Industrial 4-Port 10/100/1000Base-T

+ 2-Slot 100/1000Base-X SFP Ethernet Switch

IGS-620TF

User's Manual

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Revision

PLANET Industrial 4-port 10/100/1000Base-T + 2-slot 100/1000Base-X SFP Ethernet Switch User's Manual

For Model: IGS-620TF

Revision: 1.0 (APRIL, 2013)

Part No: EM-IGS_620TF_v1.0 (2350-AH0580-000)

Table Of Contents

1. Introduction

1.1 Package Contents

Check the contents of your package for the following parts:

- Industrial Gigabit Ethernet Switch x 1

- User's Manual x 1

- DIN Rail Kit x 1

- Wall Mount Kit x 1

If any of these are missing or damaged, please contact your dealer immediately; if possible, retain the carton including the original packing material, and use them again to repack the product in case there is a need to return it to us for repair.

The term **"Industrial Gigabit Ethernet Switch"** mentioned in this user's manual also means the IGS-620TF.

1.2 How to Use This Manual

This Industrial Gigabit Ethernet Switch User Manual is structured as follows:

Chapter 2 Installation

The chapter explains the feature, functionality and the physical installation of the Industrial Gigabit Ethernet Switch.

Chapter 3 Application

The chapter explains the Industrial Gigabit Ethernet Switch application.

Chapter 4 Switch Operation

The chapter explains the Industrial Gigabit Ethernet Switch transmit operation.

Chapter 5 Troubleshooting

The chapter explains the troubleshooting of the Industrial Gigabit Ethernet Switch.

Chapter 6 Cable Connection Parameters

The chapter contains the cable connection parameters of the Industrial Gigabit Ethernet Switch.

Appendix A

This chapter contains cable information of the Industrial Gigabit Ethernet Switch.

1.3 Product Features

Physical Port

- 4-Port 10/100/1000Base-T RJ-45 with auto MDI / MDI-X function

- 2 SFP interfaces, 100/1000Base-X dual mode (DIP switch control)

Layer 2 Features

- IEEE 802.3 / 802.3u / 802.3ab / 802.3z Ethernet Standard Compliant

- 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

- Backplane (Switching Fabric): 12Gbps

- Integrated address look-up engine, support 1K absolute MAC addresses

- Automatic address learning and address aging

- CSMA/CD Protocol

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 for 6000 VDC for power line
- Supports 6000 VDC Ethernet ESD protection
- -40 to 75 degrees C operating temperature

Fiber Port Redundancy

- Link status auto-detect and redundant on Dual ports with the same connector type
- Only when Primary-Port is active, the Backup-Port is blocked.
- When Primary-Port link fails, 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.

1.4 Product Specifications

Model	IGS-620TF
Hardware Specification	
10/100/1000Base-T Ports	4
SFP Interfaces	2 1000Base-SX/LX/BX SFP interfaces (Port-5 and Port-6) Compatible with 100Base-FX SFP
Dimensions (W x D x H)	135 x 87 x 32mm
Weight	503g
Power Requirements	DC 12~48V, Redundant power with polarity reverses protection function. AC 24V Power Adapter
Power Consumption / Dissipation	7.2 watts/24BTU
Installation	DIN Rail Kit and Wall Mount Ear
Switch Specification	
Switch Processing Scheme	Store-and-Forward
MAC Address Table	1K entries
Flow Control	Back pressure for half duplex IEEE 802.3x Pause Frame for full duplex
Switch Fabric	12Gbps
Throughput (packet per second)	8.9Mpps
Maximum Transmission Unit	9216bytes

Network Cables	**10/100/1000Base-T :** Cat. 3, 4, 5, 5e, 6 UTP cable (100meters, max.) EIA/TIA-568 100-ohm STP (100meters, max.) **1000Base-SX :** 50/125μm or 62.5/125μm multi-mode fiber optic cable, up to 550m (vary on SFP module) **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 (vary on SFP module) 9/125μm single-mode fiber optic cable, up to 20/40/60 kilometers (vary on SFP module)
Standards Conformance	
Standards Compliance	IEEE 802.3 Ethernet IEEE 802.3u Fast Ethernet IEEE 802.3ab Gigabit Ethernet IEEE 802.3z Gigabit Ethernet 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)

