



SPOEB10xx-100 User's Guide

- Stand-Alone Media Converter
- Power Over Ethernet
- 10/100Base-TX to 100Base-FX

The SPOEB10xx-1xx Power over Ethernet (POE) is a two port 10/100Base-TX to 100Base-FX media converter capable of providing power to Data Terminal Equipment (DTE) Power Devices (PD) via the Media Dependent Interface (MDI) twisted pair cable. The SPOEB10xx-100 emulates Power Sourcing Equipment (PSE) and provides power via the 10/100Base-TX interface for a remote PD device that complies with the IEEE802.3af™ standard.

Part Number	Port One - Copper 10/100Base-TX	Port Two - Duplex Fiber-Optic 100Base-FX
SPOEB1011-100	RJ-45 100 m (328 ft.)*	ST, 1300 nm multimode 2 km (1.2 miles)
SPOEB1013-100	RJ-45 100 m (328 ft.)*	SC, 1300 nm multimode 2 km (1.2 miles)
SPOEB1014-100	RJ-45 100 m (328 ft.)*	SC, 1310 nm single mode 20 km (12.4 miles)
SPOEB1015-100	RJ-45 100 m (328 ft.)*	SC, 1310nm single mode 40 km (24.9 miles)
SPOEB1016-100	RJ-45 100 m (328 ft.)*	SC, 1310 nm single mode 60 km (37.3 miles)
SPOEB1017-100	RJ-45 100 m (328 ft.)*	SC, 1550 nm single mode 80 km (49.7 miles)
SPOEB1035-100	RJ-45 100 m (328 ft.)*	SC, 1310 nm single mode 120 km (74.6 miles)

*Cable distances are the typical maximum distances. Actual distance is dependent upon the physical characteristics of the network installation.

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Part Number	Port One - Copper 10/100Base-TX	Port Two - Duplex Fiber-Optic 100Base-FX
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Single fiber, Installed in pairs

SPOEB1029-100	RJ-45 100 m (328 ft.)*	SC, 1310Tx/1550Rx nm single mode 20 km (12.4 miles)
SPOEB1029-101	RJ-45 100 m (328 ft.)*	SC, 1550Tx/1310Rx nm single mode 20 km (12.4 miles)

*Cable distances are the typical maximum distances. Actual distance is dependent upon the physical characteristics of the network installation.

Optional Accessories (sold separately)

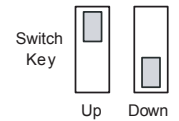
Part Number	Description
WMBL	Wall Mount Bracket Length: 4.0 in. (102 mm), fits converter length: 4.7 in. (119 mm)
WMBD	DIN Rail Mount Bracket; Length: 5.0 in. (127 mm)
WMBV	Vertical Wall Mount Plate; Length: 5.0 in. (127 mm)

Installation

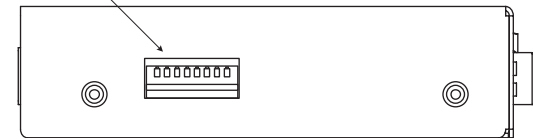
CAUTION: All installation and service must be performed by qualified service personnel. Read and follow all warning notices and instructions marked on the product and included in this manual.

Set the configuration switches

The configuration switches are located on the side panel of the SPOEB10xx-100 media converter. Use a small, flat blade screwdriver to set the switches.



8-Position Switch



Eight-position configuration switch

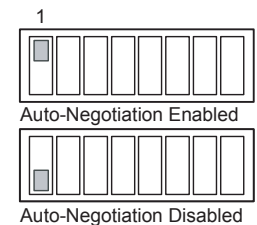
- SW1 - Auto-Negotiation TP
- SW2 - Speed TP
- SW3 - Duplex TP
- SW4 - Duplex Fiber
- SW5 - AutoCross TP
- SW6 - PSE power
- SW7 - PSE/LPT power
- SW8 - Not used

1 - Auto-Negotiation

Up - Enables Auto-Negotiation.

Down - Disables Auto-Negotiation.

The Auto-Negotiation feature allows the media converter to bring up the copper links to the highest speed and mode possible for all the attached network devices.

