N210/N110 - 10Gb Ethernet Adapter Installation and User's Guide for i386 and SPARC platforms on Solaris Release 10.

Driver release 2.1.1, May 2005 (chxge-2.1.1-s10)

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Contents

Introduction

This document describes the Chelsio N210 and N110 10Gb Ethernet Adapter driver for Solaris Release 10.

Hardware and Software Requirements

The N210/N110 driver supports the following architectures.

- All Sun SPARC architectures supporting PCI*/PCI-X (133, 100, or 66Mhz) adapters.
- All x86 (i386) architectures supporting PCI*/PCI-X (133, 100, or 66Mhz) adapters.
    - AMD CPUs, 32-bit and 64-bit (x86/x86_64/amd64)
    - Intel CPUs, 32-bit and 64-bit (x86/x86_64)

*The N210/N110 10Gb Ethernet adapter supports 3.3v PCI bus only. Running a 10Gb adapter on a PCI (32-bit) bus is not recommended as throughput performance will be significantly reduced by the limitations of PCI.

Hardware Installation

1. Halt and power off your system.
2. Power off all remaining peripherals attached to your system.
3. Unpack the 10Gb Ethernet adapter and place it on an anti-static surface.
4. Remove the system case cover according to the system manufacturer's instructions.
5. Remove the PCI filler plate from the slot where you will install the 10Gb Ethernet adapter. For maximum performance, it is highly recommended to install the adapter into a PCI-X slot running at 133Mhz. Avoid installing more than one device per PCI segment as this will revert the bus to 100Mhz operation.
6. Holding the 10Gb Ethernet adapter by the edges, align the edge connector with the PCI connector on the motherboard. Apply even pressure on both edges until the card is firmly seated. It may be necessary to remove the XFP (optics) modules prior to inserting the adapter.
7. Secure the 10Gb Ethernet adapter with a screw, or other securing mechanism, as described by the system manufacturer's instructions. Replace the case cover.
8. Connect a fiber cable, multi-mode for short range (SR) optics or single-mode for long range (LR) optics, to the 10Gb Ethernet adapter.

Software Installation

The Chelsio N210/N110 10Gb Ethernet adapter driver software may be downloaded via our support website at http://www.chelsio.com. The driver may also be distributed on CD-ROM.

In either case, the driver file will be named chxge-2.1.1-s10.tar.gz. Copy this file to a location on your system where you have read/write access and enough space to un-tar the package.

Using the `gunzip` and `tar` utilities, unpack the driver file. This will create a new directory named `chxge-2.1.1-s10.`

```
# gunzip -d < chxge-2.1.1-s10.tar.gz | tar xf -
```

Use the `cd` command to change to the newly created `chxge-2.1.1-s10` directory

Installing the i386 driver

Use the `pkgadd` utility to install the `CHLSchxgei` package.

```
# pkgadd –d .
```

At the prompt, select the number for the CHLSchxgei driver and answer ‘y’ to install the driver.

Installing the SPARC driver

Use the `pkgadd` utility to install the `CHLSchxges` package.

```
# pkgadd –d .
```

At the prompt, select the number for the CHLSchxges driver and answer ‘y’ to install the driver.

Uninstalling the i386 driver

Unplump and unload the driver prior to removal, use `ifconfig <interface> down unplumb` to bring down the interface. Use `modinfo | grep chxge` to identify the module ID and use `modunload –i <module_ID>` to unload the driver.

Use the `pkgrm` utility to remove the CHLSchxgei package.

```
# pkgrm CHLSchxgei
```

Answer ‘y’ to the interactive prompts to remove the driver from the system.

Uninstalling the SPARC driver

Unplump and unload the driver prior to removal, use `ifconfig <interface> down unplumb` to bring down the interface. Use `modinfo | grep chxge` to identify the module ID and use `modunload –i <module_ID>` to unload the driver.

Use the `pkgrm` utility to remove the CHLSchxges package.

```
# pkgrm CHLSchxges
```

Answer ‘y’ to the interactive prompts to remove the driver from the system.

