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Product Specification

1-Port 10/100/1000Base-T to 2-Port 100/1000Base-X SFP Industrial Gigabit Media Converter

IGT-1205AT

Version 1.0

Change History:

Revision	Date	Author	Change List
Version 0.9	2013/02/26	Marc Liao	Draft version
Version 1.0	2013/05/16	Kent Kang	Add fiber redundant feature

Author	Marc Liao	Editor:	Marc Liao
Reviewed by:	Kent Kang	Approved by:	Tom Shih

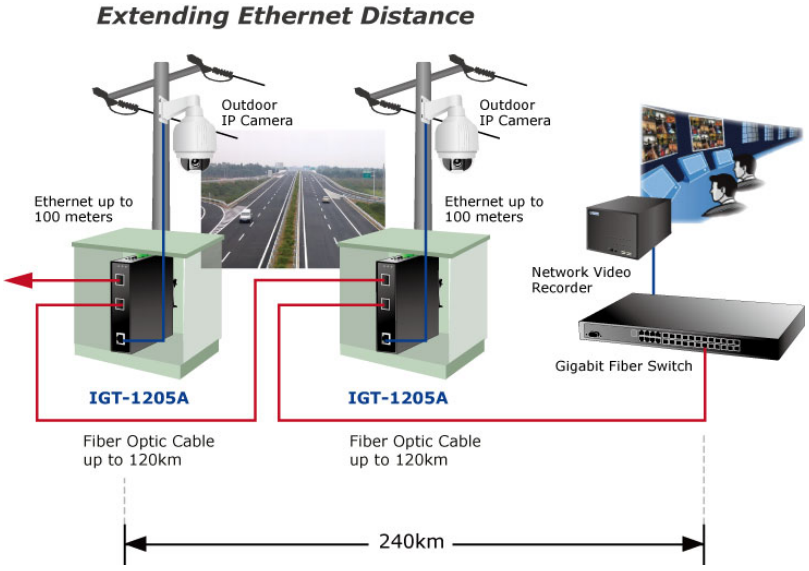
1. PRODUCT DESCRIPTION

Industrial-grade, Reliable and Flexible Network Distance Extension Solution

The PLANET IGT-1205AT is an industrial Gigabit Media Converter providing non-blocking wire-speed performance and great flexibility for Gigabit Ethernet extension in harsh industrial environment. It is equipped with one **10/100/1000Base-T** RJ-45 copper and **two 100/1000Base-X SFP** fiber optic interfaces delivered in an IP30 rugged strong case with redundant power system. The IGT-1205AT is well suited for applications in deploying surveillance system, secure control and wireless service in climatically demanding environments with wide temperature range from **-40 to 75 degrees C**.

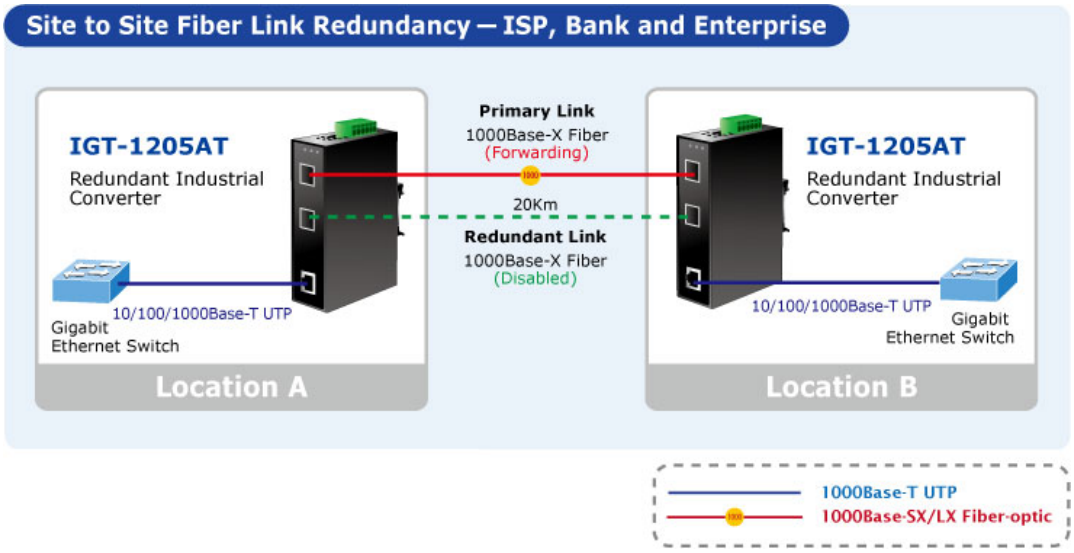
Fiber-Optical Link Capability Enables Extension of Network Deployment

