TRANSITION NETWORKS®

User's Guide

E-100BTX-FX-05

Stand-Alone Media Converter

- **Fast Ethernet**
- **Copper to Fiber**
- **100Base-TX to 100Base-FX**
- **Extended Temperature**

Transition Networks E-100BTX-FX-05 Fast Ethernet media converter connects 100Base-TX shielded or unshielded twisted-pair copper cable to 100Base-FX fiber-optic cable. The E-100BTX-FX-05 series of media converters include both standard temperature models *(listed below)* and extended temperature model.

Standard Temperature Models: 0°C to 50°C *(32°F to 122°F)*

Part Number	Port One - Copper 100Base-TX	Port Two - Duplex Fiber-Optic 100Base-FX
E-100BTX-FX-05	RJ-45 100 m *(328 ft)**	ST, 1300 nm multimode 2 km *(1.2 miles)**
E-100BTX-FX-05(SC)	RJ-45 100 m *(328 ft)**	SC, 1300 nm multimode 2 km *(1.2 miles)**
E-100BTX-FX-05(LC)	RJ-45 100 m *(328 ft)**	LC, 1300 nm multimode 2 km *(1.2 miles)**
E-100BTX-FX-05(MT)	RJ-45 100 m *(328 ft)**	MT-RJ, 1300 nm multimode 2 km *(1.2 miles)**
E-100BTX-FX-05(SM)	RJ-45 100 m *(328 ft)**	SC, 1310 nm single mode 20 km *(12.4 miles)**
E-100BTX-FX-05(SMLC)	RJ-45 100 m *(328 ft)**	LC, 1310 nm single mode 20 km *(12.4 miles)**
E-100BTX-FX-05(LH)	RJ-45 100 m (*328 ft)**	SC, 1310 nm single mode 40 km *(24.9 miles)**
E-100BTX-FX-05(XL)	RJ-45 100 m *(328 ft)**	SC, 1310 nm single mode 60 km *(37.3 miles)**
E-100BTX-FX-05(LW)	RJ-45 100 m *(328 ft)**	SC, 1550 nm single mode 80 km *(49.7 miles)**
E-100BTX-FX-05(XLW)	RJ-45 100 m *(328 ft)**	SC, 1550 nm single mode 120 km *(74.56 miles)**

* Typical maximum cable distance. Actual distance is dependent upon the physical characteristics of the network installation.

The media converters with the "HT" extension in the part number can be used in an extended temperature environment from -25°C to 65°C *(-13°F to 149°F)*.

Part Number	Port One - Copper 100Base-TX	Port Two - Duplex Fiber-Optic 100Base-FX
E-100BTX-FX-05(HT)	RJ-45 100 m *(328 ft)**	ST, 1300 nm multimode 2 km *(1.2 miles)**
E-100BTX-FX-05(SCHT)	RJ-45 100 m *(328 ft)**	SC, 1300 nm multimode 2 km *(1.2 miles)**
E-100BTX-FX-05(SMHT)	RJ-45 100 m *(328 ft)**	SC, 1310 nm single mode 20 km *(12.4 miles)**
E-100BTX-FX-05(LHHT)	RJ-45 100 m *(328 ft)**	SC, 1310 nm single mode 40 km *(24.9 miles)**
E-100BTX-FX-05(XLHT)	RJ-45 100 m *(328 ft)**	SC, 1310 nm single mode 60 km *(37.3 miles)**
E-100BTX-FX-05(LWHT)	RJ-45 100 m *(328 ft)**	SC, 1550 nm single mode 80 km *(49.7 miles)**
E-100BTX-FX-05(100HT)**	RJ-45 100 m *(328 ft)**	SC, 1310Tx/1550Rx nm single mode 20 km *(12.4 miles)**
E-100BTX-FX-05(101HT)**	RJ-45 100 m *(328 ft)**	SC, 1550Tx/1310Rx nm single mode 20 km *(12.4 miles)**

