



## Copper to Fiber Stand-Alone Media Converter

### User Manual

Model No.	Description
FVT-2001	10/100BASE-TX to 100BASE-FX MMF SC Converter, 2km
FVT-2002	10/100BASE-TX to 100BASE-FX MMF ST Converter, 2km
FVT-2201	10/100BASE-TX to 100BASE-FX SMF SC Converter, 20km
FVT-2202	10/100BASE-TX to 100BASE-FX SMF SC Converter, 20km
FVT-2401	10/100BASE-TX to 100BASE-FX SMF SC Converter, 40km
GVT-2000	10/100/1000BASE-T to 1000BASE-X SFP Converter
GVT-2001	10/100/1000BASE-T to 1000BASE-SX MMF SC Converter, 550m
GVT-2002	10/100/1000BASE-T to 1000BASE-SX/LX SMF SC Converter, 20km
GVT-2003	10/100/1000BASE-T to 1000BASE-SX/LX SMF ST Converter, 20km

Ver. 1.03

1

## 1. Introduction

LevelOne media converters are Fast Ethernet 10/100Base-TX to 100Base-FX and 10/100/1000Base-T to 1000Base-SX/LX converters to provide the flexibility required in network integration. The TX port auto-sense connection speed, auto-negotiates half/full duplex modes and auto-selects MDIX media type. The fiber connectors come with multimode or singlmode, SC, ST or SFP connector to provide necessary connection interface and distance capabilities.

LevelOne have designed 19" racks to organize media converters the smart way by providing a single power supply. With the Plug-and-play technology, the converter is easy to set-up and run.

For simple, cost-effective network design, LevelOne converter series is the perfect solution to bridge the complex network infrastructure.

2

## 1.1. Features

### Fast Ethernet Module

- Comply with IEEE 802.3, 802.3u and 802.3x standards.
- Convert between UTP cabling and Fiber-optic cabling.
- One RJ-45 connector, Auto-MDI/MDIX for UTP port.
- Support 10/100 Mbps Auto-negotiation for UTP port.
- Fiber cabling connectivity up to 40Km.
- Store-and-forward switching to separate two collision domains.
- One fiber connector (SC/ ST) for 100Base-FX.
- 2 DIP-switches to set the operation mode
- Link- Lost-Forwarding function.

### Gigabit Ethernet Module

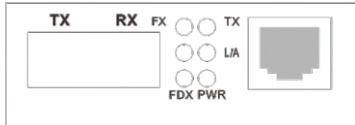
- Comply with IEEE 802.3, 802.3u and 802.3x, IEEE 802.3ab 1000BaseT, 802.3z 1000Base SX/LX standards.
- Convert between UTP cabling and Fiber-optic cabling.
- One RJ-45 connector, Auto-MDI/MDIX for UTP port.
- Support 10/100/1000 Mbps Auto-negotiation for UTP port
- Fiber cabling connectivity up to 80Km.
- Store-and-forward switching to separate two collision domains.
- One fiber connector (SC / SFP) for 1000Base-SX/LX
- DIP-switches to set the operation mode function.
- Link- Lost-Forwarding function.

3

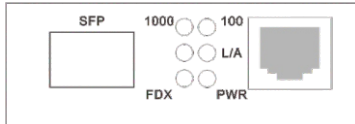
## 2. Hardware Description

### 2.1. Front Panel

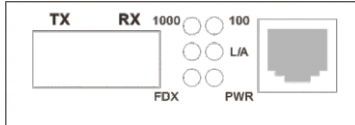
- FVT-2001 / FVT-2002 / FVT-2201 / FVT-2401 / FVT-2202



- GVT-2000



- GVT-2001 / GVT-2002 / GVT-2003



- (1) RJ-45 Port      (3) Fiber/SFP Connector  
(2) LED Indicators      (4) DIP-Switch

4

### 2.2. Rear Panel



Model No.	Power Adapter
FVT-2001	DC 5V, 1A
FVT-2002	DC 5V, 1A
FVT-2201	DC 5V, 1A
FVT-2202	DC 5V, 1A
FVT-2401	DC 5V, 1A
GVT-2000	DC 5V, 2A
GVT-2001	DC 5V, 2A
GVT-2002	DC 5V, 2A
GVT-2003	DC 5V, 2A