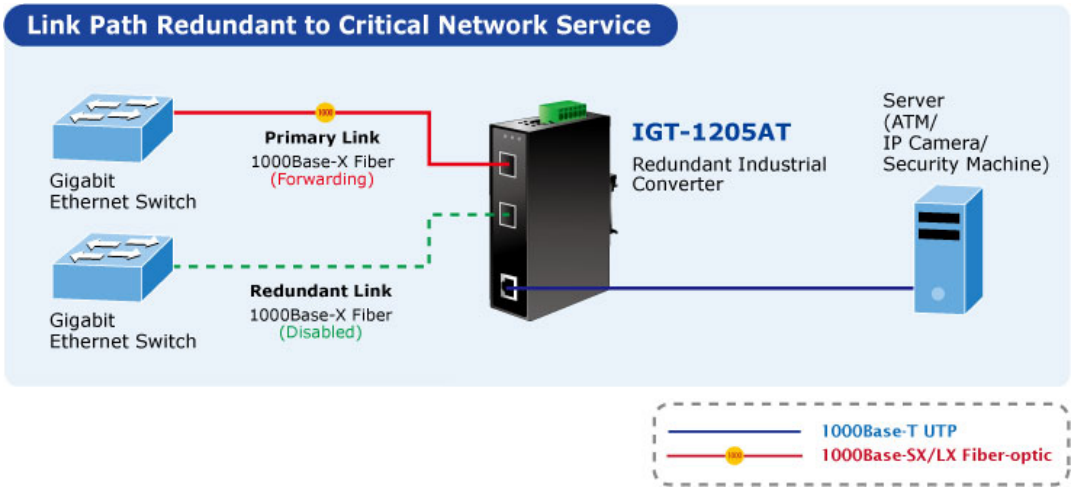
The two SFP slots are compatible with **100Base-FX** or **1000Base-SX / LX / WDM** through SFP (Small Form Factor Pluggable) fiber-optic transceivers. The fiber optical uplink capability guarantees the throughput to all nodes hooked into the network and the Gigabit Ethernet distance can be extended from 550 meters (Multi-Mode fiber cable) up to 10/20/30/40/50/70 /120 kilometers (Single-Mode fiber cable), also the Fast Ethernet distance can be extended from 2km (Multi-Mode fiber cable) up to 20/40/60 kilometers (Single-Mode fiber cable). They are well suited for applications within the factory data centers and distributions.



Adjustable 3-Port Switch Mode or 2 Fiber Redundant Mode

Via the built-in DIP switch, the two SFP fiber interfaces of IGT-1205AT can be configured as **Ethernet switch mode** or **Fiber Redundant mode**. With the Ethernet switch mode, it can operate in Store-and-Forward mechanism with high performance; with the 2-port Fiber redundant mode, it provides rapid fiber redundancy of link for highly critical Ethernet applications. The redundant mode supports auto-recovering function. If the destination port of a packet is link-down, it will forward the packet to the other port of the backup pair.





Environmentally Hardened Design

The IGT-1205AT is equipped with the slim-type IP30 metal case for easy deployment in heavy Industrial demanding environments. With IP30 industrial case protection, the IGT-1205AT provides a high level of immunity against electromagnetic interference and heavy electrical surges which are usually found on plant floors or in curb side traffic control cabinets. Being able to operate under the temperature range from -40 to 75 degrees C, the IGT-1205AT can be placed in almost any difficult environment. The IGT-1205AT also allows either DIN rail or wall mounting for efficient use of cabinet space.

Convenient and Reliable Power System

To enhance the operation reliability and flexibility, the IGT-1205AT is equipped with two DC power input connectors for redundant power supply installation. It also possesses an integrated power supply source with wide-ranging voltages (12 to 48V DC or 24V AC) for worldwide high availability applications requiring dual or backup power inputs.

2. PRODUCT FEATURES

Physical Port

- 1-port 10/100/1000Base-T RJ-45 with auto MDI / MDI-X function
- 2-port SFP slot interface, SFP supports 1000Base-X and 100Base-FX transceiver via DIP switch configured

Fiber Port Redundancy

- Link status auto-detect and redundant on Dual ports with the same connector type
- Only Primary-Port is active at a time, the Backup-Port is blocked
- When Primary-Port link failure occurs, the traffic will swap to Backup-Port automatically.
- Once the Primary-Port status is back to link-up, the traffic will swap from Backup-Port to Primary-Port

Layer 2 Features

- Supports Auto-negotiation and 10/100Mbps half / full duplex and 1000Mbps full duplex mode
- High performance Store and Forward architecture, runt/CRC filtering eliminates erroneous packets to optimize the network bandwidth
- Prevents packet loss with back pressure (Half-Duplex) and IEEE 802.3x PAUSE frame flow control (Full-Duplex)
- 9K Jumbo Frame Size support
- Integrated address look-up engine, support 1K absolute MAC addresses
- Automatic address learning and address aging

