



OPTICAL BROADCAST SYSTEMS

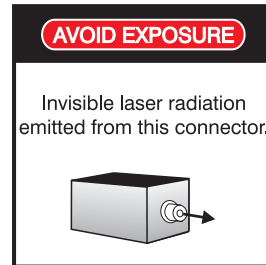
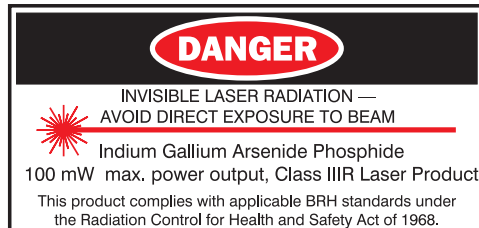
Model 2807 PDS/PNS Mini-Node CATV Receiver

Installation Guide and User Manual

IOM2807
Revision 2.2, March 2006

Laser Safety Warning

The optical emissions from the return path module optical output and connected optical fiber are laser-based and may present eye hazards. Follow all safety precautions.



Technical Support

If you encounter any kind of problem after reading this manual, contact your local distributor or a Force, Inc. Applications Engineer. To reach technical support::

On the Web:	http://www.forceinc.com
By Phone (Monday through Friday 8:00 am to 5:00 pm EST):	USA (800) 732-5252 TEL (540) 382-0462
By Fax:	(540) 381-0392
By Email:	csr-sales@forceinc.com

Contents

Laser Safety Warning 1

Technical Support 1

Product Specifications 3

FCC Notice 3

Optical and Video Characteristics 3

Electrical Characteristics 4

Environmental Characteristics 4

Physical Characteristics 4

Specification Notes 4

 CNR vs. Receiver Optical Input at 110 Channels 4

Installation and Operation 6

General Installation Instructions 6

Unit Physical Description 7

 Model 2807 Mini-node CATV Receiver 7

Module Placement 7

Items Provided 8

Items Required 8

Inspection 8

Connections 8

Operation of the LCD Display 9

Control Button Operation 10

 RF Equalization Update Mode 10

 RF Attenuation Adjust Mode 11

Optical Status LED 11

Measuring RF Input Levels at the Return Path 11

Safety Precautions 11

Power-up and Operation 11

Performance Verification 12

Troubleshooting 12

Cleaning 13

Warranty and Return Policy 14

Warranty 14

 Force Obligations 14

 Exclusions 14

Product Return Policy 14

 Products Returned for Credit - Non Distributor 15

Products Returned for Repair or Replacement 15

 Active Product Under Warranty 15

 Obsolete Product Under Warranty 15

 Active Out of Warranty 15

 Obsolete Product Out of Warranty 16

Receiving an RMA for Returns 16

Product Specifications

FCC Notice

The Model 2807 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 instructions in this manual, may cause harmful interference, in which case the user must correct the interference at the user's own expense. Compliance with applicable regulations depends on the use of shielded I/O cables. The user is responsible for procuring the appropriate cables.

Optical and Video Characteristics

@ 25°C, SM Fiber (Note 9)

	Min.	Typ.	Max.	Units	Notes
CATV Receiver					
Operating Wavelength	1290	1310	1330	nm	
Operating Wavelength	1490	1510	1610	nm	
Optical Input Power	-8.0		+4.5	dBm	
Channel Loading			110	Channels	
Bandwidth	50		860	MHz	1
Required Fiber Bandwidth	2,000			MHz	
Output Impedance		75		Ohms	
RF Output Level		+38		dBmV	2
RF Equalization	0		+10	dB	3
Output Return Loss		16		dB	
Composite Second Order (CSO)		-63		dBc	
Composite Triple Beat (CTB)		-66		dBc	
Carrier-to-Noise Ratio (CNR)	See Figure 1				4
Backreflection Tolerance			-50	dB	5
Return Path Modules					
Operating Wavelength	1280	1310	1340	nm	
Operating Wavelength	1490	1550	1610	nm	
RF Input Power	23	28	33	dBmV	
Optical Power (FP Laser)		1.5		mW	
Optical Power (DFB Laser)		3.0		mW	
Bandwidth	5		42	MHz	

Electrical Characteristics

	Min.	Typ.	Max.	Units	Notes
Power Supply Voltage	+10	+12	+15	V _{DC}	6
Power Dissipation		10		Watts	

