



# EdgeAccess<sup>®</sup> Media Converter

**Model 9120  
Gigabit Ethernet Media  
Converter  
User Manual**



## CAUTION!

This product may contain a laser diode operating at a wavelength of 1300nm - 1600nm. Use of optical instruments (e.g., 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 Class 1 limits in 21 CFR Chapter 1, Subchapter J.

## ATTENCION!

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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Model 9120 Gigabit Media Converter  
User Manual  
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To reference Technical Advisories and Product Release Notes, go to Canoga Perkins'  
website: <http://www.canoga.com/cservice.htm>

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## Chapter 1 Overview

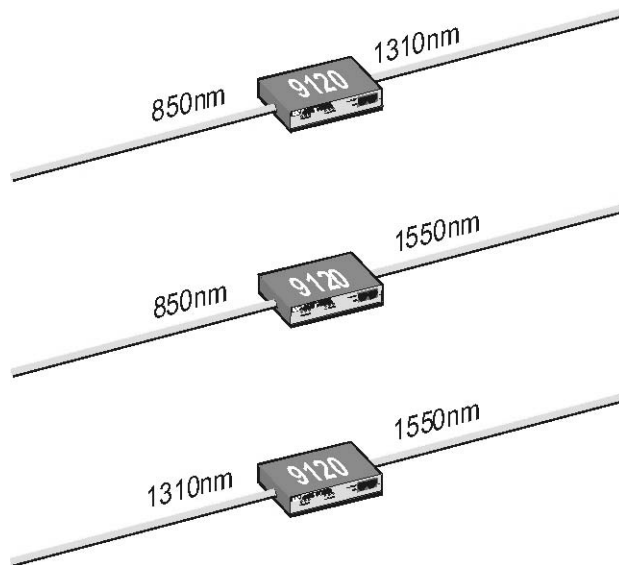
The 9120 is a Gigabit Ethernet Media Converter. It extends multi mode Gigabit segments up to 70km over single mode fiber. It is designed for installation into the Canoga Perkins 9101 Chassis and is also available as a standalone unit. The unit is especially suited for the long-distance extension of Gigabit LAN segments. Extension port options include 1310nm on multimode or single mode fiber and 1550nm on singlemode fiber.

The 9120 introduces Gigabit extension capability to Canoga Perkins 9101 chassis. It is field installable and can coexist with Canoga Perkins 8829 10Mbps, and 9119 100Mbps Ethernet converters. The 9120 is a NEBS Level 3 compliant (in chassis) product designed and built with quality components to ensure reliability and longevity.

The 9120 features user controllable Link Loss Forwarding (LLF), Canoga Remote Fault (RMF), and Link Loss Echo (LLE). The user may enable or disable these features from a set of easily accessed switches located on the front panel of the 9120. Primary application is the interconnection of gigabit Enterprise Switches and Service Provider Backbone Networks. Within the 9101 platform, the 9120 addresses the Service Providers' requirements for Transparent LAN Services across a widely dispersed customer environment and physical plant.

The 9120 Media Converter is available in three categories:

- Gigabit Ethernet 850nm MM SC
- Gigabit Ethernet 1310nm SM SC
- Gigabit Ethernet 1550nm SM SC



*Figure 1. 9120 Categories.*

## Canoga Perkins

### 9120 Media Converter Feature List:

- Full-duplex 1000Mbps Ethernet operation up to 70km
- Multimode and single mode fiber support
- Supports 850nm, 1310nm and 1550nm
- Field installable into existing 9101 Chassis
- Available as standalone or rackmount for EdgeAccess 9101Chassis
- Front panel LEDs for diagnostics and monitoring
- Link Loss Forwarding, Canoga Remote Fault, and Link Loss Echo Alarms
- User Configurable Link Loss Forwarding, Canoga Remote Fault, and Link Loss Echo
- NEBS Level 3 compliant (in the 9101 Chassis)

### 1.1 Ship List

The following items are included:

- 9120 Media Converter
- User Manual
- Power Supply with 6-foot power cord (standalone model only)
- Tie Wrap/Velcro Kit

### 1.2 Applications

Figure 2 shows a typical application allowing a full-duplex link at a distance of up to 70km.