Industrial Case / Installation

- Slim IP30 metal case protection
- DIN Rail and Wall Mount Design
- Redundant Power Design
  - 12 to 48V DC, redundant power with polarity reverse protect function
  - AC 24V power adapter acceptable
- Supports EFT protection 6000 VDC for power line
- Supports 6000 VDC Ethernet ESD protection
- -40 to 75 degrees C operating temperature

3. PRODUCT SPECIFICATION

3.1 MAIN COMPONENT

Switch ASIC:	Marvell 88E6161-A2-LGO2I000	X1

3.2 Functional Specifications

Model	**IGT-1205AT**
Hardware Specifications	
Copper Port	1 x 10/100/1000Base-T RJ-45 TP Auto-MDI/MDI-X, Auto-Negotiation
SFP / mini-GBIC Slots	2 1000Base-SX/LX/BX SFP interfaces (Port-5 and Port-6) Compatible with 100Base-FX SFP
DIP Switch	■ DIP-1: SFP Port 1 1000Base-X (default) / 100Base-FX ■ DIP-2: SFP Port 2 1000Base-X (default)/ 100Base-FX ■ DIP-3: Switch mode / Fiber Redundant mode
Connector	Removable 6-pin terminal block Pin 1/2 for Power 1; Pin 3/4 for fault alarm; Pin 5/6 for Power 2
Alarm	Provides one relay output for power failure Alarm Relay current carry ability: 1A @ DC 24V
LED	3 x LED for System and Power: ■ Green: DC Power 1 ■ Green: DC Power 2 ■ Green: Power Fault 2 x LED for Per Copper Port: ■ Green: 1000 LNK/ACT ■ Orange:100 LNK/ACT 1 x LED for Per mini-GBIC interface (Port-1 and Port-2) ■ Green: LNK/ACT
ESD Protection	6KV DC
EFT Protection	6KV DC
Enclosure	IP30 type metal case
Installation	DIN rail kit and wall mount ear
Dimensions (W x D x H)	135 x 87 x 32mm
Weight	505g
Power Requirements	DC 12~48V or AC 24V Redundant power with polarity reverses protection function
Power Consumption / Dissipation	4.8 watts/16BTU
Switch Specification	
Switch Processing Scheme	Store-and-Forward

Address Table	1K entries
Flow Control	Back pressure for half duplex IEEE 802.3x Pause Frame for full duplex
Switch fabric	6Gbps
Throughput (packet per second)	4.46Mpps@64bytes
Maximum Transmit Unit	9216 bytes
Speed	SX/LX: 2000Mbps (full-duplex) FX: 200Mbps (full-duplex) TP: 10/20Mbps, 100/200Mbps, 2000Mbps
Standards Conformance	
Standards Compliance	IEEE 802.3 Ethernet / 10Base-T IEEE 802.3u Fast Ethernet / 100Base-TX IEEE 802.3ab Gigabit Ethernet / 1000Base-T IEEE 802.3z Gigabit Ethernet / 1000Base-SX/LX IEEE 802.3x Full-Duplex Flow Control
Regulation Compliance	FCC Part 15 Class A, CE
Stability Testing	IEC60068-2-32(Free fall) IEC60068-2-27(Shock) IEC60068-2-6(Vibration)
Environment	
Temperature	Operating: -40~75 degrees C Storage: -40~75 degrees C
Humidity	Operating: 5~95% (Non-condensing) Storage: 5~95% (Non-condensing)
Cable	
Twisted-Pair	10Base-T: 2-Pair UTP CAT. 3, 4, 5, up to 100 meters 100Base-TX: 2-Pair UTP CAT. 5, 5e up to 100 meters 1000Base-T: 4-Pair UTP CAT. 5e, 6 up to 100 meters
Fiber-Optic Cable	■ 1000Base-SX : 50/125μm or 62.5/125μm multi-mode fiber optic cable, up to 550m ■ 1000Base-LX : 9/125μm single-mode fiber optic cable, up to 10/20/30/40/50/70/120 kilometers (vary on SFP module) ■ 100Base-FX : 50/125μm or 62.5/125μm multi-mode fiber optic cable, up to 2 kilometers 9/125μm single-mode fiber optic cable, up to 20/40/60 kilometers (vary on SFP module)