5

### 2.3. LED Indicators

#### Fast Ethernet Module

LED	Status	Meaning
PWR	On	Power on
FX	On	100Mbps Fiber Speed
TX	On	100Mbps UTP Speed
	OFF	10 Mbps UTP Speed
FDX	On	Converter works in the full duplex mode
	OFF	Converter works in the half duplex mode
L/A UTP(right)	On	Connection status display for fiber link. "ON" indicates that Fiber link is in correct connection.
	Blinks	Active status display of fiber link "Blink" indicates packet goes through FX end.
L/A Fiber(left)	On	Connection status display for electric link. "ON" indicates that electric link is in correct connection.
	Blinks	Active status display of fiber link "Blink" indicates packet goes through TX end

6

## Gigabit Ethernet Module

LED	Status	Meaning
PWR	On	Power on
1000	On	1000Mbps UTP Speed
100	On	100Mbps UTP Speed
FDX	On	Converter works in the full duplex mode
	Off	Converter works in the half duplex mode
L/A UTP(right)	Blinks	Active status display of electrical interface link "Blink" indicates packet goes through TP
L/A Fiber(left)	Blinks	Active status display of fiber interface link "Blink" indicates packet goes through FX

Note: The UTP port speed is 10Mbps when both 100 and 1000 LED indicators "OFF"

## 2.4. DIP-switch

The DIP-switch is used to configure operation mode for LLF (Link Lost Forwarding) and Flow-Control function for UTP/Fiber port. The default value of DIP switch is OFF.

### Fast Ethernet Module/Gigabit Ethernet Module

No	Status	Description
1	ON	LFP is Enable
	OFF	LFP is Disable
2	ON	Flow-Control function ENABLED
	OFF	Flow-Control function DISABLED

7

## 4. Specification

### Fast Ethernet Module

Standard	IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX/100BASE-FX IEEE802.3x Flow Control and Back pressure
Connector	Fiber: Duplex ST/SC RJ-45 Socket: CAT-3/5 (10/100Mbps) Twisted Pair cable, Auto MDI/MDI-X, Auto-Negotiation
Switch architecture	Store and Forward
Fiber parameters	Fiber Core: Multi-Mode (62.5/125um, 50/125um) Single-Mode (8/125um, 9/125um) Wavelength: 1310nm(Multi-mode) 1310nm(Single-mode) 1310/1550nm(Single-mode fiber) Fiber Distance: Multi-Mode Fiber 2KM Single-Mode Fiber (20KM or 40KM)
Transparent packet	64 to 1600 Bytes for Non-VLAN Ethernet packet
Link Fault Pass through	UTP → Fiber: If UTP port link down, then converter will forced fiber to link down. Fiber → UTP: If Fiber port link down, the media converter will force UTP port to link down.
DIP Switch	DIP Switch 1: LFP function DIP Switch 2: Flow-Control function
LED	Power, UTP (100Mbps, L/A, FDX) Fiber (L/A, 100Mbps)
Power	DC5V, 1A
Dimension	71mm x 94mm x 26mm
EMI & safety	CE, FCC Class A

10

### Link Lost Forwarding:

When LLF is enable, allow UTP link failures to be reported to the fiber side and also allow Fiber link failure to be reported to the UTP side. Therefore, A link loss forward feature is provided in both UTP and Fiber side.

### Flow Control Function :

Flow control stops and resumes the transmission of network traffic between two connected peer nodes on a full-duplex Ethernet physical link. Controlling the flow by pausing and restarting it prevents buffers on the nodes from overflowing and dropping frames.

### Note:

Please don't change the DIP-switch setting when UTP or fiber port is transmitting or receiving data. It may cause some data error.

## 3. Cabling

### Fast Ethernet Module

- Twisted-pair segment can be use unshielded twisted pair (UTP) or shielded twisted pair (STP) cabling. The cable must comply with the IEEE 802.3u 100Base TX standard for Category 5. The cable between the converter and the link partner (switch, hub, workstation, etc.) must be less than 100 meters (328 ft.) long.
- Fiber segment using multi-mode connector type must use 50 or 62.5/125 um multi-mode fiber cable. You can connect two devices up to a 2-kilometer (6,562 ft.) distance.
- Fiber segment using single-mode connector type must use 8/125 or 9/125 um single-mode fiber cable. You can connect two devices in the distance of 40 Kilometers in full duplex operation. For half-duplex operation, the recommended maximum distance is 412 meters (1,352 ft.)

