

# User Manual



**Canoga Perkins**  
**8829**  
**UTP-to-Fiber Optic**  
**Media Converter**

## **NOTICE**

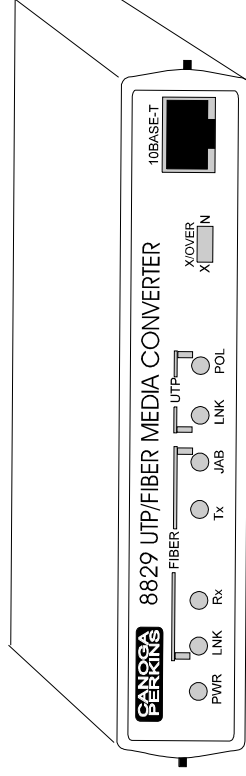
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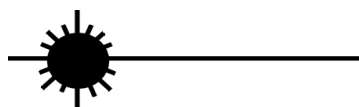
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8829 UTP-to-Fiber Optic Media Converter  
User Manual  
Part Number 6911550, Rev. J 09/2005



**8829 UTP-to-Fiber Optic  
Media Converter**



## Caution!

This product may contain a laser diode emitter operating at a wavelength of 1300nm - 1600nm. Use of optical instruments (for example: collimating optics) with this product may increase eye hazard. Use of controls or adjustments or performing procedures other than those specified herein may result in hazardous radiation exposure.

Under normal conditions, the radiation levels emitted by this product are under the Class 1 limits in 21 CFR Chapter 1, Subchapter J.

## ATTENTION!

Cet équipement peut avoir une diode laser émettant à des longueurs d'onde allant de 1300nm à 1600nm. L'utilisation d'instruments optiques (par exemple : un collimateur optique) avec cet équipement peut s'avérer dangereuse pour les yeux. Procéder à des contrôles, des ajustements ou toute procédure autre que celles décrites ci-après peut provoquer une exposition dangereuse à des radiations.

Sous des conditions normales, le niveau des radiations émises par cet équipement est en dessous des limites prescrites dans CFR21, chapitre 1, sous chapitre J.



## Notice!

**This device contains static sensitive components. It should be handled only with proper Electrostatic Discharge (ESD) grounding procedures.**

## NOTE!

**Cet équipement contient des composants sensibles aux décharges électro-statiques. Il doit absolument être manipulé en respectant les règles de mise à la terre afin de prévenir de telles décharges.**

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## **1. Introduction**

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The Canoga Perkins Model 8829 UTP-to-Fiber Optic Media Converter connects or replaces 10BASE-T unshielded twisted pair (UTP) segments with fiber optic cable. The 8829 Media Converter operates in Full-Duplex mode which allows it to be used in conjunction with Full-Duplex Switches and Routers. In this application, segments up to 40km can be supported. The 8829 Media Converter also interconnects servers or work stations located up to 3km from each other in a standard Half-Duplex (CSMA/CD) network.

The 8829 Media Converter is especially suited for harsh manufacturing environments where immunity to noise and electrical / magnetic interference or security considerations are of particular importance, in addition to long distance extension via Full-Duplex links. The 8829 conforms to 'Network Equipment Building Systems' (NEBS) Level Three standards.

The 8829 Media Converter comes in four versions:

- 10BASE-FL
- 1310nm Single Mode Laser
- 1310nm Single Mode Extended Laser
- 1310nm Single Mode ELED

## **8829 Media Converter      Canoga Perkins**

The 8829 Media Converter will work with all popular sizes of UTP cable (Category 3 minimum recommended) and single and multi-mode fiber optic cables; including 8-10/125 Single Mode, 50/125, 62.5/125 Multi Mode.

The 8829 Media Converter has the following features:

- Replaces UTP segments
- Distance up to 40km on fiber
- Fiber Break Propagation to UTP port
- Half-Duplex (CSMA/CD) or Full-Duplex
- Provides noise / interference immunity
- Provides virtually untappable security
- Automatic UTP reversed polarity correction
- Selectable normal or crossed-over UTP connection
- Seven LED indicators

### **1.1 Ship List**

The following items are included in the ship list:

- 8829 Media Converter
- User Manual
- Wall Mount Transformer with 6-foot power cord
- Tie Wrap/Velcro Kit
- Five-foot Category 5 Twisted-Pair patch cable

## 2. Setup and Installation

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### 2.1 Overview

This section details the unpacking, setup, and the options for installing the 8829 Media Converter. Figure 2-1 shows the top and front views of the 8829 Media Converter.

