Industrial 10G/5G/2.5G/1G/100M Copper to 10GBASE-X SFP+ Media Converter

IXT-705AT

User's Manual

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This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the Instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

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To avoid the potential effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment, end users of electrical and electronic equipment should understand the meaning of the crossed-out wheeled bin symbol. Do not dispose of WEEE as unsorted municipal waste and have to collect such WEEE separately.

Revision

PLANET Industrial 10G/5G/2.5G/1G/100M Copper to 10GBASE-X SFP+ Media Converter User's Manual

FOR MODELS: IXT-705AT

REVISION: 1.0 (JANUARY, 2018)

Part No: EM-IXT_705AT_v1.0 (2350-AH1250-000)

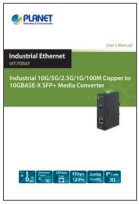
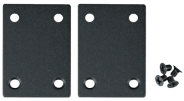
Table of Contents

1. Introduction

1.1 Package Contents

Thank you for purchasing PLANET Industrial 10G Media Converter, In the following section, unless specified, the term **"Industrial Media Converter"** mentioned in this manual refers to the IXT-705AT.

Open the box of the Industrial Media Converter and carefully unpack it. The box should contain the following items:

Industrial Media Converter x 1	User's Manual x 1	DIN-rail Kit x 1
		
Wall-mount Kit x 1	SFP+ Dust Cap x 1	RJ45 Dust Cap 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.

1.2 Product Overview

Flexible, Reliable and Industrial-grade Network Distance Extension Solution

PLANET IXT-705AT Industrial Media Converter is equipped with one **100/1000/2500/5000/10000BASE-T** auto-negotiation port and one 10GBASE-X SFP+ slot. It supports 10Gigabit Ethernet media conversion from copper 10GBASE-T to fiber multi-mode or single-mode, utilizing **10GBASE-SR** or **10GBASE-LR** SFP+ transceiver installed in the SFP+ slot to extend distances to servers, switches and patch panels. The deployment distance can be extended from 300 meters (multi-mode) to up to 60 kilometers (single-mode).They are well suited for applications within the factory data centers and distributions. Also, designed for use in network environments where the ultra-high bandwidth provided by 10Gigabit Ethernet is required, for example, data center cloud computing, enterprise backbones, campus networks, and carrier infrastructure.

High Performance 10Gbps Ethernet Capacity

The IXT-705AT 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 20Gbps internal fabric and featuring auto negotiation support in its 10 Gigabit port, the IXT-705AT Industrial Media Converter can handle large amounts of data in a secure topology linking to a backbone or high capacity servers.

Environmentally Hardened Design

The IXT-705AT is equipped with the slim-type IP30 metal case for easy deployment in heavy Industrial demanding environments. With IP30 industrial case protection, the IXT-705AT provides a high level of immunity against electromagnetic interference and heavy electrical surges which are usually found on plant floors or in curbside traffic control cabinets. Being able to operate under the temperature range from **-40 to 75 degrees C**, the IXT-705AT can be placed in almost any difficult environment. The IXT-705AT 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 IXT-705AT 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, incorporated into customer's automation network to enhance system reliability and uptime.

1.3 Product Features

- IXT-705AT Physical Port
  - 1-port 10000/5000/2500/1000/100BASE-T RJ45 interface with auto MDI/MDI-X function
  - 1-port 10GBASE-X SFP+ slot interface
- Layer 2 Features
  - IEEE 802.3u/802.3ab/802.3bz/802.3ae Ethernet standard compliant
  - Supports auto-negotiation and 100Mbps half/full duplex and 1/2.5/5/10Gbps full duplex mode
  - Prevents packet loss with back pressure (half-duplex) and IEEE 802.3x pause frame flow control (full-duplex)
  - 16K jumbo frame size support
  - Automatic address learning and address aging
- Industrial Case and Installation
  - Slim-type IP30 metal case
  - 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 6000 VDC Ethernet ESD protection
  - 100 meters over Cat 6A at 10Gbps
  - -40 to 75 degrees C operating temperature
  - Plug and Play installation

