



# Emulex Drivers for Solaris

## User Manual

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## Chapter 1: Introduction

This document provides information for using the Broadcom® Emulex® Fibre Channel over Ethernet (FCoE) out-of-box drivers for Solaris StorEdge SAN Foundation Software (SFS), which is part of the SFS (Leadville) stack. The module name for this FCoE driver is `elxfc`.

This document also provides information for using the Broadcom Emulex network interface card (NIC) out-of-box driver for Solaris, which operates the NIC function of the Broadcom Emulex OneConnect adapters. The module name for this NIC driver is `elxnic`.

### 1.1 Supported Operating Systems

One of the following operating systems must be installed:

- Solaris 10 (x64)
- Solaris 11 (x64)
- Solaris 11.3 (x64)

#### NOTE

- For the FCoE (`elxfc`) driver, Solaris 11.1, Solaris 11.2, or Solaris 11.3 is required. For earlier updates of Solaris 11, use the earlier version of `elxfc` posted on the Broadcom website.
- For the most current FC driver, see the latest Oracle updates.
- For the NIC (`elxnic`) driver, Solaris 10 and Solaris 11 are supported. Use the latest Oracle updates.
- SPARC is not supported.

See the Broadcom website for the latest supported operating systems.

### 1.2 Supported Adapters and Firmware

For adapters that are compatible with the Broadcom Emulex FCoE and NIC drivers, see the driver's Downloads page on the Broadcom website.

For compatible firmware versions, see the Downloads page for the specific adapter.

The NIC driver supports the Solaris Ethernet stack, including NIC virtualization (Crossbow), vSwitch, and vRouter.

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## 1.3 Abbreviations

APIC	advanced programmable interrupt controller
ASCII	American Standard Code for Information Interchange
CLI	command line interface
CNA	Converged Network Adapter
CPU	central processing unit
DHCHAP	Diffie-Hellman Challenge Handshake Authentication Protocol
DR	dynamic reconfiguration
FC	Fibre Channel
FCA	Fibre Channel adapter
FCIO	FC input/output
FC-IP	Fibre Channel over IP
FCoE	Fibre Channel over Ethernet
FCTL	FC transport library
FW	firmware
Gbps	gigabits per second
GFC	gigabit Fibre Channel
GUID	Globally Unique Identifier
HBA	host bus adapter
HW	hardware
IOCTL	input/output control
IOV	I/O virtualization
IPS	Solaris Image Packaging System
IRM	interrupt resource management
IRQ	interrupt request
LACP	Link Aggregation Control Protocol
MSI-X	message signaled interrupts – extended
MTU	maximum transmission unit
NIC	network interface card
NPIV	N_Port ID Virtualization
OS	operating system
PCI	Peripheral Component Interconnect
PF	physical function
POST	power-on self-test
SCSI	Small Computer System Interface
SFS	SAN Foundation Software
SLI	Service Level Interface
SR-IOV	single root I/O virtualization
tar	tape archive
UMC	universal multi-channel
VF	virtual function

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VLAN	virtual local area network
VM	virtual machine
VPort	virtual port
vRouter	virtual router
vSwitch	virtual switch

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## Chapter 2: Installing and Uninstalling the Solaris Drivers

This chapter details the procedures for installing and uninstalling the Solaris drivers.

### 2.1 Installing the Drivers for Solaris 10

#### 2.1.1 FCoE Out-of-Box Driver (elxfc)

To install the FCoE out-of-box driver:

1. Log in as *root*.
2. Download the platform-specific FCoE out-of-box driver from the Broadcom website to a convenient directory. The file is a regular tar file.
3. Extract the installation image from the tar file. For example:

```
cd <location of driver package>
tar xvf elxfc_kit-11.x.xx.yy-s10-i386.tar
```
4. Install the driver kit. For example:

```
cd <location of driver package>
pkgadd -d ./
```
5. Reboot the system.

**NOTE**

The `emlxdrv` utility must be used to bind the adapter to the `elxfc` driver. For more information on the `emlxdrv` utility, see the latest *Emulex Solaris FCA Utilities User Manual*, which is available on the Broadcom website.

#### 2.1.2 NIC Out-of-Box Driver (elxnic)

To install the NIC out-of-box driver:

1. Log in as *root*.
2. Download the platform-specific NIC out-of-box driver from the Broadcom website to a convenient directory. The file is a regular tar file.
3. Extract the installation image from the tar file. For example:

```
cd <location of driver package>
tar xvf elxnic_kit-11.x.xx.yy-s10-i386.tar
```
4. Install the driver kit. For example:

```
cd <location of driver package>
pkgadd -d ./
```
5. Reboot the system.

##### Binding a Driver to a Device-id Instance

Because the out-of-box NIC driver (`elxnic`) and the inbox NIC driver (`oce`) support the same set of device-ids, only one driver can be attached to a device-id instance. By default, the `oce` driver claims all the device-ids. Therefore, when



---

installing the `elxnic` driver on top of the `oce` driver, the `elxnic` driver installation fails. To re-establish the device-id to driver bindings:

1. Unbind the `oce` driver using the `emlxdrv` utility. For more information on the `emlxdrv` utility, see the latest *Emulex Solaris FCA Utilities User Manual*.
2. Retry the `elxnic` installation.

This ensures a successful package installation and will automatically bind the NIC driver.

## 2.2 Uninstalling the Drivers for Solaris 10

### 2.2.1 FCoE Driver

To uninstall the FCoE out-of-box driver:

1. Log in as `root`.
2. Remove the out-of-box driver by typing

```
pkgrm <OOB_pkg_name>
```

For example:

```
pkgrm EMLXelxfc
```

3. Reboot the system.

### 2.2.2 NIC Driver

To uninstall the NIC out-of-box driver:

1. Log in as `root`.
2. Remove the out-of-box driver by typing

```
pkgrm <nic_pkg_name>
```

For example:

```
pkgrm EMLXelxnic
```

3. Reboot the system.

## 2.3 Installing the Drivers for Solaris 11

This section details the procedures for installing the drivers for Solaris 11.

### 2.3.1 FCoE Out-of-Box Driver (elxfc)

You can install the FCoE out-of-box driver (for S11.1) using one of two options:

- Remote Repository Installation
- P5P Archive Installation

### 2.3.1.1 Option 1: Remote Repository Installation

1. Log in as *root*.
2. Add the Emulex IPS repository to the publisher list. For example:  

```
$ pkg set-publisher -O http://<Emulex provided URL> emulex
```
3. List all available versions of *elxfc*. For example:  

```
$ pkg list -af elxfc
```

NAME (PUBLISHER)	VERSION	IFO
driver/network/elxfc (emulex)	11.x.xx.yy-0	---
driver/network/elxfc (emulex)	11.x.xx.yy-0	---
4. On the system whose output was displayed in step 3, the following command will install version 10.4.xx.y.x-0:  

```
$ pfexec pkg install elxfc
```

By default, the latest version of *elxfc* that is compatible with the image is installed. To install a specific version of *elxfc*, append the package version to the package name as follows:  

```
$ pfexec pkg install elxfc@11.x.xx.yy-0
```

In instances where two publishers provide packages of the same name, specify the publisher name as follows:  

```
$ pfexec pkg install //emulex/elxfc
```

After *elxfc* installation is complete, Solaris must be configured to discover and bind the *elxfc* driver to Broadcom Emulex adapters. Use the Broadcom Emulex *emlxdrv* utility to configure these device bindings. For more information on *emlxdrv* utility, see [Chapter 3 Utilities for Solaris Drivers](#).
5. Reboot the system:  

```
$ reboot
```

### 2.3.1.2 Option 2: P5P Archive Installation

You can use a scripted installation or a manual installation.

#### Scripted Installation

1. Log in as *root*.
2. Download the *p5p* tar file from the Broadcom website.
3. Untar the archive:  

```
$ tar -xvf elxfc_p5p-11.x.xx.yy-s11.tar
```
4. Run the installation script:  

```
$ ./elxfc_install
```
5. Reboot the system:  

```
$ reboot
```

#### Manual Installation

1. Log in as *root*.
2. Download the *p5p* tar file from the Broadcom website.
3. Extract the *p5p* archive from the tar file:  

```
$ tar -xvf elxfc_p5p-<version>.tar
```
4. Run the following command to install the package:  

```
$ pfexec pkg install -g elxfc-<version>.p5p
```
5. Reboot the system:  

```
$ reboot
```

---

**NOTE**

The `emlxdrv` utility must be used to bind the adapter to the `elxfc` driver. For more information on the `emlxdrv` utility, see the latest *Emulex Solaris FCA Utilities User Manual*.

## 2.3.2 NIC Out-of-Box Driver (elxnic)

You can install the NIC out-of-box driver using one of two options:

- remote repository installation
- p5p archive installation

### 2.3.2.1 Option 1: Remote Repository Installation

1. Log in as `root`.
2. Add the Emulex IPS repository to the publisher list. For example:  

```
pkg set-publisher -O <Emulex provided URL> emulex
```
3. List all available versions of `elxnic` For example:

```
pkg list -af elxnic
NAME (PUBLISHER)          VERSION      IFO
driver/nic/elxnic (emulex) 11.x.xx.x-0 i--
driver/nic/elxnic (emulex) 11.x.xy.x-0 ---
```

4. Install the `elxnic` driver:

```
pfexec pkg install elxnic
```

By default, the latest version of `elxnic` that is compatible with the rest of the image will be installed. To install a specific version of `elxnic`, append the package version to the package name as follows:

```
$ pfexec pkg install elxnic@11.x.xy.x-0
```

In instances where two publishers provide packages of the same name, specify the publisher name as follows:

```
$ pfexec pkg install //emulex/elxnic
```

After the `elxnic` installation is complete, you must configure Solaris to discover and bind the `elxnic` driver to Broadcom Emulex adapters. Use the Broadcom Emulex `emlxdrv` utility to configure these device bindings. For more information on `emlxdrv` utility, see [Chapter 3 Utilities for Solaris Drivers](#).

5. Reboot the system.

### 2.3.2.2 Option 2: p5p Archive Installation

1. Log in as `root`.
2. Download the p5p tar file from the Broadcom website.
3. Untar the archive:

```
tar -xvf elxnic_p5p-11.x.xx.yy-s11.tar
```

4. Run the installation script:  

```
./elxnic_install
```

5. Reboot the system:

```
reboot
```

---

### Binding a Driver to a Device-id Instance

Because the out-of-box NIC driver (`elxnic`) and the inbox NIC driver (`oce`) support the same set of device-ids, only one driver can be attached to a device-id instance. By default, the `oce` driver claims all of the device-ids. Therefore, when installing the `elxnic` driver on top of the `oce` driver, the `elxnic` driver installation fails. To re-establish the device-id to driver bindings:

1. Unbind the `oce` driver using the `emlxdrv` utility. For more information on the `emlxdrv` utility, see the latest *Emulex Solaris FCA Utilities User Manual*, which is available on the Broadcom website.
2. Retry the `elxnic` installation.

This ensures a successful package installation and will automatically bind the NIC driver.

## 2.4 Uninstalling the Drivers for Solaris 11

### 2.4.1 FCoE Driver

You can uninstall the FCoE out-of-box driver by using scripted removal or manual removal.

#### 2.4.1.1 Scripted Removal

1. Log in as `root`.
2. Run the following command to remove `elxfc` from the system:

```
$ ./elxfc_remove
```

3. Reboot the system. Type

```
$ reboot
```

The script is included in the downloadable `p5p` tar file that can be retrieved from the Broadcom website. The scripted uninstall also cleans up the files in the installation directory.

#### 2.4.1.2 Manual Removal

1. Log in as `root`.
2. Run the following command to remove `elxfc` from the system:

```
$ pkg uninstall elxfc
```

3. Reboot the system:

```
$ reboot
```

### 2.4.2 NIC Driver

To uninstall the NIC out-of-box driver:

1. Log in as `root`.
2. Remove the out-of-box driver by typing

```
pkg uninstall <driver_name>
```

For example:

```
pkg uninstall elxnic
```

3. Reboot the system.

---

### 2.4.2.1 Scripted Removal

1. Log in as *root*.
2. Run the following command to remove `elxnic` driver by typing  
`./elxnic_remove`
3. Reboot the system.

---

## Chapter 3: Utilities for Solaris Drivers

Broadcom provides three utilities to facilitate configuring and using the Solaris drivers:

- `emlxdrv` utility (included in the FCA utilities)
- `emlxadm` utility (included in the FCA utilities)
- OneCommand Manager application

**NOTE** When you install the OneCommand Manager application, also install the Solaris FCA Utilities.

### 3.1 OneCommand Manager Application

The OneCommand Manager application provides the functionality of the `emlxadm` utility along with additional features, allowing you to remotely manage multiple systems. It offers a choice of a graphical user interface and a scriptable command-line interface. It is a direct-user interface to the FCIO interface provided by the Oracle StorEdge SFS. The FCIO interface provides an Oracle-common IOCTL interface to the FCTL, which manages the FCA drivers for each FCoE adapter attached to the host system. The OneCommand Manager application also directly interfaces with the Broadcom Emulex network driver, allowing you to manage the NIC function of Broadcom Emulex adapters. For more information, see the *Emulex OneCommand Manager Application User Manual*, which is available on the Broadcom website.

### 3.2 emlxadm Utility

The `emlxadm` utility changes driver parameters through a local interactive or CLI mode. It can also update firmware on non-Oracle branded devices. For more information, see the *Emulex Solaris FCA Utilities User Manual*.

### 3.3 emlxdrv Utility

The `emlxdrv` utility is used for binding (associating) the Broadcom Emulex Solaris FCoE and NIC drivers to the various models of Broadcom Emulex adapters. If the driver binding configuration is changed, the host system must be rebooted for the new configuration to take effect.

The out-of-box drivers (`elxfc` and `elxnic`) and their respective inbox drivers (`emlxs` and `oce`) support the same set of Broadcom Emulex adapter device-ids. Because only one driver can be bound to a specific device-id, the inbox driver initially binds to all device-ids by default. In order to install an out-of-box driver on top of an inbox driver, you must use the `emlxdrv` utility to establish the device-id to driver bindings.

For more information, see the *Emulex Solaris FCA Utilities User Manual*.

---

## Chapter 4: FCoE Driver Configuration

The module name for the Broadcom Emulex SFS FCA out-of-box driver is `elxfc`. You can configure the Broadcom Emulex SFS FCA driver parameters by

- Editing the configuration file (`elxfc.conf`), which is described in this section.
- Using the Broadcom Emulex FCA utilities: `emlxadm` and `emlxdrv`. For more information, see the *Emulex Solaris FCA Utilities User Manual*.
- Using the OneCommand Manager application. For more information, see the *Emulex OneCommand Manager Application User Manual*.

### 4.1 Editing the FCoE Configuration File (elxfc.conf)

The configuration file contains all the parameters necessary to initialize the Broadcom Emulex SFS FCA out-of-box driver.

#### 4.1.1 Changing Driver Parameters

The configurable driver parameters are defined in [Table 1, FCoE Configuration File Parameters](#).

To change driver parameters:

1. Open the configuration file in a text editor.
2. Change the parameters to the desired settings.
3. Save the file.
4. If the driver is already loaded, you must unload and reload the driver to implement your changes. For more information, see [Chapter 2, Installing and Uninstalling the Solaris Drivers](#).

To determine the requirement for the parameter change to take effect, see the Activation column in [Table 1, FCoE Configuration File Parameters](#).

#### 4.1.2 Configuring NPIV Support

This section details the procedure for configuring NPIV support.

##### 4.1.2.1 Enabling NPIV Support on Solaris 10

To enable NPIV support in the driver:

1. Log in as `root`, or `su` to root.
2. Set `enable-npiv=1` in the configuration file.
3. The FC port (fp) driver parameters are updated when the Broadcom Emulex `emlxu` utilities package (EMLXemlxu) is installed. Entries from 2 to 254 can be added to the `/kernel/drv/fp.conf` file. For example:

```
name="fp" class="fibre-channel" port=0;
name="fp" class="fibre-channel" port=1;
name="fp" class="fibre-channel" port=2;
name="fp" class="fibre-channel" port=3;
name="fp" class="fibre-channel" port=4;
name="fp" class="fibre-channel" port=5;
name="fp" class="fibre-channel" port=6;
name="fp" class="fibre-channel" port=7;
```

```
name="fp" class="fibre-channel" port=8;  
name="fp" class="fibre-channel" port=9;
```

The first two lines are listed by default because ports 0 and 1 are required. The above example shows that ports 2 to 9 have been added to support up to 10 virtual ports. The port number of each entry must increment by 1 in sequential order, without gaps in the number sequence. That is, you cannot have "name="fp"

```
class="fibre-channel" port=7;" and then have the next line be "name="fp"  
class="fibre-channel" port=10;"
```

4. Reboot the system.

To create, delete, or list the virtual ports after a system reboot, see the *Emulex OneCommand Manager Application User Manual*.