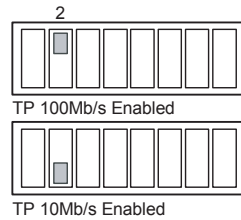


Installation -- continued

Eight-position configuration switch -- continued

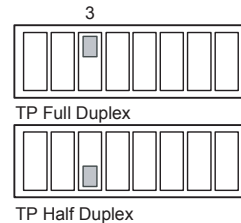
2 - Speed

Up - Forces 100 Mb/s on the copper port.
Down - Forces 10 Mb/s on the copper port.
(Only when Auto-Negotiation is disabled)



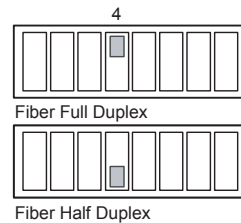
3 - TP Full/Half Duplex

Up - Full-Duplex the twisted-pair cable distances are constrained by the cable requirements.
Down - Half-Duplex the twisted-pair cable distances are constrained by the 512-Bit Rule.
(Only when Auto-Negotiation is disabled)



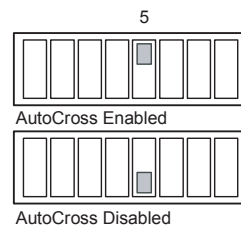
4 - Fiber Full/Half Duplex

Up - The cable distances for the fiber port are constrained by the cable requirements.
Down - The cable distances for the fiber port are constrained by the 512-Bit Rule.



5 - AutoCross™

Up - Enables the AutoCross function.
Down - Disables the AutoCross function.
The AutoCross™ feature allows either straight-through (MDI) or crossover (MDI-X) cables to be used when connecting to 100Base-TX devices, such as wireless access point, VoIP phone, network camera, etc. AutoCross determines the characteristics of the cable connection and automatically configures the unit to link up, regardless of the cable configuration.



Installation -- Continued

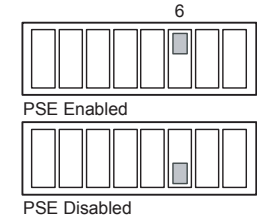
Eight-position configuration switch -- continued

6 - PSE Power

Up - Enables PSE power.

Down - Disables PSE power.

The IEEE 802.3af™ standard allows a device to provide power (PSE - Power Sourcing Equipment) to a remote device and for a remote device (PD - Powered Device) to accept and use this power over a twisted pair interface.

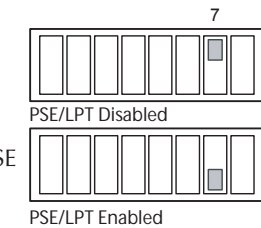


7 - PSE/LPT

Up - Disabled PSE/LPT.

Down - Enabled PSE/LPT.

This feature is used to re-initialize a powered device (PD). If the fiber RX (receive) link drops with the PSE/LPT switch in the enable position (down), the PSE power will turn OFF for two seconds then turn back ON to re-start the remote device. The power will remain ON to allow the remote PD to re-establish the link with the media converter.



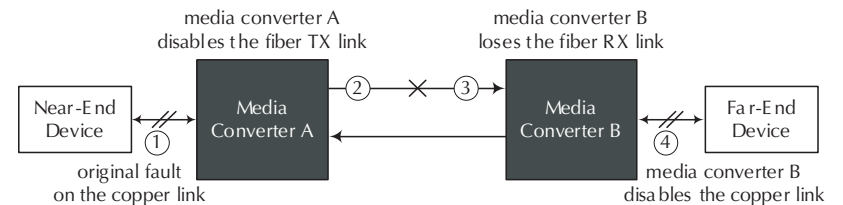
8 - Not Used

Additional features

Link Pass-Through (always enabled)

The Link Pass-Through 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 on one media port, the media converter will automatically disable the TX (transmit) signal of the other media port, thus, "passing through" the link loss.

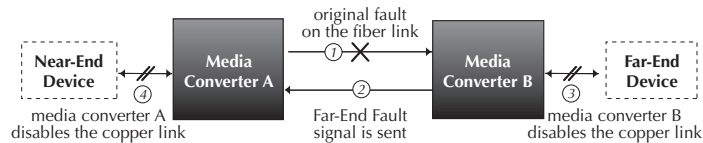
The far-end device is automatically notified of the link loss, which prevents the loss of valuable data unknowingly transmitted over an invalid link. See diagram below.



