



T320/T310/T302 Chelsio Ethernet Adapter
Installation and User's Guide for Microsoft® Windows®
Server™ 2003, Windows® XP and Windows® Vista.

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Introduction

This document describes the installation of Chelsio T320, T310 and T302 Ethernet Adapter drivers for Microsoft Windows Server 2003 and Windows XP.

Hardware and Software Requirements

The Chelsio Ethernet driver supports the following architectures.

All x86 (i386) architectures supporting PCI*/PCI-X (133, 100, or 66Mhz) and PCIE (x4, x8) adapters.

- AMD CPUs, 32-bit and 64-bit (x86/x86_64/amd64)
- Intel CPUs, 32-bit and 64-bit (x86/x86_64)

*The Chelsio 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.

The Chelsio Ethernet driver is designed for Windows Server 2003 but should run on Windows Operating System which supports NDIS 5.1, such as Windows XP.

Scalable Networking Pack

Chelsio Recommends Installing Microsoft SNP (Scalable Networking Pack) which provides support for Receive Side Scaling (RSS). Please refer to Knowledge Base Article KB912222 from Microsoft for the installation of SNP bits.

If SP2 has already been installed then there is no need install the above SNP pack as the SNP pack is already included in SP2 update

Hardware Installation

1. Shutdown and power off your system.
2. Power off all remaining peripherals attached to your system.
3. Unpack the Chelsio 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 or PCIE x8 slot.

6. Holding the Chelsio 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 Chelsio 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 or regular Ethernet cable for the 1Gb Ethernet adapter.

Software Installation Guide

The Chelsio Ethernet driver currently has two components.

1. Chelsio T320/T310/T302 Virtual Bus Driver (ch_vbd.sys)
2. Chelsio T320/T310/T302 Ndis Miniport Driver (cxge3.sys)

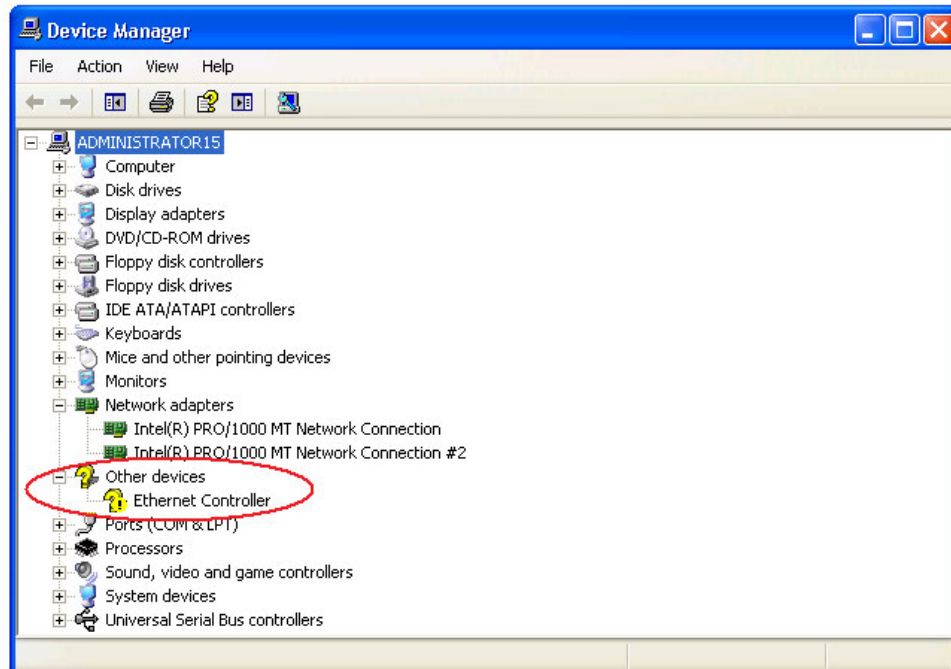
Please install the components in the order they are being described here.

Virtual Bus Driver Installation

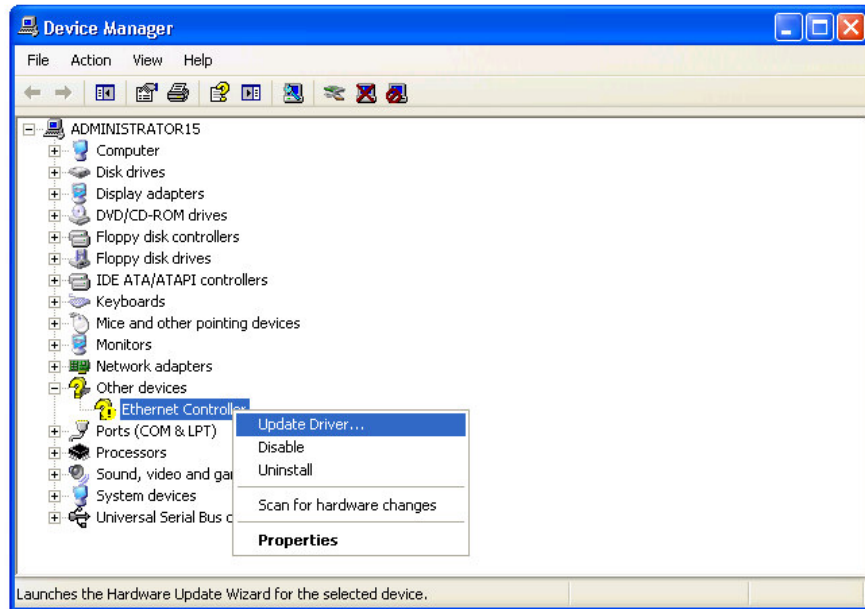
If the PC has just been booted up with the Chelsio NIC card, the Windows Device Manager Wizard.



Else, please open the device manager and right click on the host name and click on “**Scan for hardware changes**” to trigger a scan for PNP compliant hardware.



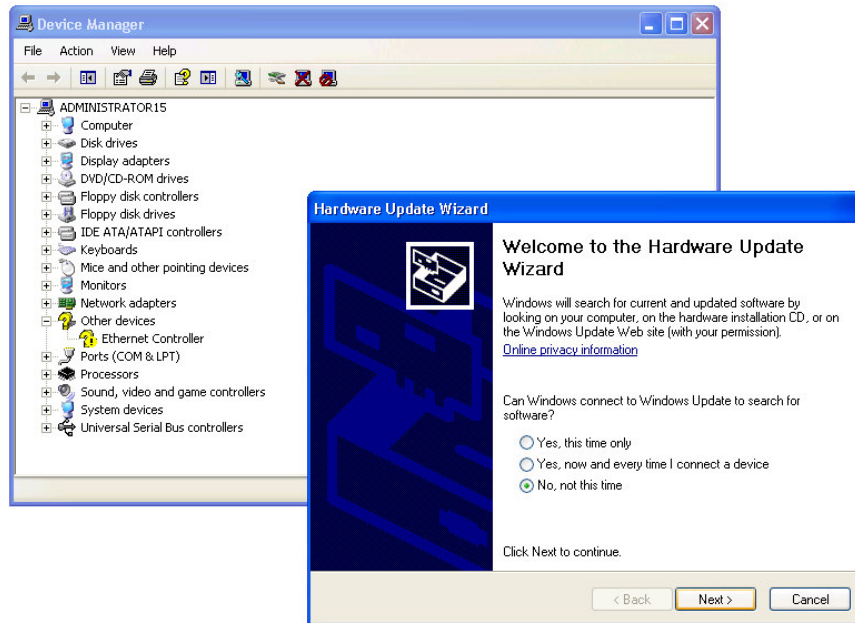
After scanning for hardware changes the device manager will identify the Chelsio card in the device tree as an “**Ethernet controller**” icon in the “**Other devices**” as shown above.



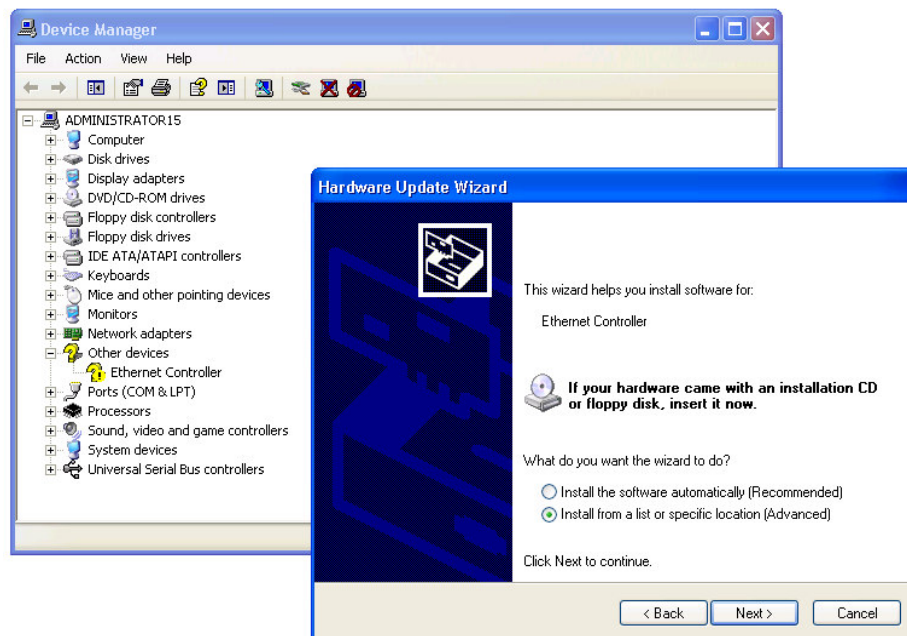
In order to install the Chelsio VBD driver, right-click on the “**Ethernet controller**” and click on “**Update Driver...**”. Links



