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

XT-705A

User's Manual

Trademarks

Contents are subject to revision without prior notice.

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FCC Warning

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.

CE Mark Warning

This device is compliant with Class A of CISPR 32. In a residential environment this equip-ment may cause radio interference.

WEEE Warning

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

Model: XT-705A

Revision: 1.1 (OCTOBER, 2021)

Part No: EM-XT_705A_v1.1 (2350-AA5010-002)

Table Of Contents

1. Introduction

1.1 Package Contents

Thank you for purchasing PLANET 10G Media Converter. In the following sections, unless specified, the term "Media Converter" mentioned in this manual refers to the XT-705A.

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

XT-705A Media Converter x 1	User's Manual x 1
	
Power Adapter (5V, 2A) 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 and Reliable Network Distance Extension Solution

PLANET XT-705A Media Converter is equipped with one **10G/5G/2.5G/1G/100BASE-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 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 XT-705A 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 XT-705A Media Converter can handle large amounts of data in a secure topology linking to a backbone or high capacity servers.

Fiber-optic Linking Capability Enables Extension of Network Deployment

The SFP+ slot of the XT-705AT is compatible with **10GBASE-SR** or **10GBASE-LR** (Small Form Factor Pluggable) fiber-optic transceivers. The fiber optic uplink capability guarantees the throughput to all nodes hooked into the network and the 10 Gigabit Ethernet distance can be extended from 300 meters (multi-mode fiber cable) to 10/40/60 kilometers (single-mode

fiber cable). It is ideal for applications within the data centers and distributions.

Easy Chassis Installation

The XT-705A Media Converter can be used as a stand-alone unit or as a slide-in module to the **PLANET Media Converter Chassis** (MC-700 and MC-1500 chassis series). The media chassis can assist in providing DC power to the XT-705A Media Converter to maintain the fiber-optic network at one centralized location. It can be DIN-rail or wall mounted for efficient use of cabinet space.

Low Power Consumption

The XT-705A adopting the advanced chip technology has the power-saving feature like a low power consumption of only 3.75 watts when in full operation.

1.3 Product Features

XT-705A Physical Port

- One 10G/5G/2.5G/1G/100BASE-T RJ45 interface with auto MDI/MDI-X function
- One 10GBASE-X SFP+ slot

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

Case and Installation

■ External 5V DC, 2A power supply

■ DIN-rail and wall-mount design

■ Supports 6000 VDC Ethernet ESD protection

■ 100 meters over Cat 6A / Cat7 at 10Gbps

■ 0 to 50 degrees C operating temperature

■ Co-works with PLANET's 10"/19" Media Converter Chassis **(MC-700/MC-1500/MC-1500R/MC-1500R48)**

■ Plug and Play installation

1.4 Product Specifications

Model	XT-705A
Hardware Specifications	
Copper Interface	1 x 10G/5G/2.5G/1G/100BASE-T RJ45 Auto-MDI/MDI-X, auto-negotiation
Fiber Optic Interface	1 x 10GBASE-X R SFP+ interface.
LED	**System:** PWR (Green) **10G/5G/2.5G/1G/100 BASE-T RJ45 Interfaces:** 1G/10G LNK (Orange) 5G/2.5G/100M LNK (Green)
Switch Processing Scheme	Store and Forward