1.4 Product Specifications

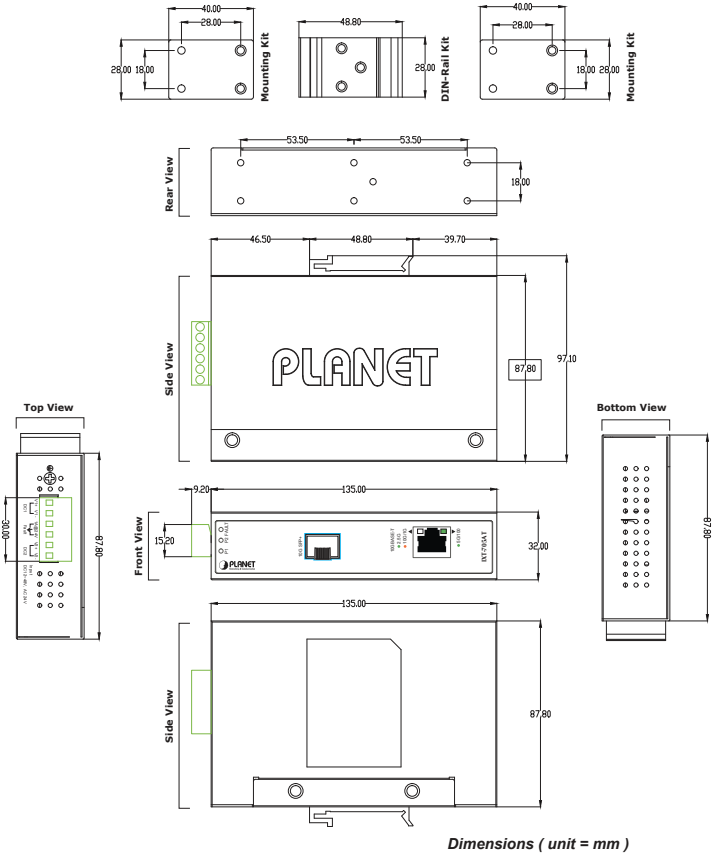
Model	IXT-705AT
Hardware Specifications	
Copper Interface	1 x 10000/5000/2500/1000/100 BASE-T RJ45 Auto-MDI/MDI-X, auto-negotiation
Fiber Optic Interface	1 10GBASE-SR/LR SFP+ interface
Connector	Removable 6-pin terminal block Pin 1/2 for Power 1, Pin 3/4 for fault alarm, Pin 5/6 for Power 2
Alarm	Provides one relay output for power failure Alarm relay current carry capacity: 1A @ DC 24V
LED	➢ System: Fault Alert (Red), PWR (Green) ➢ 10000/5000/2500/1000/100 BASE-T RJ45 Interfaces 1/10G LNK (Orange) 5000/2500/100M LNK (Green)
ESD Protection	6KV DC
Enclosure	IP30 type metal case
Installation	DIN rail kit and wall mount ear
Dimensions (WxDxH)	32 x 87 x 135mm
Weight	458g
Power Requirements	DC 12~48V or 24V AC
Converter Specifications	
Flow Control	Back pressure for half duplex IEEE 802.3x pause frame for full duplex
Fabric	20Gbps
Throughput (packet per second)	2.48Mpps@64bytes

Address Table	9K entries, automatic source address learning and aging
Jumbo Frame	16K
Network Cables	➢ 10000/5000/2500/1000/100 BASE-T: Cat5e, 6, 6A, 7 UTP cable (100 meters, max.) EIA/TIA-568 100-ohm STP (100 meters, max.) ➢ 10GBASE-LR/SR/BX: 50/125μm or 62.5/125μm multi-mode fiber optic cable, up to 300m 9/125μm single-mode fiber optic cable, up to 60km
Standards Conformance	
Standards Compliance	IEEE 802.3u 100BASE-TX IEEE 802.3ab 1000BASE-T IEEE 802.3bz 2.5G/5GBASE-T IEEE 802.3an 10GBASE-T IEEE 802.3ae 10Gbps Ethernet IEEE 802.3x full-duplex flow control
Regulatory Compliance	FCC Part 15 Class A, CE
Stability Testing	IEC60068-2-32(Free fall) IEC60068-2-27(Shock) IEC60068-2-6(Vibration)

2. Hardware Description

2.1 Physical Dimensions

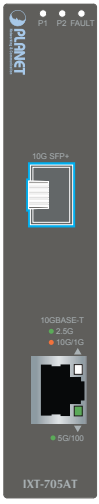
IXT-705AT dimensions (W x D x H): 32 x 87 x 135mm



Dimensions (unit = mm)

2.2 Converter Front Panel and LED Indicators

Figure 2-1 shows the front panels of the Industrial Media Converter.