3.3 Physical Specification

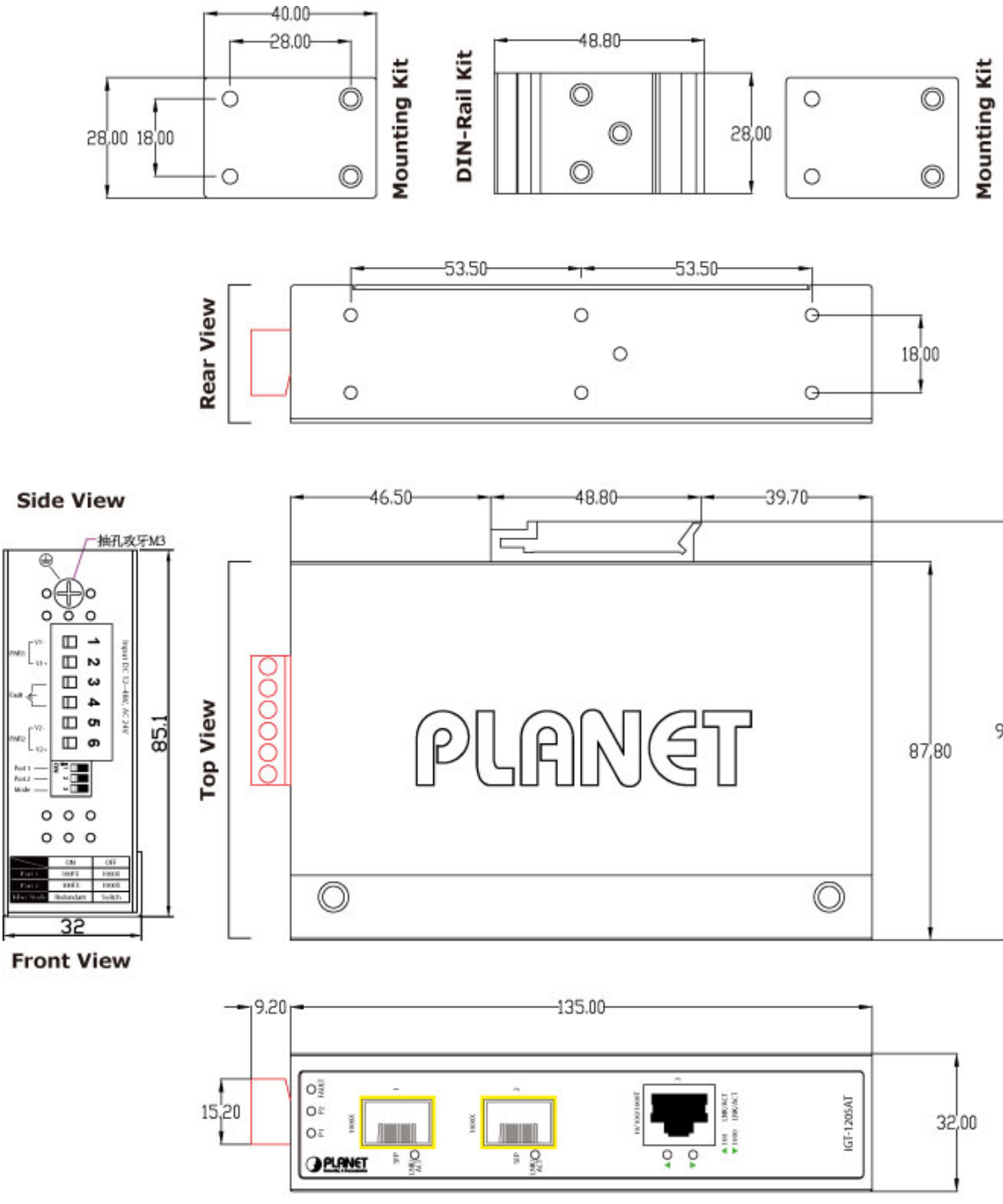
- **Dimensions:**

  135mm x 87mm x 32mm (D x W x H)