1.5 Physical Dimensions

IGS-620TF Industrial Gigabit Ethernet Switch dimensions (W x D x H): 135 x 87 x 32mm
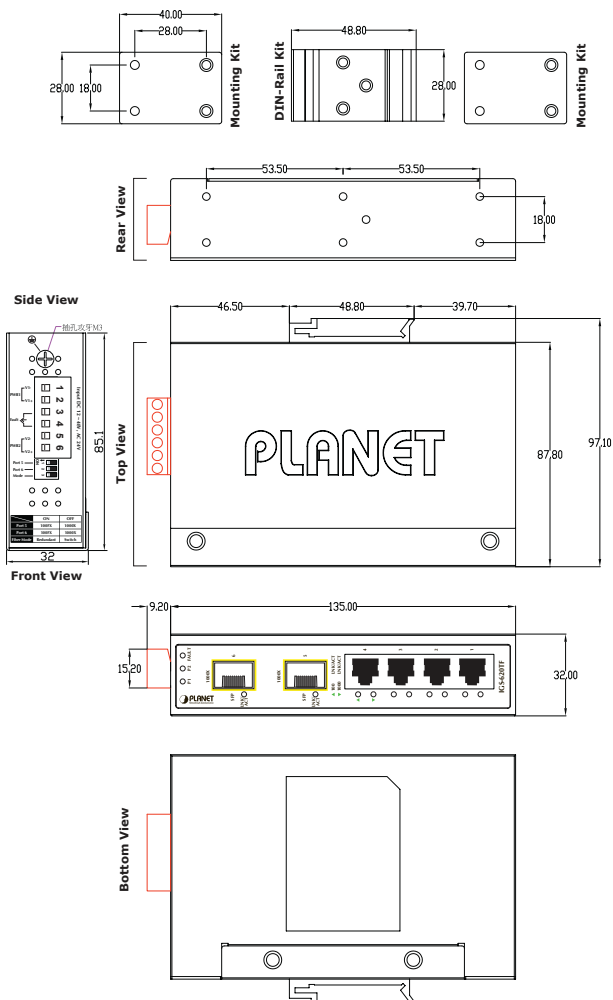
2. Installation

This section describes the functionalities of the Industrial Gigabit Ethernet Switch's components and guides how to install it on the desktop. Basic knowledge of networking is assumed. Please read this chapter completely before continuing.

2.1 Product Description

Flexibility and Network Distance Extension Solution

The IGS-620TF Industrial Gigabit Ethernet Switch is equipped with four 10/100/1000Base-T auto-negotiation ports and two 100/1000X SFP slots. The two SFP slots are compatible with 1000Base-SX / LX or 100Base-FX through SFP (Small Form Factor Pluggable) fiber-optic transceiver; the two SFP slots allow changing the operation speed mode with its built-in DIP switch. 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). The Fast Ethernet distance can also 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 6-Port Switch Mode or 4 + 2 Fiber Redundant Mode

Via the built-in DIP switch, the IGS-620TF can be configured as 6-Port Ethernet switch or 4+2 fiber redundant mode. With the 6-Port switch mode, the IGS-620TF can operate in Store-and-Forward mechanism with high performance; on the other hand, when in the 4+2 fiber redundant mode, it provides rapid fiber redundancy of link for highly critical Ethernet applications. The redundant mode also 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

With IP30 metal industrial case protection, the IGS-620TF 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. It also possesses an integrated power supply source with wide range of voltages (12 to 48V DC or 24V AC) for worldwide high availability applications requiring dual or backup power inputs. Being able to operate under the temperature range from -40 to 75 degrees C, the IGS-620TF can be placed in almost any difficult environment. The compact, IP-30 standard metal case of IGS-620TF allows either DIN rail or wall mounting for efficient use of cabinet space.

Robust Gigabit Switch Performance

The IGS-620TF has 1K MAC Address table and offers wire-speed packets transfer performance without risk of packet loss, the high data throughput of the device makes it ideal for most Gigabit environments. With a 12Gbps internal switching fabric and featuring auto negotiation support in each Gigabit port, the IGS-620TF Industrial Gigabit Ethernet Switch can handle large amounts of data in a secure topology linking to a backbone or high capacity servers.

The flow control function enables the IGS-620TF to provide fast and reliable data transfer. All of the RJ-45 copper interfaces in the IGS-620TF support 10/100/1000Mbps Auto-Negotiation for optimal speed detection through RJ-45 Category 6, 5 or 5e cables. The standard Auto-MDI/MDI-X support can detect the type of connection to any Ethernet device without requiring special straight or crossover cables.

2.1.1 Switch Front Panel

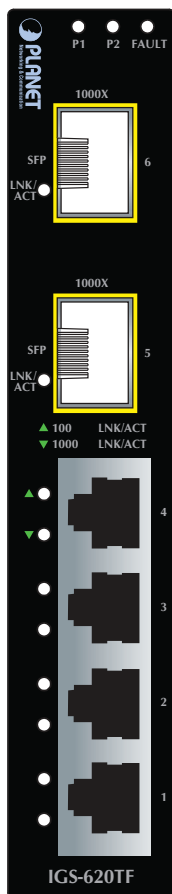Figure 2-1 shows a front panel of Industrial Gigabit Ethernet Switch.

Figure 2-1: IGS-620TF Front Panel

2.1.2 LED Indicators

System

LED	Color	Function
P1	Green	**Lit:** indicate power 1 has power.
P2	Green	**Lit:** indicate power 2 has power.
FAULT	Green	**Lit:** indicate either power 1 or power 2 has no power.