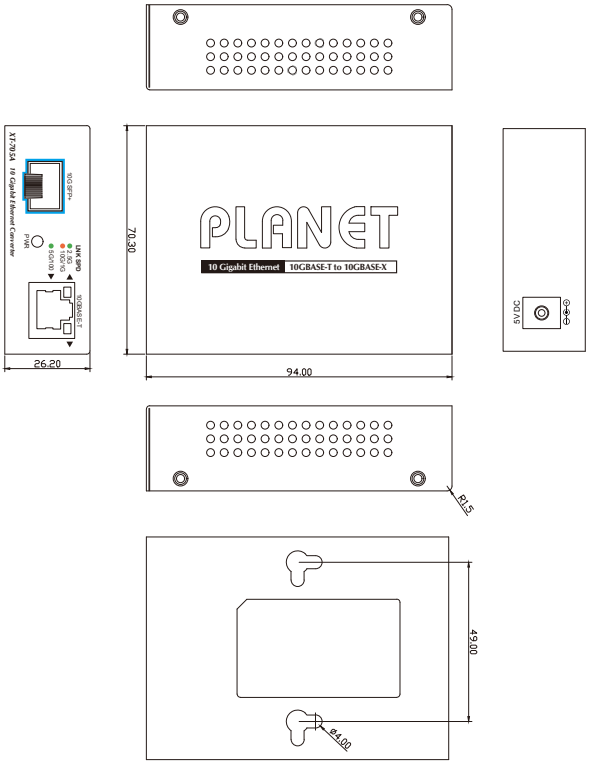
ESD Protection	6KV DC
Enclosure	Compact-sized metal case
Installation	Desktop, wall mountable Media convert Chassis installation Optional DIN-rail kit
Dimensions (W x D x H)	94 x 26 x 70mm
Weight	180g (device only)
Power Requirements	5V DC, 2A max.
Power Consumption	3.75 watts / 12.8 BTU per hour max.
Converter Specifications	
Flow Control	Back pressure for half duplex IEEE 802.3x pause frame for full duplex
Fabric	20Gbps
Address Table	9K entries, automatic source address learning and aging
Jumbo Frame	16K

Network Cables	**10G/5G/2.5G/1G/100M BASE-T:** 10G--Cat 6A/Cat 7 5G--Cat 6/Cat 6A/Cat 7 1G/2.5G--Cat 5e/Cat 6/Cat 6A/ Cat 7 100M--Cat 5/Cat 5e/Cat 6/Cat 6A/ Cat 7 Cat 5/5e/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	
Regulatory Compliance	FCC Part 15 Class A, CE
Operating environment	0 ~ 50 degrees C
Storage environment	-10 ~ 70 degrees C
Operating Humidity	5 ~ 95%, relative humidity (non-condensing)
Storage Humidity	5 ~ 95%, relative humidity (non-condensing)
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

2. Hardware Description

2.1 Physical Dimensions

XT-705A dimensions (W x D x H): 94 x 70 x 26mm



Unit: mm

2.2 Converter Front Panel and LED Indicators

Figure 2-2 shows the front panel of the Media Converter.

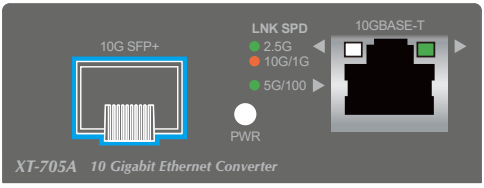


Figure 2-2: XT-705A Front Panel

System

LED	Color	Function
PWR	Green	**Lit:** Power is active
		Off: Power is inactive

Per 10G/5G/2.5G/1G/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**.

2.3 Rear Panel

The rear panel of the XT-705A consists of one DC jack, which accepts input power with 5V DC, 2A.

Figure 2-3: One DC jack for DC power input

2.4 Power Information:

The central pole of the Media Converter's power jacks measures 2.5mm wide that requires +5VDC power input. It conforms to the bundled AC-DC adapter and PLANET's media chassis. Should you have the issue of power connection, please contact your local sales representative.

Please keep the AC-DC adapter as a spare part when the XT-705A is installed in a media chassis.

2.5mm

Width of DC Receptacle: **2.5mm**

+5V for each slot

DC receptacle is 2.5mm wide that matches the central pole; the width of the Media Converter DC jack also measures 2.5mm.
Warning: Do not install any improper unit.

The device is a power-required device, meaning it will not work till it is powered. If your networks should be active all the time, please consider using UPS (Uninterrupted Power Supply) for your device. It will prevent you from network data loss or network downtime.

