



TN-EOT-xx
Ethernet over Two-wire Extender SFPs
User Guide

Part Number 33720
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For details on the Lantronix warranty policy, please go to our web site at <http://www.lantronix.com/support/warranty>.

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Revision History

Date	Rev.	Comments
6/20/17	A	Initial release.
8/8/17	B	Add coax data rates.
6/11/21	C	Remove MSA compliant reference, change “Hardened -40 to +75°C operating temperature” to “-40 to +75°C extended operating temperature”, and list verified host devices.
2/8/22	D	Initial Lantronix re-brand.

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Product Description

The Lantronix TN-EOT-xx is an integrated Small-Form Factor Pluggable (SFP) module that enables traditional Ethernet switch, media converter and other network appliances to connect beyond typical Ethernet coverage (100 meters). Incorporated with the latest VDSL2 technology, this SFP can be easily adapted to existing applications with existing 2-wire cable, such as phone line, to avoid the cost of rewiring. It can drastically extend the Ethernet service on UTP wire with distance up to 3000 meters, and even with the rate of 100Mbps speed up to 400 meters on a standard Cat 5e 2-wire cable.

The SFP also supports Telco grade noise cancellation techniques like Interleave, high SNR profile, and retransmission that can effectively eliminate the noise impact to ensure your service/control messages can securely deliver in a harsh environment.

With long reach coverage, high noise immunity, and compact board size, the Lantronix TN-EOT-xx is an ideal upgrade for your Enterprise or Industry applications.

Order Information

The TN-EOT-CO and the TN-EOT-RT are sold separately and are used in pairs.

Model	Interface
TN-EOT-CO	SFP, Ethernet Extender, Server, 1000Base-X, RJ-45 (includes RJ to BNC and RJ to Terminal Block adapters). SFP Compliant; CO side Ethernet Extender SFP; 300Mbps (Aggregate rate).
TN-EOT-RT	SFP, Ethernet Extender, CPE, 1000Base-X, RJ-45 (includes RJ to BNC and RJ to Terminal Block adapters). SFP Compliant; CPE side Ethernet Extender SFP; 300Mbps (Aggregate rate).



TN-EOT-CO Extender SFP



TN-EOT-RT Extender SFP



RJ-45 to BNC (Pigtail) Adapter, 28008



RJ-45 to Terminal Block Adapter, 28009

Features

- Enable Ethernet over 2-wire on our Media Converter or Switch by plugging in the Ethernet Extender SFP
- Compliant with any Gigabit SFP slot
- Based on VDSL2 technology
- Utilize the existing 2-wire cable
- Support maximum data rate up to 300Mbps per line
- Distance up to 3000 meters
- -40 to +75°C extended operating temperature

Specifications

Standards	IEEE 802.3z, ITU-T VDSL2
Connectors	One RJ-45
Software	MTU: Max. 2048 bytes MAC Address: 00-C0-F2-7A-00-00 through 00-C0-F2-7A-CE-1F Self Boot & Managed by Internal Flash when plugged into an unmanaged device
Status LEDs	LED1: ORANGE: On: Server; Off: CPE LED2: GREEN: Link Status
Dimensions	Width: 0.52" [13 mm] x Depth: 3.1" [79 mm] x Height: 0.67" [17 mm]
Power Input	3.3v, 700mA
Environment	Operating Temperature: -40 ~ +75°C. Storage Temperature: -40 ~ +85°C Operating Humidity: 10% to 90% (non-condensed) Storage Humidity: 5% to 95% (non-condensed)
Weight	0.07 lbs. [.03 kg]
ESD Class	2kV
Compliance	Safety; CE / FCC
Warranty	1 year

Interface Pin Assignments (RJ-45)

The interface is a standard eight-pin modular jack. The table below shows the pin out assignments.