Per 10/100/1000T Ports

LED	Color	Function
100 LNK/ACT	Orange	**Lit:** indicate the link through that port is successfully established at 100Mbps or 10Mbps. **Blink:** indicate that the Switch is actively sending or receiving data over that port. **Off:** indicate the link through that port is successfully established at 1000Mbps.
1000 LNK/ACT	Green	**Lit:** indicate the link through that port is successfully established at 1000Mbps or 10Mbps. **Blink:** indicate that the Switch is actively sending or receiving data over that port. **Off:** indicate the link through that port is successfully established at 100Mbps.

Per 100 / 1000X SFP Slots

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

2.1.3 Switch Upper Panel

The upper panel of the Industrial Gigabit Ethernet Switch 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. Figure 2-2 shows the upper panel of the Industrial Gigabit Ethernet Switch.
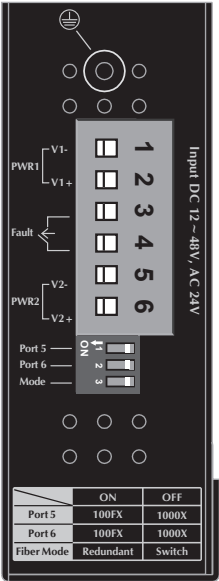
Figure 2-2: Industrial Gigabit Ethernet Switch Upper Panel

The 3 DIP switch settings and descriptions:

	ON	OFF (Default)
Port 5 (DIP 1)	100FX	1000X
Port 6 (DIP 2)	100FX	1000X
Fiber Mode (DIP 3)	Fiber Redundant	Switch

The fiber redundancy function explains in chapter 2.1.7 Redundancy Overview.

2.1.4 Wiring the Power Inputs

The 6-contact terminal block connector on the top panel of Industrial Gigabit Ethernet Switch is used for two DC redundant power inputs. Please follow the steps below to insert the power wire.

Insert positive / negative DC power wires into the contacts 1 and 2 for POWER 1, or 5 and 6 for POWER 2.
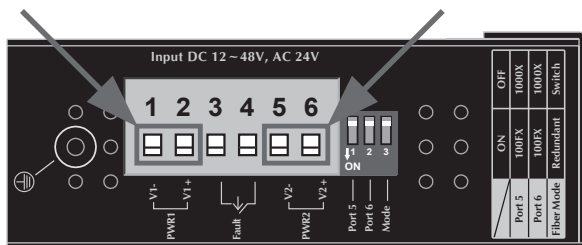
V1- V1+   V2- V2+

Tighten the wire-clamp screws for preventing the wires from loosening.


```
1      2      3      4      5      6
Power 1      Fault      Power 2
-      +                  -      +
```

The wire gauge for the terminal block should be in the range between 12 and 24 AWG.

Note

2.1.5 Wiring the Fault Alarm Contact

The fault alarm contacts are in the middle of the terminal block connector as the picture shows below. Inserting the wires, the Industrial Gigabit Ethernet Switch will detect the fault status of the power failure and then forms an open circuit. The following illustration shows an application example for wiring the fault alarm contacts.
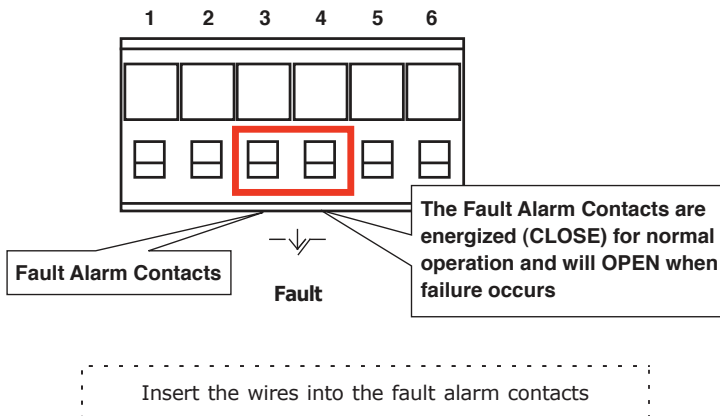

The Fault Alarm Contacts are energized (CLOSE) for normal operation and will OPEN when failure occurs

Fault Alarm Contacts

Fault

Insert the wires into the fault alarm contacts

Note | The wire gauge for the terminal block should be in the range between 12 and 24 AWG.

2.1.6 Cabling

10/100/1000Base-T and 100Base-FX / 1000Base-SX/LX

All 10/100/1000Base-T ports come with Auto-Negotiation capability. They automatically support 1000Base-T, 100Base-TX and 10Base-T networks. Users only need to plug a working network device into one of the 10/100/1000Base-T ports, and then turn on the Industrial Gigabit Ethernet Switch. The port will automatically runs in 10Mbps, 20Mbps, 100Mbps or 200Mbps and 1000Mbps or 2000Mbps after the negotiation with the connected device.

The Industrial Gigabit Ethernet Switch has two SFP interfaces that support 100/1000 dual speed mode (Optional Multi-mode / Single-mode 100Base-FX / 1000Base-SX/LX SFP module) through DIP switch setting.

