



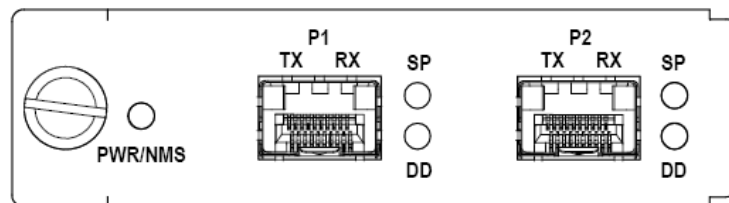
EM316-2SFP

Transparent SFP-to-SFP Converter
With EM316NM or EM316LNXM-OT Management

User Guide

PN 1259003-001

Revision C3



October 30, 2007

Table of Contents

1 Preliminary Considerations	iv
1.1 Trademarks.....	iv
1.2 Copyright	iv
1.3 Customer Support.....	iv
1.4 MRV Regulatory Compliance	v
1.5 General Safety.....	vi
1.5.1 Cautions and Warnings	vi
1.5.2 Laser Safety.....	vi
1.5.3 Static Electricity	vii
1.5.4 Workplace Preparation	vii
1.6 Specific Document Information.....	viii
1.7 Latest Revision and Related Documents.....	viii
1.8 EM316NM and EM316NM-5 References	viii
2 Product Overview	1
2.1 Management features.....	1
2.1.1 LIN	1
2.1.2 Loopback	2
3 Preparation and Installation	3
3.1 Unpacking the Fiber Driver Module	3
3.2 Front Panel Description	4
3.2.1 LED Display Information	4
3.3 DIP Switch Configuration.....	5
3.4 Module Installation.....	6
3.5 Small Form Pluggables (SFP): Handling and Installation.....	8
3.5.1 Cleaning Fibers.....	8
3.5.1.1 Cleaning Supplies	8
3.5.1.2 Cleaning Procedure:	8
3.5.2 Working with SFPs	9
3.5.2.1 Cleaning SFPs.....	9
3.5.2.2 Mylar Tab SFP Modules	10
3.5.2.3 Actuator/Button SFP Modules.....	11
3.5.2.4 Inserting an Actuator/Button SFP Module.....	11
3.5.2.5 Bale Clasp SFP Module.....	12

4 Module Management	13
4.1 Remote Command Line Interface (CLI) Setup	14
4.2 Serial Command Line Interface (CLI) Setup	14
4.2.1 EM316NM Serial Console Setup	14
4.2.2 EM316LNxNM-OT Serial Console Setup	14
4.3 EM316NM[-5] Command Line Interface (CLI)	15
4.4 EM316LNxNM-OT Command Line Interface (CLI)	18
4.4.1 EM316LNxNM-OT Boot and CLI Login	19
4.4.2 CLI Navigation	20
4.4.3 Login Context Commands and Examples	21
4.4.3.1 "show version"	21
4.4.3.2 "show log"	21
4.4.3.3 "show running-config"	22
4.4.3.4 "show startup-config"	23
4.4.4 Configuring System Parameters	24
4.4.5 Chassis Context	25
4.4.5.1 Chassis Context – "show"	25
4.4.5.2 Displaying and Saving System Parameters	26
4.4.5.3 Restoring Default Parameters	27
4.4.5.4 Chassis Context – Other Commands	28
4.4.6 Slot Context Commands and Examples	29
4.4.6.1 "?"	30
4.4.6.2 "list"	31
4.4.6.3 "show"	32
4.4.6.4 "show digital-diagnostics"	34
4.4.7 Port Context Commands and Examples	35
4.4.7.1 "?"	35
4.4.7.2 "list"	37
4.4.7.3 "show"	38
4.4.7.4 Port Description	39
4.4.7.5 "show defaults"	40
4.4.7.6 "show config"	40
4.4.7.7 Loopback	41
4.4.7.8 LIN	41
4.4.7.9 Shutdown	42
5 Appendix	43
5.1 Technical Specifications	43
5.2 Supported Data Rates	43
5.3 Firmware Download	43
5.4 Troubleshooting	44

Table of Figures

Figure 1 -- Unpacking	3
Figure 2 -- Front Panel Schematic of the EM316-2SFP	4
Figure 3 -- LED Legend	4
Figure 4 -- DIP switch settings	5
Figure 5 -- DIP switches and PCB revision examples	5
Figure 6 -- Remove the required blank panels	6
Figure 7 -- Module installation (not all chassis are shown).....	7
Figure 8 -- Correctly inserted Fiber Driver module in a powered chassis.....	7
Figure 9 -- Cleaning cartridge	8
Figure 10 -- Contaminated fiber and clean fiber through a scope	8
Figure 11 -- SFP cleaners.....	9
Figure 12 -- Mylar Tab on SFP Module	10
Figure 13 -- Insertion of a Mylar Tab SFP Module.....	10
Figure 14 -- Removal of a Mylar Tab SFP Module	10
Figure 15 -- Actuator/Button SFP Module	11
Figure 16 -- Insertion of an Actuator/Button SFP Module.....	11
Figure 17 -- Removal of an Actuator/Button SFP Module	11
Figure 18 -- Bale Clasp SFP Module	12
Figure 19 -- Insertion of a Bale Clasp SFP Module	12
Figure 20 -- Removal of a Bale Clasp SFP Module.....	12
Figure 21 -- EM316NM[-5] CLI commands for EM316-2SFP management	15
Figure 22 -- EM316LNXM-OT general commands for 2SFP module	18

1 Preliminary Considerations

1.1 Trademarks

All trademarks are the property of their respective holders.

1.2 Copyright

MRV Communications reserves the right to make changes to products and documentation without notice in order to improve reliability, function, or design. The user assumes sole responsibility for applying the information supplied herein.

Copyright © 2007 MRV Communications. All rights reserved.

1.3 Customer Support

Before contacting customer support, look for software updates, technical specifications, and frequently asked questions (FAQ) online at the MRV support website:

<http://service.mrv.com>.

The website includes information regarding software updates, technical specifications, and frequently asked questions (FAQ) as well as contact information.

Contact help online by sending email to support@mrv.com or through the website request link at <http://service.mrv.com/support/forms/supportcall.cfm>

For direct MRV customer support by telephone, call your local sales representative, system engineer, or one of the following numbers.

MRV Americas (US, Canada, and Latin America)	+1-800-435-7997
	+1-978-952-4888
MRV Europe	+49-6105-2070
MRV International	+972-4-993-6200

Include the following important information when opening a support case.

- Site ID or company name
- Contact information
- Model or product name
- Serial number
- Top assembly revision (see label on board)
- Brief problem or question including a description of the host network environment
- Attenuation data for applicable high-speed fiber links
- Urgency of the issue

1.4 MRV Regulatory Compliance

Contact your sales representative for more regulatory compliance information regarding specific MRV products or product families.

Fiber Driver Chassis

FCC Part 15 (Class A); IC (Class A); EMC Directive: Emission (Class A) and Immunity; LVD Directive: Electrical Safety; CE Marking; TUV CUE Mark (Canada, USA, EU); GOST; RoHS Directive, WEEE Directive: Wheelie Bin Mark; ETSI, NEBS, C-Tick

Fiber Driver Modules

FCC Part 15 (Class A); IC (Class A); EMC Directive: Emission (Class A) and Immunity; LVD Directive: Electrical Safety; RoHS Directive, WEEE Directive: Wheelie Bin Mark; ETSI

Optical and Copper Transceivers

FCC Part 15 (Class A); IC (Class A); EMC Directive: Emission (Class A) and Immunity; LVD Directive: Electrical Safety; CE Marking; TUV; UL, CSA, RoHS Directive, ETSI, NEBS, compliant with EN 60825-1/A1:2002 Safety of Laser Products

China RoHS Disclosure 中国 RoHS 声明

Component Name 部件名称	Pollution Control Logo 污染控制标志	Hazardous Substance Name 有毒有害物质或元素					
		Lead 铅 (Pb)	Mercury 汞 (Hg)	Cadmium 镉 (Cd)	Hexavalent Chromium 六价铬 Cr (VI)	Polybrominated Biphenyls 多溴联苯 (PBB)	Polybrominated Diphenyl Ethers 多溴二苯醚 (PBDE)
Fiber Driver Chassis, Modules and Accessories 光纤驱动器机箱, 组件和附件		X	O	O	O	O	O
Pluggable Optics 插入式光学器件		X	O	O	O	O	O
Power Supplies 电源		X	O	O	O	O	O

O: Indicates that this hazardous substance contained in all of the homogeneous materials for this component is below the limit requirement in SJ/T11363-2006.

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。

X: Indicates that this hazardous substance contained in at least one of the homogeneous materials used in this component is above the limit in SJ/T11363-2006. Contain lead in solder.

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求，焊锡中含铅。

Table of Hazardous Substances Name and Concentration 有毒有害物质名称及含量的标识格式

1.5 General Safety

1.5.1 Cautions and Warnings

Disconnect all power from electronic devices before servicing. Some equipment may have multiple power cords requiring disconnection.

1.5.2 Laser Safety



WARNING: Fiber optic equipment may emit laser or infrared light that can injure your eyes. Never look into an optical fiber or connector port. Always assume that fiber optic cables are connected to a laser light source.



CAUTION: Do not install or terminate fibers when a laser may be active.

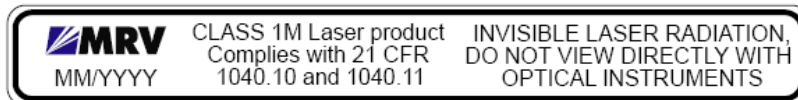


WARNING: Never look directly into a live optical fiber. Always wear appropriate laser safety glasses when working with open fiber cables that might be connected to an operational laser transmitter. Direct open fibers ends away from faces.