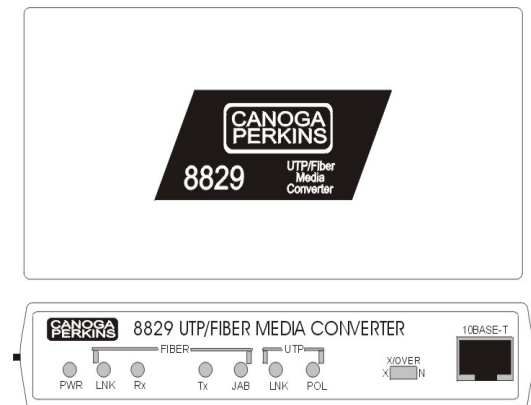


Figure 2-1. Top and Front Views of 8829

## **2.2 Unpacking**

Canoga Perkins Transceivers, Converters and AUI Extenders are carefully inspected and tested prior to shipment from the factory. In the event that there is obvious damage to the shipping container, contact the Canoga Perkins Customer Service Department.

It is recommended that you keep the shipping package until the unit has been installed and verified as being fully operational. In the unlikely event that the unit is defective, contact the Canoga Perkins Customer Service department for a Return Material Authorization number (RMA) for directions on how to return the unit (refer to Appendix A).

Canoga Perkins products, like all electronic devices with static sensitive components, should be handled with care. All user switches are located on the exterior of the package. Since there are no user-serviceable parts inside the unit, opening the case will void the factory warranty.

## 2.3 Setup of the 8829

The 8829 UTP-to-Fiber Media Converter requires its own power source. The 8829 Media Converter is supplied with a wall-mount transformer that requires 90-130VAC at 50-60Hz and provides 24VDC to the unit. The AC adapter connects to the main converter via a power connector. An optional 220V transformer is available.

The 8829 Media Converter features an 8-pin modular connector on the LAN side of the network (see Figure 2-2).

**Caution:** *To protect the Ethernet port from an intrabuilding lightening surge, use a properly grounded shielded cable.*

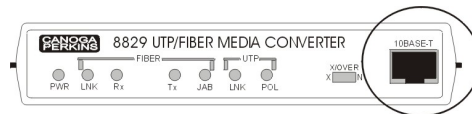


Figure 2-2. UTP Connector for 8829

### 8829 Media Converter      Canoga Perkins

The 8829 Media Converter connects to fiber optic cable via ST\* connectors on the rear panel (see Figure 2-3).

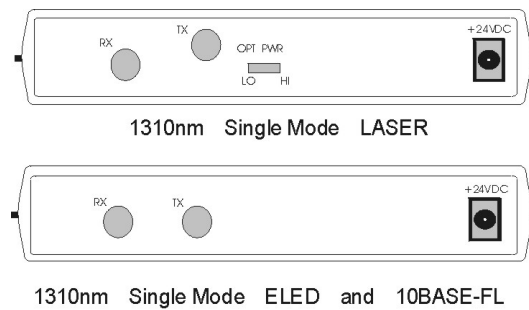


Figure 2-3. Fiber Optic Connections

When working with fiber optic cables and connectors, care should be taken to prevent contaminating connector plugs and sleeves. Dirt and dust can significantly affect connector insertion loss and consequently degrade performance.

**NOTE: Connectors should be covered with protective plastic caps when not in use.**

*\* ST is a Registered Trademark of American Telephone and Telegraph.*

## **2.4 Installing the 8829**

The 8829 Media Converter is an easy to install device and can be installed in the Canoga Perkins 8801 Model Rack Chassis, attached to vertical or horizontal surfaces, or used in a table top configuration. As with all electronic devices, adequate air flow should be provided around the unit since some heat is generated.

### **2.4.1 Stand Alone Unit**

In addition to placing on a desk top, the 8829 Media Converter can be attached to the side of any surface (PC, cabinet, desk, etc.). An attachment kit is shipped with the 8829 Media Converter stand alone unit for this purpose.

