COMPLIANCE INFORMATION

UL Listed
C-UL Listed (Canada)
CISPR/EN55022 Class A

FCC Regulations

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 the user's own expense.

Canadian Regulations

This digital apparatus does not exceed the Class A limits for radio noise for digital apparatus set out on the radio interference regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

European Regulations

Warning

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.

Achtung !

Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in weichen Fällen der Benutzer für entsprechende Gegenmaßnahmen werantwortlich ist.

Attention !

Ceci est un produit de Classe A. Dans un environment domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilsateur de prende les measures spécifiques appropriées

VCCI Class 1 Compliance

This equipment is in the 1st Class category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council For Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in commercial and/or industrial areas. When used in a residential area or in an adjacent area thereto, interference may be caused to radio and TV receivers, etc. Read the instructions for correct handling.

この装置は、第一種情報装置（商工業地域において使用されるべき情報装置）で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（VCCI）基準に適合しております。
従って、住宅地域またはその隣接した地域で使用すると、ラジオ、テレビジョン受信機等に受信障害を与えることがあります。
取扱説明書に従って正しい取り扱いをして下さい。

CAUTION: RJ connectors are NOT INTENDED FOR CONNECTION TO THE PUBLIC TELEPHONE NETWORK. Failure to observe this caution could result in damage to the public telephone network.

Der Anschluss dieses Gerätes an ein öffentlickes Telekommunikationsnetz in den EG-Mitgliedstaaten verstösst gegen die jeweligen einzelstaatlichen Gesetze zur Anwendung der Richtlinie 91/263/EWG zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Telekommunikationsendeinrichtungen einschliesslich der gegenseitigen Anerkennung ihrer Konformität.

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TRANSITION networks

Minneapolis, MN 55344 USA

10/100BASE-TX to 10/100BASE-SX

Slide-In-Module Media Converters

C/E-TX-SX-02

USER'S GUIDE

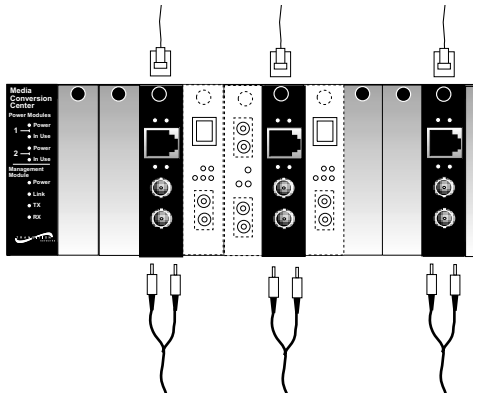
The TRANSITION Networks C/E-TX-SX-02 series Fast Ethernet™ media converters, designed to be installed in the E-MCC-1600 Media Conversion Center, connect 10BASE-T or 100BASE-TX shielded or unshielded twisted-pair copper cable to 850 nm 10/100BASE-SX *multimode* fiber-optic cable, using either an ST fiber connector (C/E-TX-SX-02) or an SC fiber connector (C/E-TX-SX-02(SC)).

C/E-TX-SX-02

*Provides an RJ-45 twisted pair 10BASE-T/100BASE-TX connector and a set of RX (receive) and TX (transmit) **ST** 10/100BASE-SX connectors to **850 nm multimode** fiber-optic cable.*

C/E-TX-SX-02(SC)

*Provides an RJ-45 twisted pair 10BASE-T/100BASE-TX connector and an RX (receive) and TX (transmit) **SC** 10/100BASE-SX connector to **850 nm multimode** fiber-optic cable.*



The ***AutoCross™*** feature allows *either* straight-through *or* crossover twisted-pair copper cable to be used when connecting the C/E-TX-SX-02 to a 10/100BASE-TX device.

The ***Autonegotiation*** feature allows automatic speed and mode sensing between the media converter and attached devices.