CAUTION: Use of controls or adjustments or performing procedures other than those specified herein may result in hazardous radiation exposure.

If a fiber optic laser device output is recognized as a higher than Class 1 product (Class 1M, for example), the device is evaluated, labeled, and certified by TUV. Class 1 and 1M outputs are not considered hazardous, but laser safety practices should always be observed.



A fiber optic transceiver emits either single-mode or multi-mode light into a fiber optic strand. Take the following precautions when handling optical fibers.

- Wear safety glasses when you install optical fibers.
- Be aware of the risk of laser radiation exposure.
- Because transmitted light is invisible to the human eye, always assume that a fiber optic transceiver is on and operational.
- Never look directly into a beam (T_x part of a transmitter) or open fiber ends. The invisible light can damage your eyes.
- Place optical fibers in a safe location during installation.
- Protect optical fiber connectors with clean dust caps for safety and cleanliness.
- Follow the manufacturer instructions when using optical test equipment.

1.5.3 Static Electricity

Eliminate static electricity in the workplace by grounding operators, equipment, and devices including components and computer boards. Grounding prevents static charge buildup and electrostatic potential differences. Transporting products in special electrostatic shielding packages reduces electrical field damage potential.

1.5.4 Workplace Preparation

A safe and effective workplace provides the following items.

- ESD protective clothing/smocks: Street clothing must not come in contact with components or computer boards since the various materials in clothing can generate high static charges. ESD protective smocks, manufactured with conductive fibers, are recommended.
- Electrostatic shielding containers or totes: These containers (bags, boxes, etc.) are made of specially formulated materials, which protect sensitive devices during transport and storage.
- Antistatic or dissipative carriers: These provide ESD protection during component movement in the manufacturing process. It must be noted that antistatic materials alone will not provide complete protection. They must be used in conjunction with other methods such as totes or electrostatic shielding bags.
- Dissipative tablemat: The mat should provide a controlled discharge of static voltages and must be grounded. The surface resistance is designed such that sliding a computer board or component across its surface will not generate more than 100 V.
- Operator grounding: Keep a wrist strap or ESD cuff in constant contact with bare skin with a cable for attaching it to the ESD ground. The wrist strap drains off the static charge of the operator. The wrist strap cord has a current-limiting resistor for personnel safety. Wrist straps must be tested frequently to ensure that they are undamaged and operating correctly. Use special grounding heel straps or shoes when a wrist strap is impractical. These items are effective only when used in conjunction with a dissipative floor.
- ESD protective floor or mat: The mat must be grounded through a current-limiting resistor. The floor or mat dissipates the static charge of personnel approaching the workbench. Special conductive tile or floor treatment can be used when mats are not practical or cause a safety hazard. Chairs should be conductive or grounded to the floor with a drag chain.

1.6 Specific Document Information

Document Number: P/N 1259003-001 Rev C3
Document: EM316-2SFP User Guide
Release Date: October 30, 2007 12:24:44 PM

1.7 Latest Revision and Related Documents

The latest revision of MRV documents may be found at <http://www.mrv.com>.

Release Notes for Fiber Driver products are produced as required.

MegaVision User Guide: Describes management of Fiber Driver modules and other MRV Communications SNMP manageable products using MRV Communication's MegaVision® Pro® Network Management System.

EM316NM[-5] Network Manager: Standard Fiber Driver network management module software guide.

EM316LNxNM-OT User Guide: Linux-based Fiber Driver network management module.

1.8 EM316NM and EM316NM-5 References

The latest EM316NM network management module revision is designated as the EM316NM-5. This document refers to these names together as EM316NM[-5], but examples refer to the EM316NM-5 model.

This name change indicates a significant product design change. Some commands may be affected. Refer to the corresponding documentation revision for information about your specific modules. There are known compatibility issues between versions when used with AH modules. If necessary, refer to AH circuit upgrade and downgrade documentation to change firmware revision levels for your application.

2 Product Overview

The EM316-2SFP transparent converter contains two MSA compliant SFP sockets connected back-to-back. No components on the EM316-2SFP board are connected to the data path, so the module is considered transparent. Supported speed ratings range from 100 Mbps up to 2.7 Gbps where speed-matching or multi-rate SFPs are required in both ports. This EM316-2SFP converter is hot-pluggable, and it is managed through the Fiber Driver management bus from a network management module.

The SFP sockets support a wide range of SFP modules available from MRV to address any network situation.

- Single-mode
- Multi-mode
- Multi-rate
- Single fiber bi-directional
- Coarse Wave Division Multiplexing (CWDM)
- Dense Wave Division Multiplexing (DWDM)
- Copper 10/100

2.1 Management features

2.1.1 LIN

Link Integrity Notification (LIN) notifies connected equipment and network management systems if the EM316-2SFP module detects a loss of receive signal on one of its SFP ports. The loss of receive signal may be caused by a cable break, disconnection, remote power loss, or a variety of other events. With LIN enabled on a module, the loss of receive signal is propagated downstream to the remote end, notifying the remote device of a fault in the circuit. This communication ensures that connected equipment is notified of a link fault. The connected device, such as a switch or router, can then activate preconfigured, link-state dependent redundancy mechanisms, and properly react to link conditions. This feature is extremely important in fault-tolerant network designs. To avoid a possible “deadly embrace” condition requiring operator intervention, ensure that neither remote device allows disabling of its SFP transmitter.

LIN works in unmanaged and managed modes, and it applies globally to the module rather than to individual ports. Enable LIN on the module to allow remote control of this feature through network management.

LIN is not supported in a mixed copper and fiber environment.

2.1.2 Loopback

The EM316-2SFP module supports loopback either by DIP switch setting or controlled through the CLI or SNMP software settings. For software control the Loopback DIP switch must be set to OFF. If the Loopback switch is ON, it cannot be over-ridden by software.

Loopback is one way to assure that the fiber optical communication path is valid and error free. Packets sent over a short-circuit link should be received by the sender without any modification to the original data packet.

3 Preparation and Installation

3.1 Unpacking the Fiber Driver Module

Follow the steps below as illustrated in the figure.

Step 1. Open the cardboard box.

Step 2. Remove the static bag containing the device.

Step 3. Check for additional accessories in the box that may move beneath the module tray during transit.

In the unlikely event that anything is missing, contact your authorized dealer or representative. If it becomes necessary to return the unit, repackage the unit in its original box.

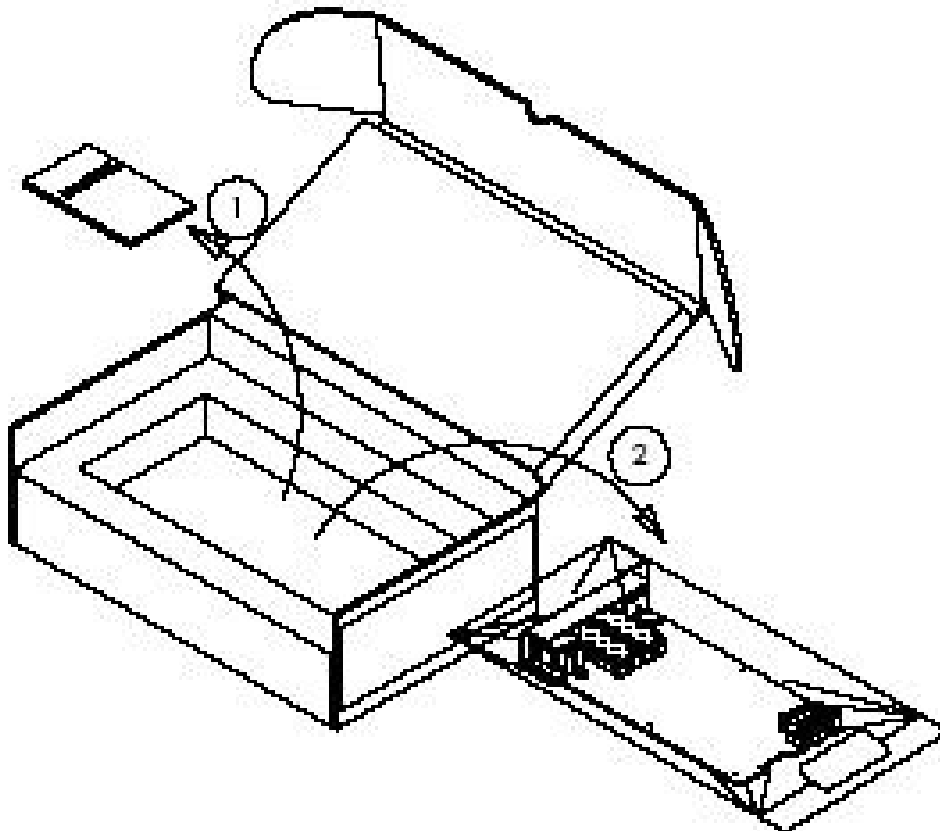


Figure 1 -- Unpacking

3.2 Front Panel Description

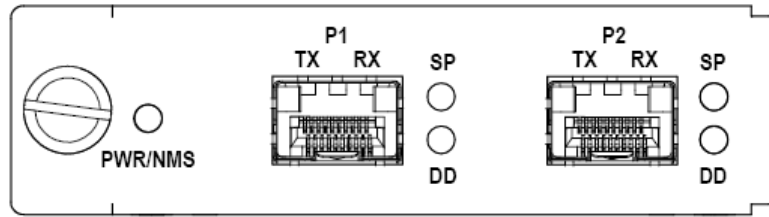


Figure 2 -- Front Panel Schematic of the EM316-2SFP

The EM316-2SFP module is equipped with the following interfaces:

Port 1 (P1): SFP port rated 100 Mbps to 2.7 Gigabit depending on SFP interface

Port 2 (P2): SFP port rated 100 Mbps to 2.7 Gigabit depending on SFP interface

Cable Lengths

The maximum cable length for SFP links is dependent upon the optical characteristic of the SFP transceivers only. The EM316-2SFP module does not affect cable length. In the case of a copper SFP, the maximum cable length is 100 meters.