Wherever the unit is mounted, the decision for the location will include the determination of a mounting place for a transformer as well. The transformer is supplied with a 6-foot power cord. The connector for the transformer is located on the rear panel of the unit (marked +24VDC). To cable the 8829 Media Converter for the UTP interface, attach an 8-pin modular jack-equipped UTP patch cable to the 10BASE-T connector on the front panel of the 8829 Media Converter.

### *8829 Media Converter*      *Canoga Perkins*

Set the XOVER switch to 'N' if connecting to a Repeater, or to 'X' if connecting the UTP to a computer.

To cable the 8829 Media Converter for the fiber interface, attach the receive fiber (connected to a transmitter at the far end) to the Rx connector; attach the transmit fiber (connected to a receiver at the far end) to the Tx connector. These connectors are located at the rear panel of the 8829 Media Converter.

#### **2.4.2 Rack Mount Installation**

Up to twelve 8829 Media Converters can be inserted into a Canoga Perkins 8801 Model Rack Chassis for cabinet installation (see Figure 2-4). The chassis accommodates either the 8829-401-0 or 8829-601-0. Power is provided in the chassis.

Refer to Section 2.4.1 for data cabling instructions.

Refer to the Canoga Perkins 8801 Model Rack Chassis User Manual for 8829 Media Converter (powered rack) installation instructions.

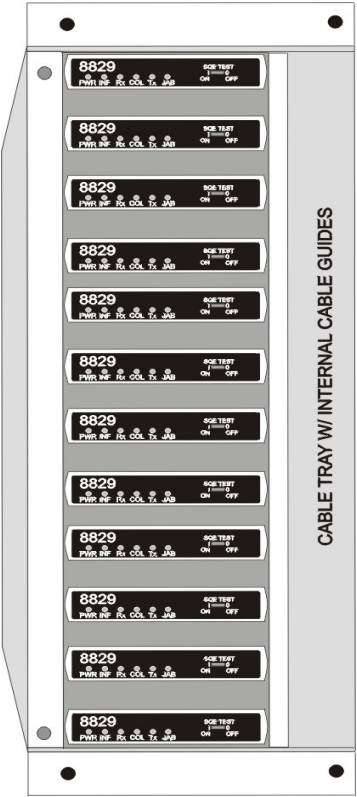


Figure 2-4. 8801 Rack Chassis

### **2.4.3 10/100 Autodetect and Full-/Half-Duplex Application Note**

The UTP interface of the 8829 Media Converter is compliant with IEEE 802.3 10BASE-T Link Integrity signaling and thus will interoperate with 10/100 Autodetect ports compliant to the IEEE 802.3u "Fast Ethernet" specification. In this application, the UTP port connected to the 8829 Media Converter should default to 10Mbps, Half-Duplex (CSMA/CD) operation.

To employ the 8829 Media Converter in a 10Mbps Full-Duplex link, the equipment at each end of the 8829 Media Converter must be a 10Mbps Full-Duplex-only port or manually configured for 10Mbps Full-Duplex operation.

### **2.4.4 Fiber Link Loss Forwarding Application Note**

The 8829 Media Converter incorporates a Fiber Link Loss Forwarding feature which allows indirect sensing of a Fiber Link Loss via the 10BASE-T connection. Whenever the 8829 Media Converter detects a Link Loss condition on the Receive fiber (F/INF OFF), it disables the UTP link. This interrupts the transmission of Link Test Pulses on the Tx pair, so

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that a Link Loss condition will be sensed on the UTP port to which the 8829 Media Converter is connected. This can then be sensed and reported by a Network Management agent in the remote UTP port's host equipment.

Because this feature completely disables the UTP Link, it also disables sensing of the received Link Test Pulse by the 8829 Media Converter , and thus the T/INF LED will also turn off.

For this reason, it is important to realize that the T/INF LED will not come on immediately when the UTP cable is connected, unless the Receive Fiber has first been connected and a good link (F/INF) has been detected on it.

## 3. Operation

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### 3.1 LED Indicators

The 8829 Media Converter has seven LED indicators on the front panel (see Figure 3-1).