#### 4.1.2.2 Enabling NPIV Support on Solaris 11

To enable NPIV support in the driver:

1. Log in as *root*, or *su* to root.
2. The `enable-npiv` parameter is set to 0 by default. To enable NPIV, set `enable-npiv` to 1 in the configuration file.

See Chapter 6 of the *Solaris Express SAN Configuration and Multipathing Guide*, which is available on the Oracle website.

#### 4.1.2.3 NPIV Limitations

The following limitations apply to NPIV:

- Due to the limitation of the Solaris SFS stack, deleting a virtual port causes that virtual port to go offline.
- FC-IP is not supported on virtual ports.
- The Broadcom Emulex LPe12000- series adapters can support up to 255 virtual ports.
- You cannot delete a virtual port with a mounted file system.

#### 4.1.2.4 NPIV and Operating System Virtualization

Solaris has several operating system virtualization solutions, including Oracle VM for x86 and Solaris containers. Devices configured to be seen on an Broadcom Emulex FCoE port (either a physical port or a virtual port) can be used with any of these operating system virtualization solutions. Consult the latest document on these technologies to learn the best use of resources related to NPIV technology.

#### 4.1.2.5 Using VPorts with Oracle VM Server for Solaris Containers or Oracle VM Server for 86

To use NPIV with Solaris containers or Oracle VM Server for x86 (formerly xVM) user domains:

1. Create virtual ports for the domains or containers to which you want to present dedicated storage.
2. Discover and attach the targets to the virtual ports.
3. Assign the target to the domain or container. The attachment runs through the virtual port that provides the path to the target.

## 4.2 FCoE Configuration File Parameters

### NOTE

- All adapter-specific parameters have an `elxfcX` prefix, where `X` is the driver instance number. For example, setting `elxfc0-log-errors=0xffffffff` enables all the error messages for the 0 instance of the `elxfc` driver.
- All parameters are adapter-specific.



- If you want to override a driver parameter for a single driver-loading session, you can specify it as a parameter to the modload command. The following example is for 64-bit platforms:  

```
modload /kernel/drv/amd64/elxfc automap=0
```
- The OneCommand Manager application reflects the configuration file driver parameters. For more information, see the *Emulex OneCommand Manager Application User Manual*.
- The Activation column in [Table 1](#) shows the requirement for the parameter change to take effect. Activation requirements include adapter reset, dynamic reset (no reset is necessary), link reset, and reboot.

The following table lists the FCoE configuration file parameters.

**Table 1 FCoE Configuration File Parameters**

Parameter	Description	Activation
ack0	Indicates whether the adapter uses or attempts to use ACK0 for Class 2. <ul style="list-style-type: none"> <li>■ 0 = The adapter only uses ACK1 when running Class 2 traffic (default).</li> <li>■ 1 = The adapter attempts to use ACK0 when running Class 2 traffic to a device.</li> </ul> If the device does not support ACK0, then the adapter uses ACK1.	Adapter reset
adisc-support	Sets the driver level support for the FC ADISC login I/O recovery method. <ul style="list-style-type: none"> <li>■ 0 = No support. Flushes active I/Os for all FCP target devices at link down.</li> <li>■ 1 = Partial support. Flushes I/Os for non-FCP2 target devices at link down</li> <li>■ 2 = Full support. Holds active I/Os for all devices at link down.</li> </ul>	Dynamic
assign-alpa	If multiple adapter instances on the same host are on the same loop, set this property differently for each adapter. Possible values are 0x00 to 0x0ef. A 0x00 setting (default) means no preference. <b>NOTE</b> This property is only applicable if the topology is set to loop.	Link reset
console-errors	Verbose mask for driver error messages to the console. Possible values are 0x0000000 to 0xFFFFFFFF. The default value is 0x0000000.	Dynamic
console-notice	Verbose mask for driver notice messages to the console. Possible values are 0x0000000 to 0xFFFFFFFF. The default value is 0x0000000.	Dynamic
console-warnings	Verbose mask for driver warning messages to the console. Possible values are 0x0000000 to 0xFFFFFFFF. The default value is 0x0000000.	Dynamic
cr-count	Specifies a count of I/O completions after an interrupt response is generated. The possible values are 1 to 255. The default value is 1. <b>NOTE</b> This property is disabled if cr-delay=0.	Link reset
cr-delay	Specifies a count in milliseconds after which an interrupt response is generated if cr-count has not been satisfied. Possible values are 0 to 63. The default value is 0. <b>NOTE</b> If cr-delay=0, the Coalesce Response parameter (cr_count) is disabled.	Link reset
enable-auth	DHCHAP support in the driver. <ul style="list-style-type: none"> <li>■ 0 = Disabled (default)</li> <li>■ 1 = Enabled</li> </ul>	Link reset

**Table 1 FCoE Configuration File Parameters (Continued)**

Parameter	Description	Activation
enable-npiv	NPIV support in the driver. <ul style="list-style-type: none"> <li>0 = Disabled-remove all vports first</li> <li>1 = Enabled (requires SLI-3 and later)</li> </ul>	Adapter reset
linkup-delay	Sets the driver wait period (seconds) for a link up after adapter initialization. Possible values are 0 to 60. The default value is 10.	Adapter reset
log-errors	Verbose mask for driver error messages to the messages file. Possible values are 0x0000000 to 0xFFFFFFFF. The default value is 0xFFFFFFFF.	Dynamic
log-notice	Verbose mask for driver notice messages to the messages file. Possible values are 0x0000000 to 0xFFFFFFFF. The default value is 0xFFFFFFFF.	Dynamic
log-warnings	Verbose mask for driver warning messages to the messages file. Possible values are 0x0000000 to 0xFFFFFFFF. The default value is 0xFFFFFFFF.	Dynamic
max-xfer-size	Sets the maximum SCSI transfer size in bytes per I/O. This property determines the scatter gather list buffer size. A pool of buffers is reallocated by the driver during boot. A larger transfer size requires a larger memory allocation. The minimum value is 131072. The maximum value is 1388544. The default value is 339968. <b>NOTE</b> For OCe11100-series and LPe16000 and LPe15000-series adapters, the maximum transfer size is 1040384 bytes.	Reboot
network-on	IP networking support in the driver. <ul style="list-style-type: none"> <li>0 = Disabled</li> <li>1 = Enabled (default)</li> </ul>	Reboot
num-iocbs	The number of IOCB buffers to allocate. Possible values are 128 to 10240. The default value is 1024.	Adapter reset
num-nodes	The number of remote FC nodes (N_Ports) the driver supports. Possible values are 0 to 4096. The default value is 0, which means no_limit.	Adapter reset
pci-max-read	Sets the PCI-X maximum memory read byte count. Possible values are 512, 1024, 2048, or 4096. The default value is 2048.	Adapter reset
pm-support	Power management support in the driver. <ul style="list-style-type: none"> <li>0 = Disabled (default)</li> <li>1 = Enabled</li> </ul>	Reboot
target-depth	Sets the remote FCP target queue depth. Possible values are 0 to 2048. The default value is 512. A value of 0=no_limit.	Link reset
topology	Sets the topology. Set to point-to-point mode if you want to run as an N_Port. Set to loop mode if you want to run as an NL_Port. <ul style="list-style-type: none"> <li>0 = loop, then point-to-point (default)</li> <li>2 = point-to-point only</li> <li>4 = loop only</li> <li>6 = point-to-point, then loop</li> </ul>	Link reset

**Table 1 FCoE Configuration File Parameters (Continued)**

Parameter	Description	Activation
ub-bufs	Sets the number of unsolicited buffers the driver should allocate. Possible values are 40 to 16320. The default value is 1000.	Reboot
vport	<p><b>NOTE</b> This property is applicable to Solaris 10 only.</p> <p>Virtual port registration table. The enable-npiv parameter must be set to 1. The virtual port registration table can have any number of comma delimited entries. Each entry must be of the form:</p> <p>"PHYS_WWPN:VPORT_WWNN:VPORT_WWPN:VPORT_ID"</p> <p>Where:</p> <ul style="list-style-type: none"> <li>■ PHYS_WWPN = World Wide Port Name of adapter's physical port</li> <li>■ VPORT_WWNN = Desired World Wide Node Name of virtual port</li> <li>■ VPORT_WWPN = Desired World Wide Port Name of virtual port</li> <li>■ VPORT_ID = Desired virtual port ID (1 to maximum vPorts)</li> </ul> <p>For entries with the same PHYS_WWPN, VPORT_WWNN, and VPORT_WWPN, the VPORT_ID must start at 1, and increment by one sequentially, without gaps in the number sequence. The VPORT_ID=0 is reserved for the physical port.</p> <p>For example:</p> <pre>vport= "10000000c9123456:28010000c9123456:20010000c9123456:1", "10000000c9123456:28020000c9123456:20020000c9123456:2", "10000000c9123457:28010000c9123457:20010000c9123457:1", "10000000c9123457:28020000c9123457:20020000c9123457:2", "10000000c9123457:28030000c9123457:20030000c9123457:3";</pre> <p>All entries are automatically created or removed by the OneCommand Manager application.</p>	Link reset
vport-restrict-login	<p>Sets the virtual port's behavior when discovering targets in the SAN.</p> <ul style="list-style-type: none"> <li>■ 1 = Prevents the vPort from logging into other initiator ports on the SAN. Also rejects logins from other ports in the SAN because it assumes that all ports that send a PLOGI are initiators. This is the default value.</li> <li>■ 0 = The driver attempts to login to every port that it can access in the SAN and accept logins from all ports.</li> </ul> <p><b>NOTE</b> In a SAN that has other initiators, this parameter greatly reduces the driver's use of hardware resources.</p>	Link reset

---

## Chapter 5: NIC Driver Configuration

In Solaris 10, the driver exports certain parameters that can be configured by editing the Broadcom Emulex NIC out-of-box driver for Solaris configuration file (`elxnic.conf`). See [Section 5.1.2, NIC Configuration File Parameters](#), and [Table 1, NIC Configuration File Parameters](#).

In Solaris 11, while you can configure the driver using the `elxnic.conf` file, use the `dladm` utility (available by default on Solaris 11 systems). For more information on using this Solaris NIC configuration utility, see the `dladm(1M)` man page.

**NOTE** man pages are available on the Oracle website.

### 5.1 Using the NIC Configuration File (elxnic.conf)

This section provides information on using and configuring the NIC driver parameters.

#### 5.1.1 Changing Driver Parameters

The configurable driver parameters are described in [Table 1, NIC Configuration File Parameters](#).

To edit the `elxnic.conf` file:

1. Open the file in a text editor.
2. Change the parameters to the desired settings.

The syntax of single lines in the file:

```
<variable> = <value>;
```

For example:

```
default_mtu = 9000;
```

Comment lines must start with a # character.

3. Save the file.
4. If the driver is already loaded, unload and reload it. Changes to the configuration file require you to unload and reload the driver. For more information, see [Chapter 2, Installing and Uninstalling the Solaris Drivers](#).

#### 5.1.2 NIC Configuration File Parameters

For the Solaris 10 driver, you can configure the `elxnic` driver parameters using either the `elxnic.conf` file (for driver parameters that are common to all the `elxnic` devices) or the `ndd` utility (for driver parameters that may need to be set with different values for different `elxnic` devices). For the Solaris 11 driver, use the `dladm` utility or the `elxnic.conf` file.

The following table lists the NIC configuration file parameters.

**Table 1 NIC Configuration File Parameters**

Parameter	Definition
default_mtu	Sets the default MTU for the driver. The possible values are 1500 and 9000. The default value is 1500.
flow_control	<p>Sets the Ethernet flow control. The possible values are:</p> <ul style="list-style-type: none"> <li>0 - Flow control disabled</li> <li>1 - Transmit only</li> <li>2 - Receive only</li> <li>3 - Both transmit and receive (default)</li> </ul> <p>Flow control cannot be disabled on NIC/FCoE adapters.</p>
fm_capability	<p>Sets the driver's device fault management capability to one of the values defined for Solaris fault management capability.</p> <p>The fm_capability value is a bitmap of one or more of these values:</p> <ul style="list-style-type: none"> <li>0x00000000 = DDI_FM_NOT_CAPABLE; A value of zero indicates that the fm_capability is disabled.</li> <li>0x00000001 = DDI_FM_EREPOR_T_CAPABLE</li> <li>0x00000002 = DDI_FM_ACCCHK_CAPABLE</li> <li>0x00000004 = DDI_FM_DMA_CHK_CAPABLE</li> </ul> <p>The default value is 0x00000007 (DDI_FM_ACCCHK_CAPABLE, DDI_FM_ACCCHK_CAPABLE, and DDI_FM_DMA_CHK_CAPABLE).</p>
log_level	<p>Sets the driver's verbosity for logs in /var/adm/messages. The log_level parameter is comprised of MOD_MASK (upper 16 bits) and SEVERITY (lower 16 bits).</p> <p>The MOD_MASK value is a bitmap of one or more of these values:</p> <ul style="list-style-type: none"> <li>0x10000 = MOD_CONFIG</li> <li>0x20000 = MOD_TX</li> <li>0x40000 = MOD_RX</li> <li>0x80000 = MOD_ISR</li> </ul> <p>The possible values for SEVERITY:</p> <ul style="list-style-type: none"> <li>0x0 = CE_CONT</li> <li>0x1 = CE_NOTE</li> <li>0x2 = CE_WARN</li> <li>0x3 = CE_PANIC</li> <li>0x4 = CE_IGNORE</li> </ul> <p>For details on MOD_MASK and SEVERITY, see <a href="#">Section 8.1, Setting MOD_MASK and SEVERITY</a>.</p>
max_rx_rings	<p>Sets the maximum number of receive queues. Possible values are:</p> <ul style="list-style-type: none"> <li>1 to 5: OCe11102. The default value is 5.</li> <li>1 to 16: OCe11102 in advanced mode on Solaris 10. The default value is 8.</li> <li>1 to 16: OCe11102 in advanced mode on Solaris 11. The default value is 8.</li> </ul> <p>The actual number of transmit and receive queues that are created depends on the number of vectors allocated. The actual number can be checked using the <code>ndd(1m)</code> command on Solaris 10 or the <code>dladm(1M)</code> command on Solaris 11. For more information, run <code>man ndd</code> on Solaris 10 or "man dladm" on Solaris 11.</p> <p>On non-IRM capable machines with FLEX10 or multi-adapter setup, some of the functions may fail to attach because of a lack of interrupts. See <a href="#">Section 5.1.6, Changing Interrupt Priorities</a> for more information.</p>

**Table 1 NIC Configuration File Parameters (Continued)**

Parameter	Definition
max_tx_rings	Sets the maximum number of transmit queues. The possible values are: <ul style="list-style-type: none"> <li>■ 1 for OCe11102 in legacy mode.</li> <li>■ 1 to 8 for OCe11102 in advanced mode on Solaris 10. The default value is 8.</li> <li>■ 1 to 16 for OCe11102 on Solaris 11. The default value is 8.</li> </ul>
rss_key_static	Enables static RSS key generation. The possible values are 0 (disabled) or 1 (enabled). The default value is 0.
rx_bcopy_limit	Sets the receive buffer size threshold to use the copy mode. The possible values are any values that are less than or equal to the default_mtu value. The default value is 128. <b>NOTE</b> On Solaris 11, consider changing this value to fine-tune the receive performance.
rx_frag_size	Sets the size of the pre-allocated receive buffer. A higher value results in better resource utilization. The possible values are 2048, 4096, and 8192. The default value is 2048. <b>NOTE</b> On Solaris 10, consider changing the value to 4096 or 8192 if the default_mtu value is 9000.
rx_max_bufs	Sets the maximum number of pre-allocated receive buffers. The possible values are 1024 to 8192. The default value is 2048. <b>NOTE</b> On Solaris 10, consider increasing the rx_max_bufs value if the rx_drops_no_frags_q[x] increments continuously in the kstat output.
tx_bcopy_limit	Sets the transmit buffer size threshold to use the copy mode. The possible values are 128, 256, 512, 1024, and 2048. The default value is 512. <b>NOTE</b> On Solaris 11, consider reducing this value if a wqb pool empty message is frequently observed. Consider increasing the value if a wqm pool empty message is frequently observed. For descriptions of these messages, <a href="#">Table 4, Log Messages for the NIC Driver for Solaris 11</a> .
tx_intr_enable	Enables the handling of transmit completions in interrupt mode. The possible values are 0 (disabled) or 1 (enabled). The default value is 0. <b>NOTE</b> Enable this parameter if you observe frequent frame loss. Also, consider using this in conjunction with rx_max_bufs.