3.2.1 LED Display Information

PWR/NMS:	Indicates power and management support
SP (each port): a link signal present.	Indicates presence of an SFP with or without a link signal present.
DD (each port): inserted.	Digital Diagnostic indicator for the SFP inserted.

LED	Color	Explanation
PWR/NMS	Off	No power to unit
	Green	Power OK; user wire port active
SP	Off	No SFP Present
	Green	Signal/Link present
	Amber	SFP inserted, no link/signal present
DD	Off	Digital Diagnostics not supported
	Green	No alarm
	Amber	Alarm

Figure 3 -- LED Legend

3.3 DIP Switch Configuration

The EM316-2SFP factory default configuration is designed to operate in the most common applications.

Network Management = Enabled
 LIN = Disabled
 Loopback = Disabled

The default configuration optimizes the EM316-2SFP module in most applications. Network management configuration does not override hardware DIP switch settings. These settings can only be changed using the DIP switches (SW1) on the EM316-2SFP module, regardless of previous card installations and network management configuration.

Refer to network management sections of this document, the Command Line Interface User Guide, or MegaVision documentation for additional information about EM316-2SFP management.

DIP Switch Settings

SW #	Function	ON	OFF	Default
1	Loopback	Disable	Enable	ON
2	NMS	Disable	Enable	OFF
3	LIN	Disable	Enable	ON
4	RESERVED	Must remain ON		

Figure 4 – DIP switch settings

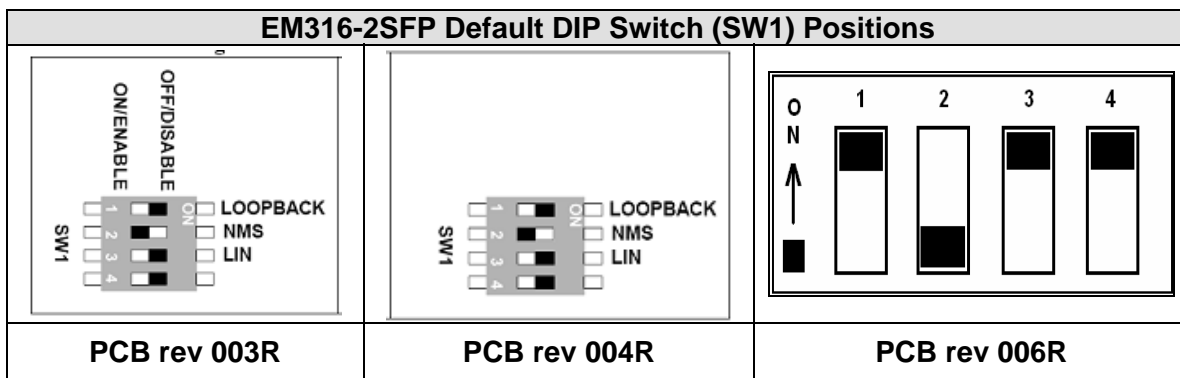


Figure 5 -- DIP switches and PCB revision examples

The DIP switch components and labeling has changed between PCB revisions. Figure 5 above illustrates some DIP switch examples by PCB revision. Note that the ON position in these revisions, as labeled on the DIP switch component, represents DISABLE for the feature as described in Figure 4. Refer to the pictures above for proper DIP switch polarity on the PCB revisions cited.

3.4 Module Installation

EM316xx cards are hot-swappable, and they are designed to insert into a powered Fiber Driver chassis. Install the EM316xx module into a single slot or multiple slot chassis by aligning the edge of the card with the rail of the chassis and hand-tighten the thumb screw.

The thumb screw points to the left in the BU-1, BU-2, BU-3, and BU-4 chassis. The thumb screw points to the bottom in the BU-16 chassis.

Tools

- 6-inch Phillips screwdriver (for some module screws)
- 6-inch flat-tip screwdriver

Procedure

Follow all guidelines to eliminate static electricity while handling the module and other electronic devices. Refer to the front of this manual for some suggestions.

Step 1. If a blank panel is covering the target slot, remove it by unfastening the two screws with a 6-inch Phillips screwdriver.

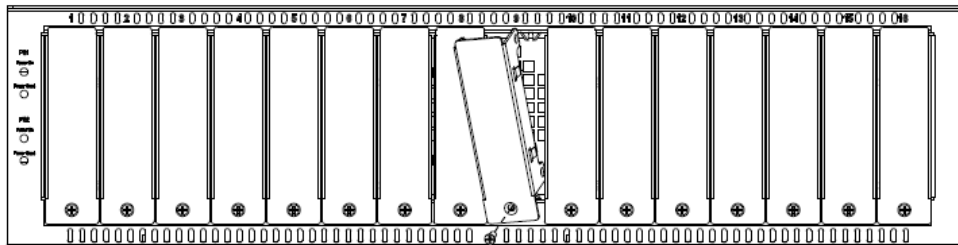


Figure 6 -- Remove the required blank panels

To comply with FCC regulations and to optimize air flow, a cover panel or a module must cover every chassis slot. No chassis slot should remain open when the unit is operational to limit external signal radiation. Securing modules and panels with appropriate screws is also important for grounding and compliance.

Step 2. Install the module inside a Fiber Driver chassis by aligning the edge of the card with the rail of the chassis. Tighten the thumbscrew by hand.

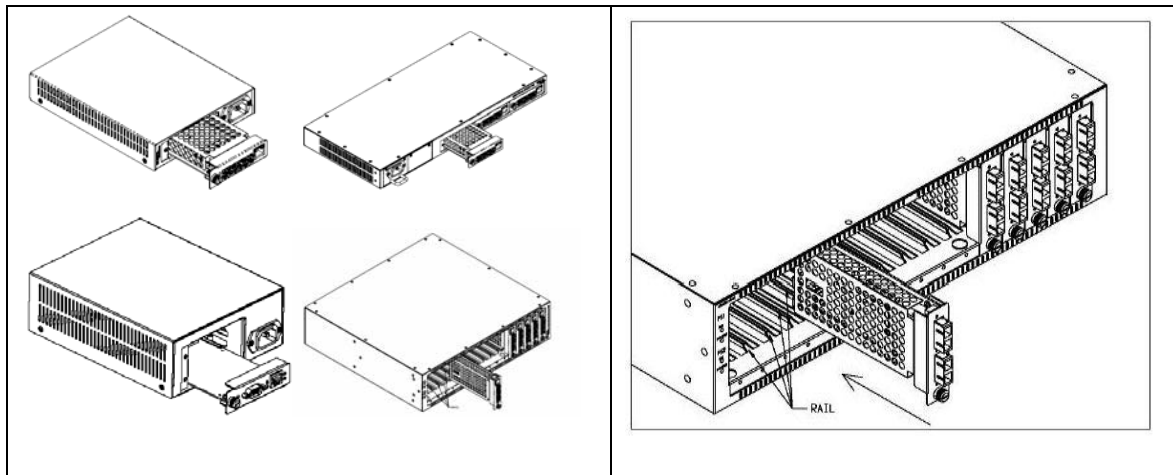


Figure 7 -- Module installation (not all chassis are shown)

Handle the module by the edges to avoid damaging any components. Follow all ESD precautions listed at the front of this manual. Use your thumb to push the module securely into the chassis slot. Do not use excessive force, but make sure the module connector is fully inserted in the chassis. Secure the module by hand using the thumbscrew.

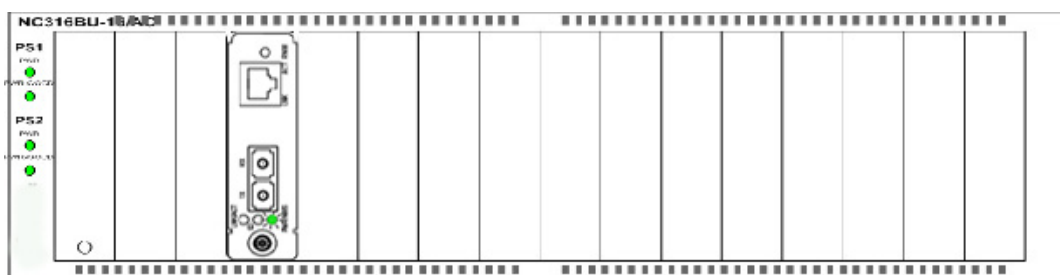


Figure 8 -- Correctly inserted Fiber Driver module in a powered chassis

3.5 Small Form Pluggables (SFP): Handling and Installation

The EM316-2SFP accepts any SFP that complies with the MSA standard. Use MRV components for guaranteed results.

Follow all ESD precautions listed at the front of this manual.

3.5.1 Cleaning Fibers

Fiber optic components and cables are very sensitive to dirt, dust and mishandling, especially in high-speed networks. Dirty or mistreated fiber may cause errors and an unwanted degradation of signal quality.

Prior to an installation the fiber and fiber optic transceivers should be cleaned following the procedure below.

3.5.1.1 Cleaning Supplies

- Optical cleaner cartridge
- Can of compressed air



Figure 9 -- Cleaning cartridge

3.5.1.2 Cleaning Procedure:

1. Blow a stream of compressed air on the fiber ends while the caps are in place.
2. Remove the caps, and blow the ends of the fibers again.
3. Clean the ends of the fibers using the cleaner cartridge; follow the instructions included with the cartridge.

