level one ®

Copper to Fiber
Stand-Alone Media Converter

Quick Installation Guide

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-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

Table of Contents

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 singlemode, 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.

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.
- 6 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.
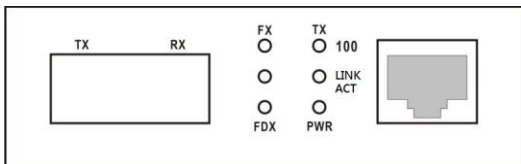- Link- Lost-Forwarding function.

1.2. Package Contents

- Stand-alone Media Converter
- Power Adapter (10/100M 5V,1A; 10/100/1000M 5V,2A)
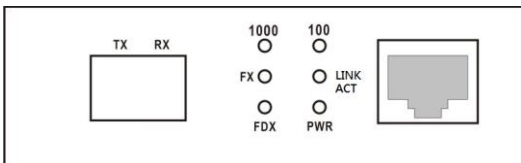- User Manual

Compare the contents of your converter module with the checklist above. If any item is damaged or missing, please contact your local dealer for service.

2.   Hardware Description

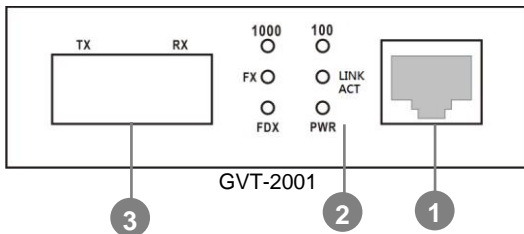## 2.1. Front Panel

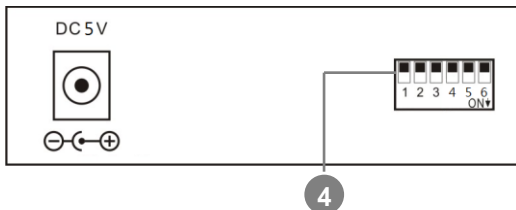FVT-2001 / FVT-2002 / FVT-2201 / FVT-2401

GVT-2000

GVT-2001

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

2.2. Rear Panel

Power Adapter: (10/100M DC 5V, 1A; 10/100/1000M DC 5V, 2A)

The rear panel contains a power socket. This power socket accepts DC 5V voltage and minimum 1A & 2A supplied current.

2.3. LED Indicators

Fast Ethernet Module

LED	Status	Meaning
PWR	On	Power on
FX 100	On	100Mbps Fiber Speed
TX 100	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
FX LINK/ACT	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.
TX LINK/ACT	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

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
LINK/ACT (UTP)	Blinks	Active status display of electrical interface link Blink" indicates packet goes through TP
LNK/ACT (Fiber)	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"

DIP-switch

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

Fast Ethernet Module

No	Status	Description
1	ON	LFP is Enable
	OFF	LFP is Disable
2	ON	Modified cut-through switch mode is enable
	OFF	Store and forward switch is enable
3	ON	force the TX port work 10/100Mbps,full/half duplex
	OFF	auto-negotiation mode is enable
4	ON	TX is 10Mbps
	OFF	TX is 100Mbps
5	ON	TX is half duplex
	OFF	TX is full duplex
6	ON	Normally close

Gigabit Ethernet Module

No	Status	Description	
1	ON	LFP Enable	
	OFF	LFP Disable	
Pin 2 \ Pin3		ON	OFF
ON		Pass through	Smart pass through
OFF		Modified cut through	Store and forward

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.

Pure Converter mode (Gigabit Ethernet Module):
When pure converter mode is enabling (on), it operates with the minimum latency. The transmission flow does not wait until entire frame is ready, but instead it forwards the received data immediately after the data being received. And TP port should be forced at1000M in this application. When DIP-Switch is in Switch Converter mode (off), the converter function is same as Switch Hub.

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.
- 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
1000Base-SX Fiber SC MM	850 (nm)	>-10.5dBm	-20dBm

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
1000Base-SX Fiber SC MM	9.5 (dBm)	550 (m)	62.5/125 50/125

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)
	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: Transmission Mode DIP Switch 3: Auto/Force the UTP port work mode DIP Switch 4: 10/100M for UTP port DIP Switch 5: Full/Half Duplex mode for UTP port DIP Switch 6: Normally close
LED	Power, UTP (100Mbps, LINK/ACT, FDX) Fiber (LINK/ACT, 100Mbps)
Power	DC5V / 1A
Dimension	71mm x 94mm x 26mm
EMI & safety	CE, FCC Class A

Gigabit Ethernet Module

Standard	IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX IEEE 802.3ab 1000BaseT IEEE 802.3z 1000BaseSX/LX standards IEEE802.3x Flow Control and Back pressure
Connector	Fiber: SC / SFP RJ-45 Socket: CAT-5 (10/100/1000Mbps 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) 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 and 3 performance 4 types work mode DIP Switch 2 and 3 is OFF = Store and forward DIP Switch 2 is OFF, 3 is ON = Cut through mode DIP Switch 2 is ON, 3 is OFF = Smart pass through DIP Switch 2 and 3 is ON = Pass through mode
LED	Power, UTP (LINK/ACT, 100Mbps, 1000Mbps, FDX) Fiber (LINK/ACT)
Power	DC5V / 2A
Dimension	71mm x 94mm x 26mm
EMI & safety	CE, FCC Class A

5. Optional SFP Modules

CVH-2000 supports 3.3V mini-GBIC module

Model No.	Description
GVT-0300	1.25G MMF SFP Transceiver, 550 m, 850nm
GVT-0301	1.25G SMF SFP Transceiver, 10 km, 1310nm
GVT-0302	1.25G SMF SFP Transceiver, 80 km, 1550nm

CE FC