Cabling

Each 10/100/1000Base-T port uses RJ-45 sockets -- similar to phone jacks -- for connection of unshielded twisted-pair cable (UTP). The IEEE 802.3 / 802.3u / 802.3ab Fast / Gigabit Ethernet standard requires Category 5 UTP for 100Mbps 100Base-TX. 10Base-T networks can use Cat.3, 4, 5 or 1000Base-T uses 5/5e/6 UTP (see table below). Maximum distance is 100 meters (328 feet). The 100Base-FX / 1000Base-SX/LX SFP slot is used as LC connector with optional SFP module. Please see table below and know more about the cable's specifications.

Port Type	Cable Type	Connector
10Base-T	Cat 3, 4, 5, 2-pair	RJ-45
100Base-TX	Cat.5 UTP, 2-pair	RJ-45
1000Base-T	Cat.5/5e/6 UTP, 4-pair	RJ-45
100Base-FX	50 / 125μm or 62.5 / 125μm multi-mode 9 / 125μm single-mode	LC (Multi / Single mode)
1000Base-SX/LX	50 / 125μm or 62.5 / 125μm multi-mode 9 / 125μm single-mode	LC (Multi / Single mode)

Any Ethernet devices like hubs/PCs can be connected to the Industrial Gigabit Ethernet Switch by using straight-through wires. The four 10/100/1000Mbps ports are auto-MDI/MDI-X and can be used on straight-through or crossover cable.

2.1.6.1 Installing the SFP Transceiver

The sections describe how to insert an SFP transceiver into an SFP slot.

The SFP transceivers are hot-pluggable and hot-swappable. You can plug in and out the transceiver to/from any SFP port without having to power down the Industrial Gigabit Ethernet Switch as Figure 2-3 shows.

MGB / MFB Series
Transceiver

Figure 2-3: Plug-in the SFP Transceiver

Approved PLANET SFP Transceivers

PLANET Industrial Gigabit Ethernet Switch supports 100/1000 dual mode with both Single mode and Multi-mode SFP transceivers. The following list of approved PLANET SFP transceivers is correct at the time of publication:

Gigabit SFP Transceiver Modules

MGB-GT	SFP-Port 1000Base-T Module - 100m
MGB-SX	SFP-Port 1000Base-SX mini-GBIC module - 550m
MGB-LX	SFP-Port 1000Base-LX mini-GBIC module - 10km
MGB-L30	SFP-Port 1000Base-LX mini-GBIC module - 30km
MGB-L50	SFP-Port 1000Base-LX mini-GBIC module - 50km
MGB-L70	SFP-Port 1000Base-LX mini-GBIC module - 70km
MGB-L120	SFP-Port 1000Base-LX mini-GBIC module - 120km
MGB-LA10	SFP-Port 1000Base-LX (WDM, TX:1310nm) mini-GBIC module - 10km
MGB-LB10	SFP-Port 1000Base-LX (WDM, TX:1550nm) mini-GBIC module - 10km
MGB-LA20	SFP-Port 1000Base-LX (WDM, TX:1310nm) mini-GBIC module - 20km
MGB-LB20	SFP-Port 1000Base-LX (WDM, TX:1550nm) mini-GBIC module - 20km
MGB-LA40	SFP-Port 1000Base-LX (WDM, TX:1310nm) mini-GBIC module - 40km

MGB-LB40	SFP-Port 1000Base-LX (WDM, TX:1550nm) mini-GBIC module - 40km
MGB-TSX	SFP-Port 1000Base-SX mini-GBIC module - 550m (-40~75°C)
MGB-TLX	SFP-Port 1000Base-LX mini-GBIC module - 10km (-40~75°C)
MGB-TL30	SFP-Port 1000Base-LX mini-GBIC module - 30km (-40~75°C)
MGB-TL70	SFP-Port 1000Base-LX mini-GBIC module - 70km (-40~75°C)

Fast Ethernet SFP Transceiver Modules

MFB-FX	SFP-Port 100Base-FX Transceiver (1310nm) - 2km
MFB-F20	SFP-Port 100Base-FX Transceiver (1310nm) - 20km
MFB-F40	SFP-Port 100Base-FX Transceiver (1310nm) - 40km
MFB-F60	SFP-Port 100Base-FX Transceiver (1310nm) - 60km
MFB-FA20	SFP-Port 100Base-BX Transceiver (WDM, TX:1310nm) - 20km
MFB-FB20	SFP-Port 100Base-BX Transceiver (WDM, TX:1550nm) - 20km
MFB-TFX	SFP-Port 100Base-FX Transceiver (1310nm) - 2km (-40~75°C)
MFB-TF20	SFP-Port 100Base-FX Transceiver (1310nm) - 20km (-40~75°C)

Note	It is recommended to use PLANET SFPs on the Industrial Gigabit Ethernet Switch. If you insert an SFP transceiver that is not supported, the Industrial Gigabit Ethernet Switch will not recognize it.

1000Base-SX/LX:

Before connecting the other switches, workstation or Media Converter, please do the following:

1. Set the DIP Switch of SFP Port 1 or Port 2 to the "OFF" position with fiber speed 1000Base-X.

	ON	OFF
Port 5 (DIP 1)	100FX	1000X
Port 6 (DIP 2)	100FX	1000X

2. Make sure both sides of the SFP transceiver are with the same media type, for example: 1000Base-SX to 1000Base-SX, 1000Base-LX to 1000Base-LX.