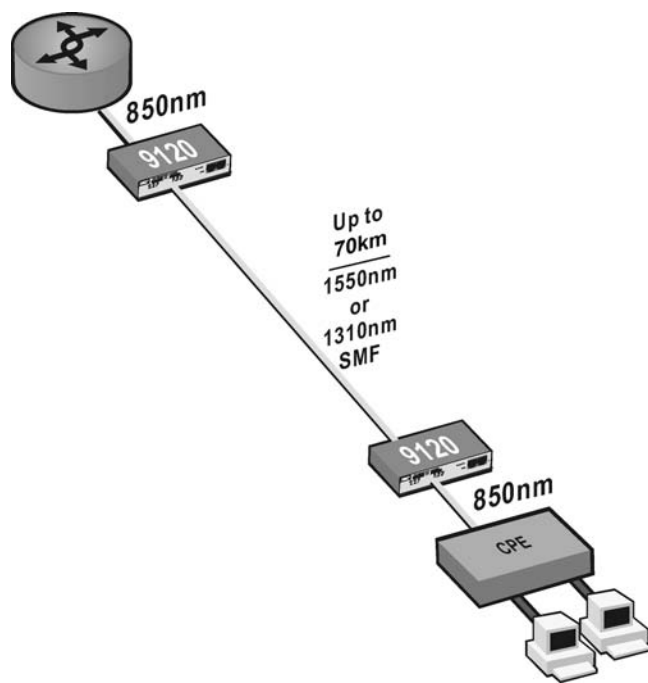
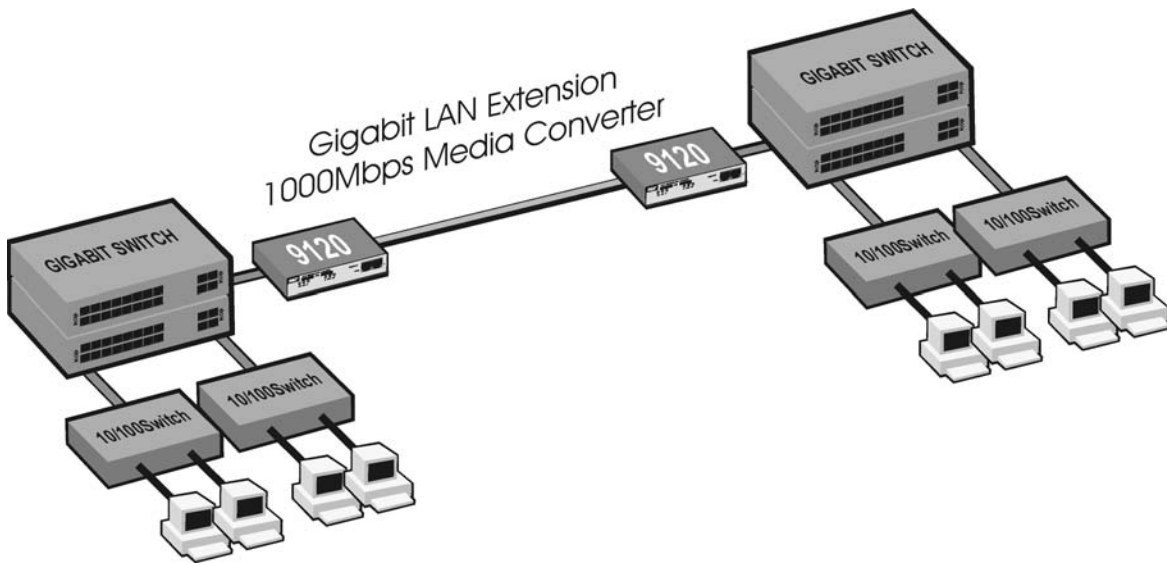


Figure 2. Typical 9120 Application.





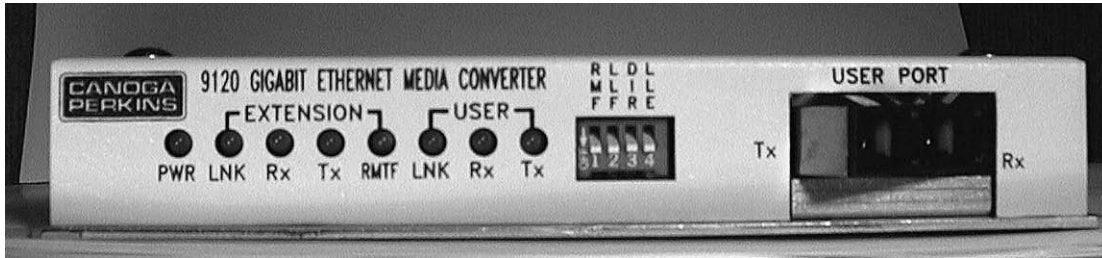
*Figure 3. 9120 Extended Application.*

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## Chapter 2

# Setup and Installation

This section details the unpacking, setup, and the options for installing the 9120 Media Converter. Figure 4 shows the front view of the 9120 Media Converter.



*Figure 4. Front View of the 9120.*

### 2.1 Unpacking

Canoga Perkins products are carefully inspected and tested prior to shipment from the factory. 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 (RMA) number. 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. Since there are no user-serviceable parts inside the unit, opening the case will void the factory warranty.

### 2.2 Setup of the 9120 Media Converter

The 9120 Gigabit Media Converter standalone model requires its own power source. The desktop version of the 9120 Media Converter is supplied with a wall-mount power supply that requires 100-240VAC at 50-60Hz and provides +5VDC to the unit. The unit can be rack mounted in the 9101 LAN Chassis. The 9120 Gigabit Media Converter rackmounted model is powered by the 9101 LAN Chassis.

#### 2.2.1 User Port Connection

The 9120 Media Converter features a Duplex SC multimode or single mode fiber optical connector on the user side of the network, located on the front of the unit (Reference Figure 4). The user port is angled to facilitate decreased fiber bend when the 9120 is mounted vertically in a 9101 chassis.