Fiber Inspection

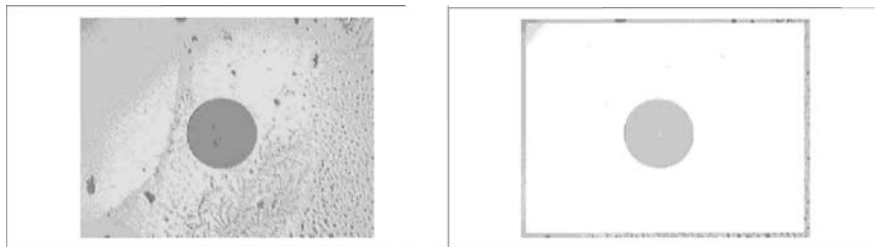


Figure 10 -- Contaminated fiber and clean fiber through a scope

3.5.2 Working with SFPs

The pluggable optics modules used in the EM316xx products are extremely portable, and consequently may be easily mistreated. If SFPs are not protected against dust, remove the dust caps and clean them with 1.25 millimeter cleaners.



Figure 11 -- SFP cleaners

3.5.2.1 Cleaning SFPs

(1) Requirements:

SFP to be cleaned
1.25 mm cleaners

(2) Procedure:

- Insert the 1.25mm cleaner into the SFP
- Turn $\frac{1}{4}$ turn
- Remove the 1.25mm cleaner and discard
- Repeat the process

Do not stretch optical fibers or bend them too tightly. Install optical cables with as little fiber stress as possible.

3.5.2.2 Mylar Tab SFP Modules

The Mylar tab or nail latch on the module has a tab that you must pull in order to remove the module from a switching module port.

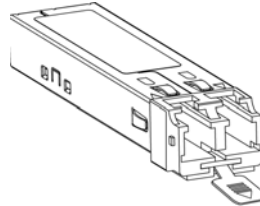


Figure 12 -- Mylar Tab on SFP Module

(3) Inserting a Mylar Tab SFP Module

To insert the Mylar tab SFP module into a switching module port, line up the SFP module with the port, and slide it into place

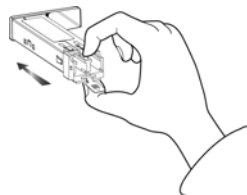


Figure 13 -- Insertion of a Mylar Tab SFP Module

(4) Removing a Mylar Tab SFP Module

To remove the SFP module from the switching module port, pull the tab gently until the SFP module disengages from the port, and then pull the SFP module out.

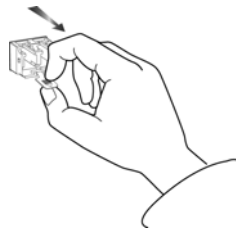


Figure 14 -- Removal of a Mylar Tab SFP Module



Caution When pulling the tab to remove the SFP module, be sure to pull in a straight outward motion. Do not twist or forcibly pull the tab because you may disconnect it from the SFP module.

3.5.2.3 Actuator/Button SFP Modules

The actuator/button SFP module has a button that you must push in order to remove the SFP module from a switching module port.

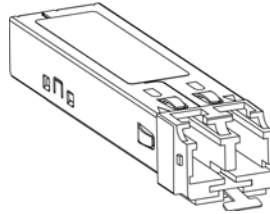


Figure 15 – Actuator/Button SFP Module

3.5.2.4 Inserting an Actuator/Button SFP Module

To insert the actuator/button SFP module into a switching module port, line up the SFP module with the port and slide it in until the actuator/button clicks into place. Be sure not to press the actuator/button as you insert the SFP module because you might inadvertently disengage the SFP module from the port.

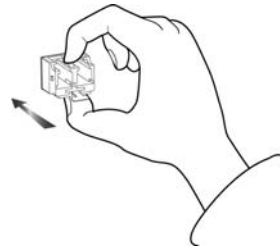


Figure 16 -- Insertion of an Actuator/Button SFP Module

(5) Removing an Actuator/Button SFP Module

Step 1 Gently press the actuator/button on the front of the SFP module until it clicks and the latch mechanism activates, releasing the SFP module from the port.

Step 2 Grasp the actuator/button between your thumb and index finger and carefully pull the SFP module from the port.

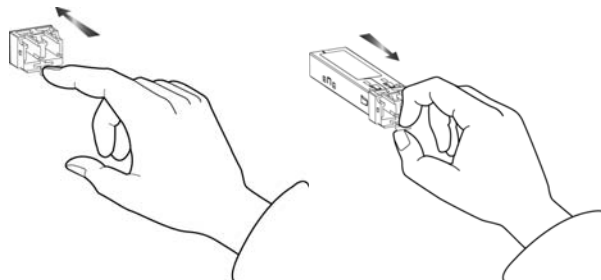


Figure 17 -- Removal of an Actuator/Button SFP Module

3.5.2.5 Bale Clasp SFP Module

The bale clasp SFP module has a bale clasp that you use to secure the SFP module in a switching module port.

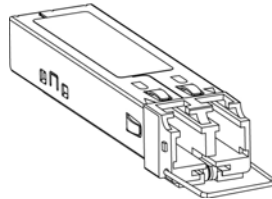


Figure 18 -- Bale Clasp SFP Module

(6) Inserting a Bale Clasp SFP Module into a Switching Module Port

Step 1 Close the bale clasp in the upward direction before inserting the SFP module.

Step 2 Line up the SFP module with the port and slide it into the port.

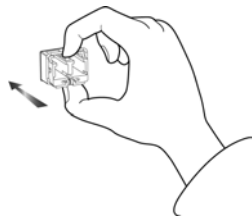
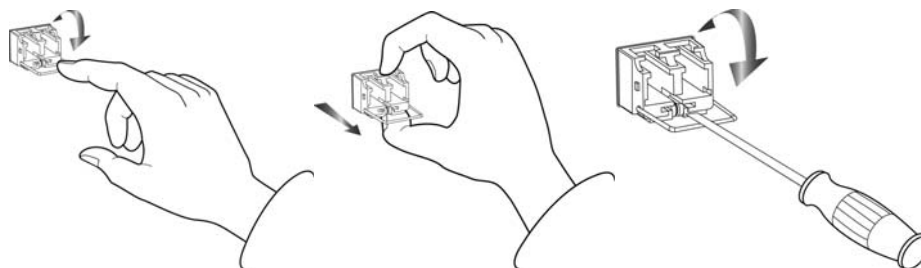


Figure 19 -- Insertion of a Bale Clasp SFP Module

(7) Removing a Bale Clasp SFP Module

Step 1 Open the bale clasp on the SFP module: With your index finger, press the clasp downward as shown. If the bale clasp is obstructed and you can not use your index finger to open it, use a small, flat-blade screwdriver or other long, narrow instrument to open the bale clasp as shown.

Step 2 Grasp the SFP module between your thumb and index finger and carefully remove it from the switching module port as shown.



Open a Bale Clasp with a Flat-Blade Screwdriver if needed.

Figure 20 -- Removal of a Bale Clasp SFP Module

4 Module Management

Most Fiber Driver modules, including the EM316-2SFP, may be managed by a Fiber Driver network management (NM) module installed in the same chassis.

The EM316-2SFP module may be managed by either the EM316NM-5 or EM316LNxNM-OT Network Management (NM) modules.

The NM module installs in the same chassis as the managed modules. It provides management for the 2SFP module and other compatible Fiber Driver modules resident in the chassis. Refer to specific module documentation to determine compatibility with a specific NM.

Although the factory settings are appropriate for most installations, network management through an NM module is highly recommended. Network environments are unpredictable, and Fiber Driver network management is a critical tool for proactive administration as well as for reduced operating expenses.

The NM provides a command line interface (CLI), accessible either through a local serial port and console or from the IP network using a terminal emulation environment. Some CLI commands specific to the 2SFP module in a managed environment are discussed in this section. Refer to the appropriate NM documentation (EM316NM-5 or EM316LNxNM-OT) for further details regarding the interface and commands specific to your installation.

The network management module also provides Simple Network Management Protocol (SNMP) support to allow control through any industry standard network management system (NMS). To maximize the graphical remote management control of Fiber Driver modules, MRV offers MegaVision® Pro. It is a unique and full-featured NMS with graphical user interfaces (GUI) for all managed MRV network components including Fiber Driver. A limited version of MegaVision called “Configurator” is available for trial through the MRV website (<http://www.mrv.com>). Refer to MegaVision Pro documentation for more information on the benefits offered with the product.

4.1 Remote Command Line Interface (CLI) Setup

The NM has at least one Ethernet port, which is typically used to connect to a Local Area Network (LAN). The factory default IP address is 192.168.14.201 with netmask 255.255.255.0, sometimes written as 192.168.14.201/24 to show the 24 bits masked for subnetting. The default gateway address is 192.168.14.1/24.

From the network, connect to the NM IP address using telnet or SSH (secure shell) to open the command line interface (CLI). Telnet services are disabled by default on the EM316LNxNM-OT, but they may be enabled for additional CLI access. SSH is not available on the EM316NM-5.

4.2 Serial Command Line Interface (CLI) Setup

Each NM has an RS-232 interface that is used for serial communications to the CLI. This connection is recommended for network setup. Besides configuration simplicity, it offers the advantage of “out-of-band” management for greater network autonomy.

Attach the serial RS-232 cable to the PC or terminal device. Configure terminal emulation software with the parameters described below.

4.2.1 EM316NM Serial Console Setup

Configure the EM316NM RS-232 serial parameters with the following values.

RS-232 Serial Port Parameters	<ul style="list-style-type: none">• 9600 baud• 8 data bits• 1 stop bit• no parity• no flow control
--	--

Connect the management port to a terminal serial port with a DB9 RS-232 rollover cable.

4.2.2 EM316LNxNM-OT Serial Console Setup

Configure the EM316LNxNM-OT RS-232 serial parameters with the following values.

RS-232 Serial Port Parameters	<ul style="list-style-type: none">• 38400 baud• 8 data bits• 1 stop bit• no parity• no flow control
--	---

Connect the management port to a terminal serial port with a flat RJ-45 to RJ-45 flat RS-232 rollover cable. The components below may be ordered from MRV.