- **Weight:**

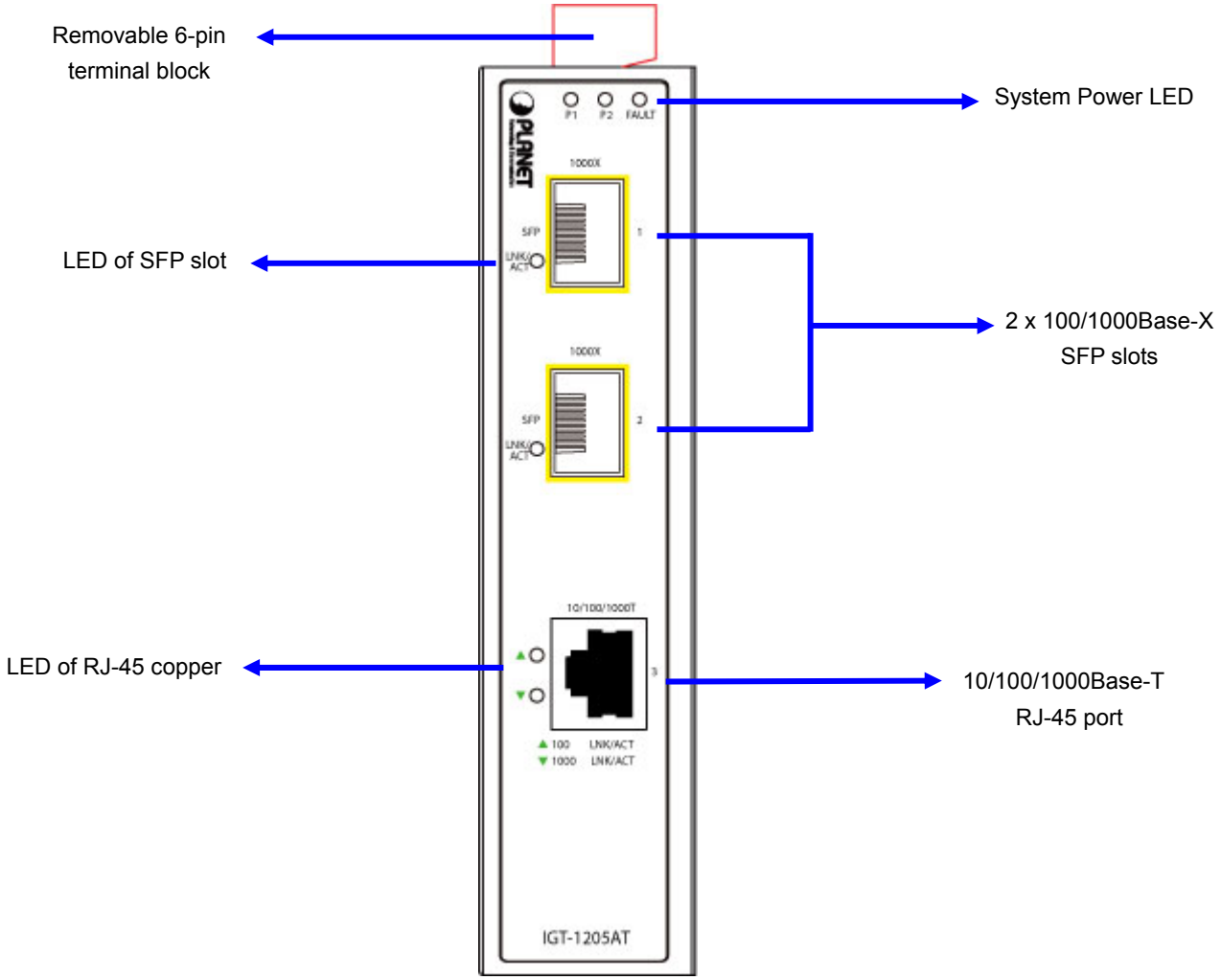
  440g

- **Diagrams:**



■ Front Panel

The Front Panel of the IGT-1205AT Industrial media converter is shown as below:



■ LED Definition

➢ System

LED	Color	Function
P1	**Green**	**Light**: indicates the power 1 has power.
P2	**Green**	**Light**: indicates the power 2 has power.
FAULT	**Green**	**Light**: indicates the either power 1 or power 2 has no power.

➢ 10/100/1000Base-T Interfaces

LED	Color	Function
1000 LNK/ACT	**Orange**	**Lit**: indicate the Switch is successfully connecting to the network at 1000Mbps.
		Blink: indicate that the Switch is actively sending or receiving data

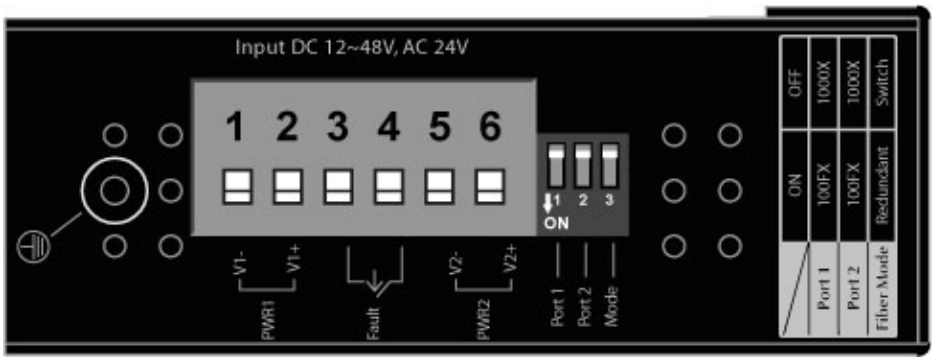
		over that port.
100 LNK/ACT	**Green**	**Lit**: indicate the Switch is successfully connecting to the network at 10Mbps or 100Mbps.
		Blink: indicate that the Switch is actively sending or receiving data over that port.

➢ **100/1000Base-X SFP Interfaces**

LED	Color	Function
LNK/ACT	**Green**	**Lit**: indicate the Switch is successfully connecting to the network at 100Mbps or 1000Mbps.
		Blink: indicate that the Switch is actively sending or receiving data over that port.