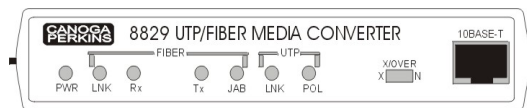


Figure 3-1. 8829 LED Indicators

- PWR** Power Indicator (Green)  
When lit, PWR indicates that the unit is receiving power.
- LNK** Fiber/Interface Integrity Indicator (Green)  
When lit, F/INF indicates that a *Keep Alive Signal* or data packets are being correctly received at the fiber input to the converter. This LED must be ON to enable the T/INF LED to operate.

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- Rx**      Receive Data, Fiber to UTP (Green)  
When blinking, Rx indicates that the converter is receiving packets via the fiber optic cable.
- Tx**      Transmit Data, UTP to Fiber (Green)  
When lit, Tx indicates that the converter is transmitting packets onto the fiber optic cable.
- JAB**      Jabber Indicator (Red)  
When lit, JAB indicates that the Fiber port is receiving an excessively long packet transmission and is blocking forwarding to UTP.
- LNK**      UTP 10BASE-T/Interface Integrity Indicator (Green)  
When lit, T/INF indicates that a *Keep Alive Signal* or data packets are being correctly received at the UTP input to the transceiver. In order for the 10BASE-T link to be active, the F/INF indicator must be ON.

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**POL**    UTP Receive Polarity Reversed  
(Yellow)  
When lit, POL indicates that the UTP  
port is receiving polarity-reversed data

### **3.2 UTP XOVER Switch**

The converter can be configured to connect to either standard DTE devices, or to repeaters (which usually cross their XMT and RCV pairs internally) without the need for special crossover cables.

To connect the 8829 Media Converter to a standard DTE device with a standard straight-through cable, set the XOVER switch to the X (internally crossed) position.

To connect the 8829 Media Converter to any 10BASE-T port marked with an X (such as most repeaters) with a standard straight-through cable, set the XOVER switch to the N (normal) position.

### 3.3 Loss Budget

A Loss Budget reflects the difference between a transceiver's Average Transmit Power and its Average Receiver Sensitivity. The loss budget for the 8829 Media Converter varies with its type of optics as is shown in Figure 3-2.

8829 Typical Loss Budget						
	- 401 10BASEFL	- 601 1310nm LASER LO PWR	HI PWR	- 607 1310nm LASER LO PWR	HI PWR	- 604 1310nm* ELED
Minimum	15dB	13dB	20dB	16dB	25dB	13dB
Typical	17dB	15dB	22dB	18dB	27dB	15dB

\*@ 25 C

Figure 3-2. 8829 Fiber Optic Loss Budgets

### **3.3.1 10BASE-FL**

The 8829 Media Converter 10BASE-FL Transceiver features a minimum loss budget of 15.5dB.

The general rule when figuring total link loss is to allow 0.5dB per connector (devices and patch panel connections) plus 4dB per km attenuation on 62.5/125 micron cable.

### **3.3.2 Single Mode 1310nm Laser**

The 8829 1310nm Laser UTP-to-Fiber Optic Media Converter features a HI and LO power setting to prevent overdriving the cable on shorter cable lengths. In general, the LO setting should be used for applications with a total link loss of approximately 9dB or less.

With the HI OPT PWR feature set, the 8829 Media Converter yields a minimum loss budget of 20dB for the standard version and 25dB for the Extended version.

It should be noted, however, that if the full single mode HI PWR loss budget is used in a Half-Duplex (CSMA/CD) application, there is a strong probability that the IEEE 802.3 Propagation De-

## *Canoga Perkins      8829 Media Converter*

lay Specification will be exceeded. This will cause devices to *time out* and *hidden* collisions will occur. Normally, the use of the 8829 Media Converter with a laser interface in HI OPT PWR mode is only recommended for Full-Duplex applications over long distances (up to 40km).

Keeping this in mind, the recommended setting is LO OPT PWR and, prior to installation, verify that the proposed application will not exceed the IEEE 802.3 Propagation Delay Budget (48 $\mu$ s total Round Trip Delay) for Half-Duplex (CSMA/CD) applications. For Low Power, the minimum budget is 14dB for the standard version and 16dB for the extended version.

When working out the cable and circuit attenuation, the user should allow 0.5dB loss per connector for all devices and patch panel connections, plus 0.5dB loss per km on 8-10/125 micron cable.