- Adapter (part number 350-0308 REV-B MRG/20028-2)
- Cable (part number 151-3028 REV-F AI 04/04)

4.3 EM316NM[-5] Command Line Interface (CLI)

Command Line Interface (CLI) commands are used to manage the EM316-2SFP module through network management interfaces. A set of relevant commands is given here with a description of their function and syntax. A Fiber Driver® Network Management Module (EM316NM[-5]) must be installed in the chassis containing the EM316-2SFP to enable this module management access. For more details on the EM316NM[-5], consult the related manuals or contact your local MRV representative.

An abbreviated list of CLI commands appears below.

<u>EM316 Commands</u>	
get-chassis-info	Display chassis information
<u>Slot (Module) Commands</u>	
get-module-info	Display module information
init-module	Initialize specified module to Defaults
reset-module	Reset specified module to Saved settings
<u>Port Commands</u>	
get-port-info	Display port information
get-port-name	Show current port name
set-port-name	Change the port name
clear-port-name	Clear the port name
<u>SFP Port Commands</u>	
get-port-dd	Get port optics digital diagnostics information
get-sfp-poll	Display SFP polling interval
set-sfp-poll	Set SFP polling interval
<u>Console Commands</u>	
banner	Display banner

Figure 21 -- EM316NM[-5] CLI commands for EM316-2SFP management

EM316 (Chassis) Commands

get-chassis-info arg1	Display chassis information
[arg1] chassis number {1}	

Slot (Module) Commands

get-module-info arg1 arg2	Display module information
[arg1] chassis number {1}	
[arg2] slot number {1-16}	
init-module arg1 arg2	Initialize specified module to defaults
[arg1] chassis number {1}	
[arg2] slot number {1-16}	
reset-module arg1 arg2	Reset specified module to saved settings
[arg1] chassis number {1}	
[arg2] slot number {1-16}	

Port Commands

get-port-info arg1 arg2 arg3	Display port information
[arg1] chassis number {1}	
[arg2] slot number {1-16}	
[arg3] port number	
get-port-name arg1 arg2 arg3	Show current port name
[arg1] chassis number {1}	
[arg2] slot number {1-16}	
[arg3] port number	
set-port-name arg1 arg2 arg3 arg4	Change the port name
[arg1] chassis number {1}	
[arg2] slot number {1-16}	
[arg3] port number	
[arg4] port name	
clear-port-name arg1 arg2 arg3	Clear the port name
[arg1] chassis number {1}	
[arg2] slot number {1-16}	
[arg3] port number	

SFP Port Commands

<code>get-port-dd arg1 arg2 arg3 arg4</code>	Get the port optics digital diagnostic information
[arg1] chassis number {1} [arg2] slot number {1-16} [arg3] port number [arg4] optional: type <now> to fetch info in real-time	
<code>get-sfp-poll</code>	Display SFP polling interval
<code>set-sfp-poll arg1</code>	Set SFP polling interval
[arg1] interval [sec]	

Console Commands

<code>banner</code>	Display banner

4.4 EM316LNXM-OT Command Line Interface (CLI)

The EM316LNXM-OT provides command line interface (CLI), SNMP, and graphical administration options for a Fiber Driver chassis system. This section introduces the CLI for the Linux-based network management (EM316LNXM-OT) module.

The commands for EM316NM and EM316LNXM-OT management are specific to each module.

The EM316LNXM-OT management module also includes MegaVisionJ, a built-in graphical interface to manage only the Fiber Driver chassis system controlled by the specified NM. This graphical system is accessible from any standard Java-enabled web browser that can reach the IP address assigned to the EM316LNXM-OT. MegaVisionJ allows remote management of the entire Fiber Driver chassis system and compatible modules.

Some commands applicable to the 2SFP modules are illustrated in this manual. The box below lists a few sample commands addressed in this document. Refer to EM316LNXM-OT documents for more detail.

- | | |
|----------------|----------------------------|
| • show | • show digital-diagnostics |
| • show version | • show config |
| • show slots | • show defaults |
| • show x.x | • description <name> |
| • ? | • shutdown / no shutdown |
| • list | • loopback / no loopback |
| • lin / no lin | |

Figure 22 -- EM316LNXM-OT general commands for 2SFP module

Some of these commands apply to both slot-level and port-level contexts as described in the navigation portion of this section. Refer to EM316LNXM-OT documentation for a more complete discussion of the Linux-based interface and available commands.

4.4.1 EM316LNXM-OT Boot and CLI Login

The box below shows the NM boot and login to the built-in admin user account. The “banner” information that displays after the login may also be displayed from the CLI prompt with the **show version** command. The **show** command is introduced in a later section. Refer to EM316LNXM-OT documentation for network manager and CLI configuration help.

```

U-Boot 1.0.1 (Jan 25 2005 - 11:08:25)

CPU:   MPC875ZPnn at 133 MHz: 8 kB I-Cache 8 kB D-Cache FEC1 FEC2
BOARD: MRV NM2 v3
DRAM:  (64 MB SDRAM) 64 MB
FLASH: 16.5 MB
Net:   FEC ETHERNET
Hit any key to stop autoboot:  0
## Booting image at e0000000 ...
   Image Name:   EM316LNXM
   Image Type:   PowerPC Linux Multi-File Image (gzip compressed)
   Data Size:    7324224 Bytes =  7 MB
   Load Address: 00000000
   Entry Point:  00000000
   Contents:
   Image 0:     676629 Bytes = 660.8 kB
   Image 1:     6647580 Bytes =  6.3 MB
   Verifying Checksum ... OK
   Uncompressing Multi-File Image ... OK
   Loading Ramdisk to 03920000, end 03f76f1c (656f1c)... OK

                               Welcome to MRV EM316LNXM

RTC[DS1338]: Clock may be incorrect, reset your time.
RTC[DS1338]: Testing RTC... OK
Reading configuration: ok

Starting up, please wait
FPGA Already Loaded.

MRV EM316LNXM

login: admin
Password:

Please wait, initializing...now ready.
EM316LNXM-OT v4.0 fdr 52 (May 14 2007 - 13:35:38).
U-Boot 1.0.1 (Jan 25 2005 - 11:08:25).
Linux kernel v2.4.26 (#1 Wed Dec 13 10:36:44 PST 2006).
EM316LNXM (firmware 5c.13) (00:20:1a:02:53:8f).
MegaVisionJ v2.32k5 - August 24, 2006
Copyright (c) MRV Corp. 1993-2007
You are a SUPER user!
fiberdriver#
    
```

4.4.2 CLI Navigation

The CLI uses five operational contexts: login, configuration, chassis, slot, and port. Only the login context is not considered a configuration mode. The system prompt includes a string to indicate the current operational context, as illustrated in the example below. The “#” character ends the prompt string, and a space separates the command from the prompt.

Each navigation command in the box below is bold for emphasis in print only.

```
fiberdriver# configure terminal
fiberdriver(config)# chassis 1
fiberdriver(chassis/1)# slot 1.4
fiberdriver(slot/1.4)# port 1.4.2
fiberdriver(port/1.4.2)# next
fiberdriver(port/1.4.3)# exit
fiberdriver(config)# exit
fiberdriver#
```

These contexts are not entirely hierarchical, but the three hardware-specific contexts do follow a structure that reflects the physical device relationships. The chassis contains slots (modules) which in turn contain ports.

Enter the configuration context with the “**configure terminal**” command. Any hardware context may be reached directly from the config context or any other hardware context. For example, there is no need to pass through the chassis context to reach the slot or port contexts.

The **next** command is a short-cut for navigating to the hardware context following the current context and at the same level. In the box above, the port value in the prompt increments from 2 to 3 to indicate this context change.

Operations on the larger component may sometimes also apply to the smaller components contained in the larger target device. Refer to EM316LNxNM-OT documentation or use the CLI help feature “?” for more information about CLI context navigation.

4.4.3 Login Context Commands and Examples

The login context refers to the only CLI state not considered a configuration context. Commands in this context are generally for system status monitoring. Use the “?” and “list” commands at the `fiberdriver #` prompt to display the list of command line options. These help commands are shown in the slot and port command illustrations later in this section.

A few login context commands are illustrated in this section.

4.4.3.1 “show version”

The `show version` command displays revision levels for the management system components.

```
fiberdriver# show version
EM316LNXNM-OT v4.0 fdr 52 (May 14 2007 - 13:35:38).
U-Boot 1.0.1 (Jan 25 2005 - 11:08:25).
Linux kernel v2.4.26 (#1 Wed Dec 13 10:36:44 PST 2006).
EM316LNXNM (firmware 5c.13) (00:20:1a:02:53:8f).
MegaVisionJ v2.32k5 - August 24, 2006
Copyright (c) MRV Corp. 1993-2007
fiberdriver#
```

4.4.3.2 “show log”

The `show log` command displays log settings for the management system components.

```
fiberdriver(config)# show log
Running Level: warning
Nvram Level: disabled
Trap Level: warning
Remote Server: 0.0.0.0
Remote Level: notice
fiberdriver(config)#
```

4.4.3.3 “show running-config”

The `show running-config` command displays the currently active system parameters for the management system.

```
fiberdriver# show running-config
Building configuration...

Current configuration:
!
! Configuration saved on 2005/01/01 01:54:38
!
!
! Configuration written by admin!
!
! EM316LNXXNM-OT v4.0 fdr 52 (May 14 2007 - 13:35:38).
! U-Boot 1.0.1 (Jan 25 2005 - 11:08:25).
! Linux kernel v2.4.26 (#1 Wed Dec 13 10:36:44 PST 2006).
! EM316LNXXNM (firmware 5c.13) (00:20:1a:02:53:8f).
Copyright (c) MRV Corp. 1993-2007.
!
ip interface 192.168.14.201/24
username admin password encrypted $1$kQ2rIq/$Ob8wFa2EW135XC4TnN7wJ/
class super username admin group all
group all write 2
group all write 1
snmp-server community read encrypted
$1$hZyZkA1$xiJTxyGDfVblbcAYyW9Wil
snmp-server community write encrypted
$1$wZCHI9/$6H3mce5Y15iLhtdpoxBoal
chassis 1 type NC316BU-16 rev 1
slot 1.2 type EM316LNXXNM-OT rev 4
slot 1.3 type EM316-2SFP rev 3
fiberdriver#
```