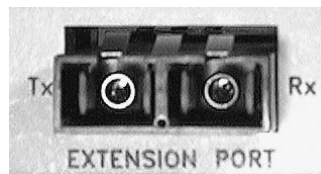
Figure 5. User Port.



## 2.2.2 Extension Port Connection

The 9120 Media Converter features a Duplex SC single mode fiber optical connector on the extension side of the network, located on the rear of the unit (Reference Figure 5).

Figure 6. Extension Port.



**Note:** 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.

## 2.2.3 Four-Position DIP Switch

Link Loss Forwarding and Canoga Remote Fault features are configured with a 4-position DIP switch located on the front of the unit (Reference Figure 6).

Figure 7. Four Position DIP Switch.



### 2.3 Installing the 9120 Media Converter

The 9120 Media Converter can be easily installed in the Canoga Perkins Model 9101 LAN Chassis, attached to vertical or horizontal surfaces, or used in a tabletop configuration. As with all electronic devices, adequate air flow should be provided around the unit since some heat is generated.

The 9120 should not be placed on top of another device that also generates heat. The cumulative heat can cause the internal temperature of the 9120 to exceed its design specifications which could potentially lead to inconsistent operation.

#### 2.3.1 Standalone Unit

In addition to being placed on a desktop, the 9120 standalone can be attached to the side of any surface (PC, cabinet, desk, etc.). An attachment kit is shipped with the 9120 standalone unit for this purpose.

Wherever the unit is mounted, the decision for the location will include determining a mounting place for a transformer as well. The power supply is furnished with a 6-foot power cord. The connector for the power supply is located on the rear panel of the unit.

#### 2.3.2 Rackmount Installation

Up to twelve 9120 Media Converters can be inserted into a Canoga Perkins Model 9101 LAN Chassis for high-density installation (see Figure 8).



*Figure 9. 9101 LAN Chassis with 9120's.*

### 2.3.3 Configuring the Fault/Forwarding DIP Switch

The 9120 includes a four-position DIP switch that must be configured for correct Link Loss and Canoga Remote Fault routing. This switch is on the front of the unit (Reference Figure 9):



Figure 10. Fault Forwarding DIP Switch.

From left to right, the switch configuration is:

- |                          |   |
|--------------------------|---|
| RMTF (Remote Fault):     | Canoga-specific Remote Fault feature (Extension Port Only).<br>Enable = On<br>Disable = Off<br>This feature is used typically when two 9120's are connected in series. LLE must be disabled for this feature to be active.  |
| LLF (Link Loss Forward): | Enables or Disables Link Loss Forwarding.<br>Enable = On<br>Disable = Off<br>The direction of fault propagation is determined by the DIR switch setting.  |
| DIR (LLF Direction):     | If LLF is ON, the DIR switch controls the direction of error propagation.<br>DIR ON = Extension to User OFF = User to Extension<br>If LLF is OFF, switch is ignored.  |
| LLE: (Link Loss Echo):   | Link-down propagation to non-Canoga connected devices (Extension Port Only).<br>Enable = On / Disable = Off.<br>If a link down is encountered on the Extension port, the Tx Extension port will be disabled. Link Loss Echo configures the 9120 to not send data until data is received. Therefore, Link Loss Echo should not be used in series with another 9120 that has LLE enabled. |

**Note:** LLE cannot be used in conjunction with RMTF.

## Chapter 3 Operation

### 3.1 LED Indicators

The 9120 Media Converter has eight LED indicators on the front panel (Reference Figure 10).



Figure 11. LED Indicators.

Table 1. LED Descriptions.

LED Indicator	Description
PWR	Power Indicator - when illuminated green, the 9120 is receiving power.
<b>Extension Port LED Indicators</b>	
LNK	Extension Port Link - illuminates green when the Extension Port link is good. When the LED is off, the link is bad. *
Rx	Receive data - when illuminated green, the Extension Port is receiving data. ***
Tx	Transmit data - when illuminated green, the Extension Port is transmitting data. When illuminated red, the Extension Port transmitter is not transmitting (may be shut down as in a LLF condition). ***
RMTF	Remote Fault - This function applies only to the extension port. Upon loss of link on the extension port, the remote device transmits an RMTF pulse from its Tx port (the RMTF LED illuminates red on the local device) to the local device indicating its link loss condition. **
<b>User Port LED Indicators</b>	
LNK	User Port Link - illuminates green when the User Port link is good. When the LED is off, the link is bad.
Rx	Receive data - when illuminated green, the User Port is receiving data. ***
Tx	Transmit data - when illuminated green, the User Port is transmitting data. When illuminated red, the User Port transmitter is not transmitting (may be shut down as in a LLF condition). ***

\* When the LNK LED on the Extension Port is off a RMTF signal is forwarded to the remote unit and via a LLF signal will disable its Extension Port transmitter causing a loss of link integrity at the local device.

\*\* Upon receipt of the RMTF signal, the local unit will illuminate the RMTF indicator and invoke LLF on the local interface if LLF is enabled and the direction is set to Extension Port to User Port.