Environmental Characteristics

	Min.	Typ.	Max.	Units	Notes
Operating Temperature Range	0		+50	°C	7
Storage Temperature Range	-20		+70	°C	
Humidity (RH non-condensing)	0		90	%	8

Physical Characteristics

	Min.	Typ.	Max.	Units	Notes
Weight		1.0		lbs.	
		0.45		kg	
Physical Dimensions		8.45 x 2.95 x 1.12		in.	
		215 x 75 x 29		mm	

Specification Notes

- 1) The receiver bandwidth is 50-860 MHz when a return path transmitter is installed.
- 2) The 2807 Mini-node contains a user-programmable digital RF attenuator which is adjustable from 0 dB to 31 dB attenuation. The user can adjust this RF attenuator to achieve +38 dBmV per channel RF output over the full rated optical input power. See page 9 for LCD operation details.
- 3) The 2807 Mini-node contains a user-programmable RF equalization function. The user has the choice of flat response (no tilt) or +10 dB tilt via the digital control panel. See page 9 for LCD operation details.
- 4) Figure 1 shows the CNR versus received optical input power and number of channels. The horizontal axis is the amount of optical light that reaches the receiver. (It is not the loss between the transmitter and receiver.) The vertical axis shows the CNR.

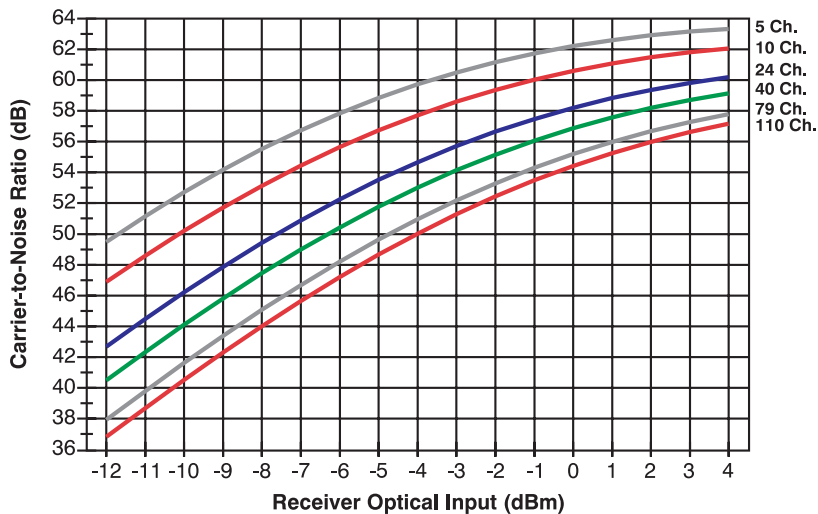


Figure 1 CNR vs. Receiver Optical Input at 110 Channels

The link CNR is usually specified for a received optical power of -3 dBm or more. Thus, a 2804TK-SCAP/12 optical transmitter, with an optical output of +12 dBm, will provide excellent performance with up to 15 dB of optical loss at full channel loading. If lower channel loading is used, then the link can operate at higher optical losses and still provide exceptional CNR.

A number of curves are plotted; the top curve is the typical result when only 5 channels are transmitted through the link. It can be seen that very high CNR results and in fact the output is quite usable with receiver optical inputs as low as -12 dBm, corresponding to 24 dB of optical loss! As the channel loading gets higher, the maximum achievable CNR drops.

- 5) **This product must be used only with APC type optical connectors or fusion spliced connections.** There is some folklore which suggests that the only critical backreflection is the one closest to the transmitter. Our experience does not support that view. We find that *all* backreflections matter, regardless of their distance from the transmitter.
- 6) The receiver is powered by the Force, Inc. Model PS200 AC adapter. See TB043 for complete specifications.
- 7) Most parameters are relatively unaffected by varying temperature. A moving air environment is recommended at ambient temperatures above +35°C.
- 8) Humidity is RH non-condensing.
- 9) The Model 2807 PDS/PNS Mini-node receiver is optimized for single-mode operation only.