4.4.3.4 “show startup-config”

The `show startup-config` command displays the contents of the **startup-config** file that are applied when the system boots. Default values are applied to any parameters not specified in this file.

```
fiberdriver# show startup-config
!
! Configuration saved on 2005/01/01 01:54:07
!
!
! Configuration written by admin!
!
! EM316LNXXNM-OT v4.0 fdr 52 (May 14 2007 - 13:35:38).
! U-Boot 1.0.1 (Jan 25 2005 - 11:08:25).
! Linux kernel v2.4.26 (#1 Wed Dec 13 10:36:44 PST 2006).
! EM316LNXXNM (firmware 5c.13) (00:20:1a:02:53:8f).
! Copyright (c) MRV Corp. 1993-2007.
!
ip interface 192.168.14.201/24
username admin password encrypted $1$kQ2rIq/$Ob8wFa2EW135XC4TnN7wJ/
class super username admin group all
group all write 2
group all write 1
snmp-server community read encrypted
$1$hZyZkA1$xiJTxyGdfVb1bcAYyW9Wil
snmp-server community write encrypted
$1$wZCHI9/$6H3mce5Y15iLhtdpoXBoal
chassis 1 type NC316BU-16 rev 1
slot 1.2 type EM316LNXXNM-OT rev 4
```


4.4.4 Configuring System Parameters

Enter "configuration" mode, as shown below, to configure the system parameters

```
fiberdriver# configure terminal
```

Note that each command is completed with the <CR> or <Enter> key, which is not printable.

Once the mode is changed, the prompt also changes. Change the SUPER user password using the "username" command.

```
fiberdriver(config)# username admin password <new password>
```

Set the IP configuration using the "ip" command group. Set IP address and IP mask information using the following command.

```
fiberdriver(config)# ip interface 169.254.88.200/16
```

The IP address (169.254.88.200) and the netmask (16) are examples only. Use the IP address and netmask appropriate for the EM316LNXM-OT on your network. Classless Inter-Domain Routing (CIDR) notation is used to specify the address (169.254.88.200) and mask (16) corresponding to 255.255.0.0.

Set specific gateway information using the following command:

```
fiberdriver(config)# ip default gateway 169.254.88.1
```

The IP information configured does not load until restarting the system or using the command:

```
ip interface update
```

Use the following command to save the configuration into permanent (non-volatile) storage:

```
fiberdriver(config)# write file  
fiberdriver(config)# exit
```

The system does not automatically save configurations to permanent storage. Use the `write file` command to save a configuration before restarting the system. Now the IP configuration is complete. The default SNMP community names are "public" for read and "private" for write.

Use the description command to change names of the chassis, slot, and port. Use the show command to verify the change. Chassis names are limited to nine characters.

4.4.5 Chassis Context

4.4.5.1 Chassis Context – “show”

The following CLI excerpt shows a Fiber Driver chassis system an EM316-2SFP module and a EM316LNXXNM-OT network management (NM) module. No other modules are installed in this example.

```

fiberdriver(chassis/1)# show
    Model: NC316BU-16
    Name: NC316BU-1
    Temp(C): 28
    Temp Min(C): 5
    Temp Limit(C): 55

PS1: not Installed  PS2: AC Good
Fan1: bad  Fan2: good
Fan3: good
Chassis Traps: on  Slot Change Traps: on  Module Specific Traps: on
  Port Traps: on      Link Traps: on      Loopback Traps: on
  LIN Traps: on  Port Change Traps: on      Port Diags Traps: on

Number Of Slots: 16
Hardware Revision: 1

Slot  Model                Name                               Serial Number
====  =====
1.1   EM316LNXXNM-OT  EM316LNXXNM-OT at 1.1  00:20:1a:02:13:f1
1.2   EM316-2SFP      EM316-2SFP      at 1.2  N/A
-----

fiberdriver(chassis/1)#
    
```

Use the command line “?” (help character) to display command line parameters for the show command.

Slot and port information examples are shown later in their own contexts. However, slot and port information may be displayed directly from a “higher” context with the following commands.

```

Fiberdriver# show slots
Fiberdriver# show ports
    
```

The command output for slot and port information is shown in the respective context sections.

4.4.5.2 Displaying and Saving System Parameters

Use the **write terminal** command to display the current operating parameters.

```
fiberdriver(port/1.1.1)# write terminal
Building configuration...

Current configuration:
!
! Configuration saved on 2005/01/01 01:54:11
!
! Configuration written by admin!
!
! EM316LNXXNM-OT v4.0 fdr 52 (May 14 2007 - 13:35:38).
! U-Boot 1.0.1 (Jan 25 2005 - 11:08:25).
! Linux kernel v2.4.26 (#1 Wed Dec 13 10:36:44 PST 2006).
! EM316LNXXNM (firmware 5c.13) (00:20:1a:02:53:8f).
! Copyright (c) MRV Corp. 1993-2007.
!
ip interface 192.168.14.201/24
username admin password encrypted
$1$kQ2rIq/$Ob8wFa2EW135XC4TnN7wJ/
class super username admin group all
group all write 2
group all write 1
snmp-server community read encrypted
$1$hZyZkA1$xiJTxyGdfVb1bcAYyW9Wil
snmp-server community write encrypted
$1$wZCHI9/$6H3mce5Y15iLhtdpoxBoal
chassis 1 type NC316BU-16 rev 1
slot 1.1 type EM316-2SFP rev 1
slot 1.2 type EM316LNXXNM-OT rev 4
fiberdriver(port/1.1.1)#
```

Use the **write file** command to save the current parameters to the configuration file.

```
fiberdriver(port/1.1.1)# write file
Building configuration file...
OK, saved to startup-config
fiberdriver(port/1.1.1)#
```

4.4.5.3 Restoring Default Parameters

Use the `default` command to discard changes applied to the module configuration. The example below illustrates returning the entire module to the original factory defaults. Use the “?” after the `default` command or refer to EM316LNxNM-OT documentation for parameters to reapply only selected default values including individual port settings.

The command below is applied in the main configuration context. The first command line in the box opens this context from the login context.

```
fiberdriver# configure terminal
fiberdriver(config)# default 1 all
Restored default configuration for 1
Restored default configuration for 1.1
Restored default configuration for 1.2
Restored default configuration for 1.2.1
Restored default configuration for 1.2.2
Restored default configuration for 1.3
Restored default configuration for 1.4
Restored default configuration for 1.5
Restored default configuration for 1.6
Restored default configuration for 1.7
Restored default configuration for 1.8
Restored default configuration for 1.9
Restored default configuration for 1.10
Restored default configuration for 1.11
Restored default configuration for 1.12
Restored default configuration for 1.13
Restored default configuration for 1.14
Restored default configuration for 1.15
Restored default configuration for 1.16
fiberdriver(config)#
```

4.4.5.4 Chassis Context – Other Commands

The commands available at the chassis level are consistent in Fiber Driver environments. These general system features are beyond the scope of this document. A list of available commands in the chassis context is displayed by typing “?” or “list” at the prompt.

```

fiberdriver(chassis/1)# ?
  chassis          Configure a chassis
  default          Restore parameter(s) to defaults
  description      Set chassis name
  echo             Display text for scripting
  end              End current mode and go down to enable node
  exit             Exit current mode and go down to previous mode
  gen-trap         Enable trap generation for the chassis
  list             Print command list
  logout           Logout of the system
  map              Configure port map for entire current context
  next             Configure next element
  no               Negate a command
  pager           Pause scrolling when screen is full
  port             Configure a port
  previous         Configure previous element
  quit            Exit current mode and go down to previous mode
  show            Show basic info
  sleep           Pause CLI for scripting
  slot             Configure a slot
  temperature-limit Adjust high-temperature limit (deg. C)
  temperature-min  Adjust low-temperature limit (deg. C)
  who             Find out who is connected to the system
  whoami          Who am I?
  write           Write running configuration to memory or terminal
fiberdriver(chassis/1)#
    
```

For a list of available commands in any context, type “?” or “list” at the prompt or refer to EM316LNXNM-OT manuals.

4.4.6 Slot Context Commands and Examples

Command examples in this section are applied in the slot-level context. The box below shows the command to navigate to the slot context from the login context.

```
fiberdriver# configure terminal  
fiberdriver(config)#  
fiberdriver(config)# slot 1.1  
fiberdriver(slot/1.1)#
```

4.4.6.1 “?”

The “?” is a special help character in the EM316LNxNM-OT command line. In previous releases, the “?” character did not echo to the display when typed. Beginning in version 4.0, the “?” displays as other commands do. Results of the help request are displayed immediately to the monitor.

The box below shows the output of the “?” typed alone on the command line in the slot-level configuration context. In other contexts, the display is different to reflect the commands available from the current prompt. Navigate to each operational context and type “?” at the prompt to become familiar with these commands in your environment. Also notice the different help output in the slot-level context of a different Fiber Driver module type. The box displayed below is specific to 2SFP modules.

```

fiberdriver(slot/1.1)# ?
  clear-type  Clear Type, if locking types
  default     Restore parameter(s) to defaults
  description Set slot name
  echo        Display text for scripting
  end         End current mode and down to previous mode
  exit        Exit current mode and down to previous mode
  list        Print command list
  logout      Logout of the system
  next        Configure next element
  no          Negate a command
  pager       Pause scrolling when screen is full
  port        Configure a port
  previous    Configure previous element
  quit        Exit current mode and down to previous mode
  show        Show basic info
  sleep       Pause CLI for scripting
  slot        Configure a slot
  up          Configure parent element
  who         Find out who is connected to the system
  whoami      Who am I?
  write       Write running configuration to memory or terminal
fiberdriver(slot/1.1)#
    
```

The “?” may also be used in two ways after a command typed at the prompt in any context. When typed immediately after a command line entry with no space separating it from the command, the “?” displays a list of commands that match the preceding string and a description of each matching command function. When a space separates the command string from the “?”, the display shows the first matching command and a list of the options for the next required parameter on the command line.