### 5.1.3 Configuring the NIC Interface

The NIC interface must be created before you can configure it. You can verify that the driver is loaded on the system and the NIC interface is created with one of the following commands:

```
dladm show-dev (Solaris 10 driver)
dladm show-phys (Solaris 11 driver)
```

After you have determined that the NIC interface has been created, you can proceed to configure it.

To configure the NIC interface(s):

1. Plumb the interface:

```
#ifconfig elxnic<X> plumb (Solaris 10 driver)
#ifconfig net<X> plumb (Solaris 11 driver)
```

Where <X> is the interface number.

To see the created interfaces, run

```
dladm show-link
```

The dladm show-link command lists all the interfaces in the system.

2. Assign a static IP address:

- ```
#ifconfig elxnic<X> <IP_Address> netmask <NetMask> up (Solaris 10 driver)
#ifconfig net<X> <IP_Address> netmask <NetMask> up (Solaris 11 driver)
```
3. Edit the `/etc/hosts` file (a symlink to `/etc/inet/hosts`) and add the IP address and hostname that you wish to assign to the given NIC interface. See the `hosts (4)` man page for more information.
  4. Edit the `/etc/inet/ipnodes` file and add an entry for the IP address and hostname for the given interface. The `/etc/inet/ipnodes` file is primarily for IPv6 only, but this step is necessary for the IP address change to take effect.
  5. Edit the `/etc/netmasks` file and add an entry with the IP address and desired subnet mask for the given interface. See the `netmasks (4)` man page for more information.
  6. Restart the network service. Run

```
svcadm restart network/physical
```

or reboot the system.

## 5.1.4 Removing the NIC Interface using elxnic

To remove the NIC interface:

1. Remove all the `elxnic` entries from `/etc/hosts`.
2. Remove all the entries from `/etc/inet/ipnodes` that are related to `elxnic` interfaces.
3. Remove all the `elxnic` netmask entries from `/etc/netmasks`.
4. Unplumb the interface, using the following command:

For the Solaris 10 driver:

```
ifconfig elxnic<X> down unplumb
```

For the Solaris 11 driver:

```
ifconfig net<X> down unplumb
```

where `<X>` is the interface number.

Alternatively, you can use the `sys-unconfig(1M)` utility for Solaris 10 or `sysconfig(1M)` utility for Solaris 11 to remove a device configuration. These utilities can delete the configurations of IP address, netmask, hostname, nfs mounts, ldap, and so on, on the host. The `sys-unconfig(1M)` or `sysconfig(1M)` utility reboots the system and clears the existing IP configuration, so you must enter all the information again, even for the existing NICs already configured in the system. The `sys-unconfig(1M)` or `sysconfig(1M)` utility must be executed from a console. On reboot, you are presented with a set of user-interface-based data entry forms that facilitate the required change in configuration.

## 5.1.5 Multi-ring Mode and the Effect of ddi\_msix\_alloc\_limit

### 5.1.5.1 Solaris 10

The `elxnic` driver is enabled to work in the multi-ring mode by default. To check the number of active transmit and receive (tx/rx) rings, type

```
#ndd -get /dev/elxnic<X> rx_rings
#ndd -get /dev/elxnic<X> tx_rings
```

The variable `<X>` is the interface number of the `elxnic` driver.

The following table shows how the value of `ddi_msix_alloc_limit` affects receive traffic distribution across CPU cores for Solaris 10:

**Table 2 Effect of “`ddi_msix_alloc_limit`” across CPU Cores for Solaris 10**

| NIC      | Mode     | APIC   | Value of <code>ddi_msix_alloc_limit</code> in <code>/etc/system</code> | CPU Cores Participating in RX Processing | Limiting Factor              |
|----------|----------|--------|------------------------------------------------------------------------|------------------------------------------|------------------------------|
| OCe11102 | Legacy   | xAPIC  | Default                                                                | 2                                        | Solaris and APIC in platform |
| OCe11102 | Legacy   | xAPIC  | 4                                                                      | 4                                        | firmware and driver          |
| OCe11102 | Legacy   | x2APIC | Default                                                                | 4                                        | firmware and driver          |
| OCe11102 | Advanced | xAPIC  | Default                                                                | 2                                        | Solaris and APIC in platform |
| OCe11102 | Advanced | xAPIC  | 8                                                                      | 8                                        | firmware and driver          |
| OCe11102 | Advanced | x2APIC | Default                                                                | 8                                        | firmware and driver          |

### 5.1.5.2 Solaris 11

Solaris 11 is multi-ring enabled by default. It creates eight transmit rings and eight receive rings on OCe11102 devices in advanced mode. To check the number of rx and tx rings, use `dladm show-phys -H` command. In [Table 3](#), the number 8 in column 5 is applicable only if the number of rx rings is increased to the maximum (16).

**NOTE** On non-IRM systems with multiple adapters, the attach for few NIC functions may fail because of lack of interrupt vectors allowed at the default level. To solve this issue, use [Table 3](#).

The following table shows how the value of `ddi_msix_alloc_limit` affects receive traffic distribution across CPU cores for Solaris 11.

**Table 3 Effect of “`ddi_msix_alloc_limit`” across CPU Cores for Solaris 11**

| NIC      | Mode     | APIC   | Value of <code>ddi_msix_alloc_limit</code> in <code>/etc/system</code> | CPU cores participating in RX processing | Limiting Factor              |
|----------|----------|--------|------------------------------------------------------------------------|------------------------------------------|------------------------------|
| OCe11102 | Legacy   | xAPIC  | Default                                                                | 2                                        | Solaris and APIC in platform |
| OCe11102 | Legacy   | xAPIC  | 4                                                                      | 4                                        | firmware and driver          |
| OCe11102 | Legacy   | x2APIC | Default                                                                | 4                                        | firmware and driver          |
| OCe11102 | Advanced | xAPIC  | Default                                                                | 2                                        | Solaris and APIC in platform |
| OCe11102 | Advanced | xAPIC  | 8                                                                      | 8                                        | firmware and driver          |
| OCe11102 | Advanced | x2APIC | Default                                                                | 8                                        | firmware and driver          |

## 5.1.6 Changing Interrupt Priorities

The Solaris operating system divides the available interrupts among multiple priority levels; each priority level has a maximum of 31 vectors. By default, each function has a maximum of two MSI-X vectors. For example, with three OCe11102 adapters in FLEX10 mode, there are 24 functions, and the driver needs at least two vectors per function for a total of 48 vectors. If the MSI-X allocation fails, the driver reverts to the INTx allocation, which results in suboptimal performance. Normally, the network drivers allocate vectors at level 6, but the requirement of 48 vectors is beyond the limit of 31, which causes issues. A solution is to assign level 6 to 12 functions and level 5 to the remaining functions so



that all functions can get two MSI-X vectors for optimum performance. It is not uncommon to assign level 5 or 6 on Solaris under these conditions.

The following example shows how the interrupt-priority for a PCI function can be configured to a level 5:

1. Type

```
# grep elxnic /etc/path_to_inst
"/pci@0,0/pci8086,340d@6/pci10df,e743@0" 0 "elxnic"
"/pci@0,0/pci8086,340d@6/pci10df,e743@0,1" 1 "elxnic"
"/pci@0,0/pci8086,3410@9/pci10df,e742@0" 2 "elxnic"
"/pci@0,0/pci8086,3410@9/pci10df,e742@0,1" 3 "elxnic"
# grep elxnic /etc/driver_aliases
elxnic "pciex19a2,710"
```

**NOTE** In the previous example, `/pci@n,n/pcinnnnn,nnnd@n` represents the parent of the PCI function, the unit number follows the last @ symbol, and `pciexnnan,nnn` indicates the device name.

2. Add the following entry to `/kernel/drv/elxnic.conf` file:

```
name= "pciex19a2,710" parent = "/pci@0,0/pci8086,3410@9" unit-address =
"0" interrupt-priorities = 5;
```

**NOTE** The path and unit number may vary on your system.

3. Reboot the system.

Interrupt priorities can be examined using the `mdb` command. For example:

```
# echo "::interrupts" | mdb -k | grep oce
```

The third column shows the interrupt priority level of the vector in the following output:

| IRQ | Vect | IPL | Bus | Trg | Type  | CPU | Share | APIC/INT# | ISR(s)  |
|-----|------|-----|-----|-----|-------|-----|-------|-----------|---------|
| 64  | 0x42 | 5   |     | Edg | MSI-X | 3   | 1     | -         | oce_isr |
| 65  | 0x43 | 5   |     | Edg | MSI-X | 0   | 1     | -         | oce_isr |

## 5.2 Using the dladm Utility for Solaris 11

### 5.2.1 Configuring the NIC Interface Using dladm

To configure the interface on Solaris 11:

Use the `dladm` utility to configure the NIC interface and also perform a runtime update of the following driver parameter:

For example, to change the MTU in Solaris 11, unplumb the interface and run

```
$> dladm set-linkprop -p mtu=9000 <interface>
```

where "`<interface>`" is `net<0,1,2...>`.

To see the plumbed interfaces, run

```
$> ifconfig -a.
```

#### 5.2.1.1 Tunable Parameters

Tunable parameters can be changed during runtime. On Solaris 10, the `nnd` command can be used to change the value of tunable parameters. On Solaris 11, these values can be changed using the `dladm` command. The parameters on Solaris 11 are named differently. They include a prefix of `_` to each of the parameter names. Through the `dladm` utility, the following tunable parameters are provided by the driver along with their usage:

---

### log\_level

```
$> dladm set-linkprop -p _log_level=<value> <interface>
```

**NOTE** See [Section 8.1, Setting MOD\\_MASK and SEVERITY](#) for log\_level values.

### rx\_bcopy\_limit

```
$> dladm set-linkprop -p _rx_bcopy_limit=<value in bytes> <interface>
```

### tx\_bcopy\_limit

```
$> dladm set-linkprop -p _tx_bcopy_limit=<value in bytes> <interface>
```

### tx\_ring\_size

```
$> dladm set-linkprop -p _tx_ring_size=<values between 256 and 2048>  
<interface>
```

-or-

```
$> dladm set-linkprop -p _tx_ring_size=<values less than tx_ring_size>  
'<interface>
```

## 5.2.1.2 Private (or Unlisted) Parameters

Private (or unlisted) parameters can be set during driver attach through the `dladm` utility and also the `elxnic.conf` file.

To see the value of private driver parameters using the `dladm` utility, type

```
$> dladm show-linkprop -p <property name> <interface>
```

The driver provides the following private parameters:

- `fw_version`
- `log_level`
- `rx_bcopy_limit`
- `rx_ring_size`
- `rx_rings`
- `rx_rings_per_group`
- `tx_bcopy_limit`
- `tx_reclaim_threshold`
- `tx_ring_size`
- `tx_rings_fw_version` (read only)

## 5.2.2 Creating a Virtual NIC Using dladm

To create a vNIC, use the `dladm` utility with the `create-vnic` option. For example:

```
$ dladm create-vnic -l net0 vnic1
```

After a vNIC is created, it can be assigned to a zone using the `zonecfg` utility. For example:

```
$ zonecfg -z zone1  
zonecfg:zone1: No such zone configured  
zonecfg:zone1> create  
zonecfg:zone1> set zonepath=/export/zone1  
zonecfg:zone1> create  
zonecfg:zone1> add net
```

---

```
zonecfg:zone1> set physical=vnic1
zonecfg:zone1> set address=192.168.1.100
zonecfg:zone1> verify
zonecfg:zone1> commit
```

Up to 63 VLANs can be used with each UMC virtual channel. For information on configuring UMC, refer to the *Emulex Universal Multi-Channel Reference Guide*, which is available on the Broadcom website.

### Considerations

- UMC can be configured using the OneCommand Manager application CLI. For more information, refer to the *Emulex OneCommand Manager Command Line Interface User Manual*, which is available on the Broadcom website.
- Using UMC in a hypervisor environment is not advised if the UMC interface is going to be part of the hypervisor virtual switch. This configuration may cause performance issues.
- You cannot run LACP if UMC is enabled.

## Chapter 6: Troubleshooting

This chapter explains some of the situations in which your system may operate in an unexpected manner, and some possible resolutions to unexpected behavior.

### 6.1 Solaris 11 elxfc Driver Installation Situation

The following table lists a Solaris 11 `elxfc` driver installation situation and the resolution.

**Table 1 Solaris 11 elxfc Driver Installation Situation and the Resolution**

| Situation                                                                                                                                                                                                                                                                              | Resolution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |         |     |                              |           |      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------|-----|------------------------------|-----------|------|
| <p>An older <code>elxfc</code> (SVR4-style) package is installed on a system that is already running a different package version installed with IPS/p5p.</p> <p><b>NOTE</b> See <a href="#">Section 2.1.1, FCoE Out-of-Box Driver (elxfc)</a> for older installation instructions.</p> | <p>Confirm that the IPS and SVR4 packages differ. If so, remove the SVR4 package.</p> <ol style="list-style-type: none"><li>View the IPS data to confirm that the versions do not match. Type<br/><pre>\$ pkg list elxfc</pre><p>The system displays the following:</p><table><thead><tr><th>NAME (PUBLISHER)</th><th>VERSION</th><th>IFO</th></tr></thead><tbody><tr><td>driver/network/elxfc emulex)</td><td>version_1</td><td>i--3</td></tr></tbody></table></li><li>View the version number for the loaded module. Type<br/><pre>\$ modinfo grep elxfc</pre><p>The system displays</p><pre>178 ffffffff7ee5000 e4ce8 40 1 elxfc (elxfc FCA version_2)</pre></li><li>After confirming that the versions do not match, type<br/><pre>\$ pkg uninstall elxfc</pre></li><li>Reboot the system.</li><li>Proceed with the p5p or remote repository <code>elxfc</code> driver installation. See <a href="#">Section 2.3.1, FCoE Out-of-Box Driver (elxfc)</a>.</li></ol> | NAME (PUBLISHER) | VERSION | IFO | driver/network/elxfc emulex) | version_1 | i--3 |
| NAME (PUBLISHER)                                                                                                                                                                                                                                                                       | VERSION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | IFO              |         |     |                              |           |      |
| driver/network/elxfc emulex)                                                                                                                                                                                                                                                           | version_1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | i--3             |         |     |                              |           |      |

**NOTE** If an `elxfc` IPS package is installed and then removed using the older SVR4 method, inconsistencies may develop that could affect re-installing or upgrading the driver. IPS packages should be installed only after removing older (SVR4) packages.

## Chapter 7: FCoE Driver Console and Log Messages

This chapter describes the situations, console messages, and log messages you may see from the FCoE driver.

### 7.1 Setting Notices, Warnings, and Error Logging Levels

The following table lists the types of notices, warnings, and error logging levels you may set using the appropriate FCoE driver parameters.

**Table 1 Setting Types of Console and Log Messages for the FCoE Driver**

| elxfc Parameter  | Description                                                                                                                                        | lpfc Parameter                                                                                                               |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| console-notices  | Verbose mask for driver error messages to the console.<br>Possible values are 0x00000000 to 0xFFFFFFFF.<br>The default value is 0x00000000         | log-only: if set to 0, log messages are logged to the system log file and also printed on the console.<br>Default = Disabled |
| console-warnings | Verbose mask for driver notice messages to the console.<br>Possible values are 0x00000000 to 0xFFFFFFFF.<br>The default value is 0x00000000        |                                                                                                                              |
| console-errors   | Verbose mask for driver warning messages to the console.<br>Possible values are 0x00000000 to 0xFFFFFFFF.<br>The default value is 0x00000000       |                                                                                                                              |
| log-notices      | Verbose mask for driver error messages to the messages file.<br>Possible values are 0x00000000 to 0xFFFFFFFF.<br>The default value is 0xFFFFFFFF.  | log-verbose: if set to non-zero, verbose messages are generated.<br>Default = Disabled                                       |
| log-warnings     | Verbose mask for driver notice messages to the messages file.<br>Possible values are 0x00000000 to 0xFFFFFFFF.<br>The default value is 0xFFFFFFFF. |                                                                                                                              |
| log-errors       | Verbose mask for driver warning messages to the messages file. Possible values are 0x00000000 to 0xFFFFFFFF.<br>The default value is 0xFFFFFFFF.   |                                                                                                                              |

### 7.2 Log Messages

#### 7.2.1 Types of Log Messages Logged in the System File

Log messages are logged to the `/var/adm/messages` system file. The following table lists the types of log messages that can be logged to the system file.

