MC100FX-SC2
MC100FX-SC30

100Base-TX UTP to 100Base-FX Fiber SC Media Converters

User's Guide

Version 1.0
11/2004

ZyXEL
Unleash Networking Power

Copyright

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Trademarks

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 MC100FX-SC2 and MC100FX-SC30 may be referred to as the MC100 or 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.

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Customer Support

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

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Introduction

The MC100FX-SC media converters allow seamless integration between a (Fast) Ethernet network using unshielded twisted pair (UTP) copper cabling and a fiber network.

The MC100FX-SC2 media converter comes with a built-in multimode fiber transceiver module with SC connector that can be used for distances of up to 2km.
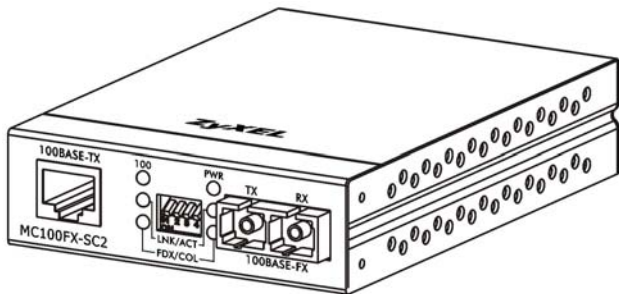
The MC100FX-SC30 media converter comes with a built-in single mode fiber transceiver module with SC connector that can be used for distances of up to 30km.
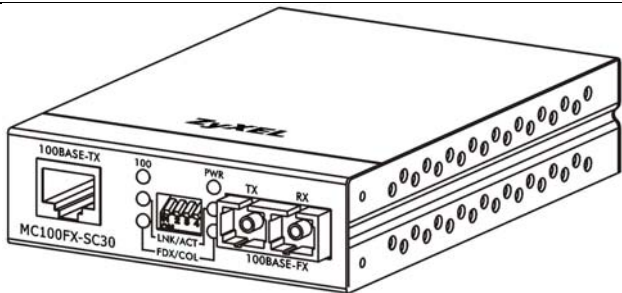
Use the LEDs to quickly check status and the DIP switches to set transmission settings and "link loss forwarding".

Key Features

Each media converter has the following key features:

➢ Converts speed and media type

➢ Built-in fiber transceiver module with SC connector

➢ 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 (10/100Mbps) and mode (full duplex or half duplex) of the connected device)

➢ LED status display

➢ DIP switches to configure fiber link negotiating defaults, Link Loss Forwarding and store-and-forward switching

➢ Link Loss Forwarding to notify the peer link if a link goes down

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 (SSF) 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.
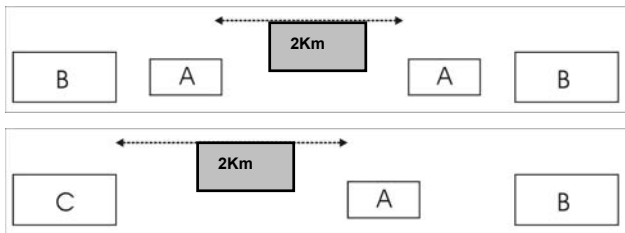

Applications

In the following figures, "A" is the media converter, "B" is a 10/100 Mbps Ethernet switch and "C" is a layer-3 switch with 100Mbps fiber module.
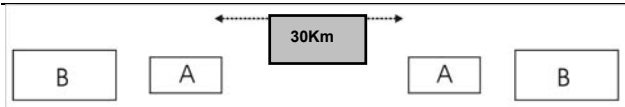
MC100FX-SC2 MMF Applications

Use MC100FX-SC2 media converter for multimode fiber connections for distances of up to 2km.

MC100FX-SC30 SMF Application

Use the MC100FX-SC30 media converter for single mode fiber connections for distances of up to 30km.

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.
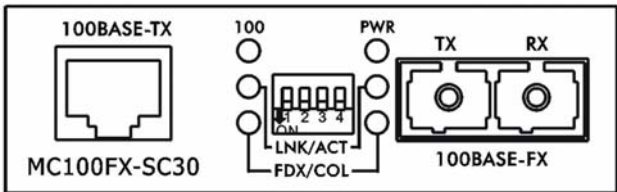
Front Panel

The front panel consists of an RJ-45 port for 100 Mbps UTP connections, LED indicators, DIP switches and a built-in fiber transceiver with SC connector.