System

LED	Color	Function
P1	Green	**Lit:** Power 1 is active
		Off: Power 1 is inactive
P2	Green	**Lit:** Power 2 is active
		Off: Power 2 is inactive
FAULT	Red	**Lit:** indicates either power 1 or power 2 has no power.
		Off: No failure

Per 10000/5000/2500/1000/100BASE-T Port

LED	Color	Function
10/2.5/1G	Green	**Lit:** To indicate that the port is operating at **2.5Gbps**.
	Orange	**Lit:** To indicate that the port is operating at **10/1Gbps**.
5G/100M	Green	**Lit:** To indicate that the port is operating at **5Gbps/100Mbps.**

Figure 2-1: IXT-705AT Front Panel

2.3 Converter Upper Panel

The upper panel of the IXT-705AT consists of one terminal block connector within two DC power inputs. Figure 2-2 shows the upper panel of the IXT-705AT.

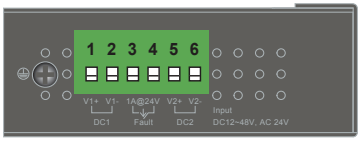


Figure 2-2: IXT-705AT Upper Panel

3. Installation

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

3.1 Quick Installation Steps

Step 1: Unpack the Industrial Media Converter.

Step 2: Check whether the DIN-rail is screwed on the Industrial Media Converter. (Please refer to **DIN-rail** Mounting section for **DIN-rail** installation if the **DIN-rail** is not screwed on the Industrial Media Converter). If you want to **wall-mount** the Industrial Media Converter, then please refer to the **Wall-mount Plate Mounting** section for wall-mount plate installation.

Step 3: To hang the Industrial Media Converter on the DIN-rail track or wall, please refer to the **Mounting Installation** section.

Step 4: Power on the Industrial Media Converter. (Please refer to the Wiring of the Power Inputs section for power input) The power LED on the Industrial Media Converter 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 5e/6/6A/7 UTP** cable for Ethernet connection.

Step 6: Insert one side of Category 5e/6/6A/7 cable into the Industrial Media Converter Ethernet port (RJ45 port) while the other side of Category 5e/6/6A/7 cable into the network devices' Ethernet port (RJ45 port), e.g., switch, PC or server.

The UTP port (RJ45) LED on the Industrial Media Converter 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 the connections are all set and LED lights all show normally, the installation is complete.

3.2 Mounting Installation

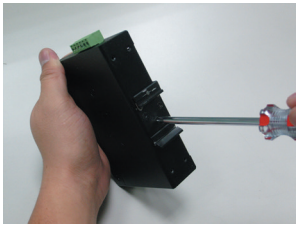
This section describes how to install the Industrial Media Converter and makes connections to it. Please read the following topics and perform the procedures in the order being presented.

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 and Industrial Media Converter are similar.

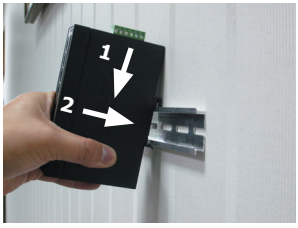
3.2.1 DIN-rail Mounting

The DIN rail is screwed on the Industrial Media Converter when is out of factory. When replacing the wall-mount application with DIN-rail application on Industrial Media Converter, please refer to the following figures to screw the DIN rail on the Industrial Media Converter. To hang the Industrial Media Converter, follow the following steps:

Step 1: Screw the DIN rail on the Industrial Media Converter.

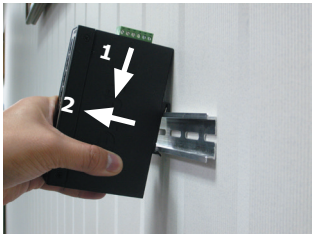


Step 2: Lightly insert the DIN rail into the track.



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 Media Converter from the trac



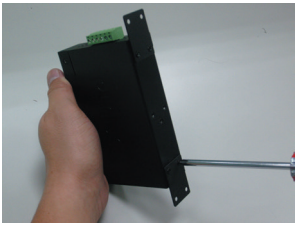
Step 5: Lightly pull out the bottom of the DIN rail from the track to remove.

3.2.2 Wall-mount Plate Mounting

To install the Industrial Media Converter on the wall, please follow the instructions described below.

Step 1: Remove the DIN rail from the Industrial Media Converter; loosen the screws to remove the DIN rail.