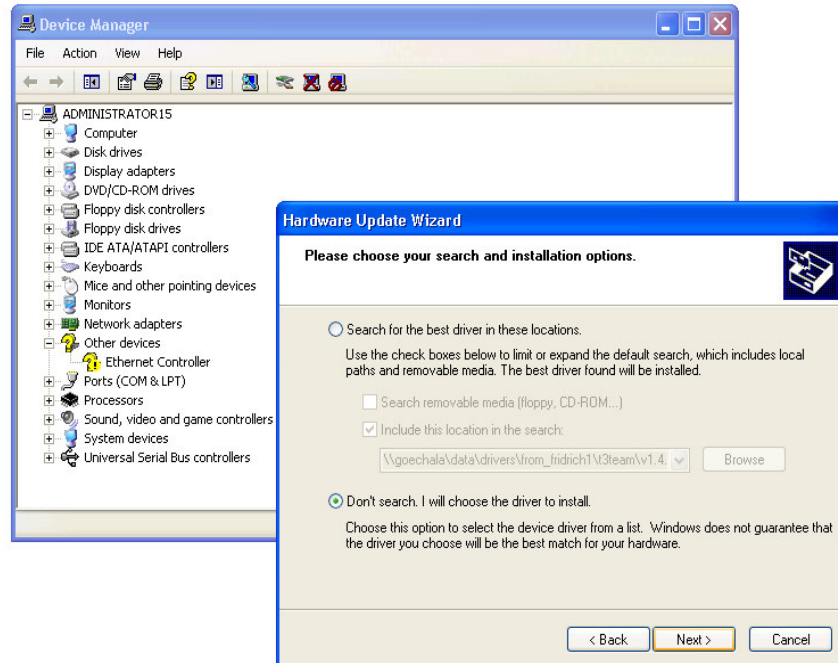
This will prompt the wizard to show the above similar to that of the one which popped up when you booted up the machine with the Chelsio NIC card.



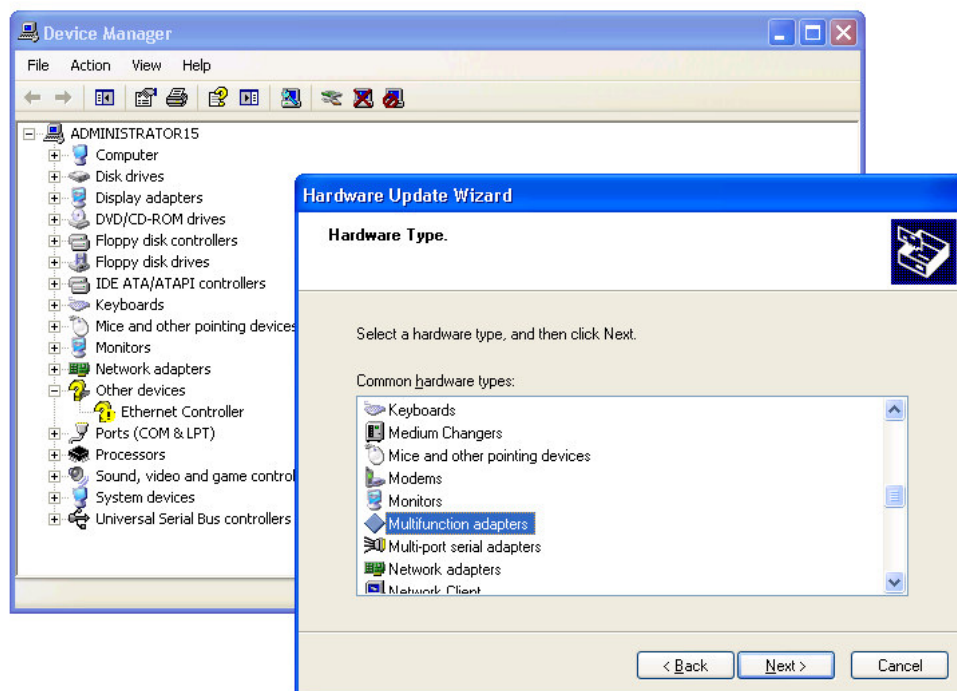
Select the ‘No, not this time’ option and click “Next”.



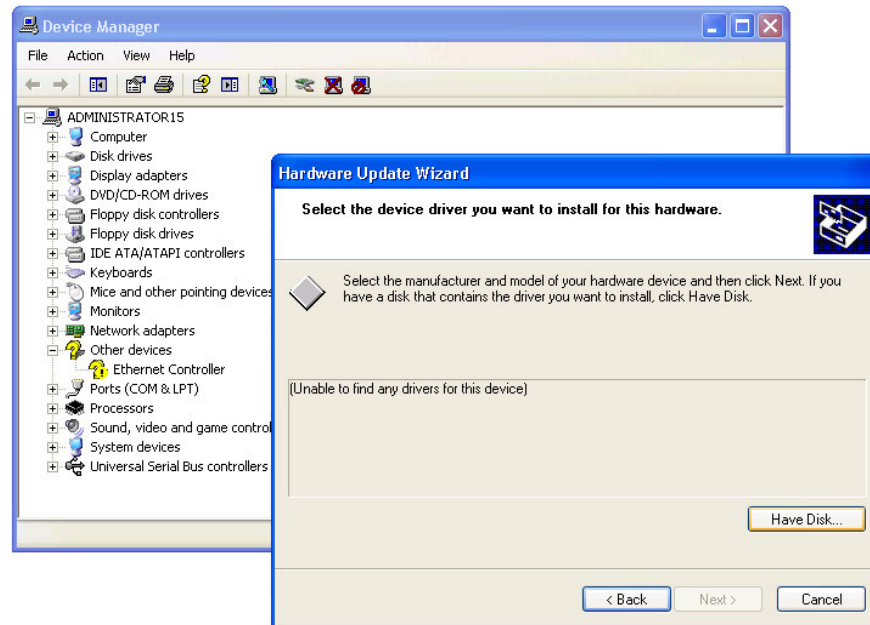
Select the “**Install from a list or Specific Location (Advanced)**” option and click “Next”.



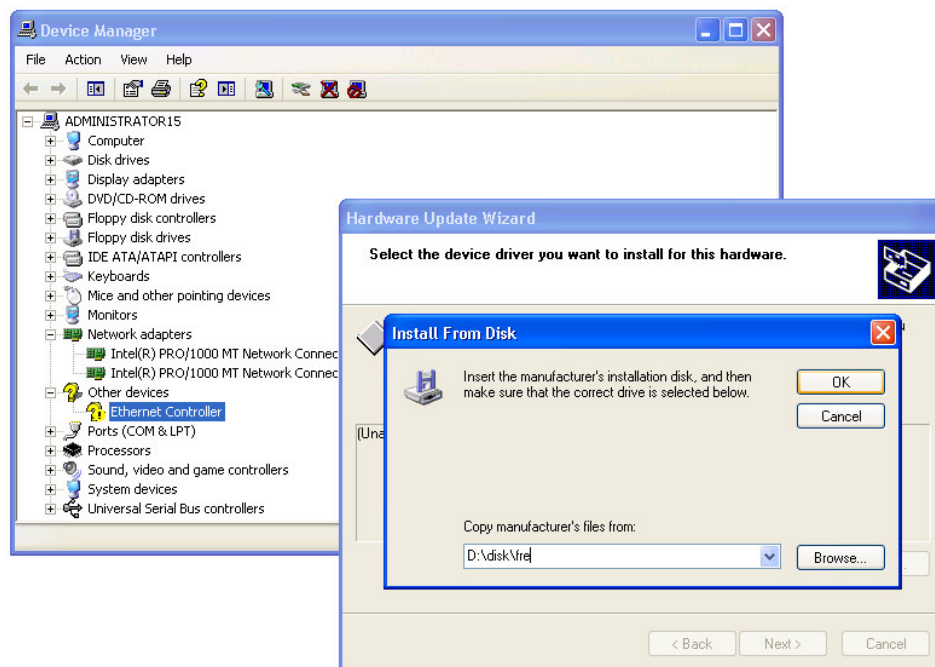
In the driver search popup please select **“Don’t search, I will choose the driver to install”** option and click **“Next”**.