The ***LinkAlert™*** feature allows the C/E-TX-SX-02 media converter to pass 10/100BASE-TX side link faults to the 10/100BASE-SX side and to pass 10/100BASE-SX side link faults to the 10/100BASE-TX side.

C/E-TX-SX-02 IN THE NETWORK

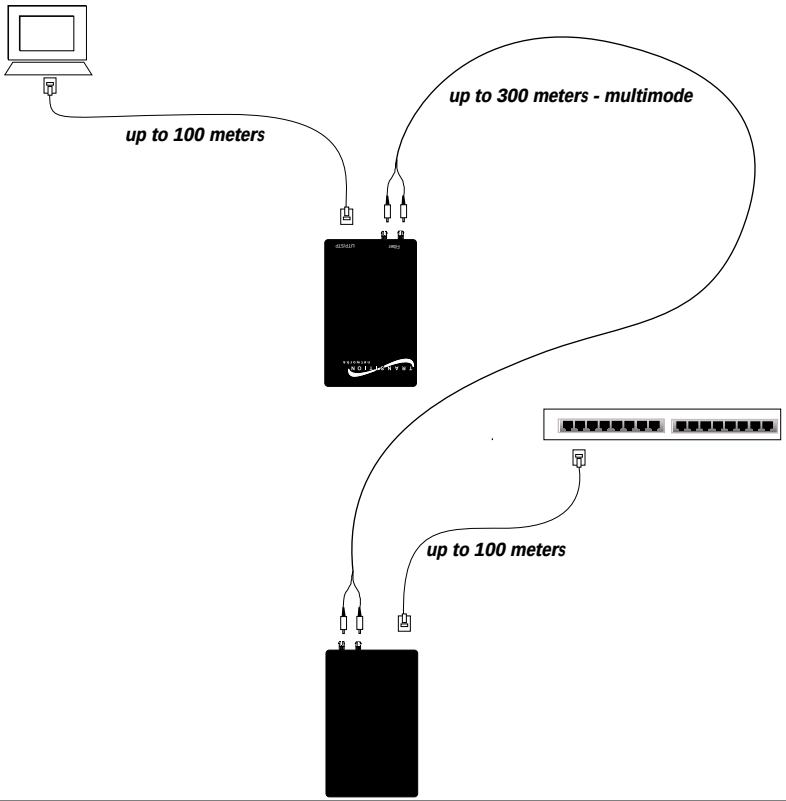
The C/E-TX-SX-02 media converter is designed to work effectively with 10/100 autonegotiating ports to provide reliable 10 Mbps or 100 Mbps fiber links.

The C/E-TX-SX-02 receives and transmits network signals in either full-duplex or half-duplex mode, depending upon the network devices to which the media converter is attached. Fast Ethernet™ in full-duplex mode allows the maximum cable distances shown on these pages. Fast Ethernet™ in half-duplex mode requires attention to the 512-bit Rule (See page 4).

NOTE: Both copper AND fiber connections to the C/E-TX-SX-02 must be at the same media-speed: 10BASE-T / 10BASE-FL or 100BASE-TX / 100BASE-SX OR one or both connections must be capable of auto-negotiation.

Network Installation

Install two C/E-TX-SX-02 series media converters in series to extend, over fiber, the distance between two 10BASE-T or 100BASE-TX devices:



TECHNICAL SPECIFICATIONS

Standards	IEEE 802.3, Compliant with pending TIA/EIA-785 specification	
Environment	Temperature:	0-40°C (32° to 104° F)
	Storage Temperature:	-15° to 65°C (5° to 149° F)
	Humidity	10-90%, non condensing
	Altitude	0-10,000 feet
Warranty	Lifetime	

TRANSITION networks

DECLARATION OF CONFORMITY

Name of Mfg: **Transition Networks**
6475 City West Parkway, Minneapolis MN 55344 USA

Model: **C/E-TX-SX-02 Series Media Converters**

Part Number(s): **C/E-TX-SX-02, C/E-TX-SX-02(SC)**

Regulation: **EMC Directive 89/336/EEC**

Purpose: To declare that the ***C/E-TX-SX-02*** to which this declaration refers is in conformity with the following standards.

