# 1000BASE-T to 1000BASE-SX/LX Media Converters

KC-210TF-SXC
KC-210TF-SXC-O
KC-210TF-LXC
KC-210TF-LXC-O
KC-210TF-LXC30-O
KC-210TF-LXC40
KC-210TF-LXC80

Installation Guide

P/N: 750-0158-002
DOC.050727-KC210

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TRADEMARKS

Ethernet is a registered trademark of Xerox Corp.

FCC NOTICE

This device complies with Class A Part 15 the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received including the interference that may cause undesired operation.

CE NOTICE

Marking by the symbol CE indicates compliance of this equipment to the EMC directive of the European Community. Such marking is indicative that this equipment meets or exceeds the following technical standards:

EMC Class A
EN 50081-1/1992 : EN55022, EN61000-3-2, EN61000-3-3
EN 50082-1/1998 : EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11

# 1. Introduction

The 1000BASE-T to 1000BASE-SX/LX media converter series provides a media conversion allowing Gigabit integration of fiber optic and copper (twisted-pair) segments. It is used to extend the connection distance between two copper Gigabit Ethernet devices via fiber optic cable transparently with no performance degradation.

The converters also provide the following key features:

- Compliance with IEEE 802.3ab 1000BASE-T and IEEE 802.3z 1000BASE-SX, 1000BASE-LX standard
- Auto-negotiation function built in twisted-pair port that allows to operate at optimal configuration connecting to an auto-negotiation capable device
- Auto MDI/MDI-X crossover configuration and receiving polarity error correction on twisted-pair interface
- Supporting low cost multimode fiber and single mode fiber cable when long reach connection is needed
- Extending network span up to 10Km over duplex single mode fiber cabling
- Setting switch to enable or disable auto-negotiation function of the fiber port when connecting non-auto legacy 1000BASE-X device
- Full LED indicators for monitoring port and connection status

The converter series support the following configuration needs:

**1000BASE-T to 1000BASE-SX / LX**

| | |
|---|---|
| **KC-210TF-SXC** | Copper to SX fiber 850nm SC |
| **KC-210TF-LXC** | Copper to LX fiber 1310nm SC |
| **KC-210TF-LXC30** | Copper to LX fiber 1310nm SC 30km |
| **KC-210TF-LXC40** | Copper to LX fiber 1550nm SC 40km |
| **KC-210TF-LXC80** | Copper to LX fiber 1550nm SC 80km |

## 1.1 Specifications

**Twisted-Pair Interface**

| | |
|---|---|
| Compliance | IEEE 802.3ab 1000BASE-T |
| Connector | Shielded RJ-45 jack |
| Pin assignments | Auto-crossover for MDI and MDI-X |
| Data speed | 1000Mbps |
| Duplex mode | Auto-negotiation for half-duplex or full-duplex |
| Cable type | 4-pair Category 5 UTP |
| Supported cable length | 100 meters |

**Fiber Optic Interface**

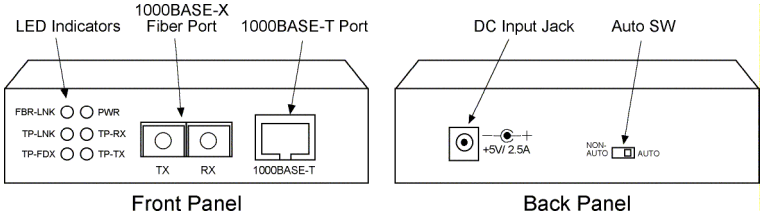
| | |
|---|---|
| Compliance | IEEE 802.3z 1000BASE-SX or LX |
| Connector | Duplex SC |
| Data speed | 1000Mbps |
| Duplex mode | Forced full-duplex or auto-negotiation (by Auto SW) |
| Auto SW | Auto-negotiation Enable/Disable switch |
| Cable types | Multimode (MM) - 50/125, 62.5/125 |
| | Single mode (SM) - 8.7/125, 9/125, 10/125 |
| Optical | Class 1 FDA and IEC-825 laser safety compliant. |

**General Information**

| | |
|---|---|
| Frame Types Supported | IEEE 802.3 Std. 64Bytes ~ 1518Bytes frames |
| | VLAN tagged frames ( plus 4 bytes tag) |
| DC Input power | +5V 1.5A min. (Operating range +5V +/-10%) |
| Power Consumption | 4 watts max. ( 0.8A max. @+5V) |
| Dimension | H 25mm x W 96m x D 101mm |
| Housing | Enclosed metal with no fan |
| Operating Temperature | -10°C ~ 40°C (cold start 0°C) |
| Storage Temperature | -20°C ~ 70°C |
| Relative Humidity | 0% ~ 70% |

# 2. Installation

## 2.1 Media Converters




**Functions of 1000BASE-T Port (Twisted-Pair Interface)**

- Auto-negotiation support for connecting to auto-negotiation devices
- Supports both of half duplex and full duplex operations
- Auto MDI/MDI-X crossover configuration and receiving polarity correction for UTP connection