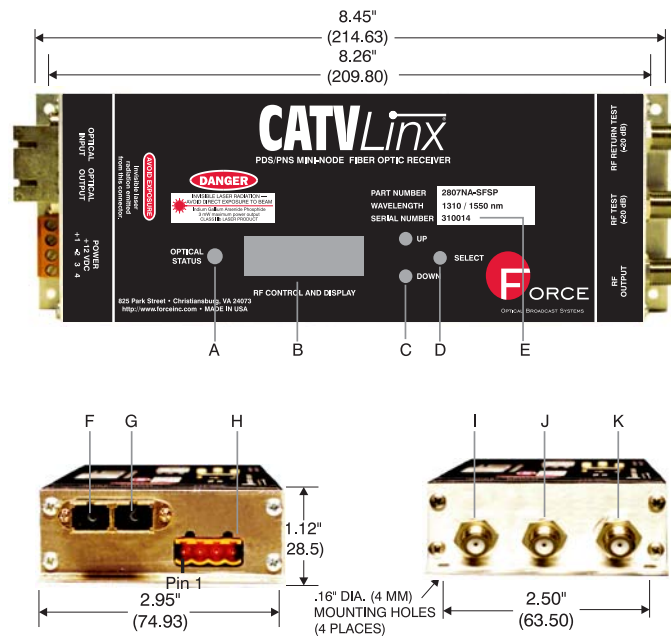
Installation and Operation

General Installation Instructions

The installation of these units is very simple. There are no special unpacking instructions, except that care should be taken to handle the units gently. Fiber optic links are sensitive electronics devices that should be handled with care. Like most electronics, they are susceptible to ESD. Proper ESD techniques such as wearing a wrist grounding strap, should be observed at all times when handling a unit. The units should not be dropped. No assembly is required.

Do not install the equipment near sources of excessive heat, such as furnace outlets or above heat producing units, such as large power supplies and tube-type equipment. Observe temperature and relative humidity requirements specified on page 4.

Unit Physical Description



- A. Optical Status (Tri-colored LED): When lit green, indicates the unit is receiving the optimum optical input power. If the optical power falls below optimum, the LED will turn yellow. If the optical power rises above optimum, the LED will turn red.
- B. LCD Display: Displays the receiver optical input level, RF attenuator setting, and equalization setting. The RF levels may be adjusted by the user via the Up/Down/Select Buttons (items C and D). See page 9 for details.
- C. Up/Down Buttons: Allows the user to adjust the RF attenuator and equalization settings.
- D. Select Button: Selects either RF attenuator or equalization setting for adjustment.
- E. Unit Serial Number: The unit serial number is a code that identifies the start date of the product warranty.
- F. Optical Input (SC/APC std., FC/APC Option): Optical Input to the receiver.
- G. Optical Output (SC/APC std., FC/APC Option): Optional optical output from the return path module, when installed.
- H. Power (4-pin Weidmuller Connector): Supplies power to the receiver. See page 8 for pin connections.
- I. RF Output (F Connector): RF output from the receiver.
- J. RF Test -20 dB (F Connector): Allows the user to measure the receiver RF output levels 20 dB down from the primary output.
- K. RF Return Test -20 dB (F Connector): Allows the user to measure the return path RF signal level 20 dB down from the return path signal level.

Warning

Invisible laser radiation emitted from the optical output connector and the connector that attaches to the receiver. Avoid direct eye contact with the beam.

Figure 2 Model 2807 Mini-node CATV Receiver
(Dimensions in parentheses are in millimeters.)

Module Placement

Units may be mounted in any orientation on most flat, dry surfaces. Secure panhead screws through mounting holes provided at the base of the module. If the unit is placed in a location where temperatures may exceed 38°C (100°F), a good heat sink should be secured. The use of silicone thermal pads is recommended between the module and the plate to maximize heat transfer. Units must have their chassis connected to a good earth ground.

Items Provided

The following is a list of items provided with each Model 2807:

Qty.	Mfr.	P/N	Description
AR	Force, Inc.	2807NX-SFSP	PDS/PNS Mini-node CATV Receiver, SM, 1310/1550 nm, SC/APC Standard, FC/APC Optional
1 per connector	Any	Any	Active Device Receptacle Caps for RF and Optical Connections