3. Check whether the fiber-optic cable type matches with the SFP transceiver model.

   ➢ To connect to 1000Base-SX SFP transceiver, use the Multi-mode fiber cable, with one side being the male duplex LC connector type.

   ➢ To connect to 1000Base-LX SFP transceiver, use the Single-mode fiber cable, with one side being the male duplex LC connector type.

Connecting the fiber cable

1. Insert the duplex LC connector on the network cable into the SFP transceiver.

2. Connect the other end of the cable to a device – switches with SFP installed, fiber NIC on a workstation or a Media Converter.

3. Check the LNK/ACT LED of the SFP slot on the front of the Industrial Gigabit Ethernet Switch. Make sure that the SFP transceiver is operating correctly.

100Base-FX:

Before connecting the other switches, workstation or Media Converter, please do the following:

1. Set the DIP Switch of SFP Port 1 or Port 2 to the "ON" position with fiber speed "100FX".

	ON	OFF
Port 5 (DIP 1)	100FX	1000X
Port 6 (DIP 2)	100FX	1000X

2. Make sure both sides of the SFP transceiver are with the same media type or WDM pair, for example, 100Base-FX to 100Base-FX, 100Base-BX20-U to 100Base-BX20-D.

3. Check whether the fiber-optic cable type matches with the SFP transceiver model.

   ➢ To connect to MFB-FX SFP transceiver, use the multi-mode fiber cable, with one side being the male duplex LC connector type.

   ➢ To connect to MFB-F20/F40/F60/FA20/FB20 SFP transceiver, use the single-mode fiber cable, with one side being the male duplex LC connector type.

Connect the fiber cable

1. Insert the duplex LC connector on the network cable into the SFP transceiver.

2. Connect the other end of the cable to a device, switches with SFP installed, to fiber NIC on a workstation or a Media Converter.

3. Check the LNK/ACT LED of the SFP slot of the switch / converter. Make sure that the SFP transceiver is operating correctly.

2.1.6.2 Remove the Transceiver Module

1. Make sure there is no network activity by consulting or checking with the network administrator. Or through the management interface of the switch/converter (if available) to disable the port in advance.

2. Remove the Fiber Optic Cable gently.

3. Turn the lever of the MGB/MFB module to a horizontal position.

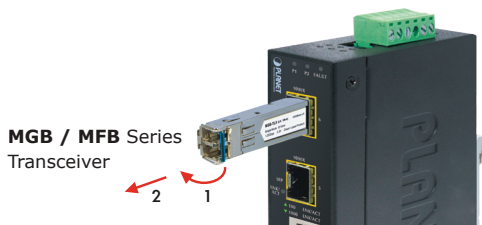4. Pull out the module gently through the lever.

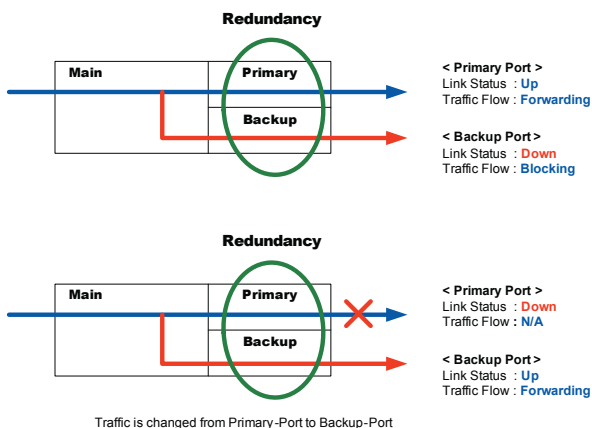**Figure 2-4:** Pull Out from the Transceiver

	Never pull out the module without pulling the lever or the push bolts on the module. Directly pulling out the module with violence could damage the module and the SFP module slot of the Industrial Gigabit Ethernet Switch.
Note	

2.1.7 Redundancy Overview

The Industrial Gigabit Ethernet Switch 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.

Redundancy

Main | Primary | < Primary Port >
Link Status : Up
Traffic Flow : Forwarding

Backup | < Backup Port >
Link Status : Down
Traffic Flow : Blocking

Redundancy

Main | Primary | < Primary Port >
Link Status : Down
Traffic Flow : N/A

Backup | < Backup Port >
Link Status : Up
Traffic Flow : Forwarding

Traffic is changed from Primary-Port to Backup-Port

Figure 2-5: Redundancy Behavior Topology

- Link status auto detect and redundant on Dual ports with same connector type.
- Only when Primary-Port is active, 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.

2.2 Mounting Installation

This section describes how to install the Industrial Gigabit Ethernet Switch and make connections to it. Please read the following topics and perform the procedures in the order being presented.

|	
Note	In the installation steps below, this Manual uses IGS-801(PLANET 8 Port Industrial Gigabit Switch) as the example. However, the steps for PLANET Industrial Switch & Industrial Media Converter are similar.