**Table 2 Log Message Types for the FCoE Driver**

| Verbose Bit | Log Message Verbose Mask | Verbose Description             | Pages                    |
|-------------|--------------------------|---------------------------------|--------------------------|
| 0x00000001  | LOG_MISC                 | Miscellaneous events            | <a href="#">31 to 32</a> |
| 0x00000002  | LOG_DRIVER               | Driver attach and detach events | <a href="#">32 to 33</a> |
| 0x00000004  | LOG_INIT                 | Adapter initialization events   | <a href="#">34 to 34</a> |
| 0x00000008  | LOG_MEM                  | Memory management events        | <a href="#">35 to 36</a> |
| 0x00000010  | LOG_SLI                  | SLI events                      | <a href="#">36 to 39</a> |

**Table 2 Log Message Types for the FCoE Driver (Continued)**

| Verbose Bit | Log Message Verbose Mask | Verbose Description         | Pages    |
|-------------|--------------------------|-----------------------------|----------|
| 0x00000020  | LOG_MBOX                 | Mailbox events              | 39 to 39 |
| 0x00000040  | LOG_NODE                 | Node events                 | 40 to 41 |
| 0x00000080  | LOG_LINK                 | Link events                 | 41 to 42 |
| 0x00000100  | LOG_ELS                  | ELS events                  | 42 to 43 |
| 0x00000200  | LOG_PKT                  | General I/O packet events   | 43 to 44 |
| 0x00000400  | LOG_FCP                  | FCP traffic events          | 45       |
| 0x00001000  | LOG_IP                   | IP traffic events           | 45 to 46 |
| 0x00002000  | LOG_SFS                  | Solaris SFS events          | 46 to 47 |
| 0x00004000  | LOG_IOCTL                | IOCTL events                | 47 to 48 |
| 0x00008000  | LOG_FIRMWARE             | Firmware download events    | 48 to 49 |
| 0x00010000  | LOG_CT                   | Common transport events     | 50 to 50 |
| 0x00020000  | LOG_FCSP                 | FCSP events                 | 51 to 52 |
| 0x00040000  | LOG_FCF                  | FCF events                  | 52 to 52 |
| 0x007C0000  | LOG_RESERVED             | Reserved                    | -        |
| 0x01000000  | LOG_FCSP_DETAIL          | Detailed FCSP events        | 51       |
| 0x02000000  | LOG_NODE_DETAIL          | Detailed node events        | 40, 40   |
| 0x04000000  | LOG_IOCTL_DETAIL         | Detailed IOCTL events       | 47, 48   |
| 0x08000000  | LOG_IP_DETAIL            | Detailed IP events          | 45       |
| 0x10000000  | LOG_FIRMWARE_DETAIL      | Detailed firmware events    | 48       |
| 0x20000000  | LOG_SFS_DETAIL           | Detailed Solaris SFS events | 46       |
| 0x40000000  | LOG_MBOX_DETAIL          | Detailed mailbox events     | 39       |
| 0x80000000  | LOG_SLI_DETAIL           | Detailed adapter SLI events | 39       |
| 0xFFFFFFFF  | LOG_ALL_MSG              | All logging on all events   | -        |

## 7.2.2 Log Message Severity Levels

The following table lists the severity type of the FCoE driver log message in the order of severity.

**Table 3 Severity Levels of FCoE Driver Log Messages**

| Severity Level         | Description                                                           |
|------------------------|-----------------------------------------------------------------------|
| DEBUG (Informational)  | Message provides engineering debugging information.                   |
| NOTICE (Informational) | Message provides general purpose information.                         |
| WARNING                | Message provides a general purpose warning.                           |
| ERROR                  | Message indicates that a driver error has occurred.                   |
| PANIC (Severe)         | Message indicates that the driver has forced a system panic to occur. |

## 7.2.3 Log Message Example

The following is an example of a log message on the system console:

```
[5.0336]elxfco: NOTICE: 720: Link up. (8Gb, fabric)
```

---

The following is an example of the same message in the system message log (/var/adm/messages) file:

```
Jan 19 14:45:36 sunv240 elxfc: [ID 349649 kern.info] [5.0336]elxfc0:
NOTICE: 720: Link up. (8Gb, fabric)
```

In the above system log message:

- Jan 19 14:45:36 – the date and time when the error or event occurred.
- sunv240 – the name of the host machine.
- elxfc: – the module where the message originates. In this case, elxfc means that it is from Broadcom Emulex SFS FCA out-of-box driver.
- [ID 349649 kern.info] – a Solaris-specific message ID and kernel message level. This changes from one driver message to another.
- [5.0336] – the driver message context tag. This may change from one driver version to another.
- elxfc0: – the module or instance where the message originates. In this case, elxfc0 means that it is from Broadcom Emulex SFS FCA out-of-box driver, instance of 0. This changes from one driver instance to another.
- NOTICE: – identifies the driver message severity level. This may change from one driver version to another. For other severity information, see [Table 3, Severity Levels of FCoE Driver Log Messages](#).
- 720: – identifies the driver message identification number. This number does change from one driver version to another.
- Link up. – identifies the actual error or event message. This message does not change from one driver version to another.
- (8 Gbps, fabric) – identifies additional information specific to the error or event message. This information is normally intended for technical support. This may change from one driver version to another.

## 7.3 Log Messages for the FCoE Driver

### 7.3.1 Miscellaneous Events (Message IDs: 0001 to 0099)

#### 0001 DEBUG:

```
VERBOSE_MASK: LOG_MISC (0x00000001)
DESCRIPTION: This is a general purpose informational message.
SEVERITY LEVEL: Debug
MESSAGE: None
ACTION: No action needed, informational.
```

#### 0002 NOTICE:

```
VERBOSE_MASK: LOG_MISC (0x00000001)
DESCRIPTION: This is a general purpose informational message.
SEVERITY LEVEL: Notice
MESSAGE: None
ACTION: No action needed, informational.
```

#### 0003 WARNING:

```
VERBOSE_MASK: LOG_MISC (0x00000001)
DESCRIPTION: This is a general purpose warning message.
SEVERITY LEVEL: Warning
MESSAGE: None
ACTION: No action needed, informational.
```

#### 0004 ERROR:

```
VERBOSE_MASK: LOG_MISC (0x00000001)
DESCRIPTION: This is a general purpose error message.
SEVERITY LEVEL: Error
```

---

MESSAGE: None  
ACTION: No action needed, informational.

**0005 PANIC:**  
VERBOSE\_MASK: LOG\_MISC (0x00000001)  
DESCRIPTION: This is a general purpose panic message.  
SEVERITY LEVEL: Panic (Severe)  
MESSAGE: None  
ACTION: Contact your customer service representative.

**0010 DEBUG: Event.**  
VERBOSE\_MASK: LOG\_MISC (0x00000001)  
DESCRIPTION: This is debug information about a driver event.  
SEVERITY LEVEL: Debug  
MESSAGE: Event.  
ACTION: No action needed, informational.

**0011 DEBUG: Event queued.**  
VERBOSE\_MASK: LOG\_MISC (0x00000001)  
DESCRIPTION: This indicates that a driver event is being queued.  
SEVERITY LEVEL: Debug  
MESSAGE: Event queued.  
ACTION: No action needed, informational.

**0012 DEBUG: Event dequeued.**  
VERBOSE\_MASK: LOG\_MISC (0x00000001)  
DESCRIPTION: This indicates that a driver event is being dequeued.  
SEVERITY LEVEL: Debug  
MESSAGE: Event dequeued.  
ACTION: No action needed, informational.

### 7.3.2 Driver Events (Message IDs: 0100 to 0199)

**0100 NOTICE: Driver attach.**  
VERBOSE\_MASK: LOG\_DRIVER (0x00000002)  
DESCRIPTION: This indicates that the driver is performing an attach operation.  
SEVERITY LEVEL: Notice  
MESSAGE: Driver attach.  
ACTION: No action needed, informational.

**0101 ERROR: Driver attach failed.**  
VERBOSE\_MASK: LOG\_DRIVER (0x00000002)  
DESCRIPTION: This indicates that the driver was unable to attach due to some issue.  
SEVERITY LEVEL: Error  
MESSAGE: Driver attach failed.  
ACTION: Check your hardware and software configuration. If the problem persists, report this error to your customer service representative.

**0102 DEBUG: Driver attach.**  
VERBOSE\_MASK: LOG\_DRIVER (0x00000002)  
DESCRIPTION: This indicates that the driver is performing a attach operation.  
SEVERITY LEVEL: Debug  
MESSAGE: Driver attach.  
ACTION: No action needed, informational.

**0110 NOTICE: Driver detach.**  
VERBOSE\_MASK: LOG\_DRIVER (0x00000002)



- 
- DESCRIPTION: This indicates that the driver is performing a detach operation.  
SEVERITY LEVEL: Notice  
MESSAGE: Driver detach.  
ACTION: No action needed, informational.
- 0111 ERROR: Driver detach failed.**  
VERBOSE\_MASK: LOG\_DRIVER (0x00000002)  
DESCRIPTION: This indicates that the driver was unable to detach due to some issue.  
SEVERITY LEVEL: Error  
MESSAGE: Driver detach failed.  
ACTION: Check your hardware and software configuration. If the problem persists, report this error to your customer service representative.
- 0112 DEBUG: Driver detach.**  
VERBOSE\_MASK: LOG\_DRIVER (0x00000002)  
DESCRIPTION: This indicates that the driver is performing a detach operation.  
SEVERITY LEVEL: Debug  
MESSAGE: Driver detach.  
ACTION: No action needed, informational.
- 0120 DEBUG: Driver suspend.**  
VERBOSE\_MASK: LOG\_DRIVER (0x00000002)  
DESCRIPTION: This indicates that the driver is performing a suspend operation.  
SEVERITY LEVEL: Debug  
MESSAGE: Driver suspend.  
ACTION: No action needed, informational.
- 0121 ERROR: Driver suspend failed.**  
VERBOSE\_MASK: LOG\_DRIVER (0x00000002)  
DESCRIPTION: This indicates that the driver was unable to suspend due to some issue.  
SEVERITY LEVEL: Error  
MESSAGE: Driver suspend failed.  
ACTION: Check your hardware and software configuration. If the problem persists, report this error to your customer service representative.
- 0130 DEBUG: Driver resume.**  
VERBOSE\_MASK: LOG\_DRIVER (0x00000002)  
DESCRIPTION: This indicates that the driver is performing a resume operation.  
SEVERITY LEVEL: Debug  
MESSAGE: Driver resume.  
ACTION: No action needed, informational.
- 0131 ERROR: Driver resume failed.**  
VERBOSE\_MASK: LOG\_DRIVER (0x00000002)  
DESCRIPTION: This indicates that the driver was unable to resume due to some issue.  
SEVERITY LEVEL: Error  
MESSAGE: Driver resume failed.  
ACTION: Check your hardware and software configuration. If the problem persists, report this error to your customer service representative.
-

---

### 7.3.3 Adapter Initialization Events (Message IDs: 0200 to 0299)

- 0200 NOTICE: Adapter initialization.**  
VERBOSE\_MASK: LOG\_INIT (0x00000004)  
DESCRIPTION: This indicates that the adapter is initializing.  
SEVERITY LEVEL: Notice  
MESSAGE: Adapter initialization.  
ACTION: No action needed, informational.
- 0201 ERROR: Adapter initialization failed.**  
VERBOSE\_MASK: LOG\_INIT (0x00000004)  
DESCRIPTION: This indicates that an attempt to initialize the adapter has failed.  
SEVERITY LEVEL: Error  
MESSAGE: Adapter initialization failed.  
ACTION: Check your hardware configuration. If the problem persists, report this error to your customer service representative.
- 0202 DEBUG: Adapter initialization.**  
VERBOSE\_MASK: LOG\_INIT (0x00000004)  
DESCRIPTION: This indicates that the adapter is initializing.  
SEVERITY LEVEL: Debug  
MESSAGE: Adapter initialization.  
ACTION: No action needed, informational.
- 0210 DEBUG: Adapter transition.**  
VERBOSE\_MASK: LOG\_INIT (0x00000004)  
DESCRIPTION: This indicates that the adapter is changing states.  
SEVERITY LEVEL: Debug  
MESSAGE: Adapter transition.  
ACTION: No action needed, informational.
- 0220 DEBUG: Adapter online.**  
VERBOSE\_MASK: LOG\_INIT (0x00000004)  
DESCRIPTION: This indicates that the adapter is online and ready to communicate.  
SEVERITY LEVEL: Debug  
MESSAGE: Adapter online.  
ACTION: No action needed, informational.
- 0230 DEBUG: Adapter offline.**  
VERBOSE\_MASK: LOG\_INIT (0x00000004)  
DESCRIPTION: This indicates that the adapter is offline and unable to communicate.  
SEVERITY LEVEL: Debug  
MESSAGE: Adapter offline.  
ACTION: No action needed, informational.
- 0231 WARNING: Adapter shutdown.**  
VERBOSE\_MASK: LOG\_INIT (0x00000004)  
DESCRIPTION: This indicates that the adapter has been shutdown and will require a reboot to reinitialize.  
SEVERITY LEVEL: Warning  
MESSAGE: Adapter shutdown.  
ACTION: Contact your customer service representative.
- 0240 ERROR: Adapter reset failed.**  
VERBOSE\_MASK: LOG\_INIT (0x00000004)  
DESCRIPTION: This indicates that an attempt to reset the adapter has failed.  
SEVERITY LEVEL: Error

---

MESSAGE: Adapter reset failed.  
ACTION: Check your hardware configuration. If the problem persists, report this error to your customer service representative.

### 7.3.4 Memory Management Events (Message IDs: 0300 to 0399)

**0300 DEBUG: Memory alloc.**

VERBOSE\_MASK: LOG\_MEM (0x00000008)  
DESCRIPTION: This indicates that the driver allocated system memory.  
SEVERITY LEVEL: Debug  
MESSAGE: Memory alloc.  
ACTION: No action needed, informational.

**0301 ERROR: Memory alloc failed.**

VERBOSE\_MASK: LOG\_MEM (0x00000008)  
DESCRIPTION: This indicates that the driver was unable to allocate system memory. The system is low on memory resources.  
SEVERITY LEVEL: Error  
MESSAGE: Memory alloc failed.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your system administrator.

**0310 ERROR: Memory pool error.**

VERBOSE\_MASK: LOG\_MEM (0x00000008)  
DESCRIPTION: This indicates that a problem has occurred with the memory buffer pool management.  
SEVERITY LEVEL: Error  
MESSAGE: Memory pool error.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

**0311 DEBUG: Memory pool alloc failed.**

VERBOSE\_MASK: LOG\_MEM (0x00000008)  
DESCRIPTION: This indicates that the driver was unable to allocate memory from one of its own memory pools.  
SEVERITY LEVEL: Debug  
MESSAGE: Memory pool alloc failed.  
ACTION: If the problem occurs frequently you may be able to configure more resources for that pool. If this does not solve the problem, report these errors to customer service.

**0312 DEBUG: Memory pool detail.**

VERBOSE\_MASK: LOG\_MEM (0x00000008)  
DESCRIPTION: This provides detailed information about memory bufferpool management.  
SEVERITY LEVEL: Debug  
MESSAGE: Memory pool detail.  
ACTION: No action needed, informational.

**0320 NOTICE: No unsolicited buffer available.**

VERBOSE\_MASK: LOG\_MEM (0x00000008)  
DESCRIPTION: This indicates that the driver's unsolicited buffer pool is exhausted. The I/O will be dropped and most likely retried by the remote device.  
SEVERITY LEVEL: Notice  
MESSAGE: No unsolicited buffer available.