Items Required

Qty.	Mfr.	P/N	Description
AR	Force, Inc.	2804T or 2805T	110 Ch. PDS Transmitter, SM, 1310 nm, SC/APC Std, FC option. 77Ch. PNS Transmitter, SM, 1310 nm, SC/APC Std., FC option.
1 per Rx	Force, Inc.	PS200	Rx Power Supply, +15 Volts, 950 mA DC Power Supply, 4-pin Power Connector
4 per unit	Any	Any	6-32 Panhead Mounting Screws with Lock Washers and Nuts (for Rx)
AR	Any	Any	EIA 19" Grounded Equipment Rack (for Tx)
1	Any	Any	Straight Screwdriver
AR	Any	Any	9/125 μm Single-mode Fiber

Inspection

Remove the unit from its shipping container. Any in-shipment damage that may have occurred should be visually apparent. Look for bent or damaged connectors or mounting brackets. Claims for damage incurred in shipment should be made directly to the transportation company in accordance with their instructions. Save the shipping cartons until installation and performance verification are completed.

Connections

Connector Name	Connector Type	Connector Function	
Optical Input	SC/APC or FC/APC*	Optical input to the unit.	
Optical Out	SC/APC or FC/APC*	Optical output from the return path unit.	
	It is imperative that backreflections be controlled to very low levels. This product must be used only with angle physical contact (APC) connectors.		
Power	4-Pin Weidmuller Connector	Pin	Function
		1	+12 Volts DC
		2	Ground
		3	Optical Status Flag. This is an open drain output that can sink up to 10 mA at +12 Volts. An external pull-up resistor is required. This pin will be pulled low when the optical input is within optimal range
4	Optical Input Power Meter. This is an analog voltage proportional to the amount of light reaching the detector. The response is 1 Volt per mW of input light.		
RF Output	F Connector	RF output from the unit.	
RF Test	F Connector	RF Test (-20 dB) output for receiver.	
RF Return Test	F Connector	RF Test (-20 dB) output for return path module (if installed).	

*Note: The FC/APC interface uses the "wide-key" standard. This means that the units are optimized for use with FC/APC connectors that have a 2.14 mm wide alignment key. "Narrow-key" FC/APC connectors (2.02 mm) may be used but will produce inferior results. Standard FC/PC connectors have a 2.36 mm wide key and cannot be plugged into to the unit.

Operation of the LCD Display

The top of the 2807 Mini-node contains a 16 character x 2 line LCD display with backlight. This LCD is used to display receiver optical input power, the current status of the internal RF equalizer and the status of the internal digital RF attenuator. The UP/DOWN/SELECT buttons are used to display and/or configure parameters for the receiver. A typical display is shown below:



The RF equalizer text (EQ) has two possible states, TILT and FLAT.



OR



The RF attenuator (ATN:) will display values ranging from 0-31 dB, for example:



As the UP button is pushed repeatedly, the attenuation will increase to 31 dB and the display will show MAX as shown below:



As the DOWN button is pushed repeatedly, the attenuation will decrease to 0 dB and then the display will show MIN as shown below:



The optical input text (OPT IN:) will show one of the following. If the optical input is greater than + 5.0 dBm, the display will show OVL D!.



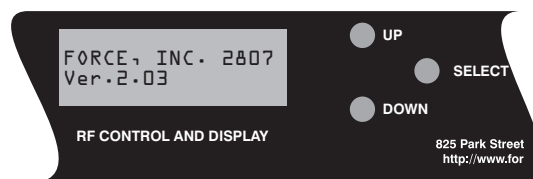
If the optical input is less than -12.0 dBm, the display will show L O W!.



If the light level is greater than or equal to -12.0 dBm and less than or equal to +5.0 dBm, the display will show the actual input level with a resolution of 0.1 dB and an absolute accuracy of ± 0.6 dBm.



When the display select button is pushed 3 times, the display will become that shown below. This is also the temporary display at power up:



Control Button Operation

When no button has been pushed for 20 seconds or more, the display will revert to idle mode. In idle mode, the UP and DOWN buttons are ignored. In order to change the setup of the Model 2807 Mini-node, push the SELECT button. This will cause the unit to enter the equalization update mode. The EQ: text on the display will flash. Hitting the SELECT button again will cause the unit to enter the attenuation update mode. The ATN: text on the display will flash. Hitting the SELECT button additional times will cause the unit to toggle between the equalization update mode and the attenuation update mode. Again, if no button is pressed for 20 seconds or more, the unit will revery to the idle display mode.