2.2.1 Install DIN-Rail Mounting

The DIN-Rail is screwed on the Industrial Gigabit Ethernet Switch when out of factory. When replacing the wall mount application with DIN-Rail application on Industrial Gigabit Ethernet Switch is needed, please refer to the following figures to screw the DIN-Rail on the Industrial Gigabit Ethernet Switch. To hang the Industrial Gigabit Ethernet Switch, follow the following steps:

Step 1: Screw the DIN-Rail on the Industrial Gigabit Ethernet Switch.
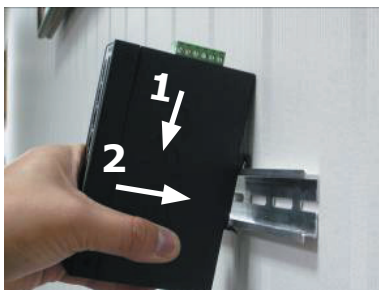
Step 2: Lightly insert the DIN-Rail into the track.

Step 3: Make sure the DIN-Rail is tightly secured on the track.

Step 4: Please refer to the following procedures to remove the Industrial Gigabit Ethernet Switch from the track.

Step 5: Lightly pull out the bottom of the DIN-Rail from the track to remove.

2.2.2 Wall Mount Plate Mounting

To install the Industrial Gigabit Ethernet Switch on the wall, please follow the instructions described below.

Step 1: Remove the DIN-Rail from the Industrial Gigabit Ethernet Switch; loose the screws to remove the DIN-Rail.

Step 2: Place the wall mount plate on the rear panel of the Industrial Gigabit Ethernet Switch.

Step 3: Use the screws to screw the wall mount plate on the Industrial Gigabit Ethernet Switch.
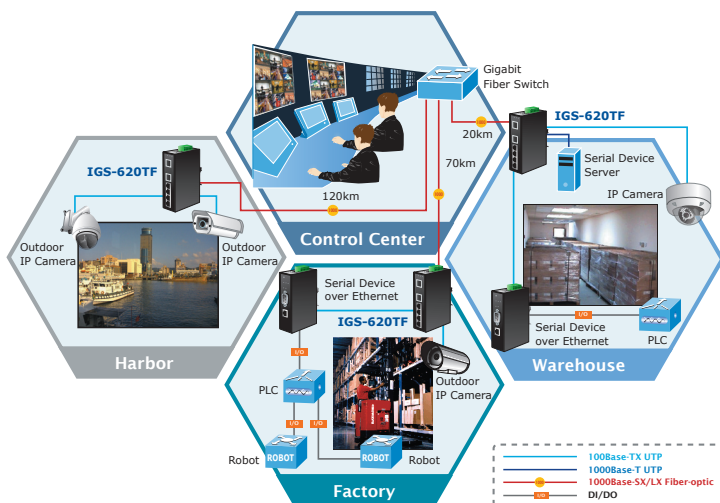
Step 4: Use the hook holes at the corners of the wall mount plate to hang the Industrial Gigabit Ethernet Switch on the wall.

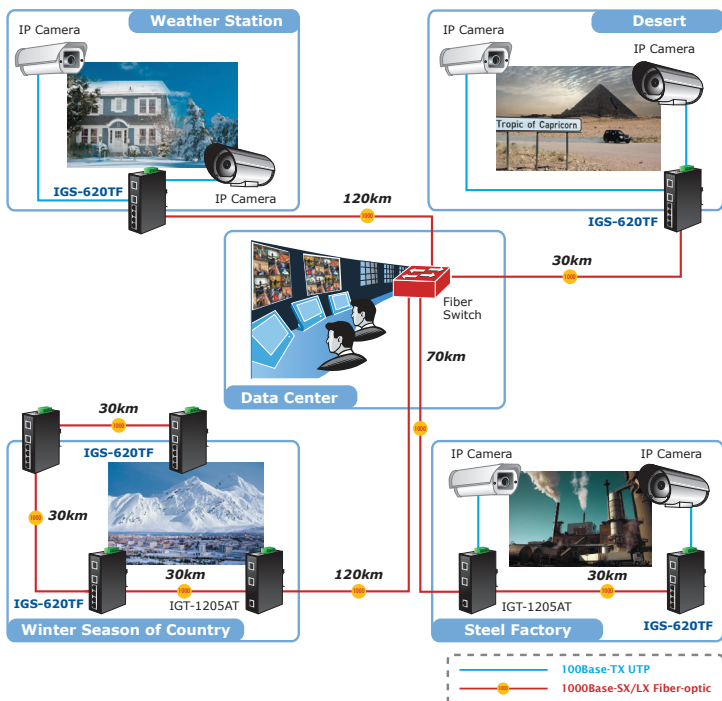**Step 5:** To remove the wall mount plate, reverse steps above.

3. Applications

In this paragraph, we will describe how to install the Industrial Gigabit Ethernet Switch.

Public Construction

Harsh Climate

Installation Steps

Step 1: Unpack the Industrial Gigabit Ethernet Switch.