### Gigabit Ethernet Module

- Using four twisted-pair, Category 5 cabling for RJ-45 port connection. The cable between the converter and the link partner (switch, hub, workstation, etc.) must be less than 100 meters (328 ft.) long.

8

### Gigabit Ethernet Module

Standard	IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX IEEE 802.3ab 100BaseT IEEE 802.3z 1000BaseSX/LX standards IEEE802.3x Flow Control and Back pressure
Connector	Fiber: SC / SFP RJ-45 Socket: CAT-5 (10/100/1000 Mbps or pure 1000Mbps) Twisted Pair cable, Auto MDI/MDI-X, Auto-Negotiation
Switch architecture	Store and Forward
Fiber parameters	Fiber Core: Multi-Mode (62.5/125um, 50/125um) Wavelength: 850nm(Multi-mode) 1310nm(Single-mode) Fiber Distance: 550M (Multi-Mode Fiber)
Transparent packet	64 to 9000 Bytes for Ethernet packet
Link Lost Forward	UTP → Fiber: If UTP port link down, then converter will forced fiber to link down. Fiber → UTP: If Fiber port link down, the media converter will force UTP port to link down.
DIP Switch	DIP Switch 1: LFP function DIP Switch 2: Flow-Control function
LED	Power, UTP (L/A, 100Mbps, 1000Mbps, FDX) Fiber (L/A)
Power	DC5V, 2A
Dimension	71mm x 94mm x 26mm
EMI & safety	CE, FCC Class A

11

- Fiber segment using multi-mode connector type must use 50 or 62.5/125 um multi-mode fiber cable. You can connect two devices up to 550m distances.
- Fiber segment using single-mode connector type must use 8/125 or 9/125 um single-mode fiber cable. You can connect two devices in the distance of 80 Kilometers in full duplex operation. For half-duplex operation, the recommended maximum distance is 412 meters (1,352 ft.)

### Optical Fiber

Module Name	Wavelength	Avg. Launch Power	Avg. Sensitivity
100Base-FX Fiber SC MM	1310 (nm)	>-21dBm	-31dBm
100Base-FX Fiber ST MM	1310 (nm)	>-21dBm	-31dBm
100Base-FX Fiber SC SM 20KM	1310 (nm)	>-15dBm	-34dBm
100Base-FX Fiber SC SM 40KM	1310 (nm)	>-10dBm	-37dBm
100Base-FX Fiber SC SM 20KM	1310/1550 (nm)	>-10dBm	-34dBm
1000Base-SX Fiber SC MM	850 (nm)	>-10.5dBm	-20dBm
1000Base-SX/LX Fiber SC SM 20KM	1310 (nm)	>-8dBm	-23dBm
1000Base-SX/LX Fiber ST SM 20KM	1310 (nm)	>-8dBm	-23dBm

Module Name	Avg. Power Loss Budget	Max. FDX Fiber Distance	Fiber Size (um)
100Base-FX Fiber SC MM	10 (dBm)	2 (Km)	62.5/125 50/125
100Base-FX Fiber ST MM	10 (dBm)	2 (Km)	62.5/125 50/125
100Base-FX Fiber SC SM	19 (dBm)	20(Km)	9/125 8/125
100Base-FX Fiber SC SM	27 (dBm)	40(Km)	9/125 8/125
100Base-FX Fiber SC SM 1310/1550 (nm)	24 (dBm)	20(Km)	9/125 8/125
1000Base-SX Fiber SC MM	9.5 (dBm)	550 (m)	62.5/125 50/125
1000Base-SX/LX Fiber SC SM	15 (dBm)	20(Km)	9/125
1000Base-SX/LX Fiber ST SM	15 (dBm)	20(Km)	9/125

9

## 5. Optional SFP Modules

CVH-2000 supports 3.3V mini-GBIC module

Model No.	Description
GVT-0300	1.25Gbps Multi-mode SFP Transceiver, 550m, 850nm
GVT-0301	1.25Gbps Single-mode SFP Transceiver, 10km, 1310nm



12