---

ACTION: If the problem occurs frequently you may be able to configure more resources for that pool. If this does not solve the problem, report these errors to customer service.

**0330 ERROR: Invalid access handle.**

VERBOSE\_MASK: LOG\_MEM (0x00000008)

DESCRIPTION: This indicates that the driver had an invalid access handle assigned by the system.

SEVERITY LEVEL: Error

MESSAGE: Invalid access handle.

ACTION: If the problem occurs frequently, report these errors to customer service.

**0331 ERROR: Invalid DMA handle.**

VERBOSE\_MASK: LOG\_MEM (0x00000008)

DESCRIPTION: This indicates that the driver had an invalid dma handle assigned by the system.

SEVERITY LEVEL: Error

MESSAGE: Invalid DMA handle.

ACTION: If the problem occurs frequently, report these errors to customer service.

### 7.3.5 Service Level Interface Events (Message IDs: 0400 to 0499)

**0400 DEBUG: Vital Product Data.**

VERBOSE\_MASK: LOG\_SLI (0x00000010)

DESCRIPTION: This provides vendor specific information about the adapter.

SEVERITY LEVEL: Debug

MESSAGE: Vital Product Data.

ACTION: No action needed, informational.

**0410 DEBUG: Link atten.**

VERBOSE\_MASK: LOG\_SLI (0x00000010)

DESCRIPTION: This indicates that the adapter has triggered a link attention interrupt.

SEVERITY LEVEL: Debug

MESSAGE: Link atten.

ACTION: No action needed, informational.

**0411 DEBUG: State change.**

VERBOSE\_MASK: LOG\_SLI (0x00000010)

DESCRIPTION: This indicates that the adapter has changed state.

SEVERITY LEVEL: Debug

MESSAGE: State change.

ACTION: No action needed, informational.

**0412 DEBUG: Link Up atten.**

VERBOSE\_MASK: LOG\_SLI (0x00000010)

DESCRIPTION: This indicates that the adapter has triggered a link up attention interrupt.

SEVERITY LEVEL: Debug

MESSAGE: Link Up atten.

ACTION: No action needed, informational.

**0413 DEBUG: Link Down atten.**

VERBOSE\_MASK: LOG\_SLI (0x00000010)

DESCRIPTION: This indicates that the adapter has triggered a link down attention interrupt.

SEVERITY LEVEL: Debug

- 
- MESSAGE: Link Down atten.  
ACTION: No action needed, informational.
- 0420 ERROR: Adapter hardware error.**  
VERBOSE\_MASK: LOG\_SLI (0x00000010)  
DESCRIPTION: This indicates that an interrupt has occurred and the status register indicates a nonrecoverable hardware error.  
SEVERITY LEVEL: Error  
MESSAGE: Adapter hardware error.  
ACTION: This error usually indicates a hardware problem with the adapter. Try running adapter diagnostics. Report these errors to customer service.
- 0421 NOTICE: Adapter temperature.**  
VERBOSE\_MASK: LOG\_SLI (0x00000010)  
DESCRIPTION: This indicates that the adapter has provided general information about the adapter's temperature.  
SEVERITY LEVEL: Notice  
MESSAGE: Adapter temperature.  
ACTION: No action needed, informational.
- 0422 WARNING: Adapter temperature.**  
VERBOSE\_MASK: LOG\_SLI (0x00000010)  
DESCRIPTION: This indicates that the adapter's temperature is too hot.  
SEVERITY LEVEL: Warning  
MESSAGE: Adapter temperature.  
ACTION: Check hardware ventilation. Reduce adapter usage. Shutdown host system.
- 0423 NOTICE: Adapter notice.**  
VERBOSE\_MASK: LOG\_SLI (0x00000010)  
DESCRIPTION: This indicates that the adapter has provided general information about the adapter's condition.  
SEVERITY LEVEL: Notice  
MESSAGE: Adapter notice.  
ACTION: No action needed, informational.
- 0424 WARNING: Adapter warning.**  
VERBOSE\_MASK: LOG\_SLI (0x00000010)  
DESCRIPTION: This indicates that an interrupt has occurred indicating a recoverable adapter error.  
SEVERITY LEVEL: Warning  
MESSAGE: Adapter warning.  
ACTION: This error usually indicates a hardware or firmware problem with the adapter. Check and/or update firmware levels. Report these errors to customer service.
- 0425 ERROR: Adapter error.**  
VERBOSE\_MASK: LOG\_SLI (0x00000010)  
DESCRIPTION: This indicates that a recoverable adapter error has occurred.  
SEVERITY LEVEL: Error  
MESSAGE: Adapter error.  
ACTION: This error usually indicates a hardware or firmware problem with the adapter. Check and/or update firmware levels. Report these errors to customer service.
- 0426 NOTICE: Adapter Async Status.**  
VERBOSE\_MASK: LOG\_SLI (0x00000010)  
DESCRIPTION: This indicates that the adapter has provided general information about the adapter's async status.  
SEVERITY LEVEL: Notice  
MESSAGE: Adapter Async Status.
-

- 
- ACTION: No action needed, informational.
- 0430 DEBUG: Ring event.**  
VERBOSE\_MASK: LOG\_SLI (0x00000010)  
DESCRIPTION: This indicates that an SLI ring event has occurred.  
SEVERITY LEVEL: Debug  
MESSAGE: Ring event.  
ACTION: No action needed, informational.
- 0431 DEBUG: Ring error.**  
VERBOSE\_MASK: LOG\_SLI (0x00000010)  
DESCRIPTION: This indicates that an SLI ring error is being reported by the adapter.  
SEVERITY LEVEL: Debug  
MESSAGE: Ring error.  
ACTION: No action needed, informational.
- 0432 DEBUG: Ring reset.**  
VERBOSE\_MASK: LOG\_SLI (0x00000010)  
DESCRIPTION: This indicates that an SLI ring is being reset.  
SEVERITY LEVEL: Debug  
MESSAGE: Ring reset.  
ACTION: No action needed, informational.
- 0440 DEBUG: Adapter msg.**  
VERBOSE\_MASK: LOG\_SLI (0x00000010)  
DESCRIPTION: This indicates that a message was sent to the driver from the adapter.  
SEVERITY LEVEL: Debug  
MESSAGE: Adapter msg.  
ACTION: No action needed, informational.
- 0450 ERROR: IOCB invalid.**  
VERBOSE\_MASK: LOG\_SLI (0x00000010)  
DESCRIPTION: This indicates that an IOCB was received from the adapter with an illegal value. This error could indicate a driver or firmware problem.  
SEVERITY LEVEL: Error  
MESSAGE: IOCB invalid.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.
- 0451 DEBUG: IOCB queue full.**  
VERBOSE\_MASK: LOG\_SLI (0x00000010)  
DESCRIPTION: This indicates that the IOCB queue is full. This will occur during normal operation.  
SEVERITY LEVEL: Debug  
MESSAGE: IOCB queue full.  
ACTION: No action needed, informational.
- 0452 DEBUG: IOCB event.**  
VERBOSE\_MASK: LOG\_SLI (0x00000010)  
DESCRIPTION: This indicates that an IOCB local error event is being reported by the adapter.  
SEVERITY LEVEL: Debug  
MESSAGE: IOCB event.  
ACTION: No action needed, informational.
- 0453 DEBUG: IOCB stale.**  
VERBOSE\_MASK: LOG\_SLI (0x00000010)  
DESCRIPTION: This indicates that an IOCB completed after its associated packet completed.  
SEVERITY LEVEL: Debug
-

---

MESSAGE: IOCB stale.  
ACTION: No action needed, informational.

**0460 DEBUG: SLI.**  
VERBOSE\_MASK: LOG\_SLI\_DETAIL (0x80000000)  
DESCRIPTION: This provides detailed information about an SLI event.  
SEVERITY LEVEL: Debug  
MESSAGE: SLI detail.  
ACTION: No action needed, informational.

**0461 ERROR: SLI ERROR.**  
VERBOSE\_MASK: LOG\_SLI (0x00000010)  
DESCRIPTION: This error provides information about an SLI event.  
SEVERITY LEVEL: Error  
MESSAGE: SLI ERROR.  
ACTION: No action needed, informational.

**0462 DEBUG: SLI DEBUG.**  
VERBOSE\_MASK: LOG\_SLI (0x00000010)  
DESCRIPTION: This provides debug information about an SLI event.  
SEVERITY LEVEL: Debug  
MESSAGE: SLI DEBUG.  
ACTION: No action needed, informational.

### 7.3.6 Mailbox Events (Message IDs: 0500 to 0599)

**0500 DEBUG: Mailbox event.**  
VERBOSE\_MASK: LOG\_MBOX (0x00000020)  
DESCRIPTION: This indicates that a mailbox event has occurred.  
SEVERITY LEVEL: Debug  
MESSAGE: Mailbox event.  
ACTION: No action needed, informational.

**0501 DEBUG: Mailbox detail.**  
VERBOSE\_MASK: LOG\_MBOX\_DETAIL (0x40000000)  
DESCRIPTION: This provides detailed information about a mailbox event.  
SEVERITY LEVEL: Debug  
MESSAGE: Mailbox detail.  
ACTION: No action needed, informational.

**0510 DEBUG: Stray mailbox interrupt.**  
VERBOSE\_MASK: LOG\_MBOX (0x00000020)  
DESCRIPTION: This indicates that a mailbox command completion interrupt was received and the mailbox is not valid. This error could indicate a driver or firmware problem.  
SEVERITY LEVEL: Debug  
MESSAGE: Stray mailbox interrupt.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

**0520 DEBUG: Mailbox error.**  
VERBOSE\_MASK: LOG\_MBOX (0x00000020)  
DESCRIPTION: This indicates that an unsupported or illegal mailbox command was completed. This error could indicate a driver or firmware problem.  
SEVERITY LEVEL: Debug  
MESSAGE: Mailbox error.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

**0530 ERROR: Mailbox timeout.**

---

VERBOSE\_MASK: LOG\_MBOX (0x00000020)  
DESCRIPTION: The firmware did not response a mailbox command. This error could indicate a hardware or firmware problem.  
SEVERITY LEVEL: Error  
MESSAGE: Mailbox timeout.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

### 7.3.7 Node Events (Message IDs: 0600 to 0699)

**0600 DEBUG: Node create.**

VERBOSE\_MASK: LOG\_NODE (0x00000040)  
DESCRIPTION: This indicates that a node has been created for a remote device.  
SEVERITY LEVEL: Debug  
MESSAGE: Node create.  
ACTION: No action needed, informational.

**0601 DEBUG: Node opened.**

VERBOSE\_MASK: LOG\_NODE\_DETAIL (0x02000000)  
DESCRIPTION: This indicates that a node has been opened for I/O transport.  
SEVERITY LEVEL: Debug  
MESSAGE: Node opened.  
ACTION: No action needed, informational.

**0602 NOTICE: Node create failed.**

VERBOSE\_MASK: LOG\_NODE (0x00000040)  
DESCRIPTION: This indicates that a node create request for a remote device has failed.  
SEVERITY LEVEL: Notice  
MESSAGE: Node create failed.  
ACTION: No action needed, informational.

**0603 DEBUG: Node updated.**

VERBOSE\_MASK: LOG\_NODE (0x00000040)  
DESCRIPTION: This indicates that a node has been updated for a remote device.  
SEVERITY LEVEL: Debug  
MESSAGE: Node updated.  
ACTION: No action needed, informational.

**0610 DEBUG: Node destroy.**

VERBOSE\_MASK: LOG\_NODE (0x00000040)  
DESCRIPTION: This indicates that a node has been destroyed for a remote device.  
SEVERITY LEVEL: Debug  
MESSAGE: Node destroy.  
ACTION: No action needed, informational.

**0611 DEBUG: Node closed.**

VERBOSE\_MASK: LOG\_NODE\_DETAIL (0x02000000)  
DESCRIPTION: This indicates that a node has been temporarily closed for I/O transport.  
SEVERITY LEVEL: Debug  
MESSAGE: Node closed.  
ACTION: No action needed, informational.

**0612 NOTICE: Node missing.**

VERBOSE\_MASK: LOG\_NODE (0x00000040)



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DESCRIPTION: This indicates that a FCP2 device node has been found missing.  
SEVERITY LEVEL: Notice  
MESSAGE: Node missing.  
ACTION: No action needed, informational.

**0620 DEBUG: Node not found.**  
VERBOSE\_MASK: LOG\_NODE (0x00000040)  
DESCRIPTION: This indicates that there was an attempt to send an I/O pkt to an unknown device node. The driver maintains a node table entry for every device it needs to communicate with on the FC network.  
SEVERITY LEVEL: Debug  
MESSAGE: Node not found.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

**0621 DEBUG: Node timeout.**  
VERBOSE\_MASK: LOG\_NODE (0x00000040)  
DESCRIPTION: This indicates that the node timer expired; the node is ready to be opened, or it has been offline too long and needs to be flushed.  
SEVERITY LEVEL: Debug  
MESSAGE: Node timeout.  
ACTION: No action needed, informational.

### 7.3.8 Link Events (Message IDs: 0700 to 0799)

**0700 DEBUG: Link event.**  
VERBOSE\_MASK: LOG\_SLI (0x00000010) or LOG\_LINK (0x00000080)  
DESCRIPTION: This indicates that a link event has occurred.  
SEVERITY LEVEL: Debug  
MESSAGE: Link event.  
ACTION: No action needed, informational.

**0710 NOTICE: Link down.**  
VERBOSE\_MASK: LOG\_LINK (0x00000080)  
DESCRIPTION: This indicates that the Fibre Channel link is down to the adapter.  
SEVERITY LEVEL: Notice  
MESSAGE: Link down.  
ACTION: Check your network connections. If the problem persists, report this error to your system administrator.

**0720 NOTICE: Link up.**  
VERBOSE\_MASK: LOG\_LINK (0x00000080)  
DESCRIPTION: This indicates that the Fibre Channel link is up.  
SEVERITY LEVEL: Notice  
MESSAGE: Link up.  
ACTION: No action needed, informational.

**0721 NOTICE: NPIV Link up.**  
VERBOSE\_MASK: LOG\_LINK (0x00000080)  
DESCRIPTION: This indicates that the Fibre Channel link is up for all virtual ports.  
SEVERITY LEVEL: Notice  
MESSAGE: NPIV Link up.  
ACTION: No action needed, informational.

**0730 NOTICE: Link reset.**  
VERBOSE\_MASK: LOG\_LINK (0x00000080) or LOG\_SFS (0x00002000)

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DESCRIPTION: This indicates that an issue has forced the Fibre Channel link to be reset.  
SEVERITY LEVEL: Notice  
MESSAGE: Link reset.  
ACTION: No action needed, informational.

**0731 ERROR: Link reset failed.**

VERBOSE\_MASK: LOG\_LINK (0x00000080) or LOG\_SFS (0x00002000)  
DESCRIPTION: This indicates that an attempt to reset the Fibre Channel link has failed.  
SEVERITY LEVEL: Error  
MESSAGE: Link reset failed.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

### 7.3.9 ELS Events (Message IDs: 0800 to 0899)

**0800 DEBUG: ELS sent.**

VERBOSE\_MASK: LOG\_ELS (0x00000100)  
DESCRIPTION: This indicates that an ELS command is being sent.  
SEVERITY LEVEL: Debug  
MESSAGE: ELS sent.  
ACTION: No action needed, informational.

**0801 DEBUG: ELS comp.**

VERBOSE\_MASK: LOG\_ELS (0x00000100)  
DESCRIPTION: This indicates that an ELS command completed normally.  
SEVERITY LEVEL: Debug  
MESSAGE: ELS comp.  
ACTION: No action needed, informational.

**0810 ERROR: Stray ELS completion.**

VERBOSE\_MASK: LOG\_ELS (0x00000100)  
DESCRIPTION: This indicates that an ELS command completion was received without issuing a corresponding ELS command. This error could indicate a driver or firmware problem.  
SEVERITY LEVEL: Error  
MESSAGE: Stray ELS completion.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

**0811 DEBUG: Abnormal ELS completion.**

VERBOSE\_MASK: LOG\_ELS (0x00000100)  
DESCRIPTION: This indicates that an ELS command completed with a status error in the IOCB. It could mean the Fibre Channel device on the network is not responding or the Fibre Channel device is not an FCP target. The driver will automatically  
SEVERITY LEVEL: Debug  
MESSAGE: Abnormal ELS completion.  
ACTION: retry this ELS command if needed. If the command is a PLOGI or PRLI, and the destination PortID is not an FCP Target, no action is needed. Otherwise, check physical connections to Fibre Channel network and the state the remote PortID is in.