Step 2: Check whether the DIN-Rail is screwed on the Industrial Gigabit Ethernet Switch. (Please refer to DIN-Rail Mounting section for DIN-Rail installation if the DIN-Rail is not screwed on the Industrial switch). If you want to wall mount the Industrial Gigabit Ethernet Switch, then please refer to the Wall Mount Plate Mounting section for wall mount plate installation.

Step 3: To hang the Industrial Gigabit Ethernet Switch on the DIN-Rail track or wall, please refer to the Mounting Installation section.

Step 4: Power on the Industrial Gigabit Ethernet Switch. (Please refer to the Wiring of the Power Inputs section for power input) The power LED on the Industrial Gigabit Ethernet Switch will light up. Please refer to the LED Indicators section for the functions of LED lights.

Step 5: Prepare the twisted-pair, straight through Category 5 cable for Ethernet connection.

Step 6: Insert one side of Category 5 cables into the Industrial Gigabit Ethernet Switch Ethernet port (RJ-45 port) while the other side of category 5 cable to the network devices' Ethernet port (RJ-45 port), eg. switch, PC or Server. The UTP port (RJ-45) LED on the Industrial Gigabit Ethernet Switch will light up when the cable is connected with the network device. Please refer to the LED Indicators section for the functions of LED lights.

Step 7: When all connections are all set and LED lights all show normally, the installation is complete.

Note

Make sure the connected network devices support MDI/MDI-X. If it does not support, then use the crossover category 5 Cable.

4. Switch Operation

4.1 Address Table

The Industrial Gigabit Ethernet Switch is implemented with an address table. This address table is composed of many entries. Each entry is used to store the address information of some node in network, including MAC address, port no, etc. This information comes from the learning process of Industrial Gigabit Ethernet Switch.

4.2 Learning

When one packet comes in from any port, the Industrial Gigabit Ethernet Switch will record the source address, port no, and the other related information in the address table. This information will be used to decide either forwarding or filtering for future packets.

4.3 Forwarding & Filtering

When one packet comes from some port of the Industrial Gigabit Ethernet Switch, it will also check the destination address besides the source address learning. The Industrial Gigabit Ethernet Switch will look up the address table for the destination address. If not found, this packet will be forwarded to all the other ports except the port which this packet comes in. And these ports will transmit this packet to the network it connected. If found, and the destination address is located at a different port from this packet that comes in, the Industrial Gigabit Ethernet Switch will forward this packet to the port where this destination address is located according to the information from address table. But, if the destination address is located at the same port with this packet, then this packet will be filtered; thereby increasing the network throughput and availability.

4.4 Store-and-Forward

Store-and-Forward is one type of packet-forwarding techniques. A Store-and-Forward Industrial Gigabit Ethernet Switch stores the incoming frame in an internal buffer and does the complete error

checking before transmission. Therefore, no error packets will occur. It is the best choice when a network needs efficiency and stability.

The Industrial Gigabit Ethernet Switch scans the destination address from the packet-header, searches the routing table provided for the incoming port and forwards the packet, only if required. The fast forwarding makes the switch attractive for connecting servers directly to the network, thereby increasing throughput and availability. However, the switch is most commonly used for segment existing in hub, which nearly always improves overall performance. An Ethernet Switching can be easily configured in any Ethernet network environment to significantly boost bandwidth using conventional cabling and adapters.

Due to the learning function of the Industrial Gigabit Ethernet Switch, the source address and corresponding port number of each incoming and outgoing packet is stored in a routing table. This information is subsequently used to filter packets whose destination address is on the same segment as the source address. This confines network traffic to its respective domain, reducing the overall load on the network.

The Industrial Gigabit Ethernet Switch performs **"Store and Forward"**; therefore, no error packets occur. More reliably, it reduces the re-transmission rate. No packet loss will occur.

4.5 Auto-Negotiation

The STP ports on the Industrial Gigabit Ethernet Switch have a built-in **"Auto-negotiation"**. This technology automatically sets the best possible bandwidth when a connection is established with another network device (usually at Power On or Reset). This is done by detecting the modes and speeds at the second of both devices. Both 10Base-T and 100Base-TX devices can be connected with the port in either Half- or Full-Duplex mode. 1000Base-T can be only connected in Full-duplex mode.

5. Troubleshooting

This chapter contains information to help you solve issues. If the Industrial Gigabit Ethernet Switch is not functioning properly, make sure the Industrial Gigabit Ethernet Switch was set up according to instructions in this manual.

The per port LED is not lit

Solution:

Check the cable connection of the Industrial Gigabit Ethernet Switch.

Performance is bad

Solution:

Check the speed duplex mode of the partner device. The Industrial Gigabit Ethernet Switch is run at Auto-negotiation mode and if the partner is set to half duplex, then the performance will be poor.

Per port LED is lit, but the traffic is irregular

Solution:

Check that the attached device is not set to dedicate full duplex. Some devices use a physical or software switch to change duplex modes. Auto-negotiation may not recognize this type of full-duplex setting.

