level one

Copper to Fiber
Stand-Alone Media Converter

User Manual

Part No.	Model No.	Description
531063	FVT-4001	10/100Base-TX to 100Base-FX SC, Multi-mode 2km
531052	FVT-4002	10/100Base-TX to 100Base-FX ST, Multi-mode 2km
531071	FVT-4301	10/100Base-TX to 100Base-FX SC, Single-mode 30km
531404	GVT-4000	10/100/1000Base-T to SFP mini-GBIC, 3.3V
531402	GVT-4001	10/100/1000Base-T to 1000SX SC, Multi-mode 550m

Table of Contents

1.   Introduction

LevelOne media converters are Fast Ethernet 100Base-TX to 100Base-FX and 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 30Km.
- Store-and-forward switching to separate two collision domains.
- One fiber connector (SC/ ST) for 100Base-FX.
- 4DIP-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, 1000BaseSX/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 70Km.
- 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.
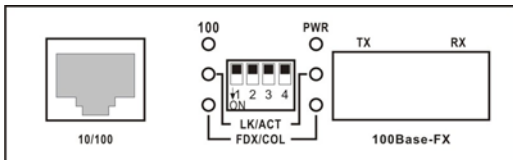- Link- Lost-Forwarding function.

1.2. Package Contents

- Stand-alone Media Converter
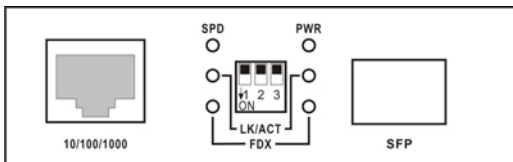- Power Adapter DC 9V, 0.7A
- User Manual

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.
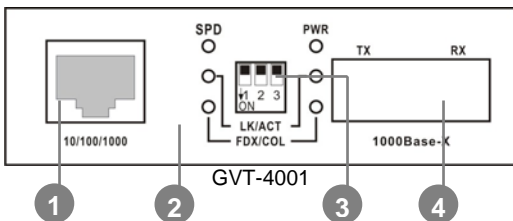
2. Hardware Description

2.1. Front Panel

FVT-4001 / FVT-4002 / FVT-4301

GVT-4000

GVT-4001

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

2.2. **Rear Panel**

Power Adapter: DC 9V, 0.7A

The rear panel contains a power socket. This power socket accepts DC9V voltage and minimum 0.7A supplied current.

2.3. LED Indicators

Fast Ethernet Module

LED	Status	Meaning
PWR	Green	Power on
100	Green	100Mbps UTP Speed
	OFF	10 Mbps UTP Speed
LK/ACT (UTP)	Green	The unit is linking with it's link partner.
	Blinks	The unit is transmitting or receiving packets
	Off	No device attached
LK/ACT (Fiber)	Green	The unit is linking with it's link partner.
	Blinks	The unit is transmitting or receiving packets
	Off	No device attached
FDX/COL (UTP)	Orange	The UTP port is operating in full-duplex mode.
	Blinks	Collision of Packets occurs in the port.
	Off	Half-duplex mode or no device attached
FDX/COL (Fiber)	Orange	The fiber port is operating in full-duplex mode.
	Blinks	Collision of Packets occurs in the port.
	Off	Half-duplex mode or no device attached

Gigabit Ethernet Module

LED	Status	Meaning
PWR	Green	Power on
SPD	Green	1000Mbps UTP Speed
	Orange	100Mbps UTP Speed
	OFF	10Mbps UTP Speed
LNK/ACT (UTP)	Green	The unit is linking with its link partner.
	Blinks	The unit is transmitting or receiving packets
	Off	No device attached
FDX/COL (UTP)	Orange	The UTP port is operating in full-duplex mode.
	Blinks	Collision of Packets occurs in the port.
	Off	Half-duplex mode or no device attached
LNK/ACT (Fiber)	Green	The unit is linking with its link partner.
	Blinks	The unit is transmitting or receiving packets from FX devices.
	Off	No device attached
FDX/COL (Fiber)	Orange	The fiber port is operating in full-duplex mode.
	Blinks	Collision of Packets occurs in the port.
	Off	Half-duplex mode or no device attached

2.4. 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	UTP 100Mbps Full Duplex mode
	OFF	UTP Auto-Nego
2	ON	Fiber in Half Duplex
	OFF	Fiber in Full Duplex
3	ON	LLF Enable
	OFF	LLF Disable
4	ON	Pure converter mode
	OFF	Switch Converter mode

Gigabit Ethernet Module

No	Status	Description
1	ON	Fiber in 1000Mbps Full Duplex
	OFF	Fiber Auto-Negotiation
2	ON	UTP LLF Enable
	OFF	UTP LLF Disable
3	ON	Fiber LLF Enable
	OFF	Fiber LLF Disable

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 (Fast 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 at 100M 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 30 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 10 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)	-18 (dB)	-30 (dB)
100Base-FX Fiber ST MM	1310 (nm)	-18 (dB)	-30 (dB)
100Base-FX Fiber SC SM	1310 (nm)	-6 (dB)	-34 (dB)
1000Base-SX Fiber SC MM	850 (nm)	-10 (dB)	-17 (dB)

Module Name	Avg. Power Loss Budget	Max. FDX Fiber Distance	Fiber Size (um)
100Base-FX Fiber SC MM	12 (dBm)	2 (Km)	62.5/125 50/125
100Base-FX Fiber ST MM	12 (dBm)	2 (Km)	62.5/125 50/125
100Base-FX Fiber SC SM	28 (dBm)	30(Km)	9/125 8/125
1000Base-SX Fiber SC MM	7 (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 (30 KM)

Transparent packet	64 to 1600 Bytes for Non-VLAN 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: UTP Auto-Nego / 100Mbps Full Duplex mode DIP Switch 2: Fiber Full/Half Duplex DIP Switch 3: LLF (Link Lose Forwarding) Disable/Enable DIP Switch 4: Switch Converter / Pure converter mode
LED	Power, UTP (100Mbps, LK/Act, FDX/COL) Fiber (LK/Act, FDX/COL)
Power	DC9V / 0.7A
Dimension	119mm x 85mm x 26mm
EMI & safety	CE, FCC Class A

Gigabit Ethernet Module

Standard	IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX/100BASE-FX IEEE 802.3ab 1000BaseT IEEE 802.3z 1000BaseSX/LX standards IEEE802.3x Flow Control and Back pressure (only for GVT-5001 and Giga Fiber port in Auto-Nego mode)
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: 1310nm(Multi-mode) Fiber Distance: 550M (Multi-Mode Fiber)
Transparent packet	64 to 1536 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: Fiber Auto-Nego/1000Mbps Full Duplex mode DIP Switch 2: UTP ➜Fiber LLF Disable/Enable DIP Switch 3: Fiber➜ UTP LLF Disable/Enable
LED	Power, UTP (SPD, LK/ACT, FDX) Fiber (LK/Act, FDX/COL)
Power	DC9V / 0.7A
Dimension	119mm x 85mm x 26mm
EMI & safety	CE, FCC Class A

5. Optional SFP Modules

GVT-4000 supports 3.3V mini-GBIC module

Part No.	Model No.	Description
570622	GVT-0300	Mini-GBIC SFP transceiver Multi-Mode, 550m
551071	GVT-0301	Mini-GBIC SFP transceiver Single-Mode, 10km
551072	GVT-0302	Mini-GBIC SFP transceiver Single-Mode, 70km

CE FC