EMC-CISPR 22: 1985 Class A; EN 55022: 1988 Class A; EN 50082-1:1992; EN 60950 A4:1997; IEC 801.2, IEC 801.3, and IEC 801.4; IEC 950

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).

Stephen Anderson, Vice-President of Engineering

November 1, 1999
Date

CABLE SPECIFICATIONS

The physical characteristics of the media cable must meet or exceed IEEE 802.3 specifications.

Fiber Cable

MULTIMODE

Fiber Optic Cable Recommended:	62.5 / 125 µm multimode fiber	
Optional:	100 / 140 µm multimode fiber	
	85 / 125 µm multimode fiber	
	50 / 125 µm multimode fiber	
Wavelength :	850 nM	
Attenuation:	≤3.75 dB/ 1 kilometer @ 850 nM	
Fiber-optic Transmitter Power:	min: -16.0 dBm	max: -10.0 dBm
Fiber-optic Receiver Sensitivity:	min: -29.50 dBm	max: -7.2 dBm
Link Budget	13.5 dB	
Typical Maximum Cable Distance:*	Full-duplex: 300 meters	
	Half Duplex: See page 4	

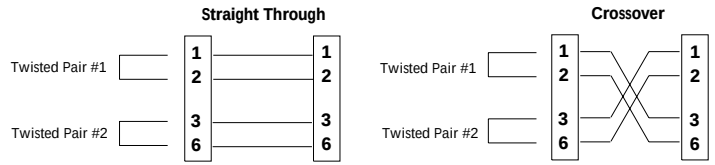
*Actual distance dependent upon physical characteristics of network installation.

Copper Cable

Category 5 twisted-pair copper wire is required. Either shielded twisted-pair (STP) or unshielded twisted-pair (UTP) can be used. DO NOT USE FLAT OR SILVER SATIN WIRE.

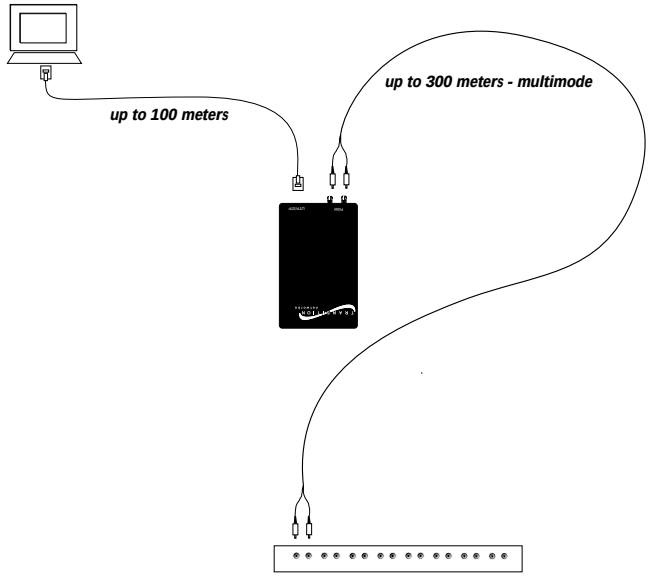
CATEGORY 5:

Gauge	24 to 22 AWG
Attenuation	22.0 dB /100m @ 100 MHz
Maximum Cable Distance:	100 meters
RJ-45 Pin-out::	Pin 1=TD+, Pin 2=TD-, Pin 3=RD+, Pin 6=RD-