Installation- Continued

Far-End Fault (always enabled)

This troubleshooting feature generally used in conjunction with Link Pass Through to notify both end devices of a link loss. If the fiber RX signal is lost on the far end converter, the converter will automatically generate a far-end fault signal and send it on its TX fiber port to notify the near-end converter of the fiber link loss. Link Pass-Through will then disable the copper link on both ends, alerting both end devices of network trouble. See diagram below.



- Both end devices are notified automatically of the link loss
- Prevents loss of valuable data transmitted unknowingly over invalid link
- Allows quick diagnosis and resolution of network problem

Transition Networks' media converters that include the FEF feature will work with other network devices that support Far End Fault per IEEE standards.

Automatic Link Restoration (always enabled)

Transition Networks's converters will automatically re-establish the link in all network conditions:

- Without a device reset, the converters will automatically re-establish the link when connected to switches after a link loss.
- With Auto-Negotiation enabled, automatic link restoration allows using Auto-Negotiation with Link-Loss Notification.
- With Link Pass-Through enabled in both directions, automatic link restoration allows using Link-Loss Notification in both directions.

CAUTION: Associated Ethernet wiring shall be limited to inside the building.

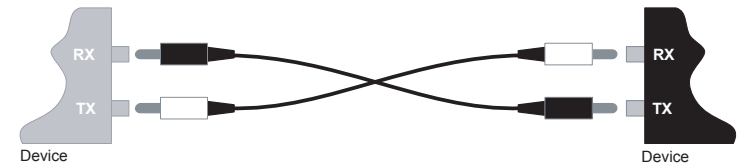
Installing fiber cables

1. Locate a 100Base-FX fiber cable with male, two-stranded TX to RX connectors installed at both ends.
2. Connect the fiber cables to the SPOEB10xx-100 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:

Installation -- Continued

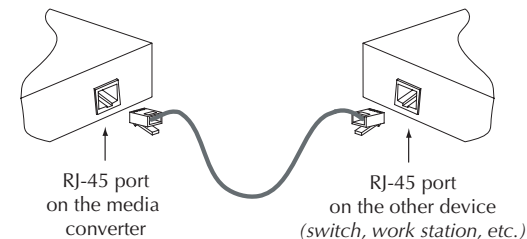
Install the fiber cable -- continued

- Connect the male TX cable connector to the female RX port.
- Connect the male RX cable connector to the female TX port.



Install the copper cable

1. Locate 100Base-TX 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 (*wireless access point, VoIP phone, network camera, etc.*).



Connecting power

1. Connect the barrel connector, on the power adapter, to the power port on the media converter (*back panel*).
2. Connect the power adapter plug to AC power.
3. Verify that the converter is powered by observing the illuminated LED power indicator light on the front panel

Note: If an under or over voltage condition is detected on the main power input, the error LED will turn ON. This means that the LED will stay ON even if the voltage returns to a valid level. This condition indicates a problem with the power supply adapter; therefore, the power supply adapter should be replaced.

Installation -- Continued

Power over Ethernet (PoE)

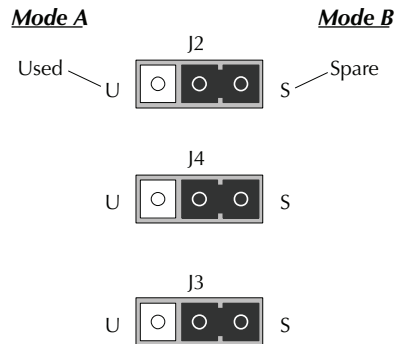
The SPOEB10xx-1xx media converter transmits electrical power, along with data, to remote devices over standard twisted-pair cable in an Ethernet network.

There are two modes of transmitting 48VDC PoE as defined in IEEE 802.3af:

Mode A uses pins 1&2, 3&6 to transmit data and power; Mode B uses pins 4&5, 7&8 to transmit power. These are the spare pairs in 10BASE-T and 100BASE-TX device configurations; therefore, Mode B requires a 4-pair cable.

To set A or B PoE Mode, do the following:

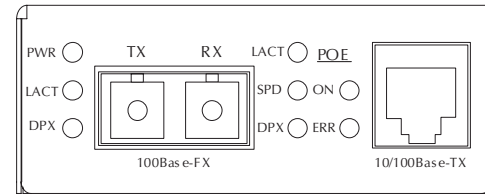
1. Remove the 4 screws and pull the cover off the media converter.
2. Locate the 3 header connects J2, J3, and J4.
- 2 Set jumpers 2, 3, and 4 to the same side, either (*S* or *U*). See diagram below.