**E-100BTX-FX-05(100/101HT) are installed in pairs.

Accessories sold separately

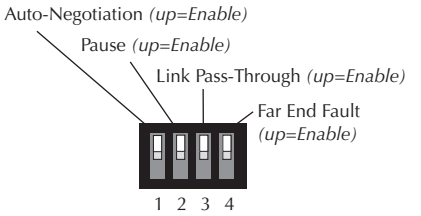
Part Number	Description
SPS-1872-SA	Optional External Power Supply; 18-72VDC Stand-Alone Wide-Input; Output: 12.6VDC, 1.0 A
SPS-1872-CC	Optional External Power Supply; 18-72VDC Piggy-Back Wide-Input; Output: 12.6VDC, 1.0 A
E-MCR-04	12-Slot Media Converter Rack *(includes universal internal power supply)* 17 x 15 x 5 in. *(432 x 381 x 127 mm)*
WMBL	Optional Wall Mount Brackets; 4.0 in. *(102 mm)*
WMBV	Optional Vertical Mount Bracket; 5.0 in. *(127 mm)*
WMBD	Optional DIN Rail Mount Bracket; 5.0 in. *(127 mm)*
WMBD-FS	Optional DIN Rail Mount Bracket *(flat, small)*; 3.1in. *(79 mm)*

Installation

CAUTION: Wear a grounding device and observe electrostatic discharge precautions when setting the 4-position switch and jumper. Failure to observe this caution could result in damage or failure of the media converter.

4-position switch

- The 4-position switch is located on the side of the media converter. Use a small flat-blade screwdriver or a similar device to set the recessed switches.



1. Auto-Negotiation
   up Enables Auto-Negotiation for the copper connection.
   down Disables Auto-Negotiation for the copper connection.
2. Pause Control
   up Enabled
   down Disabled
3. Link Pass-Through
   up Enabled
   down Disabled
4. Far-End Fault
   up Enabled
   down Disabled

AutoCross™ Jumper

The AutoCross feature allows either straight-through (MDI) or crossover (MDI-X) cables to be used when connecting to 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.

NOTE: AutoCross is enabled by default, the recommended state.

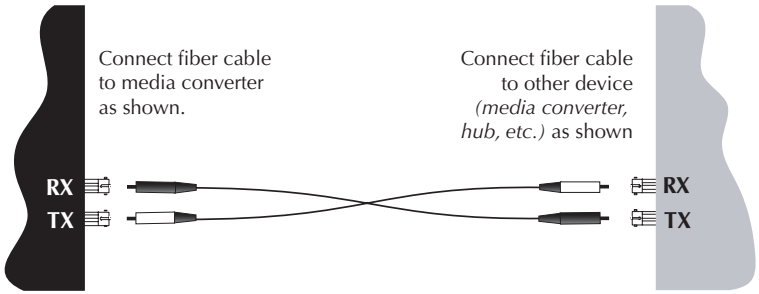
The jumper is located on the media converter's circuit board To set the jumper:

1. Using a small screwdriver, remove the four (4) screws that secure the cover; then remove the cover from the media converter.
2. Locate header J3 on the circuit board; using a small needle-nosed pliers move the jumper to the desired position. (*Refer to the drawing to the right.)*
3. Carefully replace the cover, and then replace the four (4) screws to secure the cover to the media converter.

Installation -- Continued

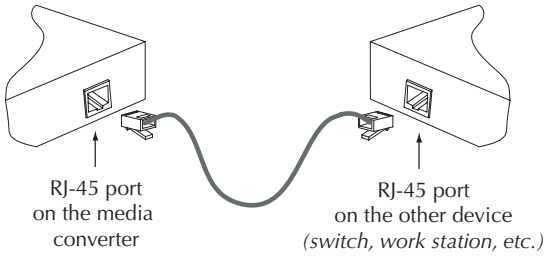
Installing the fiber cable

1. Locate a 100Base-FX compliant fiber cable with male, two-stranded TX to RX connectors installed at both ends.
2. Connect the fiber cables to the media converter as described:
   - Connect the male TX cable connector to the female TX port.
   - Connect the male RX cable connector to the female RX port.
3. Connect the fiber cables to the other device *(another media converter, hub, etc.)* as described:
   - Connect the male TX cable connector to the female RX port.
   - Connect the male RX cable connector to the female TX port.