RF Equalization Update Mode

When the unit is in the equalization update mode (the EQ: text will be flashing once per second), the UP and DOWN push buttons will toggle the unit between the FLAT and TILT modes. In FLAT mode, the RF output will be flat versus frequency (assuming that the RF into the optical transmitter was flat). In the TILT mode, the RF output will be tilted upward by 10 dB over the full receiver bandwidth (again, assuming that the RF into the optical transmitter was flat).

RF Attenuation Adjust Mode

When the unit is in attenuation adjust mode (the **ATN:** text will flash once per second), the UP and DOWN push buttons are used to adjust the internal digital RF attenuation. It may range from 0 dB to 31 dB. Each push of the UP and DOWN push buttons will increment or decrement the numerical value by one. Once a value of 0 dB is reached, further pushes of the DOWN button will cause the display to show **MIN** for two seconds. Once a value of 31 dB is reached, further pushes of the UP button will cause the display to show **MAX** for two seconds.

Optical Status LED

The optical status LED indicates the general status of the Model 2807 Mini-node. The presence of any color light indicates that the unit is powered. If the light into the Model 2807 Mini-node exceeds +4.5 dBm, the LED will turn red indicating that excessive optical power is being applied to the optical input. If the light into the 2807 Mini-node is less than -8.0 dBm, the LED will turn yellow indicating that insufficient light is being applied to the optical input. If the light into the 2807 Mini-node is greater than or equal to -8.0 dBm and less than or equal to +4.5 dBm, the LED will be green, indicating that the optical input is within the optimum range. Each transition has a hysteresis of 0.2 dB.

Measuring RF Input Levels at the Return Path

Excessive RF input to a fiber optic CATV transmitter *WILL* destroy the laser even if the unit is not powered. Lasers can be destroyed by being overdriven for as little as one nanosecond (10^{-9} seconds). Because they can be destroyed so quickly, it is essentially impossible to design a circuit or “fuse” that will blow before the laser is destroyed. Therefore it is imperative that the RF level be within acceptable limits *BEFORE* the cable is attached to the transmitter.

- 1) Using a spectrum analyzer, determine that the RF level input to the transmitter is within safety bounds.
- 2) Ideally, the RF level should be checked with an instrument such as a spectrum analyzer to verify that the levels are appropriate. If instrumentation is not available to actually measure the RF levels, Force recommends adding 40 dB of attenuation at the transmitter input; 40 dB of attenuation will adequately protect the unit from the highest RF levels that might be seen in a typical CATV installation. Do not attach the RF cable at this time, just verify the RF levels and/or add the appropriate attenuators at the transmitter input.

Safety Precautions

The optical emissions from the return path units are laser-based Class IIIb, and may present eye hazards if improperly used. **NEVER USE ANY KIND OF OPTICAL INSTRUMENT TO VIEW THE OPTICAL OUTPUT OF THE UNIT.** Complete laser safety procedures may be downloaded at <http://www.forceinc.com/techbull/laser-safety-procedures.pdf>. As always, be careful when working with fibers. Fibers can cause painful injury if they penetrate the skin.

Power-up and Operation

- 1) Install the links as described on page 6.
- 2) Measure the RF level **BEFORE** making any connections to the transmitter. This measurement is described on page 11.
- 3) Clean the optical connectors. Download <http://www.forceinc.com/techbull/optical-connector-cleaning.pdf> for complete cleaning instructions. Be sure all connections are APC type.
- 4) Connect the optical fiber to the transmitter and the receiver. Be sure that the fiber has continuity and less than the maximum allowable optical loss. Also be certain that the fiber is the proper size. This product can only be used with single-mode fiber. The input power to the Rx must be greater than -8.0 dBm and less than +4.5 dBm. The units will not work back-to-back.
- 5) Connect the RF source (VCR, camcorder, cable television, etc.) to the RF input on the transmitter.
- 6) Connect the RF output on the receiver to the monitor input. The monitor input should present a 75 Ohm impedance.
- 7) Connect the AC power cord to the transmitter, and connect the Model PS200 wall-mount power supply to the receiver. **WARNING:** Optical laser radiation is present at the optical connector when the unit is activated. **AVOID DIRECT EYE EXPOSURE TO THE BEAM.**

- 8) The unit is now fully operational. Verify the proper operation of the link by following the steps below. RF attenuation and RF equalization may be adjusted by the user. See page 9 for details on making these adjustments.