### 3.3.3 Single Mode 1310nm ELED

The 8829 1310nm ELED UTP-to-Fiber Optic Media Converter typically has a 13dB loss budget minimum at 25°C.

In addition, the same connector and cable attenuation loss parameters called out for the 1310nm Laser apply to the 1310nm ELED.

**NOTE: The ELED version is susceptible to temperature variations and the following relationship should be kept in mind when determining loss budget requirements.**

- **As the temperature increases from the specified 25°C by one degree increments, the loss budget should be reduced by 0.18 dB.**
- **Conversely, as the temperature decreases from 25°C in one degree increments, the loss budget may be increased by 0.18dB.**

### **3.3.4 Jabber Processing**

The 8829 Media Converter will transparently forward excessively long transmissions of any length which are received at the UTP port. However, packets received at the Fiber port which exceed approximately 100ms, will not be forwarded beyond that point. If this occurs, the JAB indicator will turn ON. Further data flow from the Receive Fiber to the Transmit UTP will be blocked until there has been no packet data received for approximately one-half second. At this point, the 8829 Media Converter's Jabber circuitry will reset and the JAB LED will be turned OFF.

If the original source DTE device continues to jabber, its own internal Jabber Timer should eventually block its data flow, allowing the 8829 Media Converter to reset without manual intervention.

## 4. Troubleshooting

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The 8829 Media Converter, which is a hybrid device, has two INF LEDs. The one marked F/INF refers to the Optical Receiver and the one marked T/INF refers to the UTP receiver. When the 8829 Media Converter is put into service, and if all cables are correctly connected *and* there are UTP and fiber optic devices attached to the cables, *both* INF LEDs should light. If either INF LED does not light, check the appropriate attached cable and remote transmitter to ensure they are connected properly.

**NOTE: The T/INF LED cannot come ON unless the F/INF LED is already ON.**

If the T/INF LED still does not light, set the XOVER switch in the opposite position before proceeding further.

This also implies that if the INF LED is lit on the local device, the remote transmitter, the attached cable and the local receiver are operational. Conversely, if the remote INF LED is lit, it implies

that the local transmitter, the attached cable and the remote receiver are operational.

**NOTE: The remote unit's UTP INF LED also will not come ON unless the 8829 Media Converter's F/INF LED is already ON, due to the operation of the Fiber Break Propagation feature.**

If the Power LED is lit, and both INF LEDs are lit, you can assume with some assurance that the problem exists elsewhere. The most common cause of network problems, once physical layer problems are resolved, is software configuration.

In addition, check that the total link loss is within the allowable fiber optic loss budget and that if the proposed application is a Half-Duplex (CSMA/CD) one, it is within normal IEEE 802.3 Propagation Delay Budget parameters. If this still does not solve the problem, call the Canoga Perkins Service Department at (818) 718-6300. A 24-hour hotline, (800) 360-6642, is available for emergency repair situations.

## **5. Technical Specifications**

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### **5.1 10BASE-FL Optical**

**(Part No.: 8829-401-X)**

Emitter Type:              LED

LED Center  
Wavelength:              850nm nominal

LED Spectral  
Width:                      <75nm FWHM

LED Rise Time  
10% to 90%:              <6.5nsec.

Transmit Power, Initial: -15dBm $\pm$ 1dB (62.5/  
125 micron fiber)  
factory set

Detector Type:            PIN Photodiode

Receive Sensitivity:      -33dBm (pre-  
Squelch) typical

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Receive Dynamic Range:	22dBm (pre-Squelch) typical
Loss Budget:	17dB, typical (15dB minimum)
Optical Connector:	ST*
Bit Error Rate:	Better than 1 in $10^{-10}$ (per 802.3 Spec.)
Mean Time Between Failures:	>100,000 hours

*\* ST is a registered trademark of AT&T.*

## **5.2 1310nm Laser (Single Mode) (Part No.: 8829-601-X)**

Emitter Type:	Laser Diode
LED Center Wavelength:	1310nm nominal
Transmit Power, Initial:	LO setting: -16dB $\pm$ 1dB, factory set, Standard -14dB $\pm$ 1dB, factory set, Extended HI setting: > -11dBm, Standard > -6dBm, Extended (8/125 micron fiber)
Detector Type:	PIN Photodiode
Receive Sensitivity:	-33dBm (pre-Squelch) typical