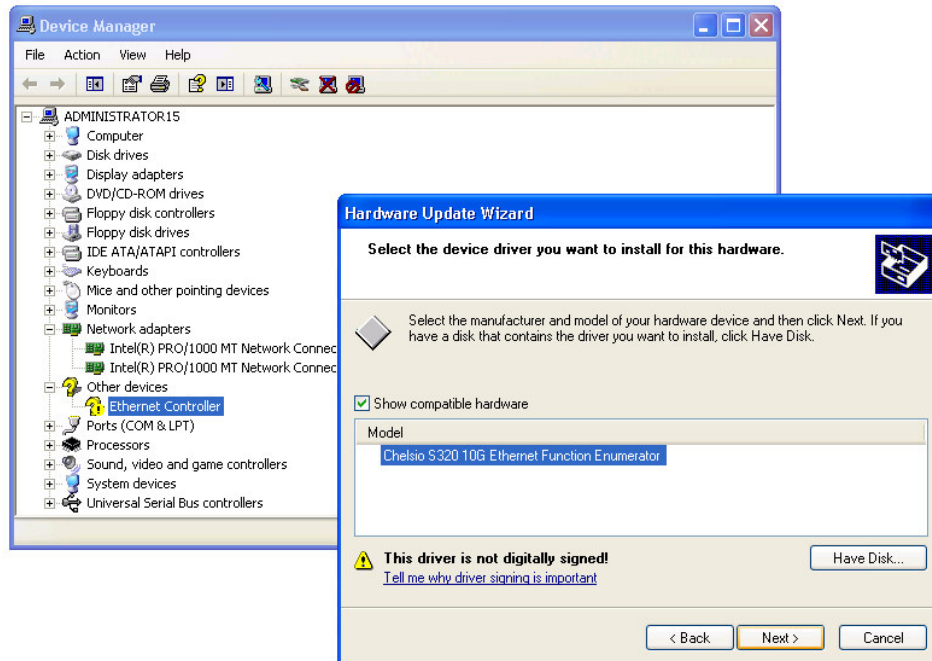
In the Hardware type popup, please select **“Multifunction adapters”** and Click **“Next”**.



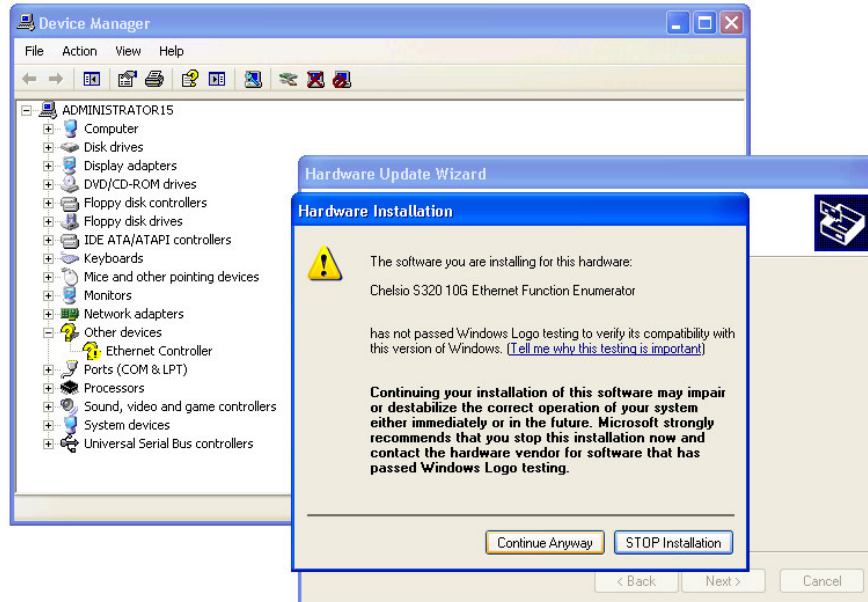
In the device driver selection popup please click on “**Have Disk...**” button.



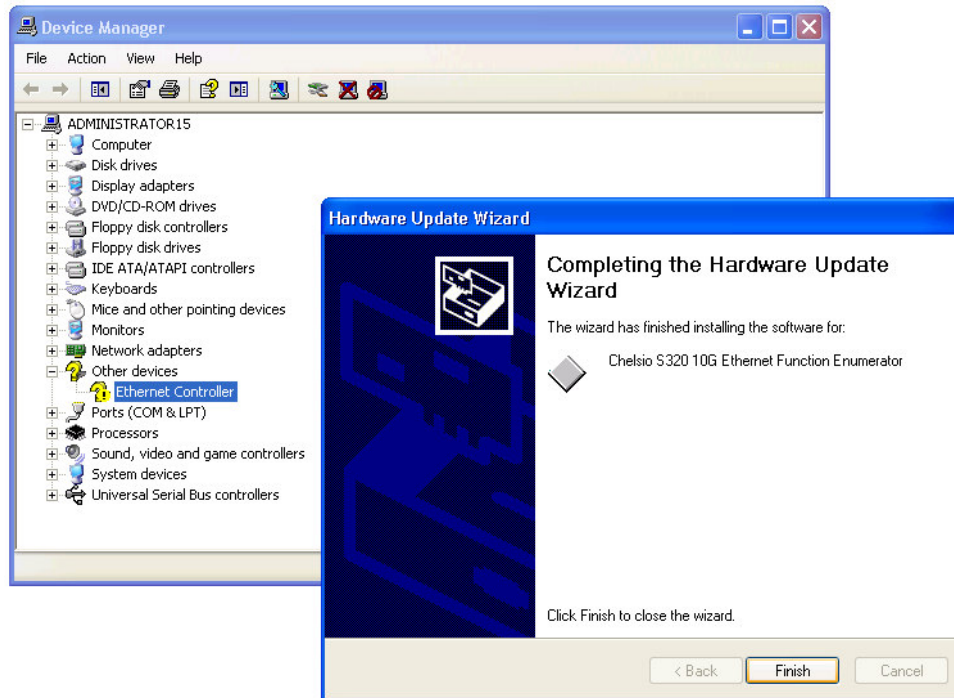
In the browse window please enter the path for the location of the “**ch_vbd.inf**” file and click “**Open**” and then press “**OK**”.



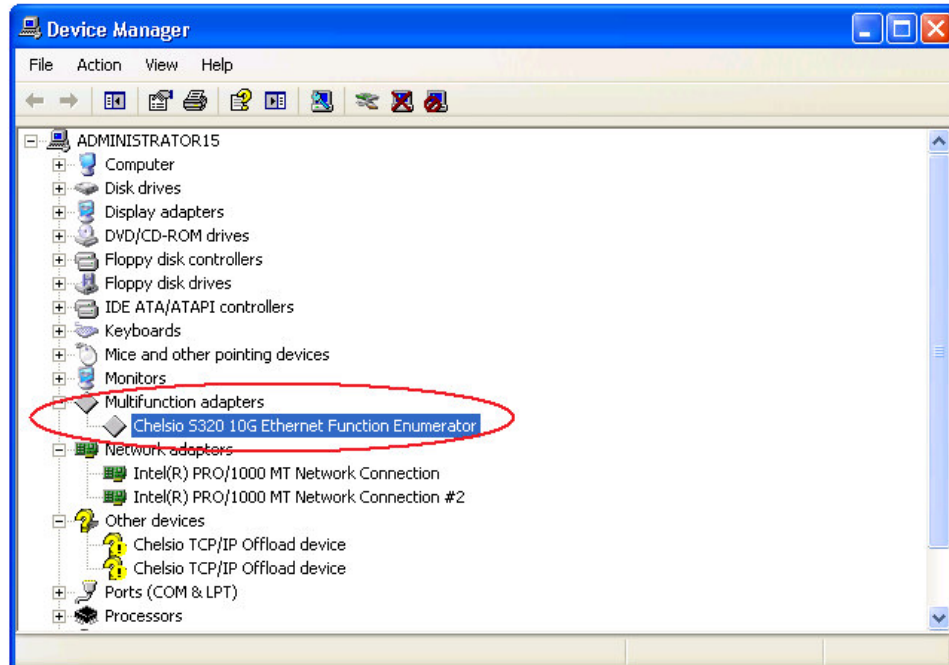
The Hardware Wizard will show the “**Chelsio Ethernet Function Enumerator**” in the list. Please select this entry and click “**Next**”.



If the drivers are unsigned the wizard will warn and prompt for continuation. Please click on “**Continue Anyway**” to continue with the installation.