Read more about the “?” help character in the EM316LNxNM-OT User Guide. There is no substitution for practicing the command to become familiar with its behavior.

4.4.6.2 “list”

The **list** command displays all the full command options (including applicable command line arguments) available in the current context. The box below illustrates the display in the slot-level context specific to 2SFP modules.

```
fiberdriver(slot/1.1)# list
clear-type
default all
default description
default me
description .LINE
echo
echo .LINE
end
exit
list
logout
next
no description
no pager
pager
port (PORT-NUM|PORT)
previous
quit
show
show config
show defaults
show digital-diagnostics
show running-config
show statistics
sleep <0-10>
slot SLOT
up
who
who am i
whoami
write file
write terminal
fiberdriver(slot/1.1)#
```


4.4.6.3 “show”

The **show** command displays management and system information related to the EM316LNXM-OT management module, the hosting chassis, other modules in the chassis, and ports available within the managed system. The arguments (parameters) following the **show** command and the operational context displayed by the system prompt control the many functions available through this command.

The next box displays the CLI help for the **show** command in the slot-level context of the 2SFP modules. The first command (shown in bold) is “**show?**” and the second command (also in bold) is “**show ?**”. The subtle difference between the two commands is the space separating the command from the “?” in the second command.

```

fiberdriver(slot/1.8)# show?
  show Show basic info
fiberdriver(slot/1.8)# show ?
  <cr> Show basic info
  config Show administrative configuration for this object
  defaults Show default configuration for this object
  digital-diagnostics Show Digital Diagnostics summary
  redundancy Show slot redundancy configuration
  running-config Current operating configuration
  statistics Show port info
fiberdriver(slot/1.8)# show
    
```

The box below illustrates the **show** command applied with no arguments in the slot-level context of a 2SFP module.

```

fiberdriver(slot/1.1)# show
  Slot: 1.1
  Model: EM316-2SFP
  Name: EM316-2SFP at 1.1
  Hardware Revision: 1

  Sw Configurable: yes  Operation Type: converter

  Number Of Ports: 2
  Port  Enable  Link           LIN      DDiags  WL(nm)  Name
  =====
  1.1.1 enable  signal Detect  enable  Ok      850     SFP-port1
  1.1.2 enable  signal Detect  enable  Ok      850     SFP-port2

  fiberdriver(slot/1.1)#
    
```

The boxes below illustrate two common parameters used with the `show` command.

Default settings are listed in the `show defaults` command output. These parameters reflect the module boot configuration which is determined by DIP switches and firmware programming. All lines in this display begin with “!” to indicate that they are comments for information only.

```
fiberdriver(slot/1.1)# show defaults
slot 1.1
! description EM316-2SFP at 1.1
fiberdriver(slot/1.1)#
```

The `show config` command displays the active environment settings currently in the operational context. The lines beginning with “!” are comments added for clarity in the CLI display only. The comment lines ending with “.” are headings that describe the settings listed in this display.

```
fiberdriver(slot/1.1)# show config
slot 1.1
! Configured parameters that override defaults:
! Configured parameters that match defaults:
! Parameters that will follow defaults:
! description EM316-2SFP at 1.1
fiberdriver(slot/1.1)#
```

The default parameter values are constant for each module, but can change to reflect DIP switch settings. Changes to these parameter values are reflected in the `show config` command output. Restoring the default values returns the module to its original operating state. Preserve changes made to the configuration for use in future CLI sessions and beyond a reboot by writing them to the **startup-config** file as described later in this section.

Each module may be given a descriptive name with the command below. The **show** command follows with the new name **bolded**.

```

fiberdriver(slot/1.1)# description myslot1.1
fiberdriver(slot/1.1)# show
      Slot: 1.1
      Model: EM316-2SFP
      Name: myslot1.1
Hardware Revision: 1

Sw Configurable: yes  Operation Type: converter

Number Of Ports: 2
Port  Enable  Link          LIN    DDiags  WL(nm)  Name
=====
1.1.1  enable  signal Detect  enable  Ok      850     SFP-port1
1.1.2  enable  signal Detect  enable  Ok      850     SFP-port2
fiberdriver(slot/1.1)#
    
```

4.4.6.4 “show digital-diagnostics”

Many SFP transceivers support the digital diagnostics standards from SFF-8472. The command below applies to ports with these SFP modules installed.

```

fiberdriver(slot/1.1)# show digital-diagnostics
Port  DDiags  Temp(C)  Supply(V)  TxPower(dBm)  RxPower(dBm)  BiasCurrent(mA)
=====
1.1.1  Ok      46       3.272      -5.066        -6.055        4.852
1.1.2  Ok      47       3.272      -6.053        -5.394        5.18
fiberdriver(slot/1.1)#
    
```

4.4.7 Port Context Commands and Examples

Command examples in this section are applied in the port-level context. The box below shows the command to navigate to a specific port context from the login context.

```
fiberdriver# configure terminal
fiberdriver(config)# port 1.3.2
fiberdriver(port/1.3.2)#
```

4.4.7.1 “?”

The “?” command, used alone on the command line, lists the commands available in the current operational context.

The “?” may also be used in two ways following a command word typed at the prompt in any context. When typed immediately after a command line entry with no space separating it from the command, the “?” displays a list of commands that match the preceding string and a description of each matching command function. When a space separates the command string from the “?”, the display shows the first matching command and a list of the options for the next required parameter on the command line.

Read more about the “?” help character in the EM316LNxNM-OT User Guide. There is no substitution for practicing the command to become familiar with its behavior.

The box below shows the output of the “?” typed alone on the command line in the port-level configuration context. The box below is specific to the 2SFP modules.

```
fiberdriver(port/1.1.1)# ?
  default      Restore parameter(s) to defaults
  description  Set port name
  echo         Display text for scripting
  end          End current mode and down to previous mode
  exit         Exit current mode and down to previous mode
  lin          Enable LIN
  list         Print command list
  logout       Logout of the system
  loopback     Enable Loopback
  next         Configure next element
  no           Negate a command
  pager        Pause scrolling when screen is full
  port         Configure a port
  previous     Configure previous element
  quit         Exit current mode and down to previous mode
  rm-chassis   Set remote chassis connectivity information
  rm-port      Set remote port connectivity information
  rm-slot      Set remote slot connectivity information
  show         Show basic info
  shutdown     Disable the port
  sleep        Pause CLI for scripting
  up           Configure parent element
  who          Find out who is connected to the system
  whoami       Who am I?
  write        Write running configuration to memory or terminal
fiberdriver(port/1.1.1)#
```

4.4.7.2 “list”

The `list` command displays all the full command options (including applicable command line arguments) available in the current context. The box below illustrates the display at the port-level context specific to the 2SFP modules and an installed SFP transceiver.

```
fiberdriver(port/1.1.1)# list
default all
default description
default lin
default loopback
default me
default rm-chassis
default rm-port
default rm-slot
default shutdown
description .LINE
echo
echo .LINE
end
exit
lin
list
logout
loopback
next
no description
no lin
no loopback
no pager
no shutdown
pager
port PORT
previous
quit
rm-chassis <0-4294967294>
rm-port <0-4294967294>
rm-slot <0-4294967294>
show
show config
show defaults
show digital-diagnostics
show running-config
show statistics
shutdown
sleep <0-10>
up
who
who am i
whoami
write file
write terminal
fiberdriver(port/1.1.1)#
```

4.4.7.3 “show”

The show command displays management and system information related to the EM316LNXM-OT management module, the hosting chassis, other modules in the chassis, and ports available within the managed system. The arguments (parameters) following the **show** command and the operational context displayed by the system prompt control the many functions available through this command.

The box below illustrates the show command applied with no arguments in the port context of a 2SFP module with a specific SFP transceiver installed. This display will vary with each installation.

```

fiberdriver(port/1.1.1)# show
  Port: 1.1.1
  Name: SFP at 1.1.1
  Part #/Rev: SFP-DGD-SX/A
  Protocol: Transparent

  Enable: enable           LIN: enable
  Link: signal Detect      Nom. BR: 2100

  Loopback: off
  Serial Number: P6K21R5
  Vendor Info: MRV COMM. INC.

  Connector: fo LC Medium: multi Mode
  Wavelength(nm): 850
  TxPower(dBm): -5.066  RxPower(dBm): -6.042  BiasCurrent(mA): 5.008
  DDiags: Ok           Temp(C): 46           Supply(V): 3.272

fiberdriver(port/1.1.1)#
    
```

The CLI help for the show command is identical in the port-level context and the slot-level contexts. Refer to the Slot-Level Commands section for “**show?**” and “**show ?**” information.