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Receive Dynamic Range:	22dB (pre-Squelch) typical
Loss Budget:	<ul style="list-style-type: none"><li>• 22dB (pre-Squelch at HI PWR), typical (20dB min.), Standard.</li><li>• 27dB typical; 25dB minimum for Extended version.</li><li>• 15dB typical, 13dB minimum at LO PWR, Standard.</li><li>• 18dB typical, 16dB minimum at LO PWR, Extended.</li></ul>
Optical Connector:	ST*
Bit Error Rate:	Better than 1 in $10^{-10}$
Mean Time Between Failures:	>100,000 hours

*\* ST is a registered trademark of AT&T*

### **5.3 1310nm ELED (Single Mode) (Part No.: 8829-604-X)**

Emitter Type:	Edge-Emitting Diode (ELED)
LED Center Wavelength:	1310nm nominal
Transmit Power, Initial @ 25°C**:	-17dBm ±1dB (8/125 micron fiber) factory set
Detector Type:	PIN Photodiode
Receive Sensitivity:	-33dBm (pre-Squelch) typical
Receive Dynamic Range:	22dB (pre-Squelch) typical
Loss Budget:	15dB (pre-Squelch) typical, 13dB min. at 25°C **

\*\* See Section 3.3.3 for more information.

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Optical Connector:	ST
Bit Error Rate:	Better than 1 in $10^{-10}$
Mean Time Between Failures:	>100,000 hours

## 5.4 Electrical / Functional

Interface	
Compatibility:	ISO/IEC 8802.3 10BASE-T; IEEE 802.3 10BASE-FL
Connectors:	ISO 8877 (RJ-45); ST
Power Input:	AC Adapter powering converter: - 5 W max. @ 110VAC, 60Hz - 5W max. @ 220VAC, 50Hz, optional
Power Output:	24VDC at <250mA
Power Up Delay:	<1 second 10BASE- FL; 1 min. Single Mode
Throughput Delay - UTP-Fiber:	<250ns

## **5.5 Physical / Environmental**

Enclosure:	Stand Alone Plastic Housing
Dimensions:	3.5"W x 6.0"L x 1.12"H
Weight:	8oz.
Power Supply:	External Wall Mount Type Dimensions: 2.4"W x 2.4"L x 2.0"H
Power Cord:	6 feet
Operating Temperature:	0° to 40°C
Humidity:	10 to 90% (non-condensing)
Compliance:	Conforms to 'Network Equipment Building Systems' (NEBS) Level Three Standards.

## **Appendix A**

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### **Limited Lifetime Warranty**

**Effective July 1, 2005 and After**, Canoga Perkins warrants that, at the time of sale, and, for its lifetime, with certain exceptions noted below, every Canoga Perkins' labeled product purchased will be free from defects in material and workmanship for its lifetime, if properly installed and used in conformity to Canoga Perkins' published specifications. This warranty covers the original user only and is not transferable. For the purposes of this Warranty, "lifetime" is defined as the serviceable life of the product (a minimum of 5 years) or any longer period during which replacement spare parts are available. Subject to the conditions and limitations set forth below, Canoga Perkins will, at its option, either repair or replace any part of its product(s) that prove defective by reason of improper workmanship or materials. The warranty period for power supplies, fans and optics is five (5) years. Consumables such as filters are covered for one year. Software is warranted for 90 days. Hardened Media Converter (HS) products are covered for three (3) years.

This warranty does not cover any damage to products that have been subjected to lightning or other Acts of Nature, misuse, neglect, accident, damage, improper installation, or maintenance, including over-voltage failures caused by use outside of the product's specified rating, normal wear and tear of mechanical components,

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or alteration or repair by anyone other than Canoga Perkins or its authorized representative. If the user is unsure about the proper means of installing or using the equipment, contact Canoga Perkins' free technical support services. Customer must notify Canoga Perkins promptly in writing of any claim based on warranty. Canoga Perkins is not liable for, and does not cover under warranty, any costs associated with servicing and/or the installation of its products or for any inspection, packing or labor costs in connection with return of goods. In the event Canoga Perkins breaches its obligation of warranty, customer's sole and exclusive remedy is limited to replacement, repair, or credit of the purchase price, at Canoga Perkins' option. Under no circumstance will Canoga Perkins be liable for consequential or incidental damages or loss of profits.