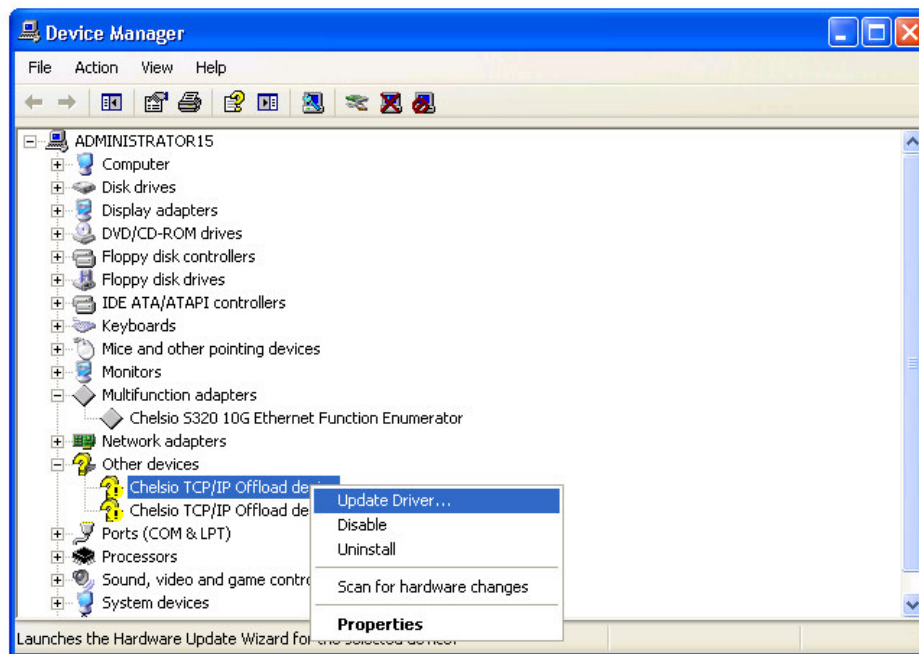
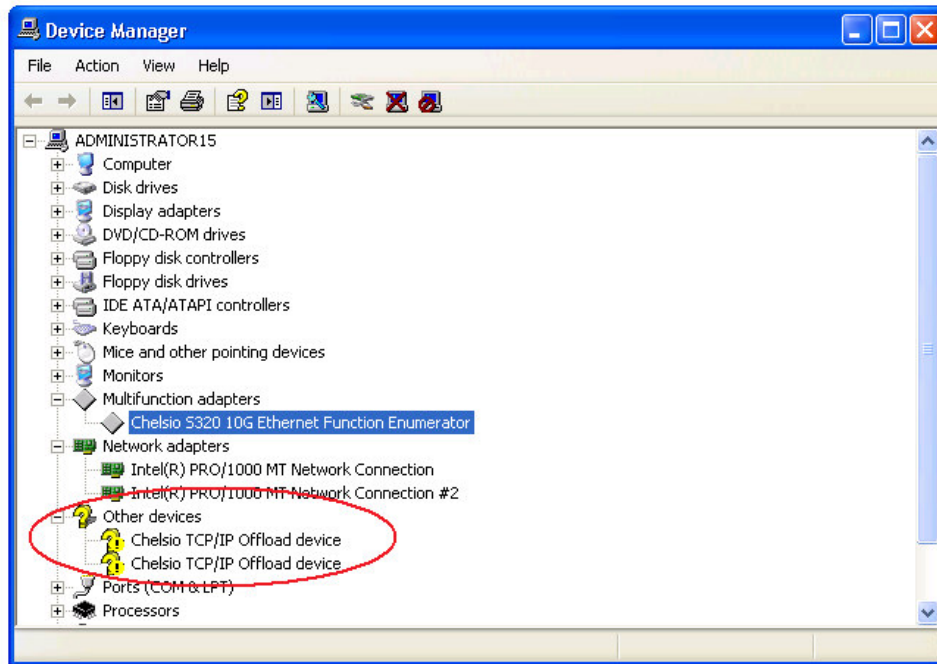
When the wizard has finished with the installation of the driver, it popup the above windows. Please click on “**Finish**” button to complete the installation of the VBD driver.



You have successfully installed the Virtual Bus Driver Installation, once you see the Multifunction adapters as shown above.

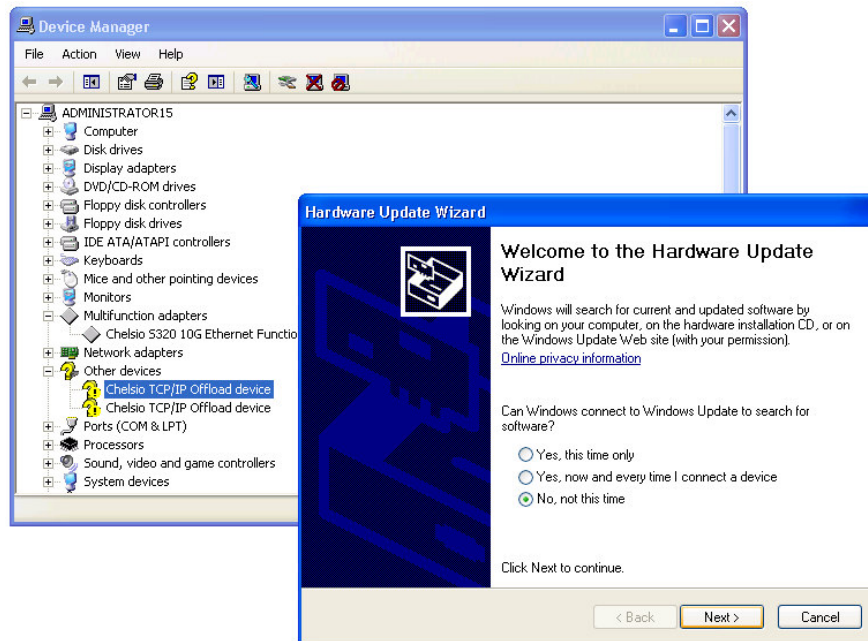
NDIS Miniport Installation

Following the installation of the VBD driver the device manager will prompt for the installation of the NDIS miniport driver.

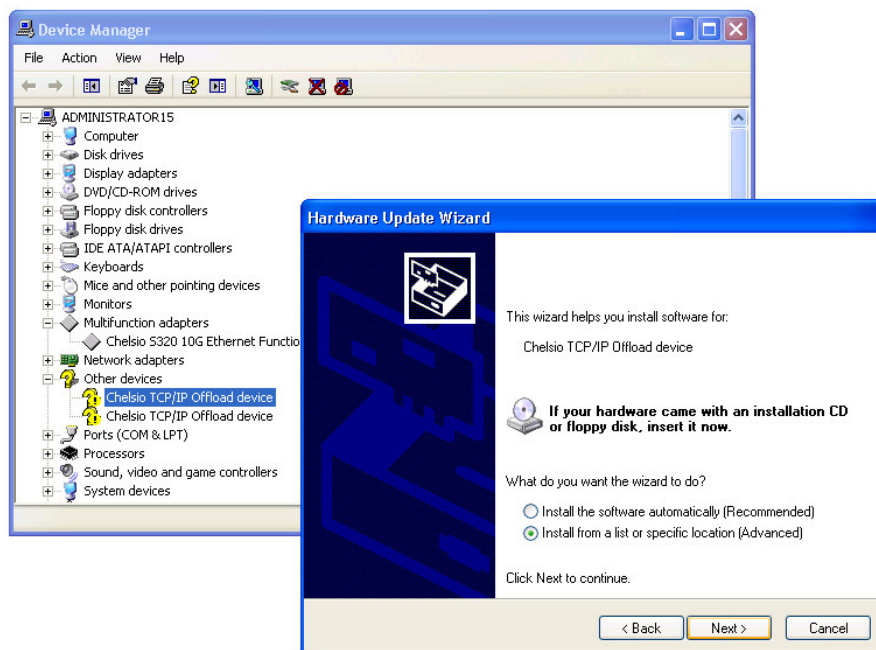


To begin miniport installation please right click on **“Chelsio TCP/IP Offload device”** and click on **“Update Driver...”**.

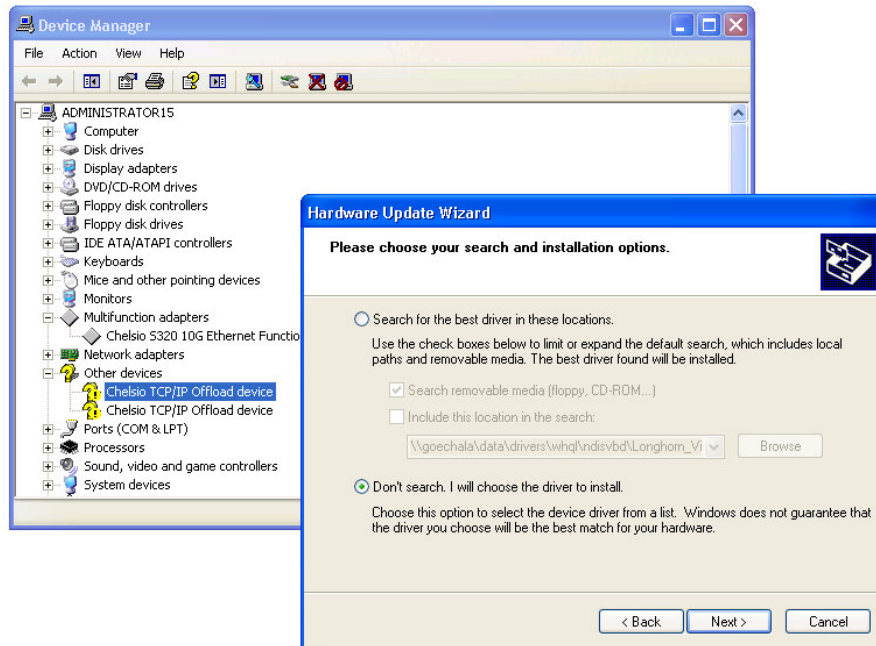
This Wizard may also open up as soon as we finish installing Virtual Bus Driver.