\*\*\* The 9120 is a transparent device which will detect the presence of any type of packets, data or otherwise, coming across the data link. This feature may cause the Rx and Tx indicators to illuminate green when data packets are not transmitted, yet other monitoring information is (e.g., auto negotiation - if this feature is enabled on the equipment interfacing with the 9120, the Rx and Tx indicators will illuminate green, even when data packets are not transmitted).

### 3.2.1 Canoga Remote Fault

The remote fault function applies to Extension Port only. If the extension port lost link, the media converter will transmit a Canoga-specific Remote Fault pattern to Extension Port's transmitter.

In the diagram below, when a unit detects a link loss on the Extension Rx port, a Remote Fault pattern will be sent to the remote unit. The unit that detected the link loss will display a red RMTF LED. Note the DIP switch RMTF setting must be enabled (up) to activate the RMTF functionality.

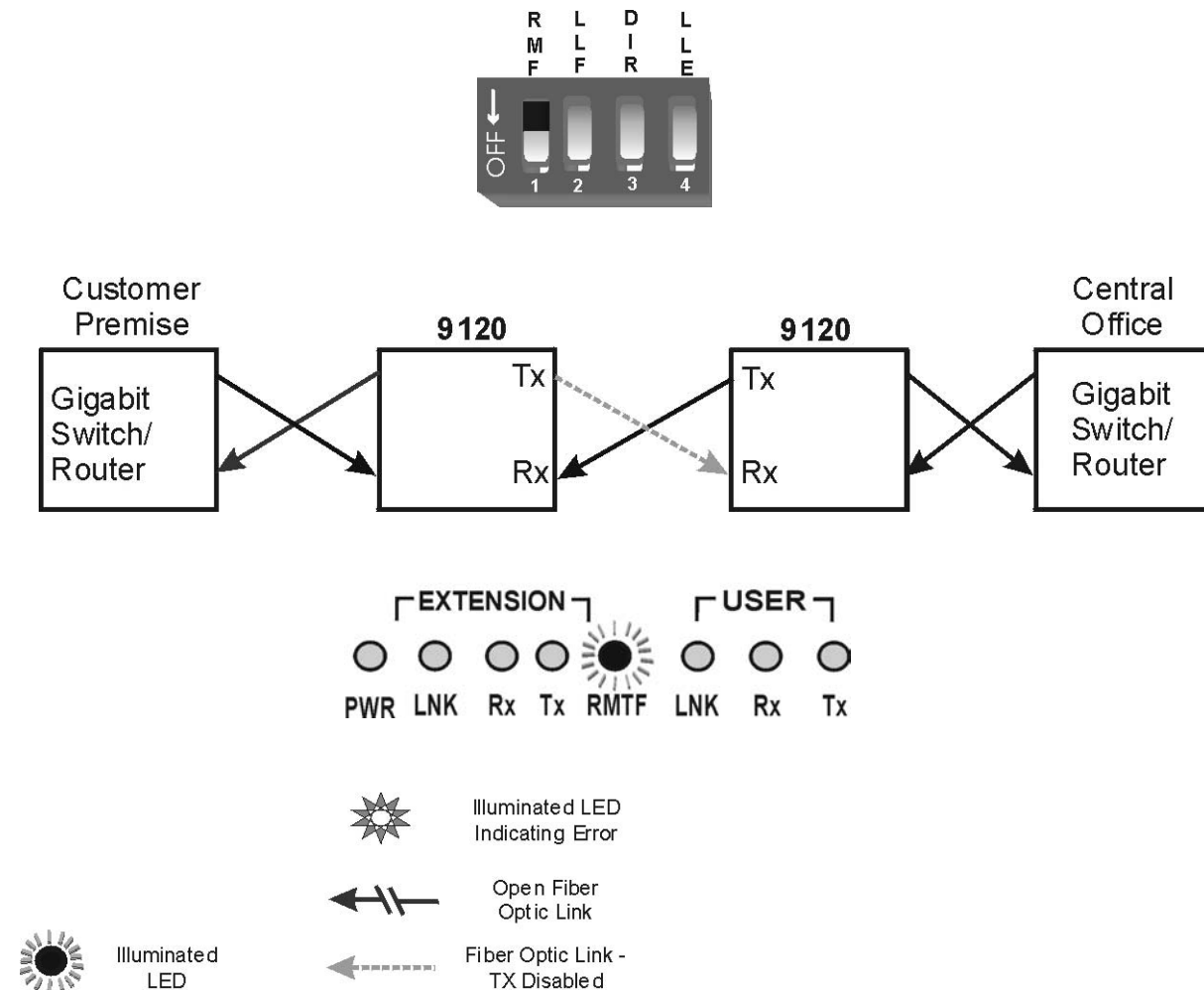


Figure 12. Remote Fault Diagram.



### 3.2.2 Link Loss Forwarding - User to Extension

When a loss of signal is detected on the User Rx port, the fault is propagated to the Extension port. The Extension Tx LED will display red, indicating the propagation of the fault to the Extension port. The fault is then propagated to the remote link.