Pin #	Description
1	Not Used
2	Not Used
3	Not Used
4	Analog Input
5	Analog Input
6	Not Used
7	Not Used
8	Not Used

Top View

1 ~ 8

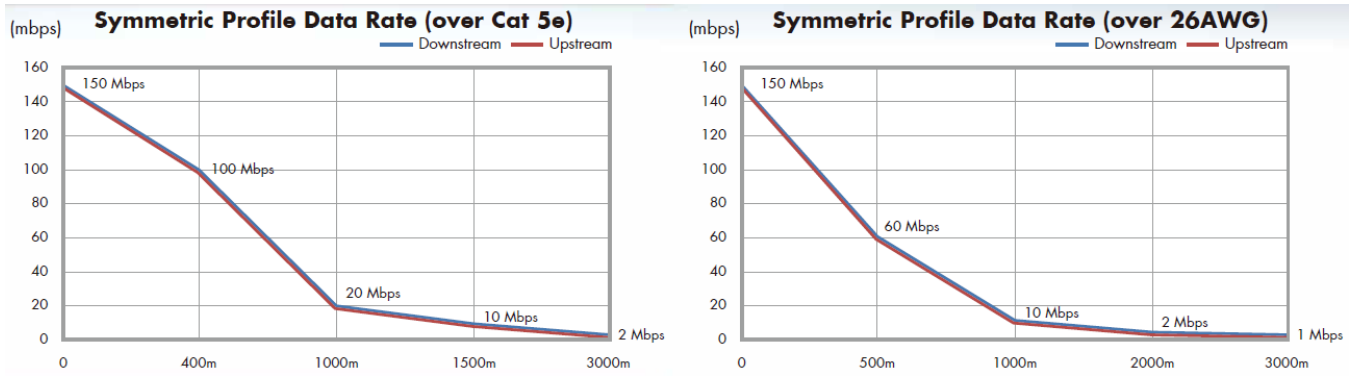


Front View



1 8

Data Rates - UTP



Data transfer rates are shown in the table below.

Cable (2-wire Cat 5)	CO to RT (Mbps)	RT to CO (Mbps)	Bi-dir. (Mbps)
260 feet	160	160	320 (160/160)
1000 feet	111	111	222 (111/111)
1260 feet	89	89	178 (89/89)

Data transfer measurements were made on Lantronix M/GE-ISW-SFP-01 media converters. Frame size used = 2048 bytes.

Data Rates - Coax

Data transfer rates are shown in the table below.

Coax Cable	CO to RT (Mbps)	RT to CO (Mbps)	Bi-dir. (Mbps)
260 feet	160	160	320 (160/160)
1000 feet	111	111	222 (111/111)
1260 feet	89	89	178 (89/89)

Data transfer measurements were made on Lantronix M/GE-ISW-SFP-01 media converters. Frame size used = 2048 bytes.

Application Example

TN-EOT-xx SFPs are typically used with Lantronix' M/GE-ISW-SFP-01.

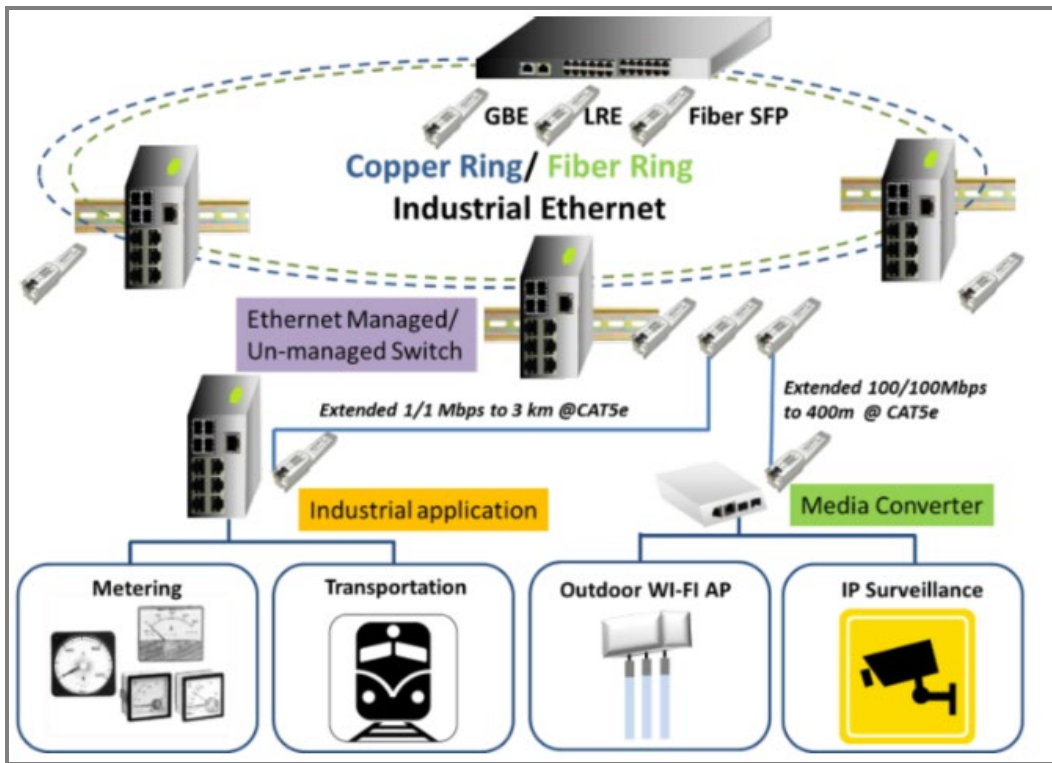
Recommended for use with media converters and unmanaged switches.