Installing the copper cable

1. Locate or build 100Base-TX compliant copper cables with male, RJ-45 connectors installed at both ends.
2. Connect the RJ-45 connector at one end of the cable to the RJ-45 port on the media converter.
3. Connect the RJ-45 connector at the other end of the cable to the RJ-45 port on the other device *(switch, workstation, etc.)*.



Installation -- Continued

Power the media converter

AC

1. Install the power cord barrel connector into the back of the media converter.
2. Connect the power adapter plug into AC power.
3. Verify that the media converter is powered by observing the illuminated LED power indicator light.

DC

Consult user guide 33266 for information on the SPS-1872-xx DC external power supply.

Operation

Status LEDs

Use the status LEDs to monitor the E-100BTX-FX-05 media converter operation in the network.

Power	*(Power)*	On = Connection to external AC power.
SDF	*(Signal Detect/Fiber)*	On = Fiber link is detected.
SDC	*(Signal Detect/Copper)*	On = Copper link is detected.
RXC	*(Receive/Copper)*	Flashing = A signal is being received on the copper link.
RXF	*(Receive/Fiber)*	Flashing = A signal is being received on the fiber link.

Auto-Negotiation

When the Auto-Negotiation feature is activated, the media converter configures itself to achieve the best possible mode of operation over a link automatically. The media converter broadcasts its speed *(100 Mb/s)* and duplex capabilities *(either full- or half-duplex)* and negotiates the best mode of operation between the two devices.

Operation -- Continued

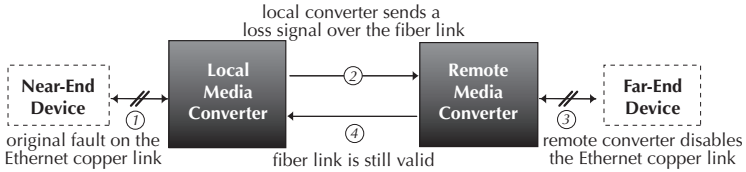
Pause Control

The Pause feature can improve network performance by allowing one end of the link to signal the other to discontinue frame transmission for a set period of time to relieve buffer congestion.

NOTE: If the Pause feature is present on ALL network devices attached to the media converter(s), enable the Pause feature on the media converter(s). Otherwise, disable the Pause feature

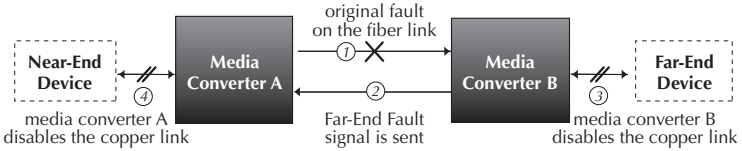
Link Pass-Through

The Link Pass-Through feature allows the media converter to monitor both the fiber and copper RX *(receive)* ports for loss of signal. In the event of a loss of an RX signal (1), the media converter will automatically disable the TX *(transmit)* signal (2), thus, "passing through" the link loss (3). The far-end device is automatically notified of the link loss (4), which prevents the loss of valuable data unknowingly transmitted over an invalid link.



Far-End Fault

When a fault occurs on an incoming fiber link (1), the media converter transmits a Far-End Fault signal on the outgoing fiber link (2). In addition the Far-End Fault signal also activates the Link Pass-Through, which, in turn, disables the link on the copper portion of the network (3) and (4).