Operation

Status LEDs

The SPOEB10xx-100 media converter front panel is shown below.



LED	Description
PWR	Green: Power ON
Fiber LACT	Green: ON = Link, Blinking = activity
Fiber DPX	Green: ON = Full, OFF = Half
TP* LACT	Green: ON = Link, Blinking = activity
TP SPD	Green: ON = 100Mb/s, OFF = 10Mb/s
TP DPX	Green: ON = Full, OFF = Half, Blinking = collision
TP ON (PSE)	Green: ON = Enabled, OFF = Disable
TP ERR (PSE)	Yellow: OFF = no problems detected Faults: <ul style="list-style-type: none"> • Yellow: ON solid = main power is over or under voltage • Blink: 1 times per sec - no signature detected • Blink: 2 times per sec - overload while applying power • Blink: 3 times per sec - short circuit detected • Blink: 4 times per sec - multiple problems detected * TP means twisted pair.

Cable Specifications

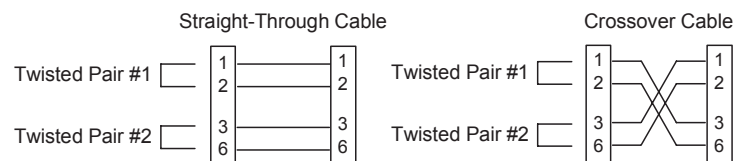
The cable's physical characteristics must meet or exceed IEEE 802.3™ specifications.

Copper cable

Category 5: (*Minimum Requirement*)

Gauge 24 to 22 AWG
Attenuation 22.0 dB /100m @ 100 MHz

- Straight-through OR crossover twisted-pair 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.

Fiber cable

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

SPOEB1011-100 (*DC-Powered*) 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

SPOEB1013-100 (*DC-Powered*) 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

SPOEB1014-100 (*DC-Powered*) 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

Cable Specifications -- Continued

SPOEB1015-100 (*DC-Powered*) 1310 nm multimode
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

SPOEB1016-100 (*DC-Powered*) 1310 nm multimode
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

SPOEB1017-100 (*DC-Powered*) 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

SPOEB1035-100 (*DC-Powered*) 1310 nm multimode
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

SPOEB1029-100 (*DC-Powered*) 1310Tx/1550Rx nm single mode
SPOEB1029-101 (*DC-Powered*) 1550Tx/1310Rx nm single mode
Fiber-optic Transmitter Power: min: -13.0 dBm max: -6.0 dBm
Fiber-optic Receiver Sensitivity: min: -32.0 dBm max: -3.0 dBm
Link Budget: 19.0 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.

Technical Specifications

For use with Transition Networks Model SPOEB10xx-100 or equivalent

Standards	IEEE 802.3, IEEE 802.3af
Data Rate	10/100 Mb/s
Packet Size (Max)	1522 bytes
Mac Address	2K
Dimensions	3.25" x 1" x 4.8" (82 mm x 25.4mm x 120mm)
Weight	0.8 lbs. (362 g) approximately
Power Consumption	20 watts (maximum)
Power Supply	48VDC, 0.67A external wall-mount adapter
Output Voltage	0.35A @ 48VDC, 16.8W
Environment	Tmra*: 0 to 40°C (32 to 104°F) Storage Temp: -25 to 85°C (-13 to 185°F) Humidity: 5 to 95%, non-condensing Altitude: 0 to 10,000 feet
MTBF	49,981 MIL217F2 Hours 132,144 Bellcore Hours
Warranty	Lifetime

*Manufacturer's rated ambient temperature.

Note: The information in this user's guide is subject to change. For the most up-to-date information on the SPOEB10xx-100 media converter, view the user's guide on-line at: www.transition.com.

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

WARNING: Visible and invisible laser radiation when open. Do not stare into the beam or view the beam directly with optical instruments. Failure to observe this warning could result in an eye injury or blindness.

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

WARNING: If the media converter is an IEEE802.3-2005 Powered Device (PD) capable of receiving power via the Media Dependent Interface (MDI) leads, the power source, connector, and cabling attached to the barrel power connector must meet the isolation requirement specified in IEEE802.3-2005. Failure to observe this warning could result in an electrical shock.

