half/full duplex and 100/1000MBps speed. If Link Loss Forwarding is enabled on the fiber port (DIP switch 3), then check if the fiber link is down (thereby forcing the Ethernet link down).

PROBLEM	POSSIBLE CAUSES AND REMEDIES
The **LNK/ACT** (Ethernet) LED is off	Check the Ethernet cable connection between the media converter and the Ethernet device. The distance between them should not be more than 100 meters Check for faulty Ethernet cables. Check that the Ethernet device supports auto-negotiating at half/full duplex and 100/1000MBps speed. If Link Loss Forwarding is enabled on the fiber port (DIP switch 3), then check if the fiber link is down (thereby forcing the Ethernet link down).
The **FDX/COL** (Ethernet) LED is off	The RJ-45 port is operating in half-duplex mode or the Ethernet link is down. See the preceding for possible causes and remedies.
The **LNK/ACT** (Fiber) LED is off	Check the fiber cable connection between the media converter and the remote device. Check that the distance between them does not exceed limits for single mode or multi mode fiber. Check for faulty cables. If the remote device does not support auto-negotiating, but does support full duplex, 1000MBps speed, then turn on DIP switch 1. If Link Loss Forwarding is enabled on the Ethernet port (DIP switch 2), then check if the Ethernet link is down (thereby forcing the fiber link down).
The **FDX/COL** (Fiber) LED is off	The fiber port is operating in half-duplex mode or the fiber link is down. See the preceding for possible causes and remedies.