Cable Specifications -- continued

Extended temperature models -- continued

E-100BTX-FX-05(100HT)	1310Tx/1550Rx nm single mode	
E-100BTX-FX-05(101HT)	1550Tx/1310Rx nm single mode	
Fiber-optic Transmitter Power:	min: -14.0 dBm	max:-8.0 dBm
Fiber-optic Receiver Sensitivity:	min: -33.0 dBm	max: -3.0 dBm
Link Budget:	19.0 dB	

Standard models

E-100BTX-FX-05	1300 nm multimode	
Fiber Optic Transmitter Power:	min: -19.0 dBm	max: -14.0 dBm
Fiber Optic Receiver Sensitivity:	min: -30.0 dBm	max: -14.0 dBm
Link Budget:	11.0 dB	
E-100BTX-FX-05(SC)	1300 nm multimode	
Fiber Optic Transmitter Power:	min: -19.0 dBm	max: -14.0 dBm
Fiber Optic Receiver Sensitivity:	min: -30.0 dBm	max: -14.0 dBm
Link Budget:	11.0 dB	
E-100BTX-FX-05(MT)	1300 nm multimode	
Fiber Optic Transmitter Power:	min: -19.0 dBm	max: -14.0 dBm
Fiber Optic Receiver Sensitivity:	min: -33.5 dBm	max: -14.0 dBm
Link Budget:	14.5 dB	
E-100BTX-FX-05(SM)	1310 nm single mode	
Fiber-optic Transmitter Power:	min: -15.0 dBm	max: -8.0 dBm
Fiber-optic Receiver Sensitivity:	min: -31.0 dBm	max: -8.0 dBm
Link Budget:	16.0 dB	
E-100BTX-FX-05(SMLC)	1310 nm single mode	
Fiber-optic Transmitter Power:	min: -15.2 dBm	max: -8.0 dBm
Fiber-optic Receiver Sensitivity:	min: -32.5 dBm	max: -3.0 dBm
Link Budget:	17.3 dB	
E-100BTX-FX-05(LH)	1310 nm single mode	
Fiber-optic Transmitter Power:	min: -8.0 dBm	max: -2.0 dBm
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm	max: -7.0 dBm
Link Budget:	26.0 dB	
E-100BTX-FX-05(XL)	1310 nm single mode	
E-100BTX-FX-05(LW)	1550 nm single mode	
Fiber-optic Transmitter Power:	min: -5.0 dBm	max: 0.0 dBm
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm	max: -7.0 dBm
Link Budget:	29.0 dB	

The fiber optic transmitters on this device meet Class I Laser safety requirements per IEC-825/CDRH standards and comply with 21 CFR1040.10 and 21CFR1040.11.

Standard Models -- continued

E-100BTX-FX-05(XLW)	1550 nm single mode	
Fiber-optic Transmitter Power:	min: 0.0 dBm	max: 5.0 dBm
Fiber-optic Receiver Sensitivity:	min: -36.0 dBm	max: -3.0 dBm
Link Budget:	36.0 dB	

The fiber optic transmitters on this device meet Class I Laser safety requirements per IEC-825/CDRH standards and comply with 21 CFR1040.10 and 21CFR1040.11.

Cable Specifications

The physical characteristics must meet or exceed IEEE 802.3™ specifications.

Fiber cable

Bit Error Rate:	<10-9
Single mode fiber *(recommended)*:	9 µm
Multimode fiber *(recommended)*:	62.5/125 µm
Multimode fiber *(optional)*:	100/140, 85/140, 50/125 µm