Pin Assignments

| Pin | 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- |

**Functions of 1000BASE-X Fiber Port (Fiber Optic Interface)**

- Full data rate of 1000Mbps for full duplex operation
- Auto SW on rear panel to enable or disable auto negotiation function as follows:

**NON-AUTO** Disable auto negotiation function (forced full duplex mode)

**AUTO** Enable auto negotiation function

Note:

1. For connecting to early 1000BASE-X devices which do not provide auto negotiation capability, you might need to set the SW to NON-AUTO position to prevent unexpected link failure occurrence.
2. In most of the cases, setting AUTO would make the link worked.
3. When installing two of these converters on both ends of a fiber connection, set the switch to NON-AUTO (forced full duplex mode) to achieve the best performance.

| Model | Fiber | Wavelength | Output power | Input Sensitivity |
|---|---|---|---|---|
| 210TF-SXC | SX | 850nm | -9.5 ~ -4 dBm | -12.5dBm max. |
| 210TF-SXC-O | SX | 850nm | -9.5 ~ -4 dBm | -18dBm max. |
| 210TF-LXC | LX | 1310nm | -9.5 ~ -3 dBm | -14.4dBm min. |
| 210TF-LXC-O | LX | 1310nm | -9 ~ -3 dBm | -21dBm min. |
| 210TF-LXC30-O | LX | 1310nm | -5 ~ 0 dBm | -24dBm min. |
| 210TF-LXC40 | LX | 1550nm DFB | -5 ~ 0 dBm | -24 dBm max. |
| 210TF-LXC80 | LX | 1550nm DFB | -2 ~ 3 dBm | -24 dBm max. |

| Model | Fiber Used | Cable Length | |
|---|---|---|---|
| 210TF-SXC | MMF 62.5/125 | 220 meters | |
| | MMF 50/125 | 500 meters | |
| 210TF-SXC-O | MMF 62.5/125 | 300 meters | |
| | MMF 50/125 | 500 meters | |
| 210TF-LXC | MMF 62.5/125 | 550 meters | |
| | MMF 50/125 | 550 meters | MM: Multimode |
| | SMF 9/125 | 10Km | SM: Single mode |
| 210TF-LXC-O | SMF 9/125 | 10Km | |
| 210TF-LXC30-O | SMF 9/125 | 30Km | |
| 210TF-LXC40 | SMF 9/125 | 40 ~ 50Km | |
| 210TF-LXC80 | SMF 9/125 | 80Km | |

## 2.2 LED Indicators

| Name | Status | State | Interpretation |
|---|---|---|---|
| PWR | Power status | On | Power on |
| | | Off | Power off |
| TP-LNK | UTP link status | On | TP Link up |
| | | Off | TP Link down |
| TP-FDX | UTP duplex status | On | TP full-duplex |
| | | Off | TP half-duplex |
| TP-RX | UTP Rx status | On | TP Receiver in operation |
| | | Off | TP no receiving operation |
| TP-TX | UTP Tx status | On | TP Transmitter in operation |
| | | Off | TP no transmission |
| FBR-LNK | Fiber link status | On | Fiber link up |
| | | Off | Fiber link down |

## 2.3 Applying Power

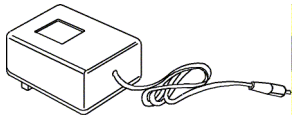
The DC input of the converter is:

**DC Input Jack**

| | |
|---|---|
| DC input rated voltage | +5VDC |
| DC input voltage range | +4.75 ~ 5.25VDC |
| DC power consumption | max. 0.8A @+5V (4 Watts) |
| DC input Jack |  |



Before you begin the installation, check the AC voltage of your area. The AC power adapter which is used to supply the DC power for the unit should have the AC voltage matching the commercial power voltage in your area. The specifications of the AC power adapter are:



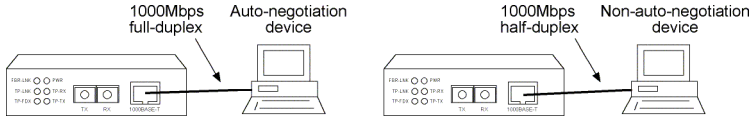
- AC input power: AC power voltage of your area
- DC output power: +5V minimal 1.5A

Steps to apply power are:

1. Connect power adapter DC plug to the DC input jack located on the back of the converter before connecting to the AC outlet.
2. Connect the power adapter to the AC outlet.
3. Check Power LED indication.

## 2.4 Making Connection

The figure below shows the configuration used when connecting to auto-negotiation device and non-auto-negotiation device.




For proper communication, the UTP connections on both ends must be in same configuration, either 1000M full-duplex or 1000M half-duplex. Set Auto SW to NON-AUTO mode to use forced full duplex mode for fiber connection.