**0820 DEBUG: ELS rcvd.**

VERBOSE\_MASK: LOG\_ELS (0x00000100)  
DESCRIPTION: This indicates that an unsolicited ELS command was received.  
SEVERITY LEVEL: Debug

---

MESSAGE: ELS rcvd.  
ACTION: No action needed, informational.

**0821 DEBUG: Unsolicited ELS dropped.**  
VERBOSE\_MASK: LOG\_ELS (0x00000100)  
DESCRIPTION: This indicates that an unsolicited ELS command was received and then dropped for some reason.  
SEVERITY LEVEL: Debug  
MESSAGE: Unsolicited ELS dropped.  
ACTION: No action needed, informational.

**0822 DEBUG: ELS reply.**  
VERBOSE\_MASK: LOG\_ELS (0x00000100)  
DESCRIPTION: This indicates that a reply is being sent for an unsolicited ELS command.  
SEVERITY LEVEL: Debug  
MESSAGE: ELS reply.  
ACTION: No action needed, informational.

**0830 ERROR: Invalid ELS command found.**  
VERBOSE\_MASK: LOG\_ELS (0x00000100)  
DESCRIPTION: This indicates that an ELS command was found with an invalid command code.  
SEVERITY LEVEL: Error  
MESSAGE: Invalid ELS command found.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

### 7.3.10 General I/O Packet Events (Message IDs: 0900 to 0999)

**0900 NOTICE: Packet abort.**  
VERBOSE\_MASK: LOG\_PKT (0x00000200)  
DESCRIPTION: This indicates that an I/O packet is being aborted.  
SEVERITY LEVEL: Notice  
MESSAGE: Packet abort.  
ACTION: No action needed, informational.

**0901 WARNING: Packet abort failed.**  
VERBOSE\_MASK: LOG\_PKT (0x00000200)  
DESCRIPTION: This indicates that an attempt to abort an I/O packet has failed.  
SEVERITY LEVEL: Warning  
MESSAGE: Packet abort failed.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

**0910 DEBUG: Packet timeout.**  
VERBOSE\_MASK: LOG\_PKT (0x00000200)  
DESCRIPTION: This indicates that an I/O packet has timed out and is being aborted.  
SEVERITY LEVEL: Debug  
MESSAGE: Packet timeout.  
ACTION: No action needed, informational.

**0911 DEBUG: CHANNEL watchdog.**  
VERBOSE\_MASK: LOG\_PKT (0x00000200)  
DESCRIPTION: This indicates that I/O(s) are getting stale waiting on a I/O channel tx queue.  
SEVERITY LEVEL: Debug

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- MESSAGE: CHANNEL watchdog.  
ACTION: No action needed, informational.
- 0912 DEBUG: TXQ watchdog.**  
VERBOSE\_MASK: LOG\_PKT (0x00000200)  
DESCRIPTION: This indicates that an I/O was found missing from the transmit queue.  
SEVERITY LEVEL: Debug  
MESSAGE: TXQ watchdog.  
ACTION: No action needed, informational.
- 0920 DEBUG: Packet flush.**  
VERBOSE\_MASK: LOG\_PKT (0x00000200)  
DESCRIPTION: This indicates that an I/O packet is being flushed.  
SEVERITY LEVEL: Debug  
MESSAGE: Packet flush.  
ACTION: No action needed, informational.
- 0921 DEBUG: Packet flushed.**  
VERBOSE\_MASK: LOG\_PKT (0x00000200)  
DESCRIPTION: This indicates that an I/O packet has been flushed.  
SEVERITY LEVEL: Debug  
MESSAGE: Packet flushed.  
ACTION: No action needed, informational.
- 0922 NOTICE: Packet flush timeout.**  
VERBOSE\_MASK: LOG\_PKT (0x00000200)  
DESCRIPTION: This indicates that an I/O packet flush request has timed out with some I/O packets's still not completed. The driver will attempt to recover by itself.  
SEVERITY LEVEL: Notice  
MESSAGE: Packet flush timeout.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.
- 0930 NOTICE: Packet transport failed.**  
VERBOSE\_MASK: LOG\_PKT (0x00000200)  
DESCRIPTION: This indicates that an attempt to send an I/O packet failed. The I/O packet will be retried by the upper layer.  
SEVERITY LEVEL: Notice  
MESSAGE: Packet transport failed.  
ACTION: No action needed, informational.
- 0931 ERROR: Packet transport error.**  
VERBOSE\_MASK: LOG\_PKT (0x00000200)  
DESCRIPTION: This indicates that an error occurred while attempting to send an I/O packet. The I/O packet will likely be failed back to the user application.  
SEVERITY LEVEL: Error  
MESSAGE: Packet transport error.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.
- 0932 DEBUG: Packet transport.**  
VERBOSE\_MASK: LOG\_PKT (0x00000200)  
DESCRIPTION: This provides additional information about a packet being sent.  
SEVERITY LEVEL: Debug  
MESSAGE: Packet transport.  
ACTION: No action needed, informational.
- 0940 DEBUG: Packet completion error.**
-

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VERBOSE\_MASK: LOG\_PKT (0x00000200)  
DESCRIPTION: This indicates that an I/O packet was completed with an error status. This can occur during normal operation.  
SEVERITY LEVEL: Debug  
MESSAGE: Packet completion error.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

### 7.3.11 FCP Traffic Events (Message IDs: 1000 to 1099)

#### 1000 DEBUG: Stray FCP completion.

VERBOSE\_MASK: LOG\_FCP (0x00000400)  
DESCRIPTION: This indicates that an FCP command completion was received without issuing a corresponding FCP command. This error could indicate a driver or firmware problem.  
SEVERITY LEVEL: Debug  
MESSAGE: Stray FCP completion.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

#### 1001 DEBUG: FCP completion error.

VERBOSE\_MASK: LOG\_FCP (0x00000400)  
DESCRIPTION: This indicates that an FCP command completed with an error status. These errors can occur during normal operation.  
SEVERITY LEVEL: Debug  
MESSAGE: FCP completion error.  
ACTION: No action needed, informational.

### 7.3.12 IP Traffic Events (Message IDs: 1200 to 1299)

#### 1200 DEBUG: IP detail.

VERBOSE\_MASK: LOG\_IP\_DETAIL (0x08000000)  
DESCRIPTION: This provides detailed information about the driver's IP interface.  
SEVERITY LEVEL: Debug  
MESSAGE: IP detail.  
ACTION: No action needed, informational.

#### 1210 ERROR: Stray IP completion.

VERBOSE\_MASK: LOG\_IP (0x00001000)  
DESCRIPTION: This indicates that an IP sequence completion was received without issuing a corresponding IP sequence. This error could indicate a driver or firmware problem.  
SEVERITY LEVEL: Error  
MESSAGE: Stray IP completion.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

#### 1211 DEBUG: Abnormal IP completion.

VERBOSE\_MASK: LOG\_IP (0x00001000)  
DESCRIPTION: This indicates that an IP sequence completed with a status error in the IOCB. It could mean the Fibre Channel device on the network is not responding.  
SEVERITY LEVEL: Debug  
MESSAGE: Abnormal IP completion.

- 
- ACTION: No action needed, informational. However, if the problem persists, report this error to your system administrator.
- 1220 DEBUG: Unsolicited IP dropped.**  
VERBOSE\_MASK: LOG\_IP (0x00001000)  
DESCRIPTION: This indicates that an unsolicited IP sequence was received, but was dropped for some reason.  
SEVERITY LEVEL: Debug  
MESSAGE: Unsolicited IP dropped.  
ACTION: No action needed, informational.
- 1221 DEBUG: IP recvd.**  
VERBOSE\_MASK: LOG\_IP (0x00001000)  
DESCRIPTION: This indicates that an unsolicited IP sequence was received.  
SEVERITY LEVEL: Debug  
MESSAGE: IP recvd.  
ACTION: No action needed, informational.
- 1230 ERROR: Invalid IP sequence found.**  
VERBOSE\_MASK: LOG\_IP (0x00001000)  
DESCRIPTION: This indicates that an IP sequence was found with an invalid code.  
SEVERITY LEVEL: Error  
MESSAGE: Invalid IP sequence found.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

### 7.3.13 Solaris SFS Events (Message IDs: 1300 to 1399)

- 1300 DEBUG: SFS.**  
VERBOSE\_MASK: LOG\_SFS (0x00002000)  
DESCRIPTION: This provides general information about the driver's SFS interface.  
SEVERITY LEVEL: Debug  
MESSAGE: SFS.  
ACTION: No action needed, informational.
- 1301 DEBUG: SFS detail.**  
VERBOSE\_MASK: LOG\_SFS\_DETAIL (0x20000000)  
DESCRIPTION: This provides detailed information about the driver's SFS interface.  
SEVERITY LEVEL: Debug  
MESSAGE: SFS detail.  
ACTION: No action needed, informational.
- 1310 WARNING: Diagnostic error.**  
VERBOSE\_MASK: LOG\_SFS (0x00002000)  
DESCRIPTION: This indicates that a diagnostic request did not complete because of some issue.  
SEVERITY LEVEL: Warning  
MESSAGE: Diagnostic error.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.
- 1311 DEBUG: ECHO diagnostic completed.**  
VERBOSE\_MASK: LOG\_SFS (0x00002000)  
DESCRIPTION: This indicates that an ECHO diagnostic has completed.  
SEVERITY LEVEL: Debug  
MESSAGE: ECHO diagnostic completed.

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- ACTION: No action needed, informational.
- 1312 WARNING: ECHO diagnostic failed.**  
VERBOSE\_MASK: LOG\_SFS (0x00002000)  
DESCRIPTION: This indicates that an ECHO diagnostic has failed to return a positive result. This could indicate a connectivity problem with your FC network.  
SEVERITY LEVEL: Warning  
MESSAGE: ECHO diagnostic failed.  
ACTION: Check your network connections. If the problem persists, report this error to your system administrator.
- 1313 DEBUG: BIU diagnostic completed.**  
VERBOSE\_MASK: LOG\_SFS (0x00002000)  
DESCRIPTION: This indicates that a BIU diagnostic has completed.  
SEVERITY LEVEL: Debug  
MESSAGE: BIU diagnostic completed.  
ACTION: No action needed, informational.
- 1314 ERROR: BIU diagnostic failed.**  
VERBOSE\_MASK: LOG\_SFS (0x00002000)  
DESCRIPTION: This indicates that a BIU diagnostic has failed to return a positive result. This usually caused by an adapter hardware problem.  
SEVERITY LEVEL: Error  
MESSAGE: BIU diagnostic failed.  
ACTION: Contact your customer service representative.
- 1315 DEBUG: POST diagnostic completed.**  
VERBOSE\_MASK: LOG\_SFS (0x00002000)  
DESCRIPTION: This indicates that a POST diagnostic has completed.  
SEVERITY LEVEL: Debug  
MESSAGE: POST diagnostic completed.  
ACTION: No action needed, informational.
- 1316 ERROR: POST diagnostic failed.**  
VERBOSE\_MASK: LOG\_SFS (0x00002000)  
DESCRIPTION: This indicates that a POST diagnostic has failed to return a positive result. This is usually caused by an adapter hardware problem.  
SEVERITY LEVEL: Error  
MESSAGE: POST diagnostic failed.  
ACTION: Contact your customer service representative.

### 7.3.14 IOCTL Events (Message IDs: 1400 to 1499)

- 1400 DEBUG: IOCTL.**  
VERBOSE\_MASK: LOG\_IOCTL (0x00004000)  
DESCRIPTION: This provides general information about the driver's IOCTL interface.  
SEVERITY LEVEL: Debug  
MESSAGE: IOCTL.  
ACTION: No action needed, informational.
- 1401 DEBUG: IOCTL detail.**  
VERBOSE\_MASK: LOG\_IOCTL\_DETAIL (0x04000000)  
DESCRIPTION: This provides detailed information about the driver's IOCTL interface.  
SEVERITY LEVEL: Debug  
MESSAGE: IOCTL detail.  
ACTION: No action needed, informational.

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**1410 DEBUG: DFC**

VERBOSE\_MASK: LOG\_IOCTL (0x00004000)  
DESCRIPTION: This provides general information about the driver's DFC interface.  
SEVERITY LEVEL: Debug  
MESSAGE: DFC  
ACTION: No action needed, informational.

**1411 DEBUG: DFC detail.**

VERBOSE\_MASK: LOG\_IOCTL\_DETAIL (0x04000000)  
DESCRIPTION: This provides detailed information about the driver's DFC interface.  
SEVERITY LEVEL: Debug  
MESSAGE: DFC detail.  
ACTION: No action needed, informational.

**1420 DEBUG: DFC Error.**

VERBOSE\_MASK: LOG\_IOCTL (0x00004000)  
DESCRIPTION: This indicates that an error was found while processing a DFC request.  
SEVERITY LEVEL: Debug  
MESSAGE: DFC Error.  
ACTION: No action needed, informational.

### **7.3.15 Firmware Download Events (Message IDs: 1500 to 1599)**

**1500 DEBUG: Firmware image.**

VERBOSE\_MASK: LOG\_FIRMWARE (0x00008000)  
DESCRIPTION: This provides general information about the firmware image.  
SEVERITY LEVEL: Debug  
MESSAGE: Firmware image.  
ACTION: No action needed, informational.

**1501 DEBUG: Firmware detail.**

VERBOSE\_MASK: LOG\_FIRMWARE\_DETAIL (0x10000000)  
DESCRIPTION: This provides detailed information about the firmware image.  
SEVERITY LEVEL: Debug  
MESSAGE: Firmware detail.  
ACTION: No action needed, informational.

**1502 NOTICE: Firmware Library**

VERBOSE\_MASK: LOG\_DRIVER (0x00000002)  
DESCRIPTION: This shows the versions of firmware contained in the driver's library.  
SEVERITY LEVEL: Notice  
MESSAGE: Firmware Library  
ACTION: No action needed, informational.

**1510 ERROR: Bad firmware image.**

VERBOSE\_MASK: LOG\_FIRMWARE (0x00008000)  
DESCRIPTION: This indicates that a bad firmware image was provided to the download function.  
SEVERITY LEVEL: Error  
MESSAGE: Bad firmware image.  
ACTION: Obtain the proper image file. If the problem persists, report this error to your customer service representative.

**1511 ERROR: Firmware image not compatible.**

VERBOSE\_MASK: LOG\_FIRMWARE (0x00008000)



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DESCRIPTION: This indicates that the firmware image provided was not compatible with the existing hardware.

SEVERITY LEVEL: Error

MESSAGE: Firmware image not compatible.

ACTION: Obtain the proper image file. If the problem persists, report this error to your customer service representative.

**1520 NOTICE: Firmware download.**

VERBOSE\_MASK: LOG\_FIRMWARE (0x00008000)

DESCRIPTION: This indicates that an attempt to download a firmware image has occurred.

SEVERITY LEVEL: Notice

MESSAGE: Firmware download.

ACTION: No action needed, informational.

**1521 NOTICE: Firmware download complete.**

VERBOSE\_MASK: LOG\_FIRMWARE (0x00008000)

DESCRIPTION: This indicates that an attempt to download a firmware image was successful.

SEVERITY LEVEL: Notice

MESSAGE: Firmware download complete.

ACTION: No action needed, informational.

**1522 ERROR: Firmware download failed.**

VERBOSE\_MASK: LOG\_FIRMWARE (0x00008000)

DESCRIPTION: This indicates that an attempt to download a firmware image was failed.

SEVERITY LEVEL: Error

MESSAGE: Firmware download failed.

ACTION: Check your hardware configuration. If the problem persists, report this error to your customer service representative.

**1523 WARNING: Firmware updated.**

VERBOSE\_MASK: LOG\_FIRMWARE (0x00008000)

DESCRIPTION: This indicates that new firmware has been updated on the adapter.

SEVERITY LEVEL: Warning

MESSAGE: Firmware updated.

ACTION: A reboot or adapter power cycle will be required to activate the new firmware.

**1530 DEBUG: Firmware dump.**

VERBOSE\_MASK: LOG\_FIRMWARE (0x00008000)

DESCRIPTION: This indicates that a firmware core dump has occurred.