Step 2: Place the wall-mount plate on the rear panel of the Industrial Media Converter.



Step 3: Use the screws to screw the wall-mount plate on the Industrial Media Converter.

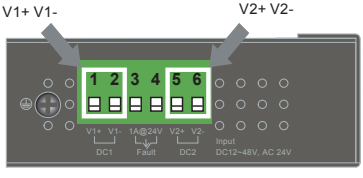
Step 4: Use the hook holes at the corners of the wall-mount plate to hang the Industrial Media Converter on the wall.

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

3.3 Wiring the Power Inputs

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

1. Insert positive / negative DC power wires into Contacts 1 and 2 for power 1 or 5 and 6 for power 2.



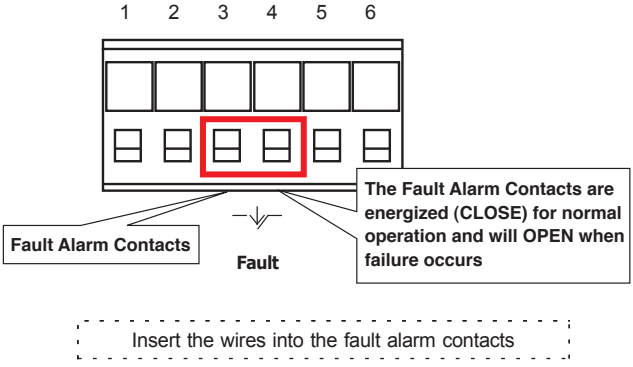
2. Tighten the wire-clamp screws for preventing the wires from loosening.

Note

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

3.4 Wiring the Fault Alarm Contact

The fault alarm contacts are in the middle of the terminal block connector as the picture shows below. When inserting the wires, the Industrial Media Converter 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.



Note

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

3.5 Cable Connection

■ 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 Media Converter

Figure 3-1: Plug in the SFP+ Transceiver

Note

It is recommended to use PLANET SFP+s on the Industrial Media Converter. If you insert an SFP+ transceiver that is not supported, the Industrial Media Converter will not recognize it.

■ 10GBASE-X SR/LR:

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

1. Make sure both sides of the SFP+ transceiver are with the same media type; for example, 10GBASE-SR to 10GBASE-SR, 10GBASE-LR to 10GBASE-LR.

2. Check whether the fiber-optic cable type matches the SFP+ transceiver model.

   - To connect to 10GBASE-SR SFP+ transceiver, use the multi-mode fiber cable with one side being the male duplex LC connector type.
   - To connect to 10GBASE-LR SFP+ transceiver, use the single-mode fiber cable with one side being the male duplex LC connector type.

Connecting the fiber cable

1. Attach the duplex LC connector on the network cable to 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.

■ Removing 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 MTB module to a horizontal position.

4. Pull out the module gently through the lever.

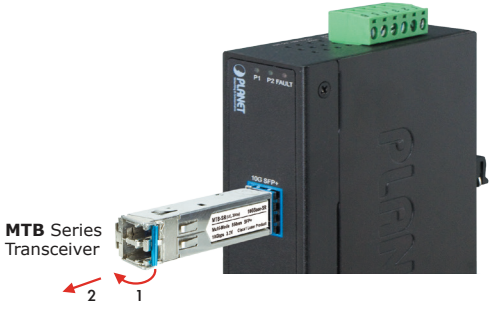


Figure 3-2: Pulling Out from the Transceiver

Never pull out the module without pulling the lever or the push bolts on the module. Directly pulling out the module with effort could damage the module and SFP+ module slot of the Industrial Media Converter.

■ 100/1000/2500/5000/10000BASE-T

The 100/1000/2500/5000/10000BASE-T port comes with auto-negotiation capability. It automatically supports 100BASE-TX, 1000BASE-T, 2500BASE-T, 5000 BASE-T and 10000 BASE-T networks. Users only need to plug a working network device into the 100/1000/2500/5000/10000BASE-T port, and then turn on the Industrial Media Converter. The port will automatically run at 100Mbps, 1000Mbps, 2500Mbps or 5000Mbps and 10000Mbps after the negotiation with the connected device.

Connecting the UTP Cable

The 100/1000/2500/5000/10000BASE-T port uses RJ45 socket -- similar to phone jack -- for connection of unshielded twisted-pair cable (UTP). The 802.3u/802.3ab/802.3bz/802.3ae Ethernet standard requires Category 5 UTP for 100Mbps 100BASE-TX. 1000/2500/5000/10000BASE-T uses Cat5e/6/6A/7 UTP (see table below). Maximum distance is 100 meters (328 feet).