Does not support use of "Link Pass Thru". The media converter's Link Pass Through (LPT) feature does not work. Supports a maximum MTU of 2048.

Typically for use with unmanaged devices; lock up issues may occur when used with managed devices.

When the TN-EOT-xx SFP is installed in managed switches, the SFPs maintain synchronization during port state changes (Disable/Enable). During resets and power cycles, the SFPs maintain sync if the ports were specifically configured for 1Gbps speed rather than Auto. With some switches, the S3290 in particular, this configuration must be performed before you insert the SFP.

The TN-EOT-xx SFP doesn't support SGMII; the port is set to 1Gbps speed by default.



Package Contents

Verify you have received the following items. Contact your sales representative if any of these items is missing or damaged. Save the packaging for possible future use.

- ❑ One TN-EOT-CO or one TN-EOT-RT SFP
- ❑ One RJ-45 to BNC (Pigtail) Adapter, 28008
- ❑ One RJ-45 to Terminal Block Adapter, 28009
- ❑ One Printed Quick Install Guide



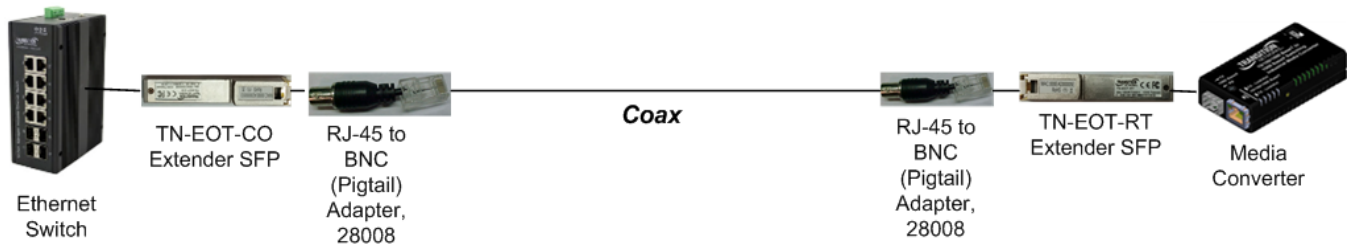
Install Overview

The TN-EOT-xx is an Ethernet Extender in a standard SFP form factor; it provides the ability to leverage the existing 2-Wire or Coax cable infrastructure to extend the Ethernet service. The TN-EOT-xx can quickly enable any switch or media converter with a Gigabit SFP slot to connect beyond typical Ethernet distances (100 meters).

Ethernet over Coax

The TN-EOT-xx can extend the Ethernet service on Coax up to 500 meters at 120Mbps bi-directional data rate (60Mbps downstream and upstream).

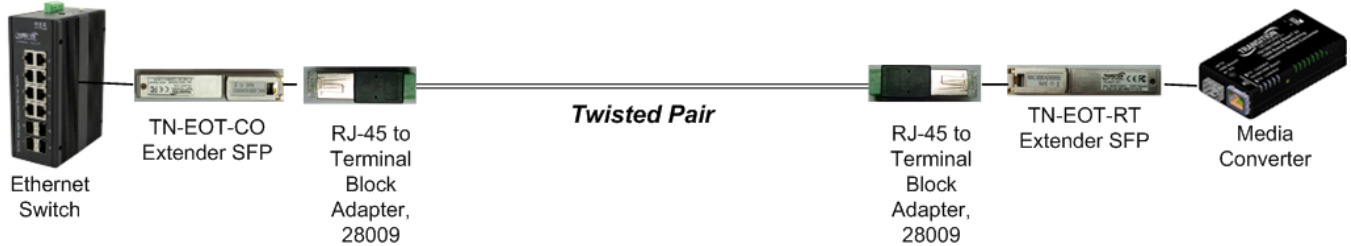
Use the RJ-45 to BNC (Pigtail) Adapter, 28008 on both ends for Ethernet over Coax:



Ethernet over 2 Wire with Adapter

The TN-EOT-xx can extend the Ethernet service on 2-wire with distances up to 400 meters at 200Mbps bi-directional data rate or extend Ethernet on non-UTP 26AWG with distances up to 500 meters at 120Mbps bi-directional data rate.

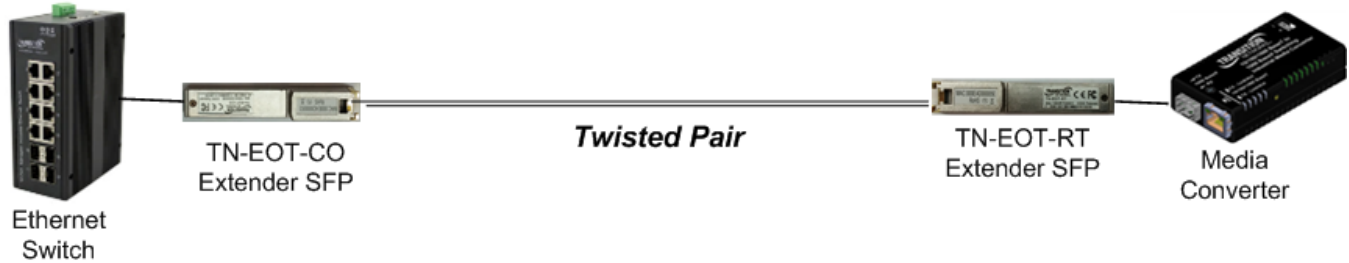
Use the RJ-45 to Terminal Block Adapter, 28009 on both ends for Ethernet over 2 Wire:



Ethernet over 2 Wire without Adapter

The TN-EOT-xx can extend the Ethernet service on 2-wire with distances up to 400 meters at 200Mbps bi-directional data rate or extend Ethernet on non-UTP 26AWG with distances up to 500 meters at 120Mbps bi-directional data rate.

Connect the twisted pair directly to the SFP through the RJ-45 connector (not using the adapters):



Verified Host Devices

The TN-EOT-xx is verified with the host devices below:

- MGE-ISW-SFP-01
- S3290
- S4224
- SM8TAT2SA
- ION C6120-1040

Note that the TN-EOT-xx can't work with Lantronix industrial switches in full temperature range (especially in high temp).