IMPORTANT: Copper based media ports, e.g., Twisted Pair (TP) Ethernet, USB, RS232, RS422, RS485, DS1, DS3, Video Coax, etc., are intended to be connected to intra-building (inside plant) link segments that are not subject to lightening transients or power faults. Copper based media ports, e.g., Twisted Pair (TP) Ethernet, USB, RS232, RS422, RS485, DS1, DS3, Video Coax, etc., are NOT to be connected to inter-building (*outside plant*) link segments that are subject to lightening transients or power faults. Failure to observe this caution could result in damage to equipment.

*MTBF is estimated using the predictability method. This method is based on MIL-217F at 25°C ambient temperature, typical enclosure heat rise of 10°C, and nominal operating conditions and parameters. Installation and configuration specific MTBF estimates are available upon request. Contact Technical Support.

Troubleshooting

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

- Is the media converter power LED ON?
NO:
 - Is the barrel connector fully inserted into the media converter?
 - Is the adapter plugged into an AC outlet; if not, plug it into the outlet.
 - Is the AC outlet active; if not, check the outlet's circuit breaker?
 - Contact Technical Support: 1.800.466.4526, then press "2."
 YES
 - Proceed to step 2.
- Is the POE LED ON?
NO
 - Is there an active (*connected to another device*) RJ-45 cable inserted into the media converter's TX port; if not, insert the cable accordingly.
 - Is the power turned ON to the other device?
 - Contact Technical Support: 1.800.466.4526, then press "2."
 YES
 - Go to step 3.
- Is the TX LACT LED ON?
NO
 - Check the twisted pair cables for proper installation in the device at both ends.
 - Disconnect and reconnect the twisted pair cable to restart the initialization process.
 - Restart the attached device to restart the initialization process.
 - Check that the AutoCross switch is in the UP position (*enabled*).
 - Contact Tech Support: 1-800-260-1312.
 YES
 - Go to step 4.
- Is the FL LINK LED ON?
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.
 - Disconnect and reconnect the fiber cable to restart the initialization process.
 - Restart the attached device to restart the initialization process.
 - Contact Tech Support: 1-800-260-1312.
 YES
 - Proceed to step 5.

Troubleshooting -- continued

5. Is data being passed through the device?

NO

- Ensure the Powered Device (PD) IEEE 802.3af compliant.
- Ensure the load to the Powered Device (PD) is less than 0.4 Amp.
- Is a data source connected; if not, connect a data source to the media converter.
- Is the data source active; if not, start sending data.
- Are the FX and TX LACT LEDs flashing?
- Contact Technical Support: 1.800.466.4526, then press "2."

Contact Us

Technical Support

Technical support is available 24 hours a day.
 U.S.A. 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

Address

Transition Networks
 6475 City West Parkway
 Minneapolis, MN 55344, U.S.A.
 telephone: 952-941-7600
 toll free: 800-526-9267
 fax: 952-941-2322

		Declaration of Conformity
Name of Mfg:	Transition Networks 6475 City West Parkway, Minneapolis MN 55344 U.S.A.	
Model:	SPOEB10xx-1xx Series Media Converters	
Part Number(s):	SPOEB1011-100, SPOEB1013-100, SPOEB1014-100, SPOEB1015-100, SPOEB1016-100, SPOEB1017-100, SPOEB1035-100, SPOEB1029-100, SPOEB1029-101	
Regulation:	EMC Directive 89/336/EEC	
Purpose: To declare that the SPOEB10xx-1xx to which this declaration refers is in conformity with the following standards.		
CISPR22:1993; EN55022:1994+A1:1995+A2:1997 Class A; FCC Part 15 Subpart B; UL1950; 21 CFR Subpart J		
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		August, 2007 Date

Compliance Information

CISPR22/EN55022 Class A

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 Fall ist der Benutzer für Gegenmaßnahmen verantwortlich.

Attention !

Ceci est un produit de Classe A. Dans un environnement domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées.



In accordance with European Union Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003, Transition Networks will accept post usage returns of this product for proper disposal. The contact information for this activity can be found in the 'Contact Us' portion of this document.



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 öffentliches Telekommunikationsnetz in den EG-Mitgliedstaaten verstößt gegen die jeweiligen 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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