Why the Industrial Gigabit Ethernet Switch doesn't connect to the network

Solution:

Check per port LED on the Industrial Gigabit Ethernet Switch. Try another port on the Industrial Gigabit Ethernet Switch. Make sure the cable is installed properly and the right type. Turn off the power. After a while, turn on the power again.

Can I install MGB-SX or other non wide temperature SFP module into SFP slot of Industrial Gigabit Ethernet Switch?

Solution:

Yes, you can. However, the MGB-SX and the other non wide temperature SFP module cannot operate under -40 to 75 degrees C.

6. 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	100	220
		62.5	200	275
		50	400	500
		50	500	550
1000Base- LX	MM	62.5	5	550
		50	4	
		50	5	
	SM	9	N/A	5000*

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

APPENDIX A: Networking Connection

A.1 Switch's RJ-45 Pin Assignments

1000Mbps, 1000Base-T

Contact	MDI	MDI-X
1	BI_DA+	BI_DB+
2	BI_DA-	BI_DB-
3	BI_DB+	BI_DA+
4	BI_DC+	BI_DD+
5	BI_DC-	BI_DD-
6	BI_DB-	BI_DA-
7	BI_DD+	BI_DC+
8	BI_DD-	BI_DC-

10/100Mbps, 10/100Base-TX

RJ-45 Connector pin assignment		
Contact	MDI Media Dependant Interface	MDI-X Media Dependant Interface-Cross
1	Tx + (transmit)	Rx + (receive)
2	Tx - (transmit)	Rx - (receive)
3	Rx + (receive)	Tx + (transmit)
4, 5	Not used	
6	Rx - (receive)	Tx - (transmit)
7, 8	Not used	

A.2 RJ-45 Cable Pin Assignments
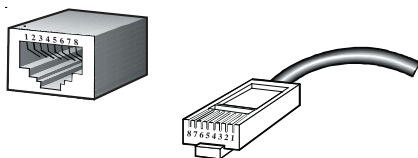
The standard RJ-45 receptacle/connector

There are 8 wires on a standard UTP/STP cable and each wire is color-coded. The following shows the pin allocation and color of straight cable and crossover cable connection:

Straight Cable

1 2 3 4 5 6 7 8   **SIDE 1**
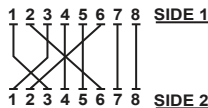
1 2 3 4 5 6 7 8   **SIDE 2**

SIDE 1	SIDE 2
1 = White/Orange	1 = White/Orange
2 = Orange	2 = Orange
3 = White/Green	3 = White/Green
4 = Blue	4 = Blue
5 = White/Blue	5 = White/Blue
6 = Green	6 = Green
7 = White/Brown	7 = White/Brown
8 = Brown	8 = Brown

Cross Over Cable

1 2 3 4 5 6 7 8   **SIDE 1**

1 2 3 4 5 6 7 8   **SIDE 2**

SIDE 1	SIDE 2
1 = White/Orange	1 = White/Green
2 = Orange	2 = Green
3 = White/Green	3 = White/Orange
4 = Blue	4 = Blue
5 = White/Blue	5 = White/Blue
6 = Green	6 = Orange
7 = White/Brown	7 = White/Brown
8 = Brown	8 = Brown

Figure A-1: Straight-Through and Crossover Cable

Please make sure your connected cables are with the same pin assignment and color as the above picture before deploying the cables into your network.

EC Declaration of Conformity

For the following equipment:

*Type of Product	:	Industrial 4-Port 10/100/1000T + 2 100/1000Base-X SFP Ethernet Switch (-40~75 degrees C)
*Model Number	:	IGS-620TF
* Produced by:		
Manufacturer Name	:	**Planet Technology Corp.**
Manufacturer Address	:	10F., No.96, Minquan Rd., Xindian Dist., New Taipei City 231, Taiwan (R.O.C.)

is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility Directive on (2004/108/EC).
For the evaluation regarding the EMC, the following standards were applied:

EN 55022	(Class A: 2010)
EN 61000-3-2	(2006 + A1:2009 + A2:2009)
EN 61000-3-3	(2008)
EN 55024	(2010)
EN 61000-4-2	(2009)
EN 61000-4-3	(2006 + A1:2008 + A2 :2010)
EN 61000-4-4	(2004 + A1:2010)
EN 61000-4-5	(2006)
EN 61000-4-6	(2009)
EN 61000-4-8	(2010)
EN 61000-4-11	(2004)

Responsible for marking this declaration if the:

☒ **Manufacturer**   ☐ **Authorized representative established within the EU**

Authorized representative established within the EU (if applicable):

Company Name: **Planet Technology Corp.**

Company Address: **10F., No.96, Minquan Rd., Xindian Dist., New Taipei City 231, Taiwan (R.O.C.)**

Person responsible for making this declaration

Name, Surname   <u>**Kent Kang**</u>

Position: <u>**Product Manager**</u>

<u>**Taiwan**</u>	<u>**3, June, 2013**</u>	*Legal Signature*
Place	*Date*	

PLANET TECHNOLOGY CORPORATION