Install Procedure

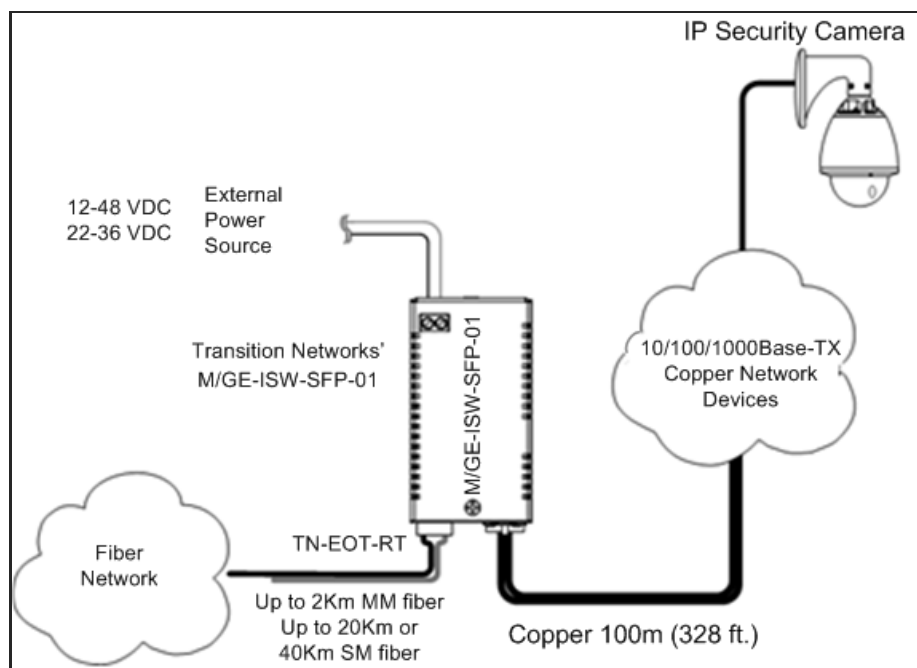
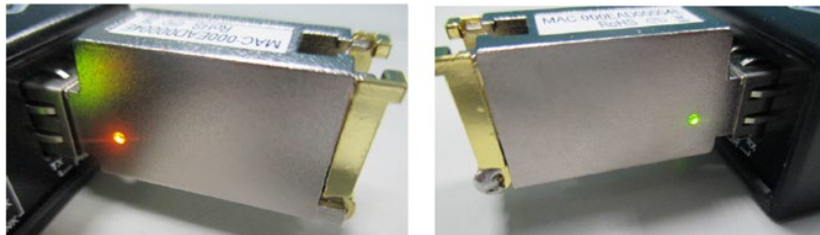
When the TN-EOT-xx SFP is installed in managed switches, the SFPs maintain synchronization during port state changes (Disable/Enable). During resets and power cycles, the SFPs maintain sync only if the ports were specifically configured for 1Gbps speed rather than Auto. With some switches, the S3290 in particular, this configuration must be performed before you insert the SFP.

The TN-EOT-xx doesn't work on 100Base SFP slot or in SGMII Auto mode; if used with a managed switch, set speed of SFP slots to Gigabit.

Use the provided adapters as follows:

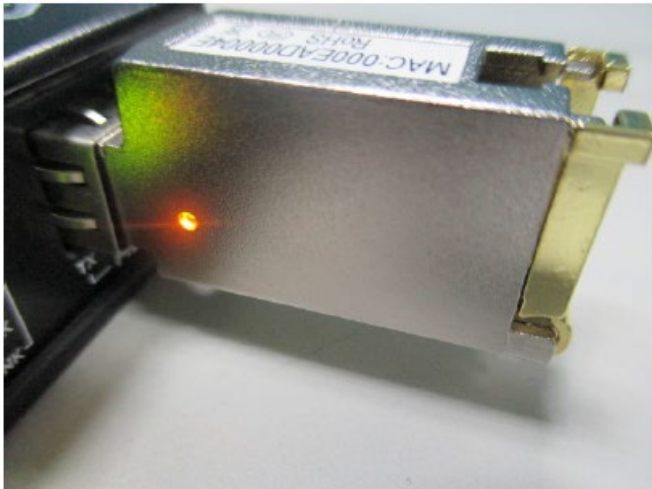
- Use the RJ-45 to BNC (Pigtail) Adapter, 28008 on both ends for Ethernet over Coax.
- Use the RJ-45 to Terminal Block Adapter, 28009 on both ends for Ethernet over 2 Wire.

1. Insert a TN-EOT-RT into the host device. LED1 lights (orange) as an indicator of RT. Check for physical connection: LED 2 begins flashing green slowly as soon as you insert the TN-EOT-RT.
2. Insert an Adapter into the TN-EOT-RT. Connect the cabling.
3. Insert a TN-EOT-CO into the host device. Check for physical connection: LED2 (green) begins flashing Green slowly as soon as you insert the TN-EOT-CO.
4. Insert an Adapter into the TN-EOT-CO. Connect the cabling.
5. Link time takes about 60 seconds. Fast flashing Green LED2 indicates DSL training. LED2 on both SFPs (TN-EOT-CO and TN-EOT-RT) stays Green when devices link up.