SEVERITY LEVEL: Debug

MESSAGE: Firmware dump.

ACTION: Check your hardware configuration. If the problem persists, report this error to your customer service representative.

**1540 WARNING: Firmware update required.**

VERBOSE\_MASK: LOG\_FIRMWARE (0x00008000)

DESCRIPTION: This indicates that a firmware update is required on the adapter.

SEVERITY LEVEL: Warning

MESSAGE: Firmware update required.

ACTION: The user must perform a manual adapter reset or link reset once the host environment is stable to trigger an automatic firmware download. Do not power cycle or reboot the system during the download operation.

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## 7.3.16 Common Transport Events (Message IDs: 1600 to 1699)

### 1600 **DEBUG: CT sent.**

VERBOSE\_MASK: LOG\_CT (0x00010000)  
DESCRIPTION: This indicates that a CT command is being sent.  
SEVERITY LEVEL: Debug  
MESSAGE: CT sent.  
ACTION: No action needed, informational.

### 1601 **DEBUG: CT comp.**

VERBOSE\_MASK: LOG\_CT (0x00010000)  
DESCRIPTION: This indicates that a CT command completed normally.  
SEVERITY LEVEL: Debug  
MESSAGE: CT comp.  
ACTION: No action needed, informational.

### 1610 **ERROR: Stray CT completion.**

VERBOSE\_MASK: LOG\_CT (0x00010000)  
DESCRIPTION: This indicates that a CT command completion was received without issuing a corresponding CT command. This error could indicate a driver or firmware problem.  
SEVERITY LEVEL: Error  
MESSAGE: Stray CT completion.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

### 1611 **DEBUG: Abnormal CT completion.**

VERBOSE\_MASK: LOG\_CT (0x00010000)  
DESCRIPTION: This indicates that a CT command completed with a status error in the IOCB. It could mean the Fibre Channel device on the network is not responding. The driver will automatically retry this CT command if needed.  
SEVERITY LEVEL: Debug  
MESSAGE: Abnormal CT completion.  
ACTION: Check physical connections to Fibre Channel network and the state the remote PortID is in.

### 1620 **DEBUG: CT rcvd.**

VERBOSE\_MASK: LOG\_CT (0x00010000)  
DESCRIPTION: This indicates that an unsolicited CT command was received.  
SEVERITY LEVEL: Debug  
MESSAGE: CT rcvd.  
ACTION: No action needed, informational.

### 1621 **DEBUG: Unsolicited CT dropped.**

VERBOSE\_MASK: LOG\_CT (0x00010000)  
DESCRIPTION: This indicates that an unsolicited CT command was received and then dropped for some reason.  
SEVERITY LEVEL: Debug  
MESSAGE: Unsolicited CT dropped.  
ACTION: No action needed, informational.

### 1622 **DEBUG: CT reply.**

VERBOSE\_MASK: LOG\_CT (0x00010000)  
DESCRIPTION: This indicates that a reply is being sent for an unsolicited CT command.  
SEVERITY LEVEL: Debug  
MESSAGE: CT reply.  
ACTION: No action needed, informational.

### 1630 **ERROR: Invalid CT command found.**

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VERBOSE\_MASK: LOG\_CT (0x00010000)  
DESCRIPTION: This indicates that a CT command was found with an invalid command code.  
SEVERITY LEVEL: Error  
MESSAGE: Invalid CT command found.  
ACTION: No action needed, informational. However, if the problem persists, report this error to your customer service representative.

### 7.3.17 FCSP Events (Message IDs: 1700 to 1799)

#### 1700 DEBUG: FCSP

VERBOSE\_MASK: LOG\_FCSP (0x00020000)  
DESCRIPTION: This provides general information about the driver's FCSP interface.  
SEVERITY LEVEL: Debug  
MESSAGE: FCSP  
ACTION: No action needed, informational.

#### 1701 DEBUG: FCSP detail.

VERBOSE\_MASK: LOG\_FCSP\_DETAIL (0x01000000)  
DESCRIPTION: This provides detailed information about the driver's FCSP interface.  
SEVERITY LEVEL: Debug  
MESSAGE: FCSP detail.  
ACTION: No action needed, informational.

#### 1702 DEBUG: FCSP error.

VERBOSE\_MASK: LOG\_FCSP (0x00020000)  
DESCRIPTION: This indicates that an error was found while processing a DFC request.  
SEVERITY LEVEL: Debug  
MESSAGE: FCSP error.  
ACTION: No action needed, informational.

#### 1705 DEBUG: FCSP state.

VERBOSE\_MASK: LOG\_FCSP (0x00020000)  
DESCRIPTION: This indicates that an authentication state is changing.  
SEVERITY LEVEL: Debug  
MESSAGE: FCSP state.  
ACTION: No action needed, informational.

#### 1706 DEBUG: FCSP event.

VERBOSE\_MASK: LOG\_FCSP (0x00020000)  
DESCRIPTION: This indicates that an authentication event has occurred.  
SEVERITY LEVEL: Debug  
MESSAGE: FCSP event  
ACTION: No action needed, informational.

#### 1707 DEBUG: FCSP status.

VERBOSE\_MASK: LOG\_FCSP (0x00020000)  
DESCRIPTION: This indicates that an authentication status is being updated.  
SEVERITY LEVEL: Debug  
MESSAGE: FCSP status.  
ACTION: No action needed, informational.

#### 1710 DEBUG: FCSP start.

VERBOSE\_MASK: LOG\_FCSP (0x00020000)  
DESCRIPTION: This indicates that authentication is being started to a specific node.

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SEVERITY LEVEL: Debug  
MESSAGE: FCSP start.  
ACTION: No action needed, informational.

**1720 DEBUG: FCSP comp.**  
VERBOSE\_MASK: LOG\_FCSP (0x00020000)  
DESCRIPTION: This indicates that authentication is being stopped or completed to a specific node.  
SEVERITY LEVEL: Debug  
MESSAGE: FCSP comp.  
ACTION: No action needed, informational.

### 7.3.18 FCF Events (Message IDs: 1800 to 1899)

**1800 DEBUG: FCF**  
VERBOSE\_MASK:  
DESCRIPTION: This provides general information about the driver's FCF interface.  
SEVERITY LEVEL: Debug  
MESSAGE: FCF  
ACTION: No action needed, informational.

**1801 DEBUG: FCF detail.**  
VERBOSE\_MASK:  
DESCRIPTION: This provides detailed information about the driver's FCF interface.  
SEVERITY LEVEL: Debug  
MESSAGE: FCF detail.  
ACTION: No action needed, informational.

**1810 DEBUG: FCF error.**  
VERBOSE\_MASK:  
DESCRIPTION: This indicates that an error was found while processing an FCF request.  
SEVERITY LEVEL: Debug  
MESSAGE: FCF error.  
ACTION: No action needed, informational.

**1820 DEBUG: FCF state.**  
VERBOSE\_MASK:  
DESCRIPTION: This indicates that an FCF object state is changing.  
SEVERITY LEVEL: Debug  
MESSAGE: FCF state.  
ACTION: No action needed, informational.

**1830 DEBUG: FCF event.**  
VERBOSE\_MASK:  
DESCRIPTION: This indicates that an FCF event has occurred.  
SEVERITY LEVEL: Debug  
MESSAGE: FCF event.  
ACTION: No action needed, informational.

## Chapter 8: NIC Driver Log Messages

This chapter describes the log messages you may see from the NIC driver.

**NOTE** To reset the adapter, reboot the system.

### 8.1 Setting MOD\_MASK and SEVERITY

Log messages are generated based on the settings of the Module Mask (MOD\_MASK) and the Severity Level (SEVERITY) as indicated in the log\_level parameter. See the log\_level parameter in [Table 1, NIC Configuration File Parameters](#).

The following table details the values and meanings of MOD\_MASK in the log\_level parameter.

**Table 1 MOD\_MASK Information for NIC Driver Log Messages**

| Name       | MOD_MASK <sup>a</sup> | Meaning                                               |
|------------|-----------------------|-------------------------------------------------------|
| MOD_CONFIG | 0x10000               | Messages in the device configuration path are logged. |
| MOD_TX     | 0x20000               | Messages in the transmit data path are logged.        |
| MOD_RX     | 0x40000               | Messages in the receive data path are logged.         |
| MOD_ISR    | 0x80000               | Messages in the interrupt path are logged.            |

a. MOD\_MASK is a bitmap of one or more of these values.

The following table details the values and meanings of SEVERITY in the log\_level parameter.

**Table 2 Severity Level Information for NIC Driver Log Messages**

| Name      | SEVERITY Value | Meaning                              |
|-----------|----------------|--------------------------------------|
| CE_CONT   | 0x0            | Continuation                         |
| CE_NOTE   | 0x1            | Information                          |
| CE_WARN   | 0x2            | Warning                              |
| CE_PANIC  | 0x3            | Causes the operating system to panic |
| CE_IGNORE | 0x4            | No action                            |

## 8.2 Log Messages for the NIC Driver

### 8.2.1 For Solaris 10

The following table details the log messages provided by the NIC driver for Solaris 10 operating systems.

**Table 3 Log Messages for the NIC Driver for Solaris 10**

| Log Message                                                              | Recommended Action                                                                                                                                                                                                                                              | MOD_MASK   | SEVERITY |
|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|
| "Insufficient Vectors"                                                   | Reload the driver after changing the interrupt priorities.                                                                                                                                                                                                      | MOD_CONFIG | CE_WARN  |
| <code> POST ERROR!!                                                      | Hardware error – Download the same firmware image to the adapter and reboot; replace the adapter if necessary.                                                                                                                                                  | MOD_CONFIG | CE_WARN  |
| <code> soft_reset bit asserted[1]. Reset failed                          | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit  | MOD_CONFIG | CE_WARN  |
| Alloc intr failed: ret <ret code>, navail <code>, nallocd <code>         | Reload the driver.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Block Enable Interrupts Failed <code>                                    | Reload the driver.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Could not allocate <code>fn_config_dbuf &lt;code&gt;</code>              | Reload the driver.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Could not reset firmware, ERR bit set <code>pd_ctrl: &lt;code&gt;</code> | Reset the adapter.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Could not reset firmware, ERR bit set <code>pd_ctrl:&lt;reg&gt;</code>   | Firmware reset failed. Reset the system.                                                                                                                                                                                                                        | MOD_CONFIG | CE_WARN  |
| CQ create failed - status: <code>                                        | Hardware error – Download the same firmware image to the adapter and reboot; replace the adapter if necessary.                                                                                                                                                  | MOD_CONFIG | CE_WARN  |
| <code>ddi_dma_addr_bind_handle()</code> failed rc: <code>                | Increase the memory.                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN  |
| <code>ddi_intr_get_pri()</code> failed                                   | Reboot the system.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Device in error state                                                    | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| device is in Suspended state                                             | Resume the device.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |

**Table 3 Log Messages for the NIC Driver for Solaris 10 (Continued)**

| Log Message                                        | Recommended Action                                                                                                                                                                                                                                                            | MOD_MASK   | SEVERITY |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|
| Device Unknown                                     | The driver does not support a particular adapter. Contact Broadcom for further information.                                                                                                                                                                                   | MOD_CONFIG | CE_WARN  |
| EQ create failed - status: <code>                  | Hardware error – Download the same firmware image to the adapter and reboot; replace the adapter if necessary.                                                                                                                                                                | MOD_CONFIG | CE_WARN  |
| EQ ring alloc failed                               | Increase the memory.                                                                                                                                                                                                                                                          | MOD_CONFIG | CE_WARN  |
| Error recovery failed, device is in error state    | The hardware or driver cannot recover from a serious hardware error. Reset the system.                                                                                                                                                                                        | MOD_CONFIG | CE_WARN  |
| Error recovery failed/timed out                    | Reset the adapter.                                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN  |
| Error recovery timed out                           | The hardware or driver cannot recover from a serious hardware error. Reset the system.                                                                                                                                                                                        | MOD_CONFIG | CE_WARN  |
| Extended MQ create failed - status: <code>         | Hardware error – Download the same firmware image to the adapter and reboot; replace the adapter if necessary.                                                                                                                                                                | MOD_CONFIG | CE_WARN  |
| Failed to Enable Interrupt <code>                  | Reload the driver.                                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN  |
| Failed to add interrupt handlers                   | Reload the driver.                                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN  |
| Failed to allocate bmbx: size <code>               | Reload the driver.                                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN  |
| Failed to allocate Queue memory                    | Increase the memory.                                                                                                                                                                                                                                                          | MOD_CONFIG | CE_WARN  |
| Failed to Configure the Adapter                    | Reboot the system.                                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN  |
| Failed to create WQ ring                           | Increase the memory.                                                                                                                                                                                                                                                          | MOD_CONFIG | CE_WARN  |
| Failed to del q - status: <status code>            | Reboot the system.                                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN  |
| Failed to init stats                               | Reboot the system.                                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN  |
| Failed to init tx/rx rings                         | Reboot the system.                                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN  |
| Failed to read MAC address - status: <status code> | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing <code>acquit</code> . | MOD_CONFIG | CE_WARN  |
| Failed to register mac                             | Reboot the system.                                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN  |
| Failed to setup interrupts                         | Reload the driver after changing the interrupt priorities.                                                                                                                                                                                                                    | MOD_CONFIG | CE_WARN  |

**Table 3 Log Messages for the NIC Driver for Solaris 10 (Continued)**

| Log Message                                                                 | Recommended Action                                                                                                                                                                                                                                              | MOD_MASK   | SEVERITY |
|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|
| FUNCTION RESET FAILED rc: <code>                                            | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| Hardware UE Detected: <code>                                                | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| HW Initialization Failed                                                    | Hardware error – Download the same firmware image to the adapter and reboot; replace the adapter if necessary.                                                                                                                                                  | MOD_CONFIG | CE_WARN  |
| HW POST FAILED                                                              | Reset the adapter.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Insufficient Vectors                                                        | Reload the driver after changing the interrupt priorities.                                                                                                                                                                                                      | MOD_CONFIG | CE_WARN  |
| Invalid q length. Must be [256, 512, 1024, 2048]: <code>                    | Correct the tx q length in the <code>elxnic.conf</code> file.                                                                                                                                                                                                   | MOD_CONFIG | CE_WARN  |
| Invalid rx_frag_size: <code><br>valid values are 2K, 4K, 8K, 16K only.      | Correct the rx_frag_size in the <code>elxnic.conf</code> file.                                                                                                                                                                                                  | MOD_CONFIG | CE_WARN  |
| IRM action <code> count <code><br>ddi_intr_free() failed rc: <ret_code>     | Reboot the system.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| IRM: Alloc intr failed: ret <ret_code>, count <code>, nallocd <code>        | Reboot the system.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| lancer physdev reset failed                                                 | Reset the adapter.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| lancer_physdev_reset INP bit polling timedout: <timeout><br>pd_ctrl: <code> | Reset the adapter.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Legacy MQ create failed - status: <code>                                    | Hardware error – Download the same firmware image to the adapter and reboot; replace the adapter if necessary.                                                                                                                                                  | MOD_CONFIG | CE_WARN  |
| Legacy MQ ring alloc failed                                                 | Increase the memory.                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN  |



**Table 3 Log Messages for the NIC Driver for Solaris 10 (Continued)**

| Log Message                                                                              | Recommended Action                                                                                                                                                                                                                                              | MOD_MASK   | SEVERITY |
|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|
| Mailbox initialization Failed with rc: <code>                                            | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| mod_install failed                                                                       | Uninstall the driver, try installing the driver after a reboot.                                                                                                                                                                                                 | MOD_CONFIG | CE_WARN  |
| MQ_EXT ring alloc failed                                                                 | Increase the memory.                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN  |
| No response from FW for Mailbox command. Mailbox stalled till recovery                   | Reset the adapter.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| oce_detach: Rx buffers pending with stack                                                | Reboot the system.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| OCE_INITIATE_DUMP Dump Image not present                                                 | Diagnostic Dump image is not present. Retry the Dump initiation                                                                                                                                                                                                 | MOD_CONFIG | CE_WARN  |
| OCE_INITIATE_DUMP failed                                                                 | Diagnostic Dump initiation by an application failed. Retry the Dump initiation.                                                                                                                                                                                 | MOD_CONFIG | CE_WARN  |
| OCE_INITIATE_DUMP failed due to recovery timeout                                         | Device Recovery failed after Diagnostic Dump initiation. Reboot the system.                                                                                                                                                                                     | MOD_CONFIG | CE_WARN  |
| oce_m_unicast: Factory mac addition failed, status: <status_code>                        | Reboot the system.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| oce_m_unicast: mac delete failed, status: <code>                                         | Reboot the system.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| oce_m_unicast: ucast mac addition failed, status:<status_code> Resetting to Factory MAC. | Reboot the system.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| oce_rx:no frags?                                                                         | Malfunctioning hardware – Check the SFP and the adapter; replace them if necessary.                                                                                                                                                                             | MOD_RX     | CE_WARN  |
| PCI Initialization Failed                                                                | Reset or replace the adapter, or move the adapter to different slot.                                                                                                                                                                                            | MOD_CONFIG | CE_WARN  |
| pci_config_setup() failed with rc: <code>                                                | Reset or replace the adapter.                                                                                                                                                                                                                                   | MOD_CONFIG | CE_WARN  |
| Pending buffers <code> cannot destroy RQ <code> cache                                    | Reboot the system.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Ring buffer allocation failed                                                            | Increase the memory.                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN  |
| RQ bdesc alloc failed                                                                    | Increase the memory.                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN  |
| RQ Buffer Pool create failed                                                             | Increase the memory.                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN  |