Network Configuration

This section describes how to configure your network after the 10Gb Ethernet adapter has been installed.

Configuring the Network Host Files

After installing the 10Gb Ethernet driver you will need to create a file named `hostname.chxge`*`instance`* for the interface. You may also need to edit the `/etc/hosts` file if you wish to add a hostname for the IP address of the interface.

1. Locate the *`instance`* number for the `chxge` interface using the `grep` command.

   ```
   # grep chxge /etc/path_to_inst
   "/pci@0,0/pci8086,3595@2/pci8086,32a@0,2/pci1425,1@2" 0 "chxge"
   ```

   In the above example, the instance number of the adapter (in bold) is 0.

2. Use the `ifconfig` utility to configure the adapter interface.

   ```
   # ifconfig chxge0 plump ipaddress netmask mask broadcast + up
   ```

   Replace ***`ipaddress`*** with your desired network IP address, and ***`mask`*** with your desired netmask. Refer to the `ifconfig(1M)` manpage for additional information.

To permanently add your configuration to the system, so that changes are not lost after reboot, you will need to create an `/etc/hostname.chxge0` configuration file.

1. Using the instance number found in the previous step 1, create a file in `/etc` named `hostname.chxge0`, adding an ***`ipaddress`*** to the file. You could alternately create the file using a ***`hostname`***.

   ```
   # echo 192.168.0.1 > /etc/hostname.chxge0
   ```

2. Create an entry in `/etc/hosts` to map your ***hostname*** to ***ipaddress***.

```
#
# Internet host table
#
127.0.0.1        localhost
192.168.0.1      chelsio_server
```

3. Create an entry in `/etc/inet/netmasks` and add the ***netmask***.

```
# network-number        netmask
192.168.0.1             255.255.255.0
```

Device Driver Parameters

This section describes how to configure the Chelsio N210/N110 10Gb Ethernet adapter driver. Configuring the driver parameters is the same between SPARC and x86 machines running Solaris 10.

The chxge driver controls the Chelsio N110 and N210 Ethernet adapters. The chxge driver has a PCI vendor ID of `pci1425` and device ID's of `0007` and `000a` for the N110 and N210, respectively.

Driver Configuration

Table 1: Driver parameters and descriptions

Driver Parameter	Values	Description
pci-burstsize		PCI Burst Size
	0	= use system default
	512	= 512 bytes
	1024	= 1024 bytes
	2048	= 2048 bytes
pci-split-transaction-cnt		PCI Split Transactions
	0	= use system default
	1	= 1 transaction
	2	= 2 transactions
	3	= 3 transactions
	4	= 4 transactions
	8	= 8 transactions
	12	= 12 transactions
	16	= 16 transactions
	32	= 32 transactions
amd-bug-workaround		Workaround for the AMD-8131 PCI-X HyperTransport Tunnel chipset.
	0	= disabled
	1	= enabled (default)
enable-latency-timer		PCI Latency Timer
	0	= use system default
	1	= set timer to 0xF8
accept-jumbo		Jumbo Frames
	0	= disabled (default)
	1	= enabled
enable-checksum-offload		Hardware Checksum Offload
	0	= disabled
	1	= enabled (default)

Driver Parameter Details

Table 2: Driver parameter details.

Driver Parameter	Description

`pci-burstsize`	The PCI-X bus supports multiple data lengths (burst size). Use the following values when adjusting this parameter.
	
	`pci-burstsize = 0;`
	`pci-burstsize = 512;`
	`pci-burstsize = 1024;`
	`pci-burstsize = 2048;`
	
	Setting `pci-burstsize` to `0` will result in using the system default burst size. Some systems do not support burst sizes greater than 512 bytes. Setting the burst size to more than 512 bytes on these systems may result in problems such as PCI bus hangs or data corruption.
	