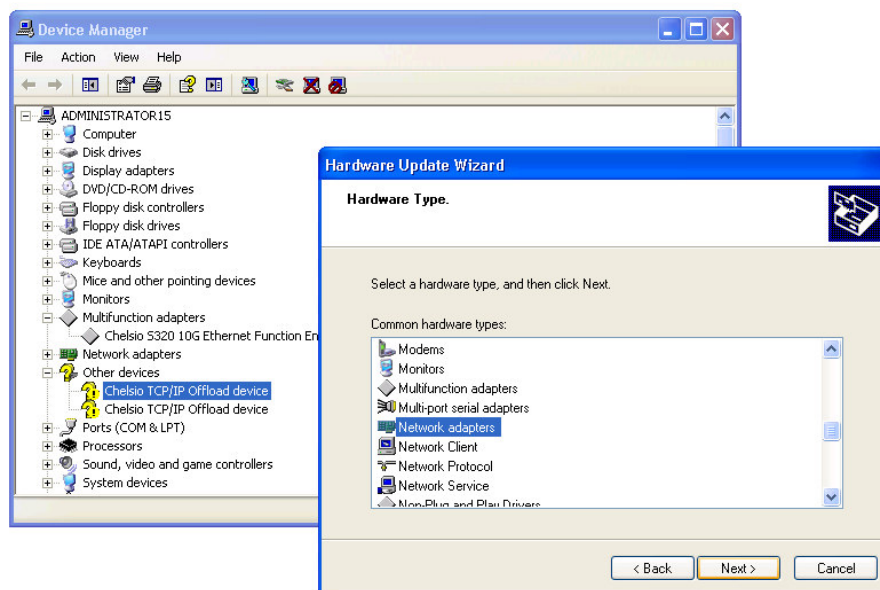
Please continue by selecting the ‘No, not this time’ option and click **“Next”**.



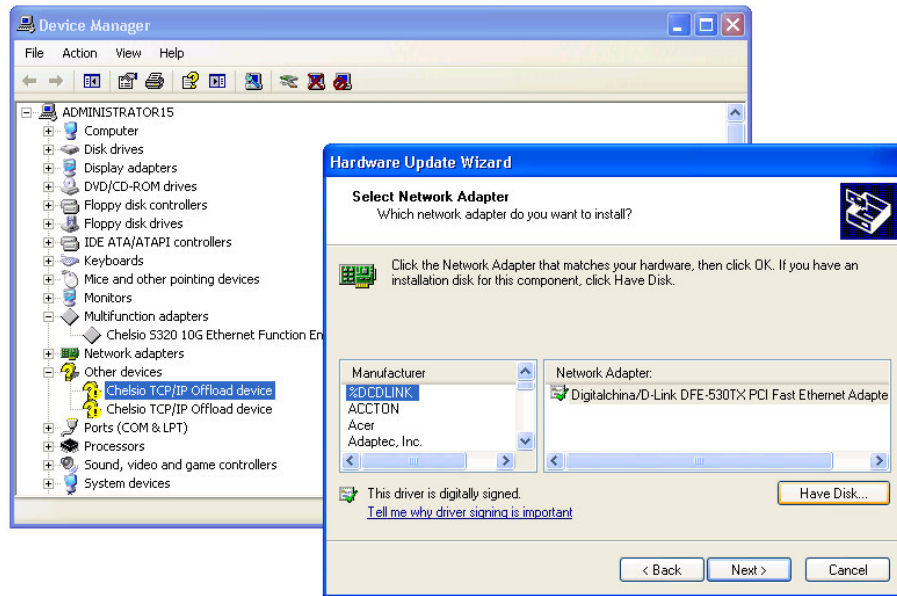
Select the **“Install from a list or Specific Location (Advanced)”** option and click **“Next”**.



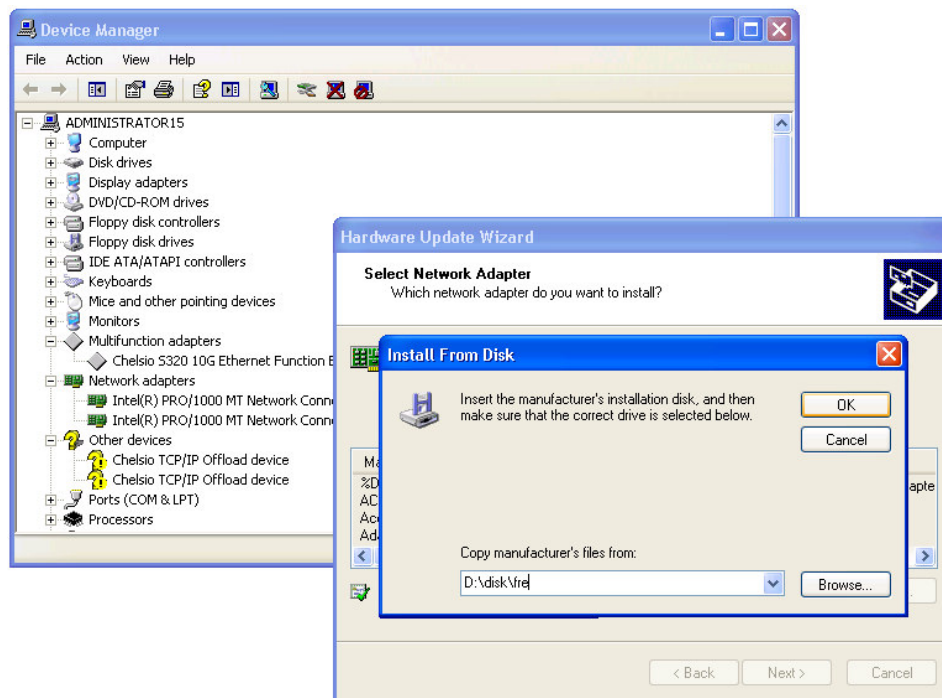
Select the **“Don’t search, I will choose the driver to install”** option and click **“Next”**.



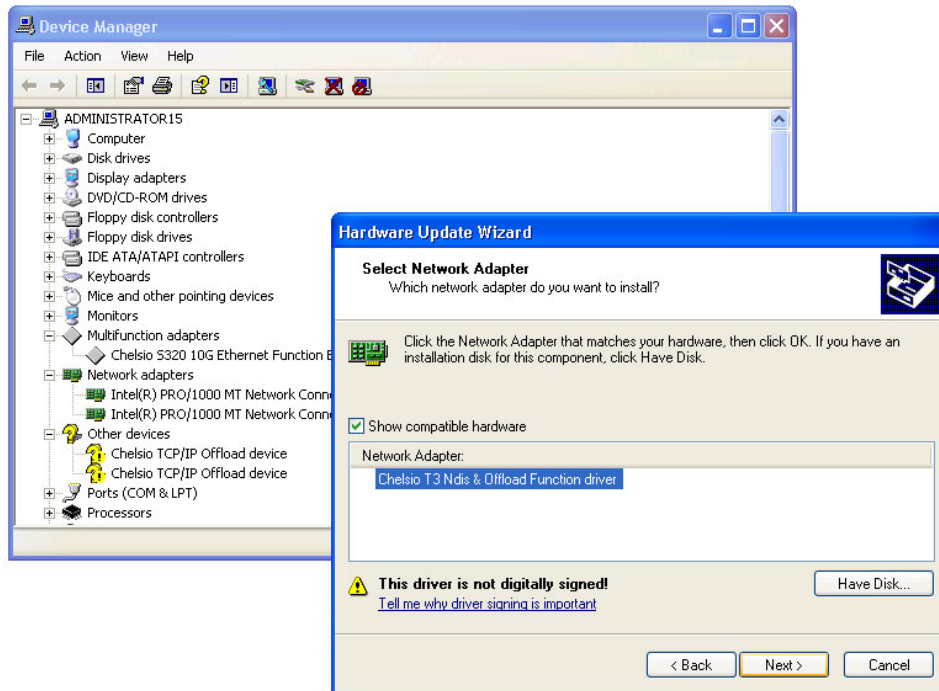
In the hardware type popup please select **“Network Adapters”** from the list and Click **“Next”**.



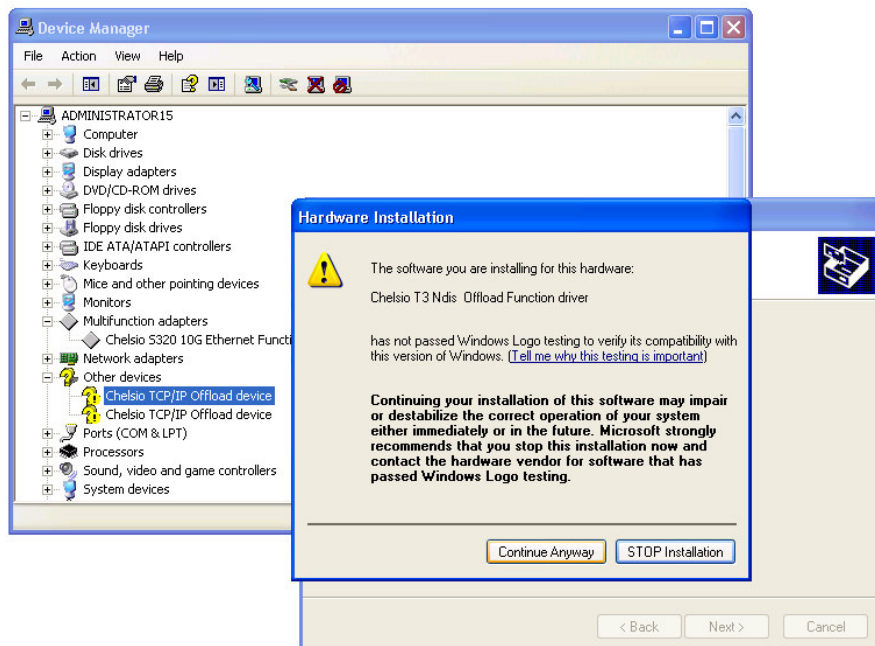
In the select adapter popup please click on “**Have Disk...**” button.