*Note: The DIP switch Link Loss Forwarding feature must be enabled (up) and the Direction switch set to "User to Extension (down)."*

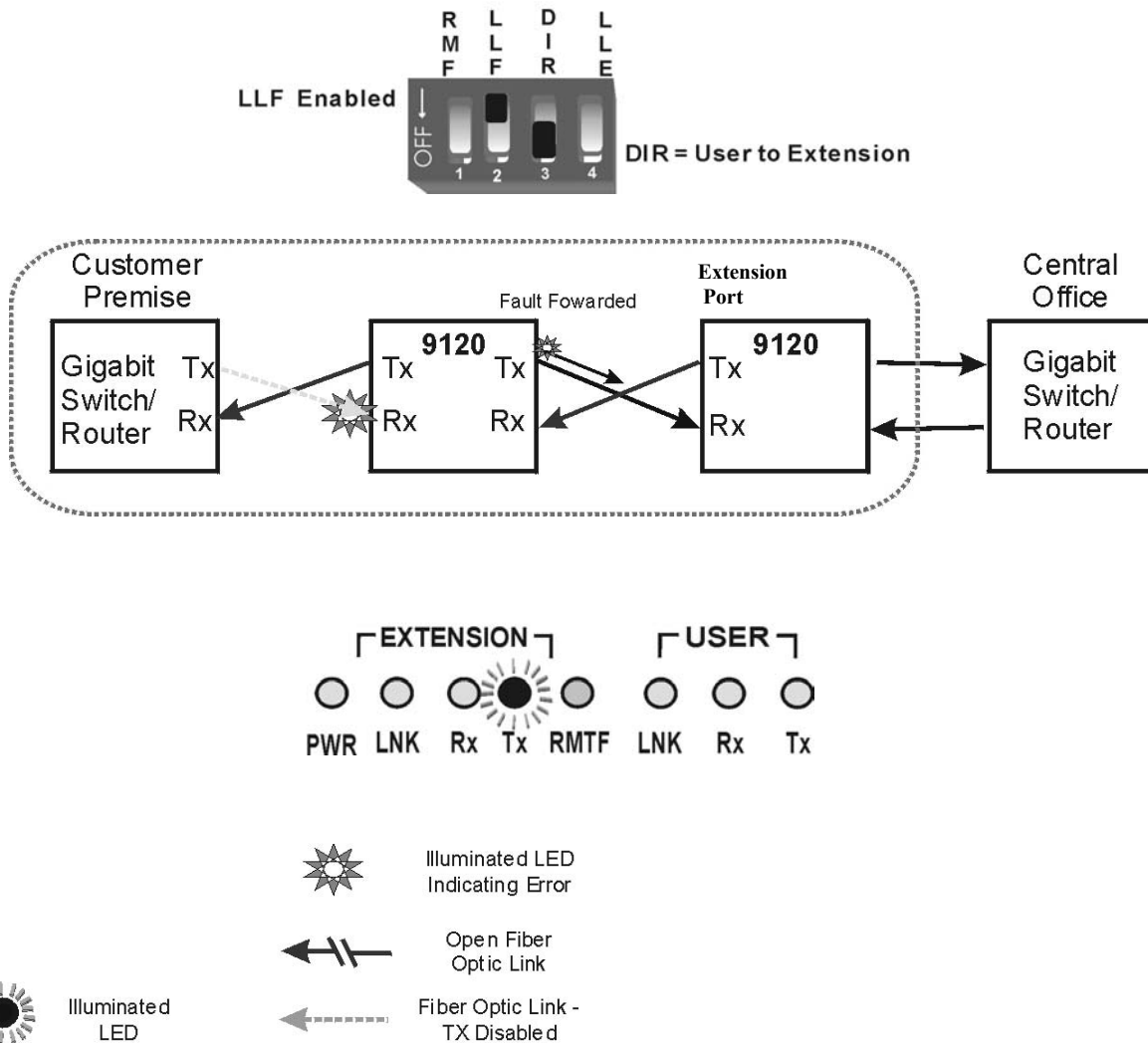


Figure 13. Link Loss Forwarding - User to Extension.

### 3.2.3 Link Loss Forwarding - Extension to User

When a loss of signal is detected on the Extension Port Rx, the fault is propagated to the User Port. The User Port Tx LED will display red, indicating the propagation of the fault to the User Port. The fault is then propagated to the remote link.

*Note: The DIP switch Link Loss Forwarding feature must be enabled (up) and the Direction switch set to "Extension to User (up)."*