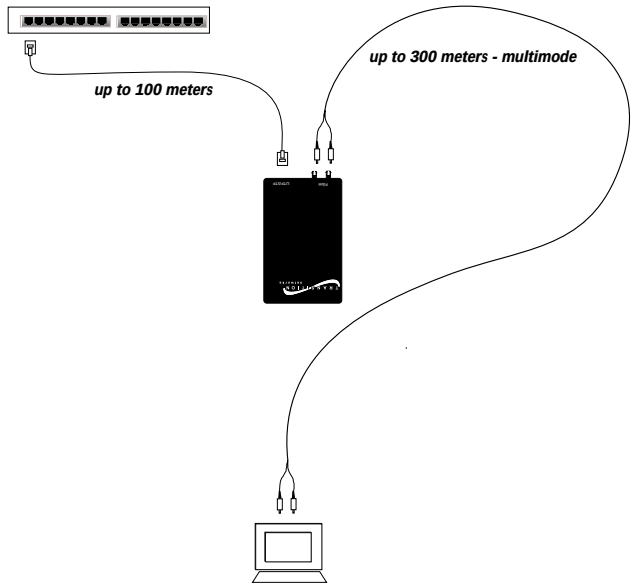


Twisted pair connection requires two active pairs configured as straight through and/or crossover. The two active pairs in an Ethernet™ network are pins 1 & 2 and pins 3 & 6. Use only dedicated wire pairs (such as blue/white & white/blue, orange/white & white/orange) for the active pins.

Use the the C/E-TX-SX-02 media converter to extend the distance between a 10BASE-T or a 100BASE-TX terminal device and a 10BASE-FL or a 100BASE-SX (half-duplex only) hub, switch, or router:



Or use the the C/E-TX-SX-02 media converter to extend the distance between a 10BASE-T or a 100BASE-TX hub, switch, or router and a 10BASE-FL or a 100BASE-SX terminal device:



C/E-TX-SX-02 IN THE NETWORK (continued)

Media Converter in Full-Duplex Network

In a full-duplex network, maximum cable lengths are determined by the cables used. See page 10 for cable specifications.

NOTE: The 512-Bit Rule described below does NOT apply in a full-duplex network.

Media Converter in Half-Duplex Network

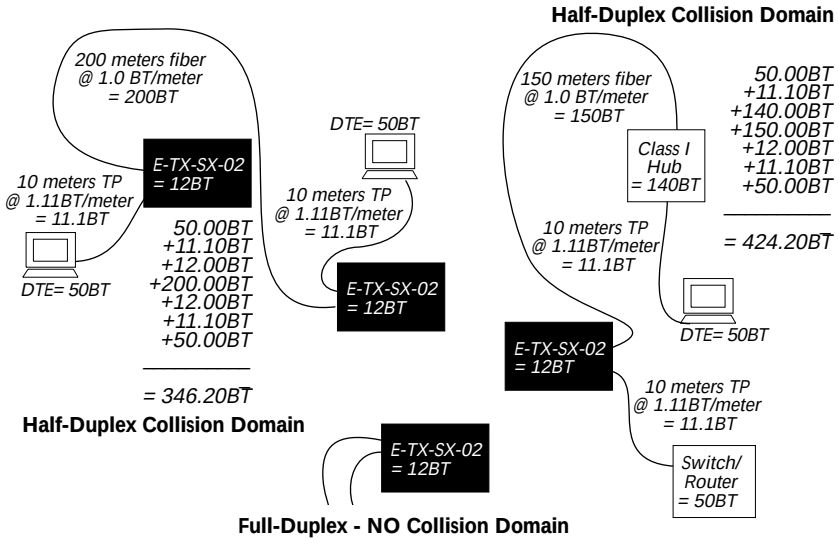
The 512-Bit Rule applies separately to each collision domain.

USING THE 512-BIT RULE

In a half-duplex network, maximum cable lengths are determined by the round trip delay limitations of each Fast Ethernet™ collision domain. (Switches and routers divide the network into separate Ethernet™ collision domains.) The 512-Bit Rule determines maximum distances by calculating the collision domain round-trip delay in bit-times.