Extended temperature models

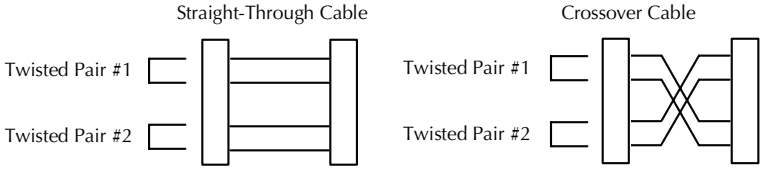
E-100BTX-FX-05(HT)	1300 nm multimode	
Fiber Optic Transmitter Power:	min: -19.0 dBm	max: -14.0 dBm
Fiber Optic Receiver Sensitivity:	min: -30.0 dBm	max: -14.0 dBm
Link Budget:	11.0 dB	
E-100BTX-FX-05(SCHT)	1300 nm multimode	
Fiber Optic Transmitter Power:	min: -19.0 dBm	max: -14.0 dBm
Fiber Optic Receiver Sensitivity:	min: -30.0 dBm	max: -14.0 dBm
Link Budget:	11.0 dB	
E-100BTX-FX-05(SMHT)	1310 nm single mode	
Fiber-optic Transmitter Power:	min: -15.0 dBm	max: -8.0 dBm
Fiber-optic Receiver Sensitivity:	min: -31.0 dBm	max: -8.0 dBm
Link Budget:	16.0 dB	
E-100BTX-FX-05(LHHT)	1310 nm single mode	
Fiber-optic Transmitter Power:	min: -8.0 dBm	max: -2.0 dBm
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm	max: -7.0 dBm
Link Budget:	26.0 dB	
E-100BTX-FX-05(XLHT)	1310 nm single mode	
Fiber-optic Transmitter Power:	min: -5.0 dBm	max: 0.0 dBm
Fiber-optic Receiver Sensitivity:	min: -38.0 dBm	max: -8.0 dBm
Link Budget:	33.0 dB	
E-100BTX-FX-05(LWHT)	1550 nm single mode	
Fiber-optic Transmitter Power:	min: -5.0 dBm	max: 0.0 dBm
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm	max: -7.0 dBm
Link Budget:	29.0 dB	

Cable Specifications -- Continued

Copper cable

Category 5: *(minimum requirement)*	
Gauge:	24 to 22 AWG
Attenuation:	22.0 dB /100m @ 100 MHz
Maximum Cable Distance:	100 meters

- Straight-through OR crossover cable may be used.
- Shielded twisted-pair (STP) OR unshielded twisted-pair (UTP) may be used
- Pins 1&2 and 3&6 are the two active pairs in an Ethernet network .
- RJ-45 Pin-out: Pin 1 = TD+, Pin 2 = TD-, Pin 3 = RD+, Pin 6 = RD-
- Use only dedicated wire pairs for the active pins: (e.g., blue/white & white/blue, orange/white & white/orange, etc.)
- Do not use flat or silver satin wire.



Technical Specifications

For use with Transition Networks Model E-100BTX-FX-05(xxxx) or equivalent

Standards:	IEEE 802.3	
Data rate:	100 Mb/s	
Dimensions:	4.75" x 3.0" x 1.0" *(119mm x 76mm x 25mm)*	
Weight:	6 oz. *(181 g)* approximate	
MTBF	46,768 hours *(MIL217F2 V5.0) (MIL-HDBK-217F)* 123,821 hours (Bellcore7 V5.0)	
Power supply: DC output:	*(standard temperature)* *(extended temperature)* minimum output regulation: 5%	12 VDC, 0.5 A *(minimum)* 9 VDC, 1.0 A *(minimum)*
Environment:	Tmra* *(standard temp)*: Storage Temperature:	0°C to 50°C *(32 to 122°F)* -15°C to 65°C *(5 to 149°F)*
	Tmra* *(extended temp)*: Storage Temperature:	-25°C to 65°C *(-13 to 149°F)* -25°C to 65°C *(5 to 149°F)*
	Humidity:	10% – 90%, non-condensing
	Altitude:	0 to 10,000 feet
Warranty:	Lifetime	

*Manufacturer's rated ambient temperature.

Product is certified by the manufacturer to comply with DHHS Rule 21/CFR, Subchapter J applicable at the date of manufacture.

CAUTION: Visible and invisible laser radiation when open. Do not stare into beam or view directly with optical instruments.

CAUTION: Use of controls, adjustments or the performance of procedures other than those specified herein may result in hazardous radiation exposure.