MC100FX-SC2
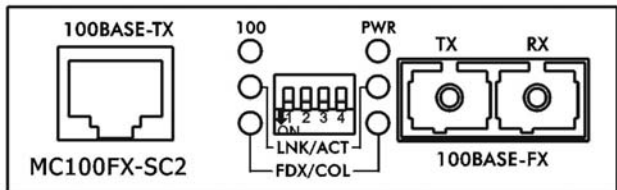
MC100FX-SC30

100Base-TX 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 (10/100Mbps) 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	Green	The media converter has a 100Mbps Ethernet connection.
	Off	The media converter has a 10Mbps Ethernet connection or no Ethernet 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.
	Blinking	Packet collisions are occurring on the Ethernet port.
	Off	The Ethernet port is operating in half-duplex mode or the Ethernet link is down.

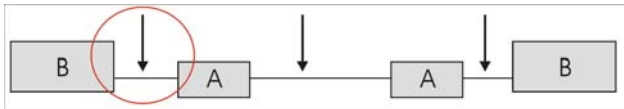| LED	STATUS	DESCRIPTION
LNK/ACT (Fiber)	Green	The media converter fiber link is up.
	Blinking	The media converter is transmitting or receiving on the fiber link.
	Off	The media converter fiber link is down.
FDX/COL (Fiber)	Orange	The fiber port is operating in full-duplex mode.
	Blinking	Packet collisions are occurring on the fiber port.
	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.
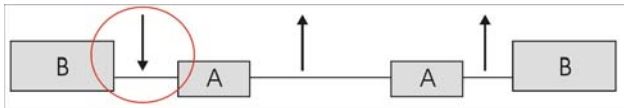
With **Link Loss Forwarding**, a link down (↓) detected on the Ethernet port will force a link down on the fiber port and vice-versa. The up link (↑) will stop transmitting and turn "off" as soon as the remote link is down.

DIP Switches

All DIP switches are off by default.

DIP Switch 1	The Ethernet link is auto-negotiating when the switch is off. Turn it on to force the Ethernet link to be up at only 100Mbps in full duplex mode.
DIP Switch 2	The fiber link operates in full-duplex mode when the switch is off. Turn it on to have the fiber link operate in half-duplex mode.
DIP Switch 3	Turn this switch on to enable Link Loss Forwarding. A message is sent to the Ethernet port if the fiber link goes down (thus forcing the Ethernet link down) and vice-versa.
DIP Switch 4	When this switch is off, the Ethernet port uses a store-and-forward switching scheme, in which incoming data frames are first stored in buffer memory and checked for errors before being forwarded. Turn this switch on to have the Ethernet port operate in pure converter mode in which the port forwards the received data frame immediately after being received (without error checking).

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.

Fiber Transceiver

The MC100FX-SC2 comes with a built-in multimode fiber transceiver with SC connector that can be used for connections of up to 2km.

The MC100FX-SC30 comes with a built-in single mode fiber transceiver with SC connector that can be used for connections of up to 30km.

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

SFP transceivers 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.

Use DIP switch 2 to change the default fiber connection settings.

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 and Fiber Standards	IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX/100BASE-FX IEEE802.3x Flow Control and Back pressure
Fiber Wavelength	Transceiver with SC connector.
	1310nm(Multi-mode) 1310nm(Single-mode)
Fiber Distance	Multi-Mode Fiber (2KM) Single-Mode Fiber (30 KM)
Ethernet Port	CAT-5 (100Mbps) unshielded twisted pair cable. Auto-crossover (MDI/MDI-X) and auto-negotiation support

ITEM	SPECIFICATION
LEDs	PWR, 100, 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
Temperature	Operating: $0 \sim 45^{o}C$ ($32 \sim 113\ ^{o}F$) Storage: $-10 \sim 70\ ^{o}C$ ($14 \sim 158\ ^{o}F$)
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 **100M** 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.
	If the connected Ethernet device does not support auto-negotiating, turn on DIP switch 1 to force a 100 Mbps full-duplex link.
	If Link Loss Forwarding is enabled (DIP switch 3 is on), then check if the fiber link is down (thereby forcing the Ethernet link down).
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 100MBps speed.
	If Link Loss Forwarding is enabled (DIP switch 3 is on), then check if the fiber link is down (thereby forcing the Ethernet link down).

PROBLEM	POSSIBLE CAUSES AND REMEDIES
The **FDX/COL** (Ethernet) LED is off	The RJ-45 port is operating in half-duplex mode or the Ethernet link is down. See above 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 (MC100FX-SC30) or multi mode fiber (MC100FX-SC2). Check for faulty cables. Check what duplex mode the remote device supports and then set DIP switch 2 (off for full-duplex and on for half-duplex). If Link Loss Forwarding is enabled (DIP switch 3 is on), 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 above for possible causes and remedies.