Class I repeater	140 BT
Class II repeater	92 BT
DTE (PC, switch, router)	50 BT
C/E-TX-SX-02	**12 BT**
1 meter CAT.5 TP cable	1.11 BT
1 meter fiber cable	1 BT
Fast Ethernet switch	50 BT

To calculate a collision domain round-trip delay in bit-times, find the longest path between any two terminal devices in the collision domain. Calculate the round trip delay by multiplying the length of the cable (in meters) by the delay per meter (in bit-times (BT)), then take the sum of all cable delays plus station (DTE), repeater, and media converter delays. If the result is less than or equal to 512 bit-times, the path is good.



YES - QUICKLY

- The media converter has selected 100 Mb/s operation. If this is NOT the correct speed, disconnect and reconnect the 10/100BASE-TX cable to restart the initialization process. If the fault is not corrected, proceed to step 6.

6. Is the 10/100TX *ACT(ivity)* LED illuminated?

NO

- If there is no activity on the 10/100BASE-TX port, proceed to step 7.
- If there is activity on the 10/100BASE-TX port, disconnect and reconnect the 10/100BASE-TX cable to restart the initialization process.
- Restart the workstation to restart the initialization process.
- Contact Technical Support: (800) 260-1312.

YES

- Proceed to step 7.

7. Is the 10/100SX *ACT(ivity)* LED illuminated?

NO

- If there is no activity on the 10/100BASE-SX port, continue below
- If there is activity on the 10/100BASE-SX port, disconnect and reconnect the 10/100BASE-SX cable to restart the initialization process.
- Restart the workstation to restart the initialization process.
- Contact Technical Support: (800) 260-1312.

YES

- Contact Technical Support: (800) 260-1312.

- Verify that TX and RX cables on media converter are connected to RX and TX ports, respectively, on other device.

FAULT ISOLATION and CORRECTION

If the media converter fails, isolate and correct the fault by determining the answers to the following questions and then taking the indicated action:

1. Is the *P(o)W(e)R* LED on the media converter illuminated?

NO

- Is the power cord properly installed in the media converter and in the grounded AC outlet?
- Does the grounded AC outlet provide power?
- Contact Technical Support: (800) 260-1312.

YES

- Proceed to step 2.

2. Does the 10/100TX *STAT(us)* LED blink ONCE and then go off?

YES

- Check twisted pair cables for proper connection.
- Contact Technical Support: (800) 260-1312.

NO

- Proceed to step 3.

3. Does the 10/100FX *STAT(us)* LED blink FIVE TIMES and then go off?

YES

- **10Mb/s:** Receive Pair has wrong polarity.
- **100Mb/s:** Proceed to step 4.

NO

- Proceed to step 4.

4. Does the 10/100SX *STAT(us)* LED blink ONCE and then go off?

YES

- Check fiber cables for proper connection.
- Verify that TX and RX cables on media converter are connected to RX and TX ports, respectively, on other device.
- Contact Technical Support: (800) 260-1312.

NO

- Proceed to step 5.

5. Is the *100* LED blinking?

NO

- The media converter has selected 10 Mb/s operation. If this is NOT the correct speed, disconnect and reconnect the 10/100BASE-TX cable to restart the initialization process. If the fault is not corrected, proceed to step 6.

YES - SLOWLY

- The media converter is selecting between 10 Mb/s and 100 Mb/s speed OR one or both of the links is down. **IF PERSISTENT**, disconnect and reconnect *either* cable to restart the initialization process. If the fault is not corrected, proceed to step 6.

INSTALLATION

Install Slide-In-Module in E-MCC-1600 Chassis

NOTE: Media Converter Slide-in-Modules can be installed in any installation slot, in any order.

- Remove Media Converter Slide-in-Module protective plate from selected installation slot by removing screw that secures plate to front of E-MCC-1600 chassis.
- Carefully slide Media Converter Slide-in-Module into installation slot, aligning Media Converter Slide-in-Module with installation guides.

  NOTE: Ensure that the Media Converter Slide-in-Module is firmly seated against the backplane.
- Secure Slide-in-Module by securing panel fastener screw attached to Slide-in-Module to E-MCC-1600 chassis.