In some areas, installing a surge suppression device may also help to protect your Media Converter from being damaged by unregulated surge or current to the converter or the power adapter.

3. Installation

This section describes the functionalities of the 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 Stand-alone Installation

Step 1: Unpack the Media Converter.

Step 2: Connect the 5V DC power adapter to the XT-705A and verify that the Power LED lights up.

(Please refer to the **2.4 Power Information** section for power input.)

Step 3:

3-1: Prepare a twisted-pair, straight-through **Category 5e/6/7 UTP cable** for Ethernet connection.

3-2: Prepare a fiber cable for connection to the 10GBASE-T SFP+ slot, and make sure both sides of the SFP transceiver are with the same media type.

(Please refer to the **3.5 Cable Connection** section for the type of connection.)

Step 4:

4-1: Insert one side of **Category 5e/6/7 cable** into the Media Converter Ethernet port (RJ45) while the other side of Category 5e/6/7 cable into the network devices' Ethernet port (RJ45), e.g., switch, PC or server.

The UTP port (RJ45) LED on the Media Converter will light up when the cable is connected with the network device. (Please refer to the **2.2 LED Indicators** section for the functions of LED lights.)

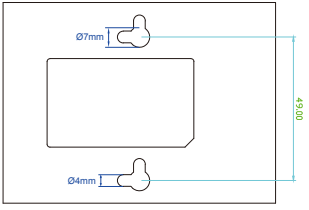
4-2: Connect the **fiber cable**. Attach the duplex LC connector on the network cable to the SFP+ transceiver. Attach the fiber cable from the XT-705A to the fiber network. TX, RX must be paired at both ends.

Step 5: When all the connections are all set and the LED lights all show normally, the installation is complete.

3.2 Wall-mount Installation

Step 1: Please find the wall that can mount the Media Converter.

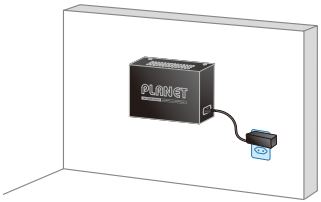
Step 2: Screw two screws on the wall.



XT-705A Switch Bottom Side

Step 3: Hang the Media Converter on the screws from the wall.

Step 4: Refer to Chapter **2.4 Power Information** on power supply to the Media Converter.



Note	Before mounting the device to the wall, please check the location of the electrical outlet and the length of the Ethernet cable.

3.3 Media Chassis Installation

To install the Media Converter in a **10-inch** or **19-inch** standard rack, follow the instructions described below.

Step 1: Place your Media Converter on a hard flat surface, with the front panel positioned towards your front side.

Step 2: Carefully slide in the module until it is fully and firmly fitted into the slot of the chassis; the Power LED of the Media Converter will turn ON.

Figure 3-2: Insert Gigabit Media Converter into an available slot

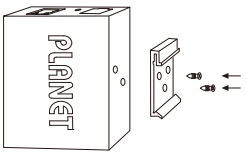
Caution

1. Never push the converter into the slot with force; it could damage the chassis.
2. The Media Converter Chassis supports hot-swap; there is no need to turn off the whole chassis before sliding in the new converter.

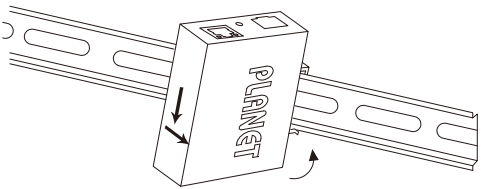
3.4 Optional DIN-rail Installation

There are two DIN-rail holes on the left side of the XT-705A that allows to be easily installed by DIN-rail mounting. PLANET optional DIN-rail mounting kit – RKE-DIN -- can be ordered separately. Refer to the following steps for the DIN-rail mounting of the XT-705A:

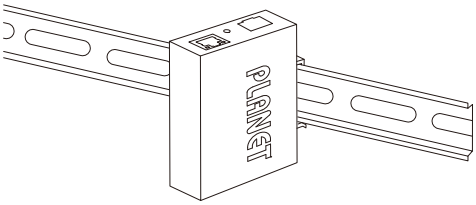
Step 1: Screw the DIN rail on the XT-705A



Step 2: Now slide the DIN rail into the track.