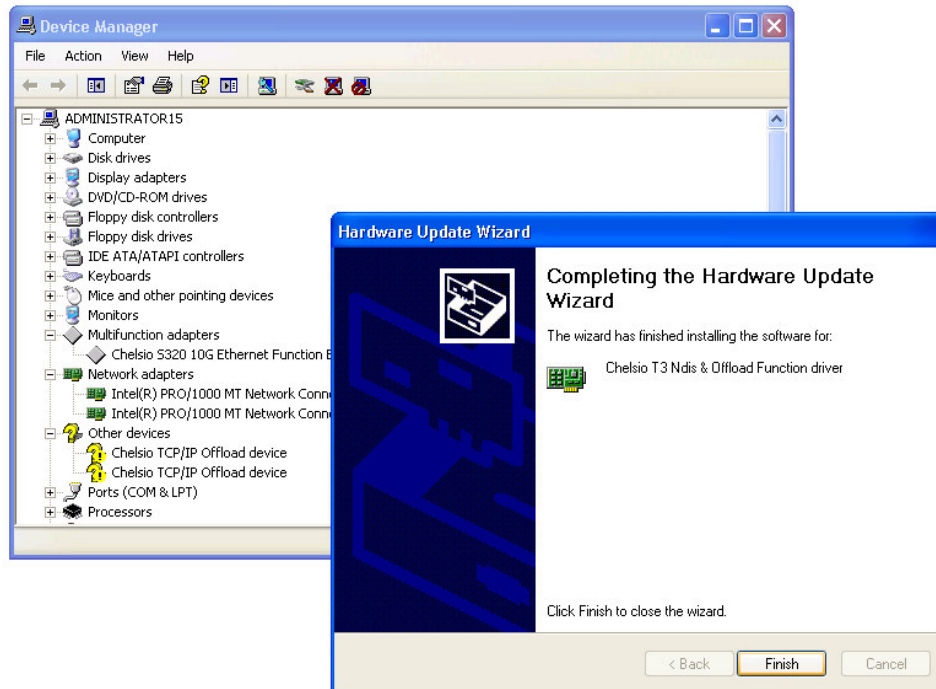
In the browse window enter the path for the location of the “**cxge3.inf**” file and click “**Open**” and then press “**OK**”.



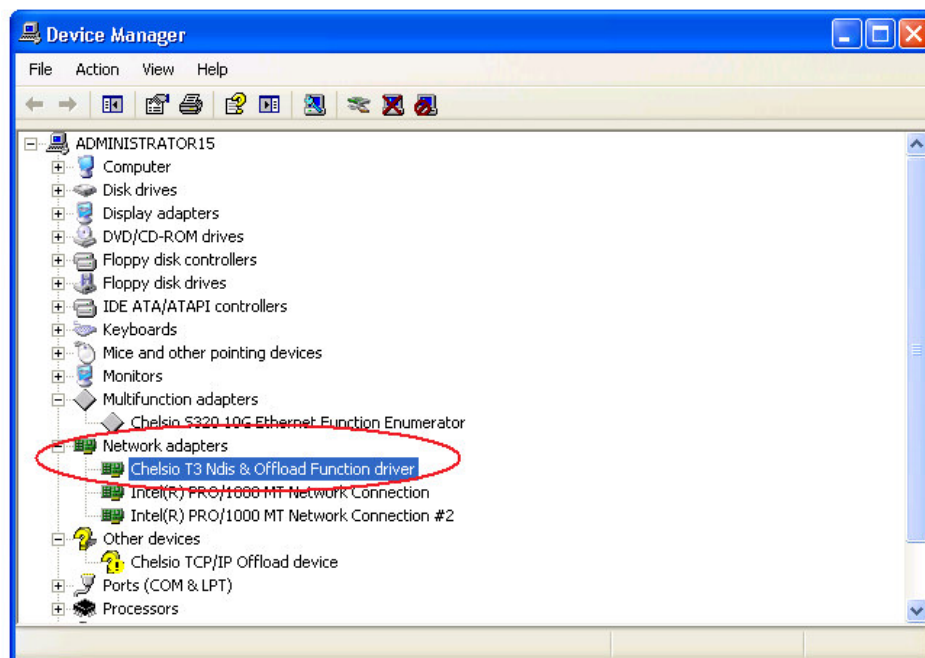
The Hardware Wizard will show the “Chelsio **Ethernet Function Enumerator**” in the list. Please select this entry and click “**Next**”.



Click on “**Continue Anyway**” if the wizard complains about the driver signature, else,

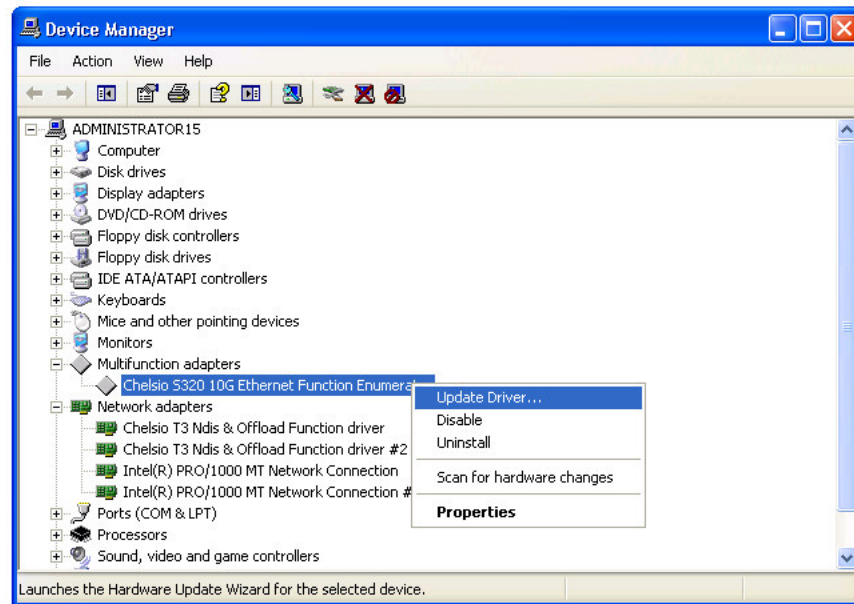


To complete the installation of the miniport driver please click on “**Finish**” button.



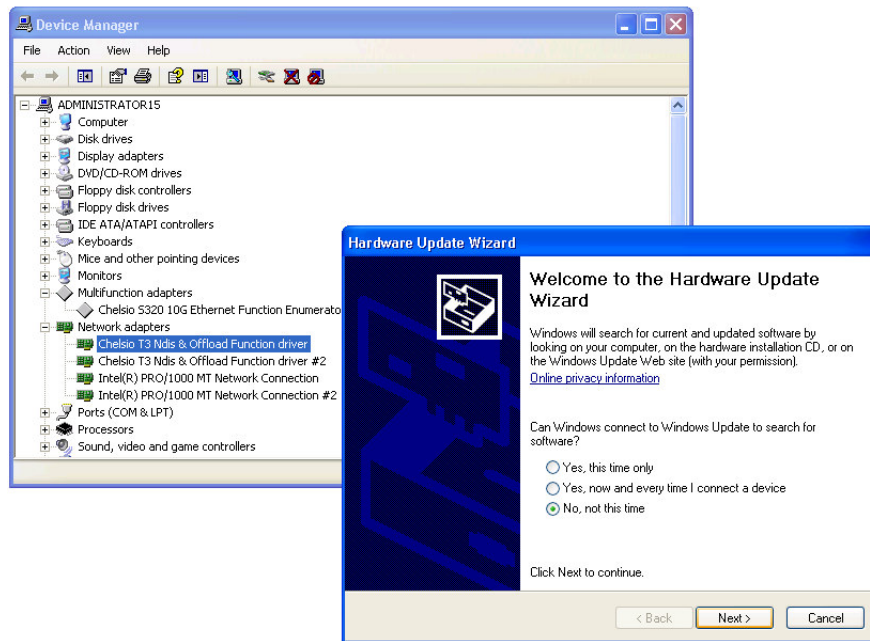
If the NDIS Miniport is installed successfully, you will find “**Chelsio T3 Ndis and Offload Functional Driver**” in Network Adapters. Continue the same steps for the other NDIS port.

Updating an Existing Driver



In order to update the driver, open device manager and Right click on the “**Chelsio Ethernet Function Enumerator**” and click on “**Update Driver**”. Beyond this please follow the same procedures as described in the installation of the VBD driver.