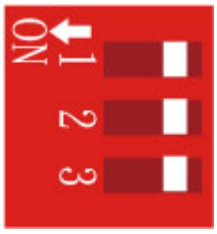
■ **Top View**

The upper panel of the IGT-1205AT consists of one terminal block connector within two DC power inputs, and also provides 3 DIP Switches for 100/1000X fiber support on two SFP slots and fiber redundant function.



■ **DIP Switch**

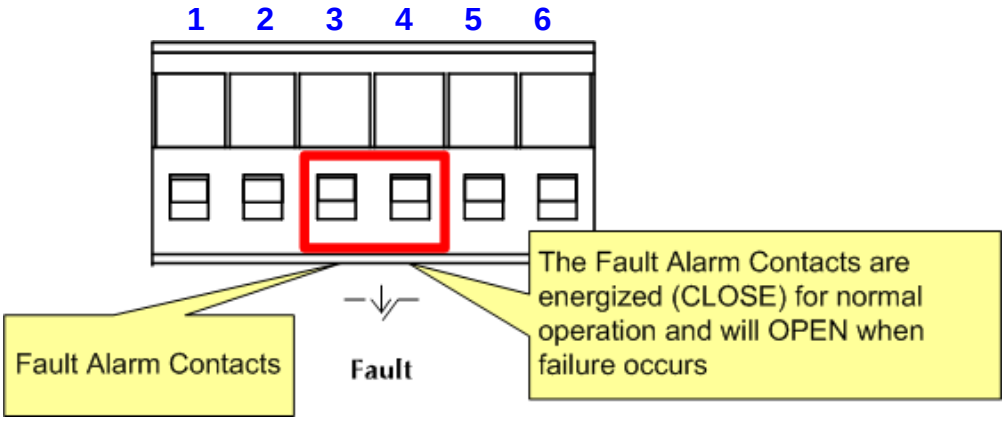
The 3 DIP switch settings and descriptions:



	ON	OFF
Port 1 (DIP 1)	100FX	1000X
Port 2 (DIP 2)	100FX	1000X
Fiber Redundant (DIP 3)	Fiber Redundant	Switch

The fiber redundancy function explains in APPENDIX A: Fiber Redundancy

■ **Fault Alarm Contact**



3.4 Environmental Specification

Operating

Temperature: -40~75 Degree C

Relative Humidity: 5~90% RH (non-condensing)

Storage

Temperature: -40~75 Degree C

Relative Humidity: 5~90% RH (non-condensing)

3.5 Electrical Specification

Power Requirement: 12~48V DC or 24V AC, Redundant power with polarity reverse protection function

■ **Power Consumption:**

Operation Mode	Input Voltage	Power Consumption
System on	12V DC	2.16 watts / 7.37 BTU
	24V DC	2.16 watts / 8.2 MTU
	48V DC	2.4 watts / 8.2 MTU
Ethernet Full Load	12V DC	4.2 watts / 14.3 BTU
	24V DC	4.32 watts / 14.8 BTU
	48V DC	4.8 watts / 16.4 BTU

3.6 Regulatory Compliance

EMI:

- FCC Class A
- CE EN61000-4-2
- CE EN61000-4-3
- CE EN61000-4-4
- CE EN61000-4-5
- CE EN61000-4-6
- CE EN61000-4-8
- CE EN61000-4-11
- CE EN61000-4-12
- CE EN61000-6-2
- CE EN61000-6-4

Stability Testing:

- IEC60068-2-32 (Free Fall)
- IEC60068-2-27 (Shock)
- IEC60068-2-6 (Vibration)