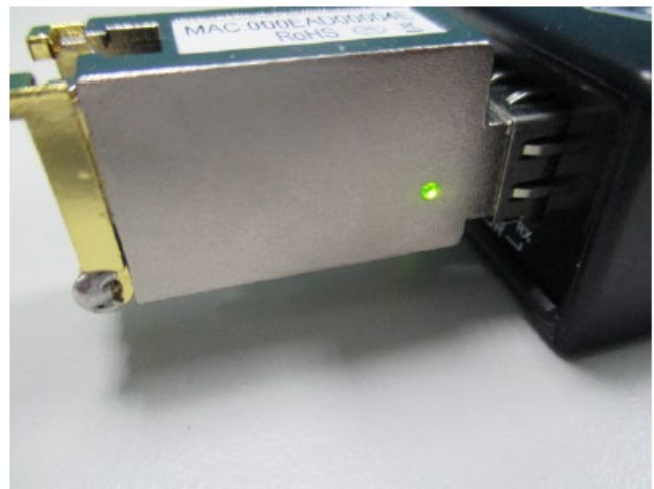


LED Descriptions

The TN-EOT-xx SFP LEDs are shown and described below.



LED 1 (Orange): CO/RT Indicator



LED 2 (Green): DSL Link Status Indicator

LED	Color	State	Description
LED 1	Orange	Off On	CO side RT side
LED 2	Green	Off Blinking On	No DSL connection DSL trying to train DSL link is on

Troubleshooting

Use the steps below to isolate the problem to the TN-EOT-xx and correct the problem.

1. Verify the operating environment matches the specs; see the [Specifications](#) section on page 4 above.
2. Check the LEDs; see the [Install Procedure](#) on page 7 above.
3. Make sure your application is supported; see [Application Example](#) on page 7 above.
4. Make sure the power source meets specs and is operating correctly.
5. For problems with large frames (greater than 4098 bytes) causing the link to drop, try setting the max MTU to 2048 bytes in the application.
6. Make sure the CO side connections and devices are good.
7. Make sure the CPE side connections and devices are good.
8. Record system and device information (see below) before contacting Technical Support:
9. Contact Lantronix Technical Support.

See the device and package labels for recording troubleshooting information.

Record System and Device Information

After performing the troubleshooting procedures, and before calling or emailing Technical Support, please record as much information as possible to help the Technical Support Specialist.

1. Record the **Model Information** for your system. See the Package and Device Labeling.
2. Model # TN-EOT-CO **SN**: _____ Model # TN-EOT-RT **SN**: _____
3. Provide additional product information to your Technical Support Specialist.

Your Lantronix service contract number: _____

Describe the failure: _____

Describe any action(s) already taken to resolve the problem (e.g., change switch mode, reboot, etc.):

The model # of other Lantronix product in the network: _____

4. Describe your network environment (devices, layout, cable type, etc.): _____

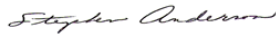
Network load and frame size at the time of trouble (if known): _____

The device history (i.e., have you returned the device before, is this a recurring problem, etc.):

5. Any previous Return Material Authorization (RMA) numbers: _____

Compliance Information

Declaration of Conformity

<h1><i>Declaration of Conformity</i></h1>			
<i>Transition Networks, Inc.</i> <small>Manufacture's Name</small>			
<u>10900 Red Circle Drive, Minnetonka, Minnesota 55343 U.S.A.</u> <small>Manufacture's Address</small>			
Declares that the products: TN-EOT-CPE, TN-EOT-CO, TN-EOT-RT			
Conform to the following Product Regulations:			
FCC Part 15 Subpart B, Class B, ANSI C63.4:2014 and ISED ICES-003 Issue 6			
EN 55032-2012 / AC:2013, Class B			
EN 61000-4-2:2008, EN 61000-4-3:2006 + A1:2007 + A2:2010, EN 61000-4-4:2012, EN 61000-4-6:2013, EN 61000-4-8:2009			
With the technical construction on file at the above address, this product carries the			
CE Mark			
I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standards(s).			
<u>Minnetonka, Minnesota</u> <small>Place</small>	<u>June 19, 2017</u> <small>Date</small>	 <small>Signature</small>	
		<u>Stephen Anderson</u> <small>Full Name</small>	<u>Vice President of Engineering</u> <small>Position</small>
			<small>28141B</small>

Standards

CE / FCC

FCC Regulations



CE Marking

This is a Class A product. In a domestic environment, this product could cause radio interference; as a result, the customer may be required to take adequate preventative measures.

European Regulations

WARNING: This is a Class A product. In a domestic environment, this product could 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, Lantronix 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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