## **Warranty Registration**

To establish original ownership and to record purchase date, please complete the warranty on-line form on our product registration page. URL: [www.canoga.com/warranty](http://www.canoga.com/warranty)

## **Optional Service Programs**

Canoga Perkins offers several optional Service Programs. Please call Canoga Perkins Sales Department (818-718-6300) or see our web site ([www.canoga.com](http://www.canoga.com)) for details.

## **CUSTOMER SERVICE DEPARTMENT REPAIR WARRANTY**

Repairs performed by the Canoga Perkins Customer Service Department will be free from defects in material and workmanship for a period of ninety (90) DAYS from the date the repaired product is shipped, or until the expiration of the original factory warranty, whichever is longer.

### **Limitations**

Canoga Perkins may at its sole discretion modify its Limited Warranty at any time and from time to time.

Other than those expressly stated herein, THERE ARE NO OTHER WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, AND SPECIFICALLY EXCLUDED BUT NOT BY WAY OF LIMITATION, ARE THE IMPLIED WARRANTIES FOR FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY. IT IS UNDERSTOOD AND AGREED CANOGA PERKINS' LIABILITY WHETHER IN CONTRACT, IN TORT, UNDER ANY WARRANTY, IN NEGLIGENCE OR OTHERWISE SHALL NOT EXCEED THE AMOUNT OF THE PURCHASE PRICE PAID BY THE CUSTOMER AND UNDER NO CIRCUMSTANCES SHALL CANOGA PERKINS BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES. THE PRICE STATED FOR THE EQUIPMENT IS A CONSIDERATION IN

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LIMITING CANOGA PERKINS' LIABILITY. NO ACTION, REGARDLESS OF FORM, ARISING OUT OF THE TRANSACTIONS OF THIS AGREEMENT MAY BE BROUGHT BY CUSTOMER MORE THAN ONE YEAR AFTER THE CAUSE OF THE ACTION HAS ACCRUED. CANOGA PERKINS' MAXIMUM LIABILITY SHALL NOT EXCEED AND CUSTOMER'S REMEDY IS LIMITED TO EITHER (i) REPAIR OR REPLACEMENT OF THE DEFECTIVE PART OF PRODUCT, OR AT CANOGA PERKINS' OPTION (ii) RETURN OF THE PRODUCT AND REFUND OF THE PURCHASE PRICE, AND SUCH REMEDY SHALL BE CUSTOMER'S ENTIRE AND EXCLUSIVE REMEDY. AUTHORIZED RESELLERS ARE NOT AUTHORIZED TO EXTEND ANY DIFFERENT WARRANTY ON CANOGA PERKINS' BEHALF.

## **Return Policy**

Customer must obtain an RMA (Return Material Authorization) number from the Canoga Perkins Customer Service Department before returning a product for service or repair.

Canoga Perkins' technical support department can be reached through any of the following means:

Telephone: 818-718-6300  
Fax: 818-718-6312  
E-Mail: [fiber@canoga.com](mailto:fiber@canoga.com)

**8829 Media Converter**      **Canoga Perkins**

If the warranty for a power supply, fan, optics, consumable or software has expired, customer must provide the Canoga Perkins Customer Service Representative with a Purchase Order to authorize the repair.

Send the defective product postage and insurance prepaid to the address provided to you by Canoga Perkins' technical support representative. Failure to properly protect the product during shipping may void this warranty. The return authorization number must be written on the outside of the carton to ensure its acceptance.

The customer must pay for the non-compliant product(s) return transportation costs to Canoga Perkins for evaluation of said product(s) for repair or replacement. Canoga Perkins will pay for the shipping of the repaired or replaced in-warranty product(s) back to the customer (any and all customs charges, tariffs, or/and taxes are the customer's responsibility).

Canoga Perkins reserves the right to charge for all testing and shipping incurred, if after testing, a return is classified as "No Problem Found."

*Canoga Perkins      8829 Media Converter*