4.4.7.4 Port Description

```
fiberdriver(port/1.1.1)# description sfp-port1
fiberdriver(port/1.1.1)# show
  Port: 1.1.1
    Name: sfp-port1
  Part #/Rev: SFP-DGD-SX/A
  Protocol: Transparent

  Enable: enable           LIN: enable
  Link: signal Detect
                        Nom. BR: 2100

  Loopback: off
  Serial Number: P6K21R5
  Vendor Info: MRV COMM. INC.

  Connector: fo LC  Medium: multi Mode
  Wavelength(nm): 850
  TxPower(dBm): -5.066  RxPower(dBm): -6.044  BiasCurrent(mA): 4.716
  DDiags: Ok           Temp(C): 46           Supply(V): 3.271

fiberdriver(port/1.1.1)#
```


4.4.7.5 “show defaults”

Default settings are listed in the **show defaults** command output. These parameters reflect the module boot configuration which is determined by DIP switches and firmware programming. All lines in this display begin with “!” to indicate that they are comments for information only.

```
fiberdriver(port/1.1.1)# show defaults
port 1.1.1
! no loopback
! no shutdown
! lin
! description SFP at 1.1.1
! rm-chassis 0
! rm-slot 0
! rm-port 0
fiberdriver(port/1.1.1)#
```

4.4.7.6 “show config”

The **show config** command displays the active environment settings currently in the operational context. The lines beginning with “!” are comments added for clarity in the CLI display only. The comment lines ending with “:” are headings that describe the settings listed in this display.

```
fiberdriver(port/1.1.1)# show config
port 1.1.1
! Configured parameters that override defaults:
! Configured parameters that match defaults:
! Parameters that will follow defaults:
! no loopback
! no shutdown
! lin
! description SFP at 1.1.1
! rm-chassis 0
! rm-slot 0
! rm-port 0
fiberdriver(port/1.1.1)#
```

The default parameter values are constant for each module, but can change to reflect DIP switch settings. Changes to these parameter values are reflected in the **show config** command output. Restoring the default values returns the module to its original operating state. Preserve changes made to the configuration for use in future CLI sessions and beyond a reboot by writing them to the **startup-config** file as described later in this section.

4.4.7.7 Loopback

Applying the “**loopback**” command to one port automatically adjusts the other SFP port.

```

fiberdriver(port/1.2.2)# loopback
fdrd[60]|CORE|    warn|Jul 07 17:55:51 1.2.1: Auto-adjusted PortLoopback -> on Ok
fdrd[60]|TRAP|    warn|Jul 07 17:55:52 Port 1.2.1 Loopback On, Chassis Name:
NC316BU-16 Slot Name: EM316-2SFP at 1.2 Port Name: SFP at 1.2.1
fdrd[60]|TRAP|    warn|Jul 07 17:55:52 Port 1.2.2 Loopback On, Chassis Name:
NC316BU-16 Slot Name: EM316-2SFP at 1.2 Port Name: SFP at 1.2.2
fiberdriver(port/1.2.2)#
    
```

```

fiberdriver(port/1.2.2)# no loopback
fdrd[60]|CORE|    warn|Jul 07 17:56:03 1.2.1: Auto-adjusted PortLoopback -> off Ok
fdrd[60]|TRAP|    warn|Jul 07 17:56:04 Port 1.2.1 Loopback Off, Chassis Name:
NC316BU-16 Slot Name: EM316-2SFP at 1.2 Port Name: SFP at 1.2.1
fdrd[60]|TRAP|    warn|Jul 07 17:56:05 Port 1.2.2 Loopback Off, Chassis Name:
NC316BU-16 Slot Name: EM316-2SFP at 1.2 Port Name: SFP at 1.2.2
fiberdriver(port/1.2.2)#
    
```

4.4.7.8 LIN

Applying the “**lin**” command to one port automatically adjusts the other SFP port.

```

fiberdriver(port/1.2.1)# lin
  fdrd[60]|CORE|    warn|Jul 07 21:23:22 1.2.2: Auto-adjusted PortLIN ->
enable Ok
  fdrd[60]|TRAP|    warn|Jul 07 21:23:24 Port 1.2.1 LIN On, Chassis Name:
NC316BU-16 Slot Name: EM316-2SFP at 1.2 Port Name: SFP at 1.2.1
  fdrd[60]|TRAP|    warn|Jul 07 21:23:24 Port 1.2.2 LIN On, Chassis Name:
NC316BU-16 Slot Name: EM316-2SFP at 1.2 Port Name: SFP at 1.2.2
fiberdriver(port/1.2.1)#
    
```

```

fiberdriver(port/1.2.1)# no lin
  fdrd[60]|CORE|    warn|Jul 07 21:23:38 1.2.2: Auto-adjusted PortLIN ->
disable Ok
  fdrd[60]|TRAP|    warn|Jul 07 21:23:41 Port 1.2.1 LIN Off, Chassis Name:
NC316BU-16 Slot Name: EM316-2SFP at 1.2 Port Name: SFP at 1.2.1
  fdrd[60]|TRAP|    warn|Jul 07 21:23:41 Port 1.2.2 LIN Off, Chassis Name:
NC316BU-16 Slot Name: EM316-2SFP at 1.2 Port Name: SFP at 1.2.2
fiberdriver(port/1.2.1)#
    
```

4.4.7.9 Shutdown

```
fiberdriver(port/1.2.1)# shutdown
  fdrd[60]|TRAP|    err|Jul 07 21:36:13 Port 1.2.1 Amps Too Low, 0.020 Chassis
Name: NC316BU-16 Slot Name: EM316-2SFP at 1.2 Port Name: SFP at 1.2.1
  fdrd[60]|TRAP|    err|Jul 07 21:36:13 Port 1.2.1 Tx Power Too Low, -inf
Chassis Name: NC316BU-16 Slot Name: EM316-2SFP at 1.2 Port Name: SFP at 1.2.1
  fdrd[60]|TRAP|    err|Jul 07 21:36:13 Port 1.2.1 Rx Power Too Low, -40.000
Chassis Name: NC316BU-16 Slot Name: EM316-2SFP at 1.2 Port Name: SFP at 1.2.1
  fdrd[60]|TRAP|    warn|Jul 07 21:36:13 Port 1.2.1 Disabled, Chassis Name:
NC316BU-16 Slot Name: EM316-2SFP at 1.2 Port Name: SFP at 1.2.1
  fdrd[60]|TRAP|    err|Jul 07 21:36:13 Port 1.2.1 Link Down, Chassis Name:
NC316BU-16 Slot Name: EM316-2SFP at 1.2 Port Name: SFP at 1.2.1
fiberdriver(port/1.2.1)#
```

```
fiberdriver(port/1.2.1)# no shutdown
  fdrd[60]|TRAP|    warn|Jul 07 21:36:25 Port 1.2.1 Amps Ok, 8.288 Chassis
Name: NC316BU-16 Slot Name: EM316-2SFP at 1.2 Port Name: SFP at 1.2.1
  fdrd[60]|TRAP|    warn|Jul 07 21:36:25 Port 1.2.1 Tx Power Ok, -5.478 Chassis
Name: NC316BU-16 Slot Name: EM316-2SFP at 1.2 Port Name: SFP at 1.2.1
  fdrd[60]|TRAP|    warn|Jul 07 21:36:25 Port 1.2.1 Rx Power Ok, -7.077 Chassis
Name: NC316BU-16 Slot Name: EM316-2SFP at 1.2 Port Name: SFP at 1.2.1
  fdrd[60]|TRAP|    warn|Jul 07 21:36:25 Port 1.2.1 Enabled, Chassis Name:
NC316BU-16 Slot Name: EM316-2SFP at 1.2 Port Name: SFP at 1.2.1
  fdrd[60]|TRAP|    warn|Jul 07 21:36:25 Port 1.2.1 Link Changed, signal Detect
Chassis Name: NC316BU-16 Slot Name: EM316-2SFP at 1.2 Port Name: SFP at 1.2.1
fiberdriver(port/1.2.1)#
```

5 Appendix

5.1 Technical Specifications

Physical Dimensions	25 mm x 75 mm x 175 mm deep (1" x 3" x 7" deep)
Weight	360 grams (9.6 ounces)
Power	5V DC at 2A maximum
Storage Temperature	-40° C to 70° C (-40° F to 158° F)
Operating Temperature	0° C to 50° C (32° F to 122° F)
Air Flow Clearance	1 inch (25 millimeters) clearance from external chassis vents
Relative Humidity	85% maximum, non-condensing
Regulatory Compliance	FCC - PART 15, SUBPART B, 1999, CLASS A; CE MARK - EN 50081-1:1992; EN 50082:1997; EN 55024:1998; EN 55022:1998; AS/NZS 3548:1995

5.2 Supported Data Rates

- 100 Mbps Ethernet
- SONET/SDH
 - OC-3/ STM-1 (155 Mbps)
 - OC-12/STM-4 (622 Mbps)
 - OC-48/STM-16 (2.5 Gbps)
 - OC-48/STM-16 with FEC (2.67 Gbps)
- Gigabit Ethernet
- Fibre Channel 1 Gbps and 2 Gbps (FC-100 and FC-200)

5.3 Firmware Download

The EM316-2SFP does not include firmware upgradeable in the field.

5.4 Troubleshooting

This section provides basic troubleshooting to rectify the most common issues with the EM316-2SFP. If the information provided in this section and in this manual do not resolve the issue, please do not hesitate to contact MRV Communications Customer Support or your local MRV sales representative.

Basic Troubleshooting Checklist

- Ensure all chassis are powered and operating properly.
- Ensure all modules are inserted correctly and receiving power.
- Ensure SFPs are inserted properly and functioning correctly.
- Ensure User Links are functioning properly and sending the desired signal.
- Ensure Fiber Optic connections are correct (R_x to T_x).
- Ensure DIP switches are set to the proper settings for your application.



**20415 Nordhoff Street
Chatsworth, CA 91311**

**Tel: 818-773-0900
Fax: 818-773-0906
<http://www.mrv.com>**

Free Manuals Download Website

<http://myh66.com>

<http://usermanuals.us>

<http://www.somanuals.com>

<http://www.4manuals.cc>

<http://www.manual-lib.com>

<http://www.404manual.com>

<http://www.luxmanual.com>

<http://aubethermostatmanual.com>

Golf course search by state

<http://golfingnear.com>

Email search by domain

<http://emailbydomain.com>

Auto manuals search

<http://auto.somanuals.com>

TV manuals search

<http://tv.somanuals.com>