Step 3: Check whether the DIN rail is tightly on the track.



Caution	You must use the screws supplied with the mounting brackets. Damage caused to the parts by using incorrect screws would invalidate your warranty.

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 Media Converter

Figure 3-5-1: Plug in the SFP+ Transceiver

Note

It is recommended to use PLANET SFP+ transceiver on the Media Converter. If you insert an SFP+ transceiver that is not supported, the 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 of the network cable to the SFP+ transceiver.
2. Connect the other end of the cable to a device like a switch 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),

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 3-5-2: Pulling Out from the Transceiver

Note	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 Media Converter.

10G/5G/2.5G/1G/100BASE-T

The 10G/5G/2.5G/1G/100BASE-T port comes with auto-negotiation capability. It automatically supports 100BASE-TX, 1GBASE-T, 2.5GBASE-T, 5GBASE-T and 10GBASE-T networks. Users only need to plug a working network device into the 10G/5G/2.5G/1G/100BASE-T port, and then turn on the 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 10G/5G/2.5G/1G/100BASE-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. 10G/5G/2.5G/1G/100BASE-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

Note

Be sure the connected network devices support MDI/MDI-X. If it does not support, then use the crossover Category 5e6/6A/7 cable.

4. Troubleshooting

This chapter contains information to help you solve issues. If the Media Converter is not functioning properly, make sure the 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 Media Converter.

Performance is bad

Solution:

Check the speed duplex mode of the partner device. The Media Converter usually runs in auto-negotiation mode. If the partner is set to half duplex, 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 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 Media Converter doesn't connect to the network

Solution:

Check per port LED on the 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-TSR or the other industrial-grade SFP+ module with non-wide temperature feature into the SFP+ slot of Media Converter?

Solution:

Yes, you can. However, the XT-705A features non-wide temperature, meaning it cannot be operated with temperature ranging from -40 to 75 degrees C.

PLANET recommends customers to use the IXT-705AT industrial-grade 10G Media Converter with the wide-ranging operating temperature feature.

Appendix A: Approved PLANET SFP+ Transceivers

PLANET 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-RJ	10GBASE-T SFP+ Copper Fiber Optic Module - 30m
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

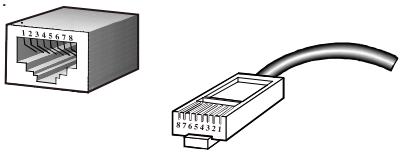
1G, 2.5G, 5G and 10GBASE-T

PIN NO	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	

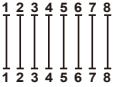
B.2 RJ45 Cable Pin Assignments



The standard RJ45 receptacle/connector

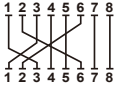
There are 8 wires on a standard UTP/STP cable and each wire is color-coded. The following shows the pin allocation and color of straight cable and crossover cable connection:

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 diagram before deploying the cables into your network.

EC Declaration of Conformity

I hereby confirm that the following equipment complies 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).

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

Model:
XT-705A

Produced by:

Manufacturer's Name: **Planet Technology Corporation**

Manufacturer's Address: 10F., No.96, Minquan Rd., Xindian Dist.,
New Taipei City 231, Taiwan, R.O.C.

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)

Person responsible for making this declaration

Name: Kent Kang

Title: Director

Taiwan	**Aug. 29, 2018**	
Country	*Date*	*Legal Signature*

PLANET TECHNOLOGY CORPORATION

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