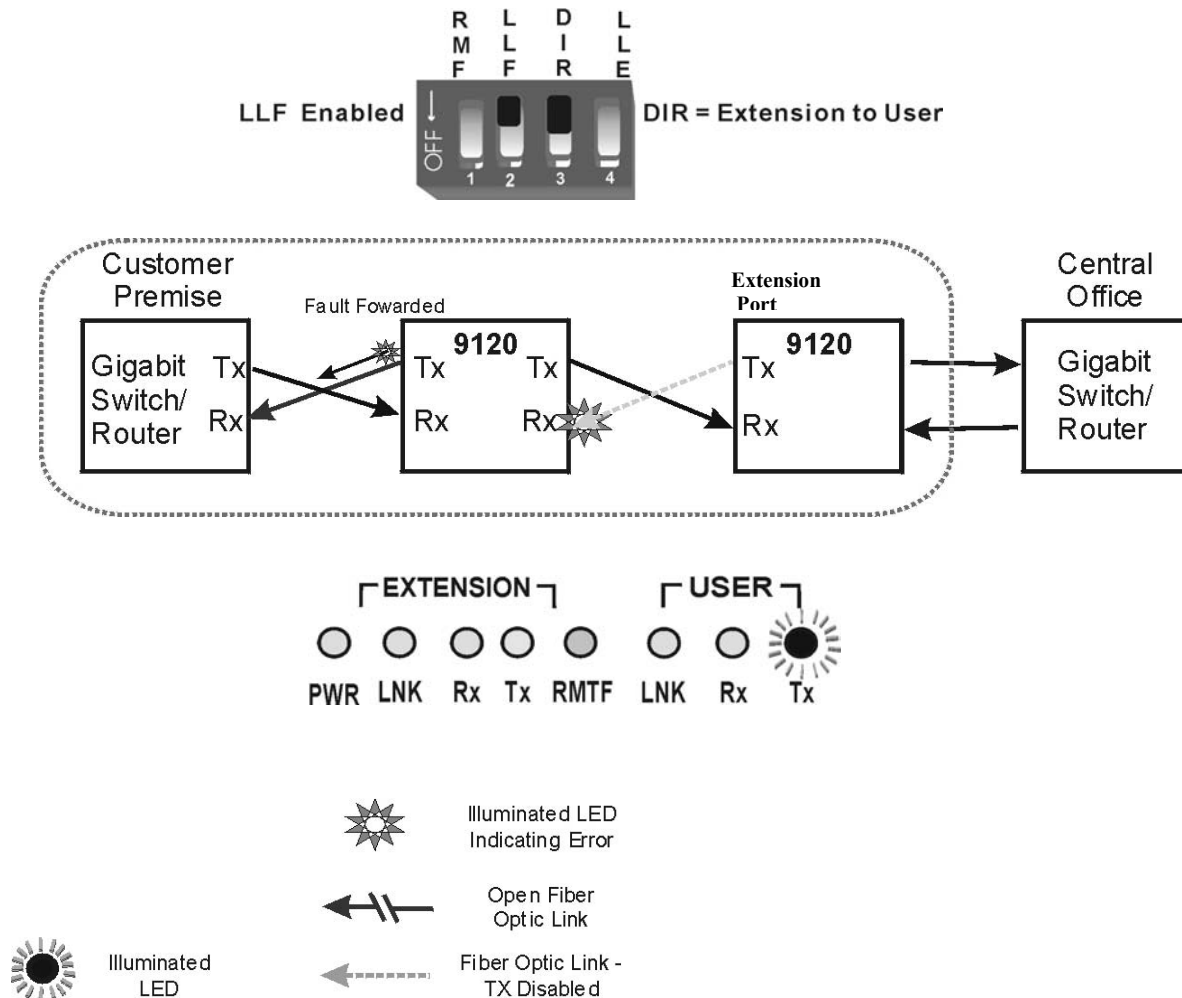


Figure 14. Link Loss Forwarding - Extension to User.

### 3.2.4 Link Loss Echo

Link Loss Echo is the Link-down propagation to another connected device (9120 or non-Canoga equipment). Link Loss Echo will work only on the Extension Port. If a link loss is detected on the Extension Port Rx, the Extension Port Tx will be disabled, echoing the fault back to the source. Link Loss Echo configures the 9120 to not send data until data is received.

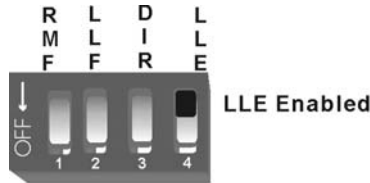


Figure 15. Link Loss Echo Switch Position.

#### 9120 Linked to a 9120

When a 9120, linked to another 9120, detects a loss of signal on the User Port Rx, it will stop transmitting to the remote 9120. Two 9120s cannot be linked together with Link Loss Echo enabled on both units.