Performance Verification

No user maintenance is required. The Model 2807 Mini-node CATV receiver contains no user-serviceable parts and requires no routine service. Contact the factory if the unit requires warranty repair work. Once the units have been installed, verify that the picture quality is good. If the picture quality is not good, there are several likely causes:

- 1) The optical fiber may have large backreflections. Use an OTDR to examine the fiber run.
- 2) There may be non-APC optical connectors somewhere in the system. These cause unacceptable levels of backreflection.
- 3) The RF input spectrum may not be flat. It is possible to have a green RF level LED even if the input spectrum has a large amount of tilt. All Force CATV products are designed to operate with a flat input spectrum.
- 4) There may be extraneous (i.e., non-video) signals in the input RF. Be sure to filter out all non-desireable signals.
- 5) The optical input power at the receiver may be too low. In this case, the optical status LED will be yellow. See Figure 1 for the expected CNR versus the channel loading and received optical power.

Troubleshooting

Common problems include lack of continuity in the optical fiber, lack of power (or reversed power), or improper input levels. The units are designed to work with a 75 Ohm system. Consult IOM 2804 or IOM2805 for additional troubleshooting of the transmitter. If problems persist, contact the factory.

Problem	Check	Comments
No optical power out of Tx.	Check Tx AC power connection.	If AC power is connected, check the primary AC power source to verify it is working. Contact Force, Inc. if no cause for this problem can be found.
No optical power at the Rx.	Check optical power output at the Tx.	If there is optical power at the Tx output, verify proper fiber is connected to the Rx. If the proper fiber is connected, ensure the integrity of the fiber.
Signal out of Rx is noisy.	Check optical power at the Rx.	If the optical status LED is yellow, the optical input power is too low. Verify proper fiber is connected to the Rx. If the proper fiber is connected, ensure the integrity of the fiber. Be sure to ground the case of the Tx and Rx. Also verify that all optical connections are APC type.
No signal out of Rx.	Verify the input signal at the Tx.	See the transmitter IOM for the required input signal level.
Signal out of Rx is distorted.	Verify input signal at Tx.	The Tx input must be within the specs given in the transmitter IOM. A larger signal will cause distortion.
	Verify fiber size.	Single-mode fiber must be used with this product.
	Verify RF output level.	If the internal RF attenuator is too low, the RF output may be overdriven.

Cleaning

If the link needs to be cleaned, avoid the use of all solvents and use low-pressure clean air to remove loose dirt. Use low-pressure clean air to clear the connectors of any debris. Dirty or scratched connector end faces will greatly reduce the unit's performance. Do not try to use fluids or high-pressure air to clean out the optical ports. Foam-tipped swabs such as the 2.5 mm Mini Foam Swab offered by Fiber Instrument Sales (P/N F1-0005) may be saturated with denatured alcohol and inserted into the optical port for cleaning. **DO NOT INSERT A DRY SWAB INTO THE OPTICAL PORT AS THIS MAY DAMAGE THE FIBER END FACE.** Many fiber optic installations experience degraded performance due to dirty optical connector end faces. Download <http://www.forceinc.com/techbull/optical-connector-cleaning.pdf> for complete cleaning instructions.

Warranty and Return Policy

Warranty

Force, Incorporated standard products are warranted to be free from defects in materials and workmanship, meeting or exceeding factory specified performance standards for a period of three (3) years from date of purchase.

Force Obligations

Force will, at its discretion and expense, repair any defect in materials or workmanship or replace the product with a new product. Force will, upon receipt of the return, evaluate the product and communicate to the customer the nature of the problem, and determine if the claim falls under warranty coverage.

If during the warranty period, Force is unable to repair the product to the original warranted state within a reasonable time, or if subcomponents of the unit have been obsoleted or discontinued, then Force has the option to provide an equivalent unit.

Exclusions

This warranty does not extend to any product that has been damaged due to acts of God, accident, misuse, abuse, neglect, improper system design or application, improper installation, improper operation or maintenance, or connection to an improper voltage supply.

The Force warranty does not cover fuses, batteries, and lamps. Modifications or alterations of Force products (including but not limited to installation of non-Force equipment or computer programs), except as authorized by Force, will void this warranty. Removal or breaking of the seals on the product will also void the warranty. In addition, cost of repair by unauthorized persons within the warranty period of the product will not be covered by Force, Incorporated. Such repairs will void the warranty.