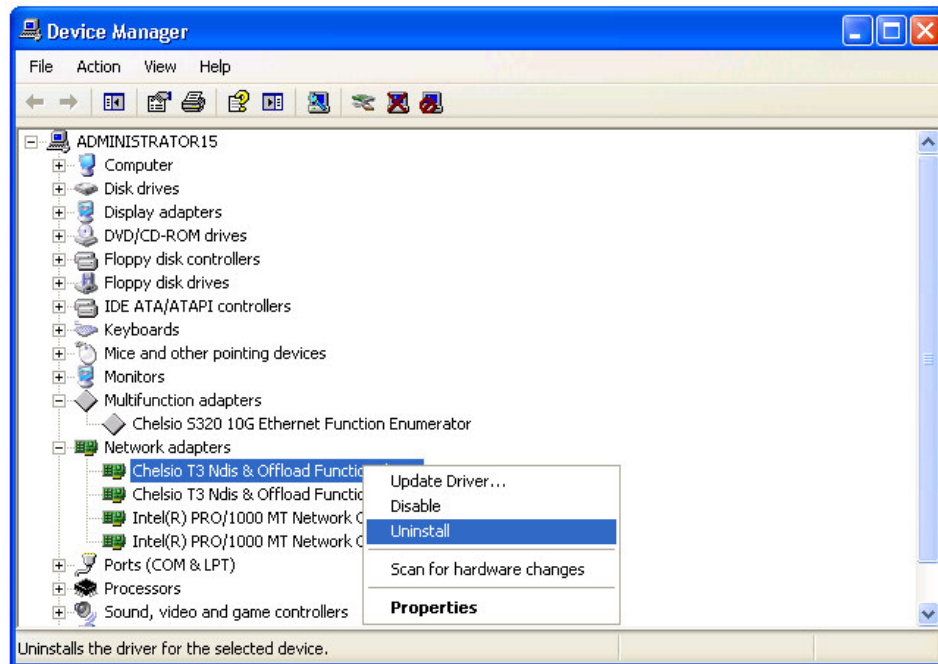
After Updating the Virtual Bus Driver, the NDIS Miniport Driver should also be updated. In order to Update NDIS Miniport Driver, right Click on the “**Chelsio T3 Ndis & Offload Functional Driver**” and click on “**Update Driver**”.



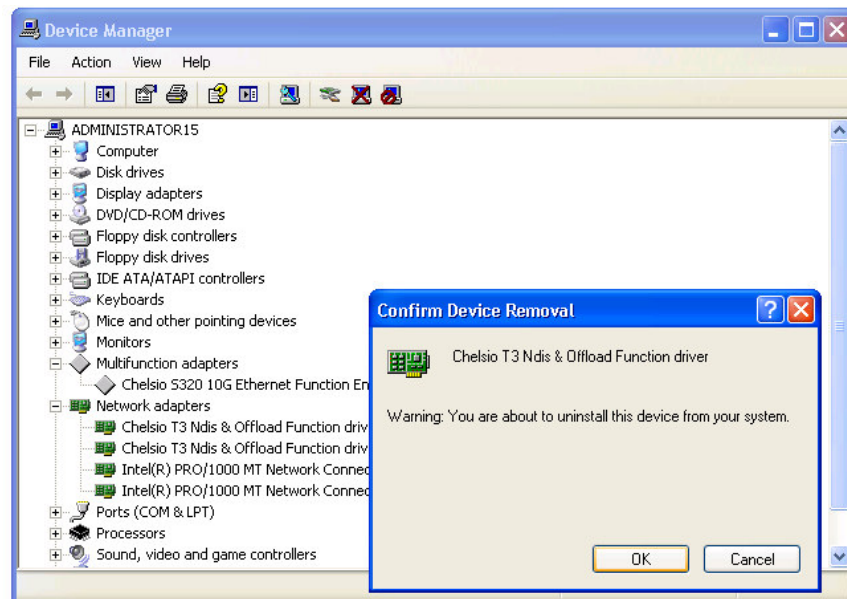
From here on please follow the same procedures as described in the **NDIS Miniport Installation** chapter. If the NDIS Miniport is successfully updated then continue updating the other NDIS port by repeating the above steps again.

Uninstalling the Driver

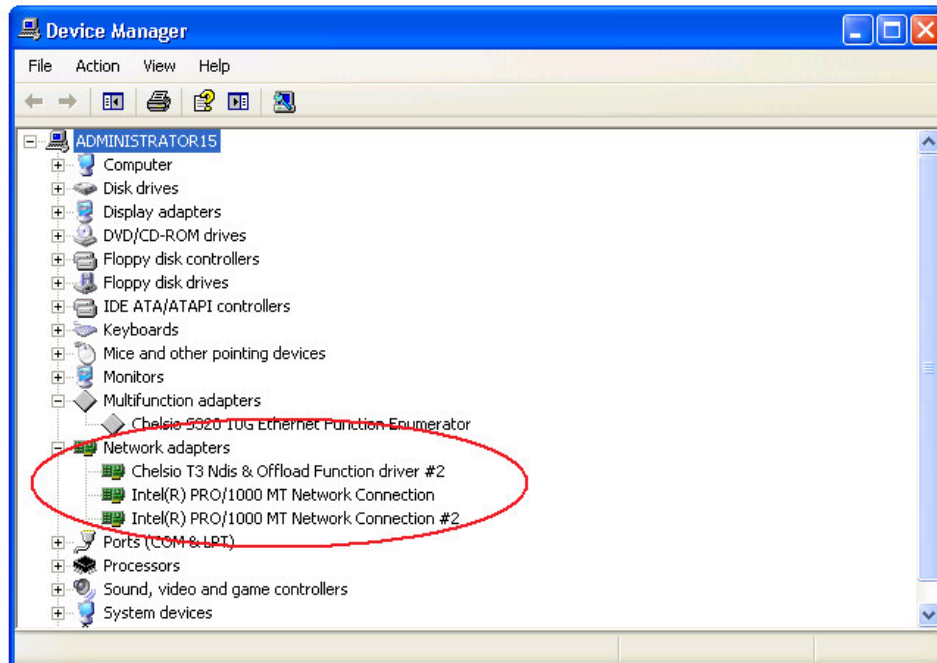
While uninstalling the driver first you need to uninstall the NDIS Miniport Driver and then followed by the Virtual Bus Driver.



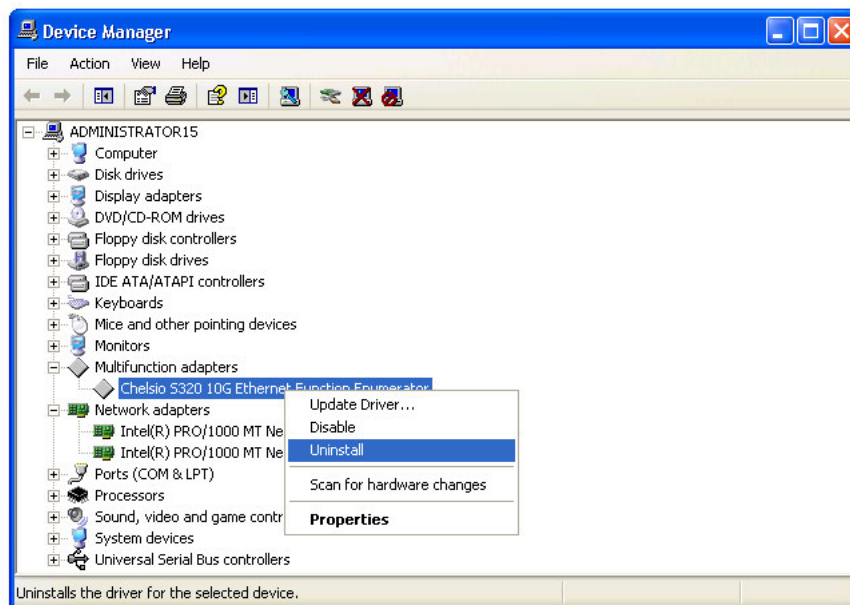
In order to uninstall the NDIS Miniport Driver, open device manager right click on the **“Chelsio T3 Ndis & Offload Function”** and click on **“Uninstall”** option.



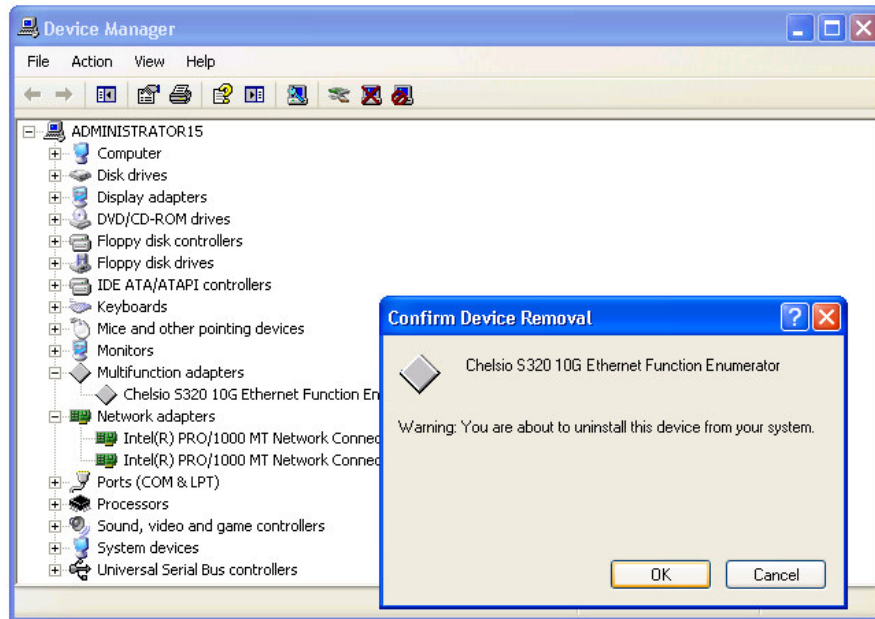
Please click on **“OK”** button to proceed further.