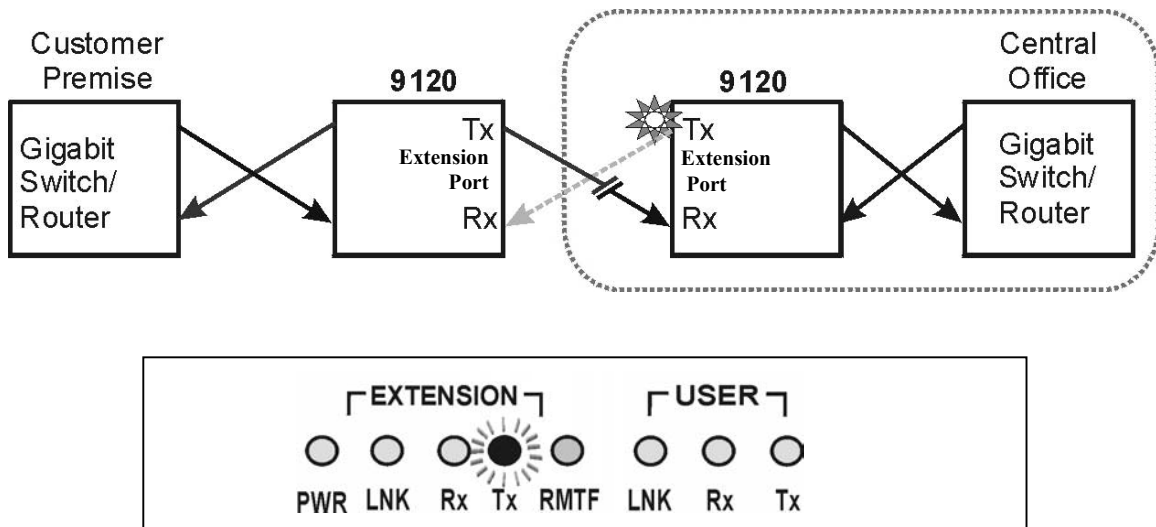
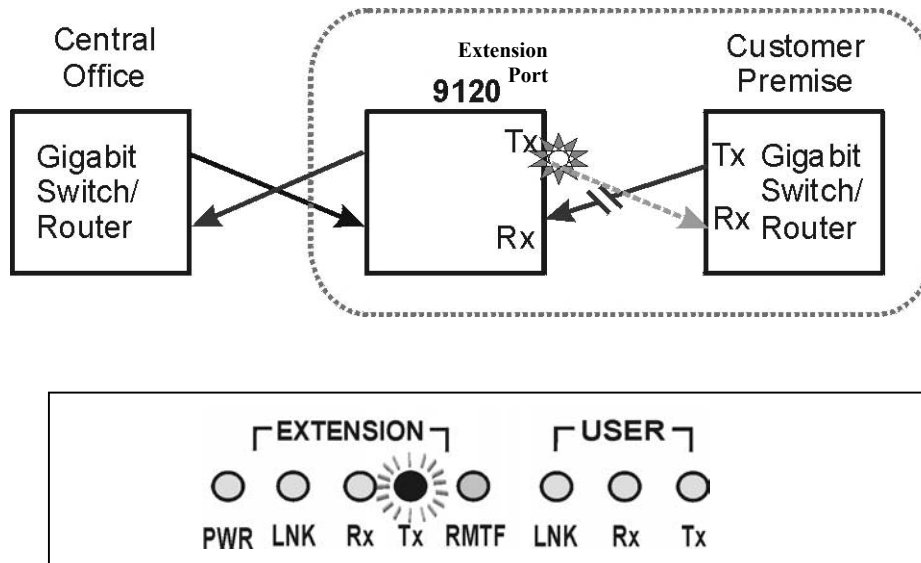


Figure 16. Link Loss Enable fault with 9120 to 9120 Link.

### 9120 Linked to Customer Equipment

When the 9120, linked to customer equipment, detects a loss of signal on the Extension Port Rx, the 9120 will stop transmitting to the customer equipment.



### Graphics Legend



Illuminated LED



Illuminated LED Indicating Error



Open Fiber Optic Link



Fiber Optic Link - TX Disabled

Figure 17. Link Loss Enable fault with 9120 to Customer Premise Link.

### 3.3 Models and Product Description

Model		Extension Port Description
<b>User Port: 1000BASE-SX, 850nm, MM, SC, 5.5dB, Full-duplex</b>		
9120-528-1-0	1000BASE-LX, 1310nm, SM, SC, 7dB, Full-duplex	for use in the 9101 powered LAN Chassis
9120-528-1-1	1000BASE-LX, SM, SC, 7dB, Full-duplex	120/240 VAC AC Adapter
<b>User Port: 1000BASE-SX, 850nm, MM, SC, 5.5dB, Full-duplex</b>		
9120-628-1-0	1000BASE-LD, 1310nm Extended Distance DFB laser, SM, SC, 21dB, Full-duplex	for use in the 9101 powered LAN Chassis
9120-628-1-1	1000BASE-LD, 1310nm Extended Distance DFB laser, SM, SC, 21dB, Full-duplex	120/240 VAC AC Adapter
<b>User Port: 1000BASE-SX, 850nm, MM, SC, 5.5dB, Full-duplex</b>		
9120-728-1-0	1000BASE-EX, 1550nm Extended Distance DFB laser, SM, SC, 21dB, Full-duplex	for use in the 9101 LAN Chassis
9120-728-1-1	1000BASE-FX, 1550nm Extended Distance DFB laser, SM, SC, 21dB, Full-duplex	120/240VAC AC Adapter
<b>User Port: 1000BASE-LX, 1310nm, SM, SC, 7dB, Full-duplex</b>		
9120-828-1-0	1000BASE-EX, 1550nm Extended Distance DFB laser, SM, SC, 21dB, Full-duplex	for use in the 9101 LAN Chassis
9120-828-1-1	1000BASE-EX, 1550nm Extended Distance DFB laser, SM, SC, 21dB, Full-duplex	120/240VAC AC Adapter

***Note:** Typically the loss budgets are 2dB greater than listed.*

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## Chapter 4

### Troubleshooting

In the case of the 9120 Media Converter, a hybrid device, there are two LNK LED indicators, marked User LNK and Extension LNK. When the 9120 Media Converter is put into service, if all cables are correctly connected and there are User and Extension devices attached to the cable, both LNK indicators should illuminate. If either LNK Indicator does not illuminate, check the appropriate attached cable and remote transmitter to ensure they are connected properly.