	*The AMD-8131 HyperTransport PCI-X chipset is known to have issues on bus segments running at 133Mhz with large burst sizes and multiple split transactions. It is recommended that the following values be used for the PCI burst size and PCI split transactions:
	
	PCI Burst Size — **PCI Split Transactions**
	512 — 3
	1024 — 2
	2048 — 1
	
	For additional information, please refer to the AMD-8131 HyperTransport PCI-X Tunnel Revision Guide: 26310 Rev 3.08 August 2004, section 56.

`pci-split-transaction-cnt`
 	
*see `pci-burstsize` for important information regarding the modification of this parameter.
	The PCI-X bus supports multiple simultaneous data transactions.
	
	`pci-split-transaction-cnt = 0;`
	`pci-split-transaction-cnt = 1;`
	`pci-split-transaction-cnt = 2;`
	`pci-split-transaction-cnt = 3;`
	`pci-split-transaction-cnt = 4;`
	`pci-split-transaction-cnt = 8;`
	`pci-split-transaction-cnt = 12;`
	`pci-split-transaction-cnt = 16;`
	`pci-split-transaction-cnt = 32;`
	
	Other values will generate a warning and the number of split transactions will not be modified.
	
	Setting `pci-split-transaction-cnt` to `0` will result in using the system default burst size.

`amd-bug-workaround`	The driver will automatically modify the PCI-X settings (`pci-split-transaction-cnt` and `pci-burstsize`) if it finds that the device is running on an AMD-8131 HyperTransport Tunnel chipset and running at 133Mhz. When enabled, the workaround will set the `pci-split-transaction-cnt` to 2 transactions and the `pci-burstsize` to 1024 (1k) bytes. Setting amd-bug-workaround to 0 will disable this feature and allow the system to come up with the default (system) settings. After modifying this value, it is important to reload the driver and config file.
`enable-latency-timer`	The driver modifies the PCI Latency Timer on the PCI-X bus. This provides a large performance increase on the PCI-X bus, especially for 10Gb Ethernet adapters. This setting will affect all devices on the same bus segment. By default, the latency timer is set to `0xF8`. This parameter can be disabled by setting `enable-latency-timer` to `0`. `enable-latency-timer=0;`

`accept-jumbo`	The 10Gb Ethernet adapter will support Jumbo frames up to 9600 bytes (9582 data + 18 header).
	
	Jumbo frames are only supported for Solaris 10 update 1 and later.
	
	Use the following parameter to enable jumbo frame support.
	
	`accept-jumbo = 1;`
	
	The default maximum MTU is 9198 bytes. The maximum MTU size may be adjusted by changing the value of the `maximum-mtu` parameter.
	
	`maximum-mtu = <value>;`
	
	MTU sizes may then be adjusted to a value smaller than the `maximum-mtu` size by using the `ifconfig` utility. Refer to the `ifconfig(1M)` manpage for additional information.

`enable-checksum-offload`	The N210 10Gb Ethernet adapter performs hardware based checksum. The N110 does not support the hardware checksum feature and will not use it regardless of the parameter setting. Hardware checksum is enabled by default. Use the following parameter to disable this feature. `enable-checksum-offload = 0;`

Setting Driver Parameters

Driver parameters may be permanently set by creating a driver configuration file. Create a file named `/kernel/drv/chxge.conf` and edit the file to include the driver parameters you wish to set.

Add parameters to the file using the **`parameter-name`**=**`value`** syntax. Refer to the following example for creating a config file.

```
# /kernel/drv/chxge.conf
# Global configuration file for Chelsio N210/N110 10Gb Ethernet
# adapter driver parameters.

# Enable Jumbo frames.
accept-jumbo = 1;
```

Device Driver Limitations

This driver release uses the GLD (Generic Link Device) API and some features are not yet supported in Solaris Release 10 or Update 1.

- Large Segment Offload (LSO) is currently not supported.
- VLAN tagging is currently not supported.
- Jumbo frames are only supported in Solaris Release 10 Update 1.

Customer Support

If you have problems with the software or hardware, please contact our customer support team via email at support@chelsio.com or check our website at http://www.chelsio.com.

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