3.7 Reliability

MTBF > 100,000 hrs @ 25 Decree C

3.8 Basic Packaging

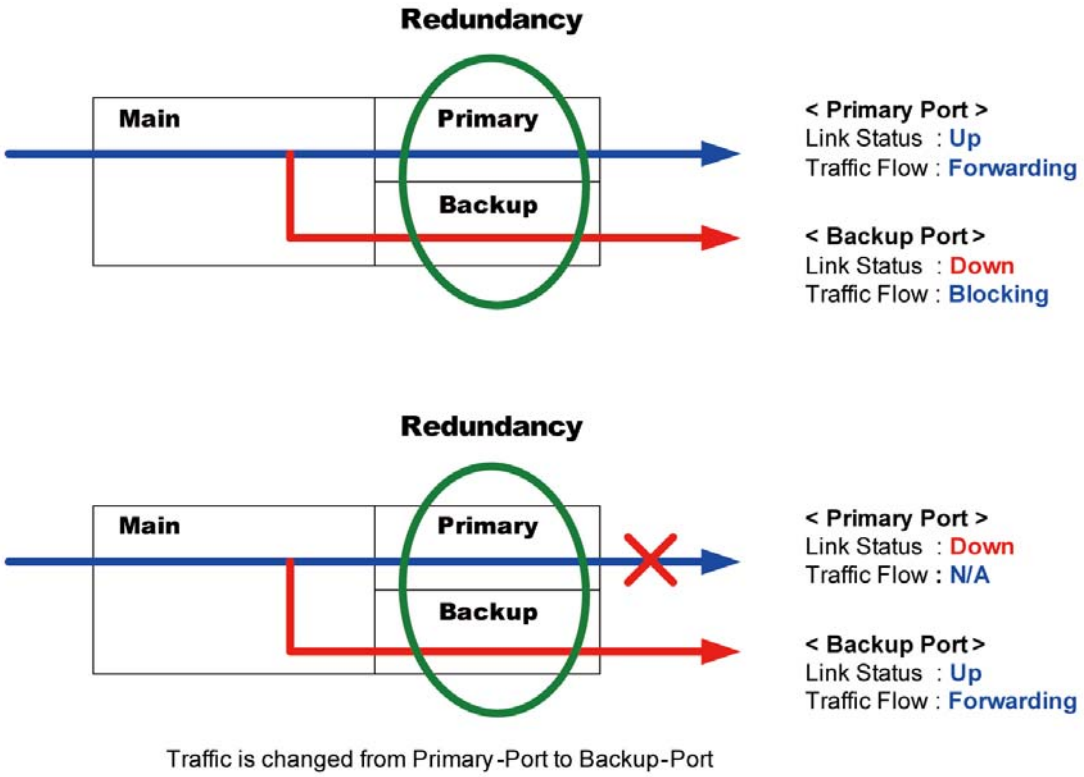
■ The Industrial Gigabit Media Converter	X1
■ User's Manual	X1
■ DIN Rail Kit	X1
■ Wall Mount Kit	X1

3.9 PACKING DIMENSION

Dimension:	410mm (W) x 310mm (D) x 265mm (H)
Weight:	TBD kg (Gross weight)
	18pcs in one carton

APPENDIX A: FIBER REDUNDANCY

The Industrial Gigabit Media Converter provides rapid fiber redundancy of link for highly critical Ethernet applications. The redundant-mode supports auto-recover function. If the destination port of a packet is link down, it forwards the packet to the other port of the backup pair. The following figure shows the redundant function.



Traffic is changed from Primary-Port to Backup-Port

- Link status auto detect and redundant on Dual ports with same connector type.
- Only Primary-Port is active at a time, the Backup-Port is blocked.
- When Primary-Port link failure occurs, the traffic swaps to Backup-Port automatically.
- Once the Primary-Port status is back to link up, the traffic swaps from Backup-Port to Primary-Port.

APPENDIX B: CABLE CONNECTION PARAMETERS

The wiring details are as below:

■ **100FX Fiber Optical Cables:**

Standard	Fiber Type	Cable Specification
100Base-FX (1300nm)	Multi-mode	50/125μm or 62.5/125μm
100Base-FX (1310nm)	Multi-mode	50/125μm or 62.5/125μm
	Single-mode	9/125μm
100Base-BX-U (TX :1310/RX :1550) 100Base-BX-D (TX :1550/RX :1310)	Single-mode	9/125μm

■ **1000X Fiber Optical Cables:**

Standard	Fiber Type	Cable Specification
1000Base-SX (850nm)	Multi-mode	50/125μm or 62.5/125μm
1000Base-LX (1300nm)	Multi-mode	50/125μm or 62.5/125μm
	Single-mode	9/125μm

■ **Wiring Distances:**

Standard	Fiber	Diameter (micron)	Modal Bandwidth (MHz * km)	Max. Distance (meters)
1000Base- SX	MM	62.5 62.5 50 50	100 200 400 500	220 275 500 550
1000Base- LX	MM	62.5 50 50	5 4 5	550
	SM	9	N/A	5000*

Notice The Single-mode port (1000Base-LX port) of IGT-620TF is complied with LX 5 kilometers and provides additional margin allowing for a 10/20/30/40/50/70/120 kilometers Gigabit Ethernet link on single mode fiber.