Standard	Transfer Speed	Cable requirement 100M
10GBASE-T	10000Mbit/s	Cat 6A/7
5GBASE-T	5000Mbit/s	Cat 6/6A/7
2.5GBASE-T	2500Mbit/s	Cat 5e/6/6A/7
1000BASET	1000Mbit/s	Cat 5e/6/6A/7
100BASE-TX	100Mbit/s	Cat 5/5e/6/6A/7

Be sure the connected network devices support MDI/MDI-X. If it does not support, then use the crossover Category 5e cable.

4. Troubleshooting

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

The per port LED is not lit

Solution:

Check the cable connection of the Industrial Media Converter.

Performance is bad

Solution:

Check the speed duplex mode of the partner device. The Industrial Media Converter 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 Media Converter doesn't connect to the network

Solution:

Check per port LED on the Industrial Media Converter. Make sure the cable is installed properly. Make sure the cable is the right type. Turn off the power. After a while, turn on the power again.

Can I install MTB-SR or the other SFP+ module with non wide temperature feature into the SFP+ slot of Industrial Media Converter?

Solution:

Yes, you can. However, the MTB-SR and the other SFP+ module with non wide temperature feature cannot operate under -40 to 75 degrees C.

APPENDIX A: Approved PLANET SFP+ Transceivers

PLANET Industrial Media Converter 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:

Available 10Gbps Modules

MTB-SR	10GBASE-SR mini-GBIC module - 300m
MTB-LR	10GBASE-LR mini-GBIC module – 10km
MTB-TSR	10GBASE-SR mini-GBIC module - 300m (-40~75 degrees C)
MTB-TLR	10GBASE-LR mini-GBIC module – 10km (-40~75 degrees C)
MTB-LA20	10GBASE-LX (WDM,TX:1270nm) mini-GBIC module - 20km
MTB-LB20	10GBASE-LX (WDM,TX:1330nm) mini-GBIC module - 20km
MTB-LA40	10GBASE-LX (WDM,TX:1270nm) mini-GBIC module - 40km
MTB-LB40	10GBASE-LX (WDM,TX:1330nm) mini-GBIC module - 40km
MTB-LA60	10GBASE-LX (WDM,TX:1270nm) mini-GBIC module - 60km
MTB-LB60	10GBASE-LX (WDM,TX:1330nm) mini-GBIC module - 60km

APPENDIX B: Networking Connection

B.1 Converter's RJ45 Pin Assignments

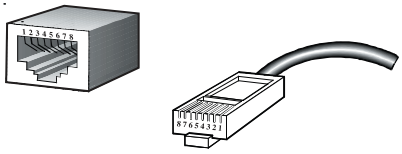
1000Mbps, 1000BASE-T

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-

100Mbps, 100BASE-TX

RJ45 Connector Pin Assignment		
Contact	MDI Media Dependent Interface	MDI-X Media Dependent 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	

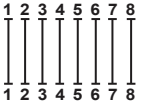
B.2 RJ45 Cable Pin Assignments



The standard RJ45 receptacle/connector

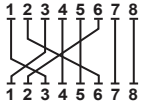
There are 8 wires on a standard UTP/STP cable and each wire is color-coded. The following shows the pin allocation and color of straight cable and crossover cable connection:

Straight Cable



	SIDE 1	SIDE 2
SIDE 1	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
SIDE 2	6 = Green	6 = Green
	7 = White/Brown	7 = White/Brown
	8 = Brown	8 = Brown

Crossover Cable



	SIDE 1	SIDE 2
SIDE 1	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
SIDE 2	6 = Green	6 = Orange
	7 = White/Brown	7 = White/Brown
	8 = Brown	8 = Brown

Figure B-1: Straight-through and Crossover Cables

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 10G/5G/2.5G/1G/100M Copper to 10GBASE-X SFP+ Media Converter

*Model Number : IXT-705AT
* 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 (2014/30/EU).
For the evaluation regarding the EMC, the following standards were applied:

EN 55032	(2015 + AC:2016)
EN61000-3-2	(2014)
EN61000-3-3	(2013)
EN 55024	(2010 + A1:2015)

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 **Kent Kang**

Position: **Director**

Taiwan	March 9, 2018	Kent Kang
Place	*Date*	*Legal Signature*