**Table 3 Log Messages for the NIC Driver for Solaris 10 (Continued)**

| Log Message                                                                                        | Recommended Action                                                                                                                                                                                                                                              | MOD_MASK   | SEVERITY            |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------|
| RQ create failed: <code>                                                                           | Hardware error – Download the same firmware image to the adapter and reboot; replace the adapter if necessary.                                                                                                                                                  | MOD_CONFIG | CE_WARN             |
| RQ ring create failed                                                                              | Hardware error – Download the same firmware image to the adapter and reboot; replace the adapter if necessary.                                                                                                                                                  | MOD_CONFIG | CE_WARN             |
| RQ shadow ring alloc failed                                                                        | Increase the memory.                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN             |
| SLIPORT Error Detected:<br>SLIPORT_ERROR1: <code><br>SLIPORT_ERROR2: <code>                        | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN             |
| WQ Buffer Pool create failed                                                                       | Increase the memory.                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN             |
| WQ create failed <code>                                                                            | Hardware error – Download the same firmware image to the adapter and reboot; replace the adapter if necessary.                                                                                                                                                  | MOD_CONFIG | CE_WARN             |
| WQ MAP Handles Pool create failed                                                                  | Increase the memory.                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN             |
| WQ Packet Desc Pool create failed                                                                  | Increase the memory.                                                                                                                                                                                                                                            | MOD_CONFIG | CE_WARN             |
| WQCQ create failed                                                                                 | Hardware error – Download the same firmware image to the adapter and reboot; replace the adapter if necessary.                                                                                                                                                  | MOD_CONFIG | CE_WARN             |
| Unrecognized Optics state                                                                          | Replace with the compatible SFP                                                                                                                                                                                                                                 | MOD_CONFIG | CE_WARN/C<br>E_NOTE |
| Optics faulted/incorrectly installed/not installed – Reseat optics. If issue not resolved, replace | Replace with the compatible SFP                                                                                                                                                                                                                                 | MOD_CONFIG | CE_WARN/C<br>E_NOTE |
| Optics of two types installed. Remove one optic or install matching pair of optics.                | Replace with the compatible SFP                                                                                                                                                                                                                                 | MOD_CONFIG | CE_WARN/C<br>E_NOTE |
| Incompatible optics. Replace with compatible optics for card to function.                          | Replace with the compatible SFP                                                                                                                                                                                                                                 | MOD_CONFIG | CE_WARN/C<br>E_NOTE |
| Unqualified optics. Replace with Avago optics for Warranty and Technical Support.                  | Replace with the compatible SFP                                                                                                                                                                                                                                 | MOD_CONFIG | CE_WARN/C<br>E_NOTE |
| Uncertified optics. Replace with Avago-certified optics to enable link operation.                  | Replace with the compatible SFP                                                                                                                                                                                                                                 | MOD_CONFIG | CE_WARN/C<br>E_NOTE |

## 8.2.2 For Solaris 11

The following table details the log messages provided by the NIC driver for Solaris 11 operating systems.

**Table 4 Log Messages for the NIC Driver for Solaris 11**

| Log Message                                  | Recommended Action                                                                                                                                                                                                                                              | MOD_MASK   | Severity |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|
| Alloc intr failed                            | Reload the driver.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Could not allocate dbuf                      | Low system resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system. Increase the memory                                                                                                                  | MOD_CONFIG | CE_WARN  |
| Could not allocate dbuf for getting mac list | Low system resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system. Increase the memory                                                                                                                  | MOD_CONFIG | CE_WARN  |
| Could not allocate stats_dbuf                | Low system resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.                                                                                                                                      | MOD_CONFIG | CE_WARN  |
| Could not allocate vstats_dbuf               | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| Could not find the MAC <mac addr>            | Provide the correct MAC address.                                                                                                                                                                                                                                | MOD_CONFIG | CE_WARN  |
| Could not get size of bar                    | Reset the adapter.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Could not get supported intrs                | Reload the driver.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Could not map bar                            | Reset the adapter.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Could not retrieve num_bars                  | Reset the adapter.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| CQ allocation failed                         | Low system resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.                                                                                                                                      | MOD_CONFIG | CE_WARN  |
| CQ create failed - status: <code>            | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| CQ ring alloc failed                         | Low system resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.                                                                                                                                      | MOD_CONFIG | CE_WARN  |

**Table 4 Log Messages for the NIC Driver for Solaris 11 (Continued)**

| Log Message                                                                              | Recommended Action                                                                                                                                                                                                                                              | MOD_MASK   | Severity |
|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|
| ddi_intr_free failed: <ret code>                                                         | Reboot the system.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Device in error state                                                                    | Reboot the system.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Device Unknown                                                                           | The device is not supported by the driver.                                                                                                                                                                                                                      | MOD_CONFIG | CE_WARN  |
| EQ create failed - status:<code>                                                         | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| EQ ring alloc failed                                                                     | Low system resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.                                                                                                                                      | MOD_CONFIG | CE_WARN  |
| error recovery failed, device is in suspended state                                      | Reboot the system.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Error recovery failed/timed out                                                          | Reset the system.                                                                                                                                                                                                                                               | MOD_CONFIG | CE_WARN  |
| Error recovery timed out                                                                 | The hardware or driver cannot recover from a serious hardware error. Reset the system.                                                                                                                                                                          | MOD_CONFIG | CE_WARN  |
| Failed to enable interrupt <int num>, type <int type>, cnt <num_vectors>, ret <ret code> | Reload the driver.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Failed to add interrupt handler                                                          | Reload the driver.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Failed to allocate bmbx                                                                  | Reload the driver.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Failed to allocate rings                                                                 | Low system resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system. Increase the memory.                                                                                                                 | MOD_CONFIG | CE_WARN  |
| Failed to Configure RSS - status:<code>                                                  | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| Failed to create WQ ring                                                                 | Low system resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.                                                                                                                                      | MOD_CONFIG | CE_WARN  |

**Table 4 Log Messages for the NIC Driver for Solaris 11 (Continued)**

| Log Message                                                                                                                    | Recommended Action                                                                                                                                                                                                                                              | MOD_MASK   | Severity |
|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|
| Failed to del - status:<code>                                                                                                  | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| Failed to delete MAC <mac_add>                                                                                                 | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| Failed to disable the interrupts                                                                                               | Reset the adapter.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Failed to enable interrupts during IRM                                                                                         | Reboot the system.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Failed to get controller attributes - status: <code>                                                                           | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| Failed to get hardware stats, version <ver num>, status <code>                                                                 | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| Failed to get pport stats                                                                                                      | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| Failed to get vlan list - status:<code><br>Failed to configure vlan list - status:<code><br>Failed to activate vlan list on vf | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |

**Table 4 Log Messages for the NIC Driver for Solaris 11 (Continued)**

| Log Message                                   | Recommended Action                                                                                                                                                                                                                                              | MOD_MASK   | Severity |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|
| Failed to get vport stats                     | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| Failed to init rings                          | Low system resources. Reboot the system to see if the issue resolves itself. If possible, add more memory.                                                                                                                                                      | MOD_CONFIG | CE_WARN  |
| Failed to remove interrupt                    | Reload the driver.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Failed to retrieve intr types                 | Unload and then reload the driver.                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Failed to set EQ delay - status:<code>        | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| Failed to Setup handlers                      | Reload the driver.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Failed to Setup handlers during IRM           | Reboot the system.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Failed to setup_interface during IRM          | Reboot the system.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Failed to get firmware version - status       | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| Failed to get firmware configuration - status | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| FUNCTION RESET FAILED                         | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| Hardware UE Detected                          | Upgrade the firmware to the correct version.                                                                                                                                                                                                                    | MOD_CONFIG | CE_WARN  |
| HW initialization failed with ret_code        | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |

**Table 4 Log Messages for the NIC Driver for Solaris 11 (Continued)**

| Log Message                                                                                                                          | Recommended Action                                                                                                                                                                                                                                              | MOD_MASK   | Severity |
|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|
| HW POST1 FAILED                                                                                                                      | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| Interrupt block disable failed                                                                                                       | Reset the adapter.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Interrupt setup failed with <code>&lt;ret_code&gt;</code>                                                                            | Reload the driver.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Interrupts block enable failed                                                                                                       | Reload the driver.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Invalid qlength. Must be [256, 2000]                                                                                                 | Set the correct queue length using the <code>dladm</code> utility.                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| IRM: Alloc intr failed: ret <code>&lt;ret code&gt;</code> count <code>&lt;code&gt;</code> nallocd <code>&lt;alloc_vectors&gt;</code> | Reload the driver.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| kstat creation failed                                                                                                                | Reload the driver.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| kstat setup Failed with <code>&lt;ret_code&gt;</code>                                                                                | Reload the driver.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| lancer_physdev_reset INP bit polling timedout: <code>&lt;timeout&gt;</code> pd_ctrl: <code>&lt;reg&gt;</code>                        | Reset the adapter.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Legacy MQ create failed                                                                                                              | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| Legacy MQ ring alloc failed                                                                                                          | Low system resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.                                                                                                                                      | MOD_CONFIG | CE_WARN  |
| Failed to read MAC address - status                                                                                                  | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| MAC allocation Failed                                                                                                                | Unload and then reload the driver.                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| MAC registration failed                                                                                                              | Unload and then reload the driver.                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| MAC unregister failed. Detach failed.                                                                                                | Reboot the system.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| Mailbox initialization failed with <code>&lt;ret code&gt;</code>                                                                     | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| MAP FAILED                                                                                                                           | Low System resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.                                                                                                                                      | MOD_TX     | CE_WARN  |

**Table 4 Log Messages for the NIC Driver for Solaris 11 (Continued)**

| Log Message                                      | Recommended Action                                                                                                                                                                                                                                              | MOD_MASK   | Severity |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|
| Map PCI config failed with <ret_code>            | Reset the adapter.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| mcast ADD/DEL failed                             | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| mod_install failed rval                          | Reset the adapter.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| MSIX not available                               | The system continues to work with INTx.                                                                                                                                                                                                                         | MOD_CONFIG | CE_WARN  |
| oce_detach : Rx buffers pending with stack       | Reboot the system.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| OCE_INITIATE_DUMP Dump Image not present         | Diagnostic Dump image is not present. Retry the Dump initiation.                                                                                                                                                                                                | MOD_CONFIG | CE_WARN  |
| OCE_INITIATE_DUMP failed                         | Diagnostic Dump initiation by an application failed. Retry the Dump initiation.                                                                                                                                                                                 | MOD_CONFIG | CE_WARN  |
| OCE_INITIATE_DUMP failed due to recovery timeout | Device Recovery failed after Diagnostic Dump initiation. Reboot the system.                                                                                                                                                                                     | MOD_CONFIG | CE_WARN  |
| oce_isr EQ Not started                           | Unplumb and plumb the device. If the error persists reload the driver.                                                                                                                                                                                          | MOD_CONFIG | CE_WARN  |
| oce_rx:no frags?                                 | The system cannot receive data because the driver is low on resources. Reload the driver. If the same error recurs, reset the adapter.                                                                                                                          | MOD_RX     | CE_WARN  |
| PCI initialization failed                        | Reset the adapter.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN  |
| POST ERROR                                       | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| Ring buffer allocation failed < code >           | Configure the server with more memory.                                                                                                                                                                                                                          | MOD_CONFIG | CE_WARN  |
| RQ bdesc alloc failed - status: <code>           | Low system resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.                                                                                                                                      | MOD_CONFIG | CE_WARN  |
| RQ create failed                                 | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN  |
| RQ ring create failed                            | Low system resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.                                                                                                                                      | MOD_CONFIG | CE_WARN  |



**Table 4 Log Messages for the NIC Driver for Solaris 11 (Continued)**

| Log Message                                                                                                                 | Recommended Action                                                                                                                                                                                                                                              | MOD_MASK   | Severity          |
|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------------|
| RQ shadow ring alloc failed                                                                                                 | Low system resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.                                                                                                                                      | MOD_CONFIG | CE_WARN           |
| soft_reset bit asserted[1].<br>Reset failed                                                                                 | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN           |
| UE Detected or FW Dump is requested<br>SLIPORT_ERR1 = <code> and SLIPORT_ERR2 = <code>                                      | Reboot the system.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN           |
| Unable to get intr priority                                                                                                 | Reload the driver.                                                                                                                                                                                                                                              | MOD_CONFIG | CE_WARN           |
| Failed to create an interface - VPORT_SRIOV - staus: <code><br>Failed to create an interface - VPORT_NORMAL - staus: <code> | Upgrade the firmware to the correct version.                                                                                                                                                                                                                    | MOD_CONFIG | CE_WARN           |
| WCCQ create failed                                                                                                          | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN           |
| WQ Buffer Pool create failed                                                                                                | Low system resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.                                                                                                                                      | MOD_CONFIG | CE_WARN           |
| WQ create failed - status: <code>                                                                                           | Check for the faulty hardware using <code>fmadm faulty</code> . If the hardware is faulty, acquit the hardware using <code>fmadm acquit &lt;dev_path&gt;</code> and reset the adapter. If the hardware is not faulty, reset the adapter without issuing acquit. | MOD_CONFIG | CE_WARN           |
| WQ MAP Handles Pool create failed                                                                                           | Low system resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.                                                                                                                                      | MOD_CONFIG | CE_WARN           |
| WQ Packet Desc Pool create failed                                                                                           | Low system resources. Repeat the operation that generated the log. If the error log is generated again, reboot the system.                                                                                                                                      | MOD_CONFIG | CE_WARN           |
| wqb pool empty                                                                                                              | The system cannot transmit data because the driver is low on resources. Check for a process generating heavy traffic.                                                                                                                                           | MOD_TX     | CE_WARN           |
| wqm pool empty                                                                                                              | The system cannot transmit data because the driver is low on resources. Check for a process generating heavy traffic.                                                                                                                                           | MOD_TX     | CE_WARN           |
| Unrecognized Optics state                                                                                                   | Replace with the compatible SFP                                                                                                                                                                                                                                 | MOD_CONFIG | CE_WARN / CE_NOTE |

**Table 4 Log Messages for the NIC Driver for Solaris 11 (Continued)**

| Log Message                                                                                        | Recommended Action              | MOD_MASK   | Severity            |
|----------------------------------------------------------------------------------------------------|---------------------------------|------------|---------------------|
| Optics faulted/incorrectly installed/not installed - Reseat optics. If issue not resolved, replace | Replace with the compatible SFP | MOD_CONFIG | CE_WARN<br>/CE_NOTE |
| Optics of two types installed. Remove one optic or install matching pair of optics.                | Replace with the compatible SFP | MOD_CONFIG | CE_WARN<br>/CE_NOTE |
| Incompatible optics. Replace with compatible optics for card to function.                          | Replace with the compatible SFP | MOD_CONFIG | CE_WARN<br>/CE_NOTE |
| Unqualified optics. Replace with Avago optics for Warranty and Technical Support.                  | Replace with the compatible SFP | MOD_CONFIG | CE_WARN<br>/CE_NOTE |
| Uncertified optics. Replace with Avago-certified optics to enable link operation.                  | Replace with the compatible SFP | MOD_CONFIG | CE_WARN<br>/CE_NOTE |