This implies that if the LNK indicator is illuminated on the local device, the remote transmitter, the attached cable and the local receiver are operational. Thus, if the RMTF LED indicator is illuminated, it indicates a problem with either the local fiber transmitter, the attached cable, or the remote fiber receiver.

The 9120 Media Converter's Link Loss Forwarding (LLF) feature will disable the Extension or User transmitter whenever the Extension LNK LED indicator is off. This allows the fiber failure to be sensed by a management agent at the remote User port as a User Link failure. Therefore, whenever the User transmitter appears to be off, check the receive Extension link cable connections to the 9120 media converter and ensure the F/LNK LED indicator is illuminated.

If the Power LED indicator and both LNK indicators are illuminated, and the RMTF indicator is off, you can assume with some assurance that the problem exists elsewhere. Data transfer through the 9120 Media Converter can only take place when both LNK indicators are illuminated and the RMTF indicator is off. The most common cause of network problems, once physical layer problems are resolved, is software configurations.

In addition, check that the total link loss is within the allowable fiber optic loss budget, and that the proposed application is within normal IEEE 802.3 Propagation Delay Budget.

If this still does not solve the problem, call the Canoga Perkins Service Department at (818) 718-6300.

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## Chapter 5

### Technical Specifications

#### 5.1 Gigabit Multimode (MM) 850nm (SX)

Emitter Type:	VCEL
Wavelength:	850nm nominal
Transmit Launch Power:	-4.0 dBm maximum -9.5 dBm minimum
Receive Sensitivity:	-15dBm minimum
Overdrive:	-3.0dBm
Loss Budget:	5.5dB minimum
Optical Connector:	Duplex SC

#### 5.2 Gigabit Single Mode (SM) 1310nm LX

Emitter Type:	Laser Diode
Wavelength:	1310nm nominal
Transmit Launch Power:	-3.0 dBm maximum -11.0 dBm minimum
Receive Sensitivity:	-18dBm minimum
Overdrive:	-3.0 dBm maximum
Loss Budget:	7.0 dB minimum
Optical Connector:	Duplex SC

### 5.3 Gigabit Single Mode (SM) 1310nm LD (DFB)

Emitter Type:	Laser Diode
Wavelength:	1310nm nominal
Transmit Power:	+2.0 dBm maximum 0.0 dBm minimum
Receive Sensitivity:	-21.0 dBm Maximum
Overdrive:	-3dBm maximum
Loss Budget:	21dB minimum
Optical Connector:	Duplex SC

### 5.4 Gigabit Single Mode (SM) 1550nm EX (DFB)

Emitter Type:	Laser Diode
Wavelength:	1550nm nominal
Transmit Power:	+2.0 dBm maximum 0 dBm minimum
Receive Sensitivity:	-23.0 dBm minimum
Overdrive:	-3dBm maximum
Loss Budget:	23 dB minimum
Optical Connector:	Duplex SC

## **5.5 Functional**

Data Interface:	ISO/IEC 8802.3 Gigabit
Fiber:	Duplex SC per ANSI X3.237-1995
Average One-way Latency:	60nsec, max.

## **5.6 Power**

Standalone:	120/240VAC, 50/60Hz, 10W Max
Rackmount:	5W Max.

## **5.7 Physical / Environmental**

Enclosure:	Standalone Metal Housing
Dimensions:	1.1"H x 3.4"W x 6.0"D
Weight:	Approximately 9 oz. (0.25kg)
Power Supply: Standalone	External Wall Mount Type <ul style="list-style-type: none"><li>• Dimensions: 3"L x 2"W x 1.6"D</li><li>• Power Cord: 6 feet</li></ul>
Operating Temperature:	0° - 50°C
Humidity:	up to 90% (noncondensing)
Regulatory Compliance:	UL 1950/CSA C22.2 No. 950 IEC 60950 IEC 825-1 FCC Part 15 Class A/IC CS-003 EN 300386-2 (in 9101 Chassis) AS/NZS 3548 NEBS Level 3 (in 9101 Chassis)



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## Chapter 6

### Glossary

CSMA/CD	Carrier Sense Multiple Access with Collision Detection
FDDI	Fiber Distribution Data Interface
FDX	Full-Duplex
LED	Light Emitting Diode
NEBS	Network Equipment Building Systems
NIC	Network Interface Card
nm	nanometer
SMF/PMD	Single-Mode Fiber / Physical Media Dependent

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## Appendix A Warranty

### 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, 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.

## **Canoga Perkins**

### **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 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)

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 CORPORATION**

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