Troubleshooting

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

Note: Dip switch positions **3** and **4** must be DOWN before strarting the troubleshooting process.

1. Is the Power LED illuminated?
   NO
   - Is the power adapter the correct model *(check I/O voltage and Hz)*?
   - Verify the voltage and frequency of the AC outlet?
   - Is the power adapter properly installed in the media converter and in the outlet?
   - Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

   YES
   - Proceed to step 2.

2. Is the SDC *(signal detect/copper)* LED illuminated?
   NO
   - Check the twisted-pair cables for proper connection.
   - Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

   YES
   - Proceed to step 3.

3. Is the SDF LED *(signal detect/fiber)* illuminated?
   NO
   - Check the fiber cables for proper connection.
   - Verify that the TX and RX cables on the media converter are connected to the RX and TX ports, respectively, on the other device.
   - Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

   YES
   - Proceed to step 4.

4. Is the RXC *(receive/copper)* LED flashing?
   NO
   - If there is no activity on the UTP/STP port, proceed to step 5.
   - If there is activity on the UTP/STP port, disconnect and reconnect the twisted-pair cable to restart the initialization process.
   - Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

   YES
   - Proceed to step 5.

5. Is the RXF *(receive/fiber)* LED flashing?
   NO
   - If there is no activity on the fiber port, contact Tech Support.
   - If there is activity on the fiber port, disconnect and reconnect the fiber cable to restart the initialization process.
   - Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

   YES
   - Contact Tech Support: 800-260-1312, Int'l: 00-1-952-941-7600.

Contact Us

Technical support
Technical support is available 24 hours a day.
US and Canada: 1-800-260-1312
International: 00-1-952-941-7600

Transition now
Chat live via the Web with Transition Networks Technical Support.
Log onto www.transition.com and click the Transition Now link.

Web-based seminars
Transition Networks provides seminars via live web-based training.
Log onto www.transition.com and click the Learning Center link.

E-Mail
Ask a question anytime by sending an e-mail to our technical support staff.
techsupport@transition.com

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10900 Red Circle Drive, Minnetonka, MN 55343, U.S.A.
telephone: 952-941-7600
toll free: 800-526-9267
fax: 952-941-2322

TRANSITION NETWORKS

Declaration of Conformity

Name of Mfg:	**Transition Networks** 10900 Red Circle Drive, Minnetonka MN 55343, U.S.A.
Model:	E-100BTX-FX-05(xxxx) Series Media Converters
Part Number(s):	E-100BTX-FX-05, E-100BTX-FX-05(SC), E-100BTX-FX-05(LC), E-100BTX-FX-05(MT), E-100BTX-FX-05(SM), E-100BTX-FX-05(SMLC), E-100BTX-FX-05(LH), E-100BTX-FX-05(XL), E-100BTX-FX-05(LW), E-100BTX-FX-05(XLW) E- 100BTX-FX-05(SMHT), E-100BTX-FX-05(HT), E-100BTX-FX-05(LHHT), E-100BTX-FX-05(XLHT), E-100BTX-FX-05(LWHT), E-100BTX-FX-05(SCHT) E-100BTX-FX-05(100HT), E-100BTX-FX-05(101HT)
Regulation:	EMC Directive 89/336/EEC

Purpose: To declare that the E-100BTX-FX-05 to which this declaration refers is in conformity with the following standards.

EN 55022:1994 + A1:1995 + A2:1997 Class A; FCC Part 15 Subpart B; EN 55024:1998; 21CFR subpart J; EN61000-3-2:1995; EN61000-3-3:1995

I, the undersigned, hereby declare that the equipment specified above conforms to the above

Stephen Anderson, Vice-President of Engineering — August, 2007 Date

Directive(s) and Standard(s).

Compliance Information

UL Listed
C-UL Listed
CISPR22/EN55022 Class A + EN55024
CE Mark

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 diesem Fäll ist der Benutzer für Gegenmaßnahmen verantwortlich.

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.

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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