Force, Incorporated makes no other representation or warranty of any other kind, express or implied, with respect to the goods, whether as to merchantability, fitness for a particular purpose, or any other matter. Force, Incorporated's liability shall not include liability for any special, indirect or consequential damages, or for any damages arising from or attributable to loss of use, loss of data, loss of goodwill, or loss of anticipated or actual revenue or profit, or failure to realize expected savings, even if Force, Incorporated has been advised of the possibility of such damages. This warranty constitutes Force, Incorporated's entire liability and the customer's sole remedy for defects in material and workmanship.

Product Return Policy

Customers will be permitted to return products for credit, repair, or replacement only after receiving authorization from the Customer Service Manager (CSM) and only with a valid Return Material Authorization (RMA) number. The criteria determining whether a product is covered under this policy are described below and RMA numbers will be issued only under these guidelines. For Return Requests that do not comply with the following criteria, the CSM must have approval from the VP Operations, or designee prior to issuing an RMA number.

Products Returned for Credit - Non Distributor

Customers will be allowed to return product for credit only under the following conditions:

- Products are current standard Force products as per the price list.
- Products are in new, unused, and undamaged condition and are in the original packaging.
- Products were originally shipped to the customer requesting Return Authorization.
- Request for return is for a valid reason as determined by Force, Inc.
- Products were shipped to the customer less than 3 months prior to return request.
- Customer receives proper Return Material Authorization prior to returning the product.
- Customer pays return freight and insurance if requested by Force, Inc.

Customers will be issued a credit for the original selling price of the product less a 20% restocking charge after verification that the product meets the criteria as stated above. Payment to customers with no outstanding balance will be made 30 days after requested by customer.

Products Returned for Repair or Replacement

Force's response to a customer product return request will be based upon whether or not the product is still part of Force's standard product offering and whether or not the product is still under warranty. A product will be considered active if it is currently part of Force's standard product offering. Active products are denoted in Force's current price list. Obsolete products are not considered active. A product is considered under warranty in accordance with "Force, Inc. Product Warranty"

Prior to receiving an RMA number, the customer will be asked to discuss the reason for the return with Technical Support to try to resolve the problem. This discussion will be documented to aid with troubleshooting and repair of the product. Any detail the customer can provide will expedite the process once the product is received.

The criteria denoted above will cause any incoming returns to fall into one of the following categories:

- A. The product is currently active and is under warranty.
- B. The product is currently obsolete, but is still under warranty.
- C. The product is active, but out of warranty.
- D. The product is obsolete and out of warranty.

Active Product Under Warranty

Force will honor the warranty for these products. As a result, product(s) should be accepted upon return for rework or repair in accordance with Force's warranty policy.

Obsolete Product Under Warranty

Force will honor the warranty for these products. As a result, product(s) should be accepted upon return for rework or repair in accordance with Force's warranty policy.

Active Out of Warranty

Force will accept return of product under this category as long as the sale of the product occurred less than five (5) years prior to the return request. The product serial number should aid in determining the age in cases where information is not in the data base. Rework or repair will be in accordance with Force's warranty policy and will include an evaluation charge, which will be quoted to the customer prior to the return of the product. The evaluation charge is 20% of the current list price of the product or a minimum of \$250 whichever is greater. The customer will either need to provide a purchase order number (with approved credit) or a credit card number before receiving an RMA number. Force cannot guarantee its ability to repair or rework the product. If costs to repair the product exceed the evaluation charge, the customer will be notified of such charges and instruction to proceed with repairs will be indicated either by a P.O. number or credit card authorization.

Obsolete Product Out of Warranty

Force is not obligated to accept requests for product under this category. The CSM, with prior approval from Operations will be responsible for approving return requests for products falling under this category.

Receiving an RMA for Returns

Customers requesting RMA numbers for any reason will be instructed as to how and where to ship the products being returned, and will be directed to show the RMA number on all external packaging and documentation. The CSM is responsible for providing any necessary instructions to the customer to ensure proper handling of the returned material. Upon receipt of the product, all Force personnel are to process the return as per SP002,"Handling of Customer Returns". Contact the factory at USA (800) 732-5252 or TEL (540) 382-0462 to request an RMA.