APPENDIX C: RELATED SFP TRANSCEIVERS

■ **Fast Ethernet Transceiver (100Base-X SFP)**

Model	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (nm)	Operating Temp.
MFB-FX	100	LC	Multi Mode	2km	1310nm	0 ~ 60 ℃
MFB-F20	100	LC	Single Mode	20km	1310nm	0 ~ 60 ℃
MFB-F40	100	LC	Single Mode	40km	1310nm	0 ~ 60 ℃
MFB-F60	100	LC	Single Mode	60km	1310nm	0 ~ 60 ℃
MFB-F120	100	LC	Single Mode	120km	1550nm	0 ~ 60 ℃
MFB-TFX	100	LC	Multi Mode	2km	1310nm	-40 ~ 75 ℃
MFB-TF20	100	LC	Single Mode	20km	1550nm	-40 ~ 75 ℃

■ **Fast Ethernet Transceiver (100Base-BX, Single Fiber Bi-Directional SFP)**

Model	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (TX)	Wavelength (RX)	Operating Temp.
MFB-FA20	100	WDM(LC)	Single Mode	20km	1310nm	1550nm	0 ~ 60 ℃
MFB-FB20	100	WDM(LC)	Single Mode	20km	1550nm	1310nm	0 ~ 60 ℃
MFB-TFA20	100	WDM(LC)	Single Mode	20km	1310nm	1550nm	-40 ~ 75 ℃
MFB-TFB20	100	WDM(LC)	Single Mode	20km	1550nm	1310nm	-40 ~ 75 ℃
MFB-TFA40	100	WDM(LC)	Single Mode	40km	1310nm	1550nm	-40 ~ 75 ℃
MFB-TFB40	100	WDM(LC)	Single Mode	40km	1550nm	1310nm	-40 ~ 75 ℃

■ **Gigabit Ethernet Transceiver (1000Base-X SFP)**

Model	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (nm)	Operating Temp.
MGB-GT	1000	Copper	--	100m	--	0 ~ 60 ℃
MGB-SX	1000	LC	Multi Mode	550m	850nm	0 ~ 60 ℃
MGB-SX2	1000	LC	Multi Mode	2km	1310nm	0 ~ 60 ℃
MGB-LX	1000	LC	Single Mode	10km	1310nm	0 ~ 60 ℃
MGB-L30	1000	LC	Single Mode	30km	1310nm	0 ~ 60 ℃
MGB-L40	1000	LC	Single Mode	40km	1550nm	0 ~ 60 ℃
MGB-L50	1000	LC	Single Mode	50km	1550nm	0 ~ 60 ℃
MGB-L70	1000	LC	Single Mode	70km	1550nm	0 ~ 60 ℃
MGB-L120	1000	LC	Single Mode	120km	1550nm	0 ~ 60 ℃
MGB-TSX	1000	LC	Multi Mode	550m	850nm	-40 ~ 75 ℃
MGB-TLX	1000	LC	Single Mode	10km	1310nm	-40 ~ 75 ℃
MGB-TL30	1000	LC	Single Mode	30km	1310nm	-40 ~ 75 ℃
MGB-TL50	1000	LC	Single Mode	50km	1550nm	-40 ~ 75 ℃

■ **Gigabit Ethernet Transceiver (1000Base-BX, Single Fiber Bi-Directional SFP)**

Model	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (TX)	Wavelength (RX)	Operating Temp.
MGB-LA10	1000	WDM(LC)	Single Mode	10km	1310nm	1550nm	0 ~ 60 ℃
MGB-LB10	1000	WDM(LC)	Single Mode	10km	1550nm	1310nm	0 ~ 60 ℃
MGB-LA20	1000	WDM(LC)	Single Mode	20km	1310nm	1550nm	0 ~ 60 ℃
MGB-LB20	1000	WDM(LC)	Single Mode	20km	1550nm	1310nm	0 ~ 60 ℃
MGB-LA40	1000	WDM(LC)	Single Mode	40km	1310nm	1550nm	0 ~ 60 ℃
MGB-LB40	1000	WDM(LC)	Single Mode	40km	1550nm	1310nm	0 ~ 60 ℃
MGB-LA60	1000	WDM(LC)	Single Mode	60km	1310nm	1550nm	0 ~ 60 ℃
MGB-LB60	1000	WDM(LC)	Single Mode	60km	1550nm	1310nm	0 ~ 60 ℃
MGB-TLA10	1000	WDM(LC)	Single Mode	10km	1310nm	1550nm	-40 ~ 75 ℃
MGB-TLB10	1000	WDM(LC)	Single Mode	10km	1550nm	1310nm	-40 ~ 75 ℃
MGB-TLA20	1000	WDM(LC)	Single Mode	20km	1310nm	1550nm	-40 ~ 75 ℃
MGB-TLB20	1000	WDM(LC)	Single Mode	20km	1550nm	1310nm	-40 ~ 75 ℃
MGB-TLA40	1000	WDM(LC)	Single Mode	40km	1310nm	1550nm	-40 ~ 75 ℃
MGB-TLB40	1000	WDM(LC)	Single Mode	40km	1550nm	1310nm	-40 ~ 75 ℃
MGB-TLA60	1000	WDM(LC)	Single Mode	60km	1310nm	1550nm	-40 ~ 75 ℃
MGB-TLB60	1000	WDM(LC)	Single Mode	60km	1550nm	1310nm	-40 ~ 75 ℃