Install Cable

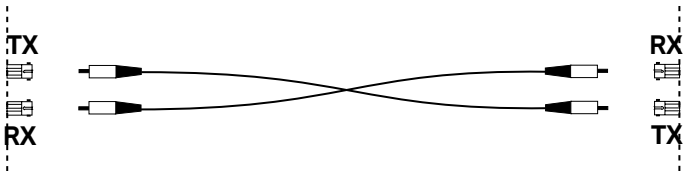
COPPER

NOTE: AutoCross™ allows the use of either straight-through or crossover configuration cables.

1. Locate or build 10BASE-T-compliant or 100BASE-TX-compliant cables with male RJ-45 connectors installed at both ends.
2. Connect RJ-45 connector at one end of cable to media converter RJ-45 port connector.
3. Connect RJ-45 connector at other end of cable to 10BASE-T-compliant or 100BASE-TX-compliant device RJ-45 port connector.

FIBER

1. Locate or build 10/100BASE-SX-compliant fiber cable with male two-stranded TX to RX connectors installed at both ends.

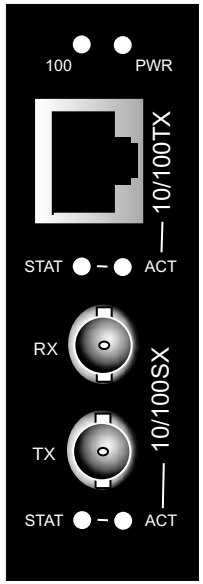


2. Connect male TX and RX cable connectors at one end of cable to TX and RX female connectors, respectively, on media converter.
3. Connect male TX and RX cable connectors at other end of cable to 10/100BASE-SX-compliant device RX and TX connectors, respectively.

OPERATION

Using Status LEDs

Use the status LEDs to monitor media converter operation in the network.



100 Steady LED indicates 100 Mb/s operation.

One (1) continuous, **slowly** flashing blink indicates speed selection in progress.

One (1) continuous, **quickly** flashing blink indicates 100 Mb/s operation.

Po(W)e(R) Steady LED indicates connection to external AC power.

STAT(us) (**10/100TX**) Steady LED indicates normal operation.

One (1) continuous, flashing blink indicates Link Down.

Five (5) continuous, flashing blinks when the selected speed is 10 Mb/s indicates that the receive pair has the wrong polarity; five (5) continuous, flashing blinks when the selected speed is 100 Mb/s should be ignored.

ACT(ivity) (**10/100TX**) Flashing LED indicates 10/100BASE-TX activity.

STAT(us) (**10/100SX**) Steady LED indicates normal operation.

One (1) continuous, flashing blink indicates Link Down.

ACT(ivity) (**10/100SX**) Flashing LED indicates 10/100BASE-SX activity.

*Using AutoCross™**

The ***AutoCross™*** feature allows either straight-through (MDI) or crossover (MDI-X) cables to be used when connecting to 10BASE-T or to 100BASE-TX devices, such as hubs, transceivers, or network interface cards (NICs). AutoCross™ determines the characteristics of the cable connection and automatically configures the unit to link up, regardless of the cable configuration.

*Requires no operator intervention.

*Using Autonegotiation**

The C/E-TX-SX-02 series media converter *Autonegotiation* feature allows the media converter to be used with 10BASE-T, 100BASE-TX, 10BASE-FL and 100BASE-SX ports.

The media converter will bring up the link in the highest speed and mode possible between the station and the device.

*Requires no operator intervention.

Using LinkAlert™

The C/E-TX-SX-02 series media converter *LinkAlert*™ feature allows the media converter to pass 10/100BASE-TX-side link faults over the link to the 10/100BASE-SX side and to pass 10/100BASE-SX-side link faults over the link to the 10/100BASE-TX side.

If the C/E-TX-SX-02 media converter does not detect a good link on the 10/100BASE-TX side, the C/E-TX-SX-02 disables all transmission (including active-idle) on the 10/100BASE-SX side.