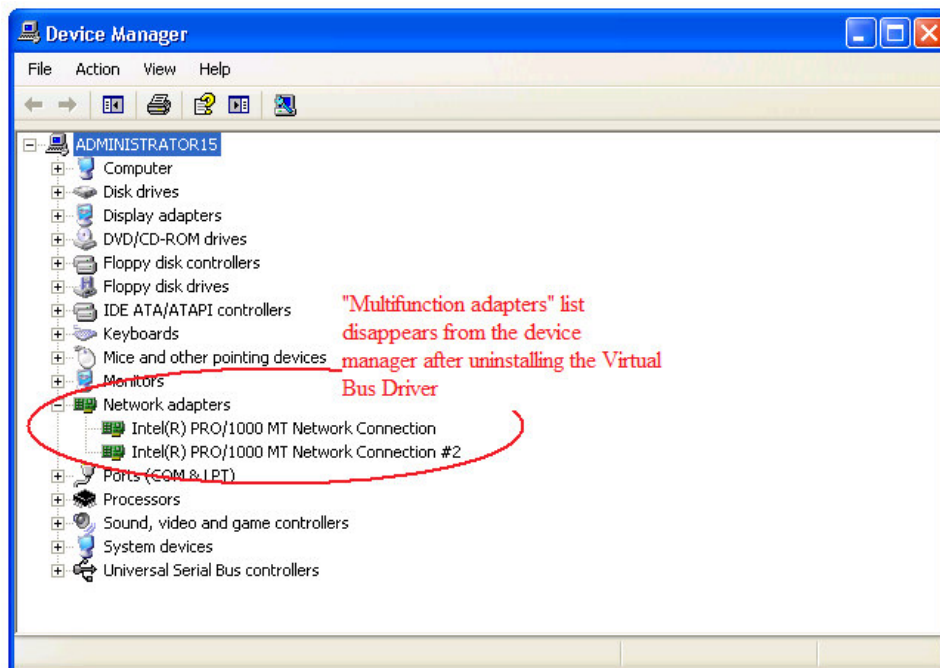
The first NDIS miniport adapter should have disappeared from the Network adapters list. Please repeat the above steps to uninstall the other NDIS miniport adapter.



After uninstalling Ndis Miniport's, now uninstall the Virtual Bus Driver by right clicking on "**Chelsio Ethernet Functional Enumerator**" and clicking on "**Uninstall**".



Please continue by clicking on “OK” button.



The ‘Multifunction Adapter’ tree will disappear after the successful un-installation of the VBD driver

Assigning IP address to the Chelsio Ethernet Adapter

1. Double click on the Network Connections icon and choose the Chelsio card entry and double click it.
2. Click on the Properties button from the Local Area Connection X Status.
3. Select “Internet Protocol (TCP/IP)” from the list and click on Properties button below it.
4. From the Internet Protocol (TCP/IP) Properties window, assign an IP Address (e.g. 192.169.1.10) and subnet mask (e.g. 255.255.255.0).
5. Click on Ok and close on the other window.
6. Check to see if you can ping to some other address on this subnet.

Driver Configuration

The Chelsio Ethernet driver provides advanced configuration options under the Device Properties. In the Network Connections window, select the Chelsio Adapter’s Local Area Connection interface (right-click -> properties). Click the Configure button.

VBD Driver Parameters

To see all tunable VBD driver parameters, open the Device Manager (Start > Control Panel -> System -> Hardware -> device Manager), click on the “Multifunction adapter”, double click the “Chelsio T3xx-E 10G Ethernet Function Enumerator”, and then click the “Advanced” tab.

The VBD driver tunable parameters are defined as:

- **Adapter Update Mode:**
 - *Description:* If enabled, the adapter is put in “Update Mode” in which driver performs bare minimum init on HW, which allows reload firmware, EEPROM, etc. User sets this mode when the adapter is in a “bad” status and user wants to recover the adapter, e.g., to an earlier known working firmware. If disabled, the adapter is in “Normal” operation mode.
 - *Range:* Enable | Disable
 - *Default:* Disable

- **Ethernet Port 0 Capability:**
 - *Description:* This parameter controls the enable or disable of physical port 0.
 - *Range:* Network (enabled) | Disabled
 - *Default:* Network
- **Ethernet Port 0 MTU:**
 - *Description:* Specifies the MTU size of physical port 0 in bytes.
 - *Range:* 1500 – 9000
 - *Default:* 1500
- **Ethernet Port 0 Queue Sets:**
 - *Description:* Specifies the number of Rx queues to use to receive ingress packets.
 - *Range:*
 - 1-8 if single-port card,
 - 1-4 if dual-port card,
 - 1-2 if quad-port card,
 - *Default:* 2
 - *Note:* if 1, the RSS function is disabled. OS will use one CPU to serve queue 0 which receives all ingress packets.
- **Ethernet Port 0 Speed & Duplex:**
 - *Description:* Specifies the Port 0 operation speed and mode.
 - *Range:*
 - 10G Full-duplex
 - 1G Full-duplex
 - 1G Half-duplex
 - 100M Full-duplex
 - 100M Half-duplex
 - 10M Full-duplex
 - 10M Half-duplex
 - Auto Detect
 - *Default:* Auto Detect
 - *Note:* For 10G-SR, LR, and CX-4 interfaces, the IEEE standards only specified full-duplex operation. Auto-negotiation and half-duplex are not supported in these standards. Therefore, for these 10G interfaces, the Auto-Detect will automatically park at 10G-Full-Duplex mode, and all other values are invalid. For 1G port, however, user can specify any of the above 1G, 100M, 10M, full or half duplex modes. If Auto-Detect selected, the 1G port will do auto-negotiation.
- **Ethernet Port 0 NDIS Function**
 - *Description:* Allows for the enumeration of a Chelsio network driver
 - *Range:* Disabled, Nic mode, Offload mode
 - *Default:* Offload mode

- *Note:* Offload mode configures the adapter to support TCP offload to be used by the network, storage or iWarp drivers. This property should not be changed unless running into extremely low memory situations and offload functionality of the adapter will never be used.
- **Ethernet Port 0 iSCSI Function**
 - *Description:* Allows for the enumeration of a iSCSI driver above the VBD
 - *Default:* Disabled
 - *Note:* This should be only enabled if the release package contains the chiscsi.sys files and if iSCSI functionality is desired.
- **Ethernet Port 0 iWarp Function**
 - *Description:* Allows for the enumeration of an iWARP driver above the VBD.
 - *Range:* Enabled | Disabled
 - *Default:* Disabled
 - *Note:* This should be only enabled if the release package contains the chiwarp.sys files and if WSD functionality is desired.
- **Ethernet Port 1 xxxxx**
 - If the second physical port is enabled, its above parameters are repeated here.
- **Port 0 Rx Pause Frame Support:**
 - *Description:* Controls the enable or disable of Ethernet 802.3x Rx flow control for port 0. If enabled, all incoming PAUSE frames will be recognized, otherwise, all incoming PAUSE will be dropped.
 - *Range:* Enabled | Disabled
 - *Default:* Enabled
- **Port 0 Tx Pause Frame Support:**
 - *Description:* Controls the enable or disable of Ethernet 802.3x Tx flow control for port 0. If enabled, the HW will send PAUSE frames when its MAC Rx FIFO usage is beyond a high-watermark. If disabled, no PAUSE will be sent, when Rx MAC FIFO gets full, further ingress packets will be dropped.
 - *Range:* Enabled | Disabled
 - *Default:* Enabled
- **Port 1 XX Pause Frame Support:**
 - If the second physical port is enabled, its Pause Frame Support parameters are repeated here.
- **Qset FreeList Jumbo Queue Size:**
 - *Description:* Specifies the Rx queue size for jumbo frames
 - *Range:* 0-4096
 - *Default:* 1024
- **Qset FreeList Regular Queue Size:**

- *Description:* Specifies the Rx queue size for standard 1500B frames
- *Range:* 0-4096
- *Default:* 1024
- **Qset TOE Control Queue Size:**
 - *Description:* Specifies the Tx queue size for TOE Control queue
 - *Range:* 0-4096
 - *Default:* 1024
 - *Note:* this is only used by Chimney Miniport
- **Qset TOE Data Queue Size:**
 - *Description:* Specifies the Tx queue size for TOE Data queue
 - *Range:* 0-4096
 - *Default:* 1024
 - *Note:* this is only used by Chimney Miniport
- **Qset Tunnel Queue Size:**
 - *Description:* Specifies the Tx queue size for non-TOE ether frames.
 - *Range:* 0-4096
 - *Default:* 1024

NDIS Miniport Driver Parameters

The NDIS Miniport Driver tunable parameters are listed in “Device Manager -> Chelsio T3 NDIS Function Driver -> Advanced” category.

- **IPv6 Checksum Offload:**
 - *Description:* Controls the enable or disable of checksum offload for IPv6 packets.
 - *Range:* *Enabled* | *Disabled*
 - *Default:* *Enabled*
- **Large Segment Offload (LSO):**
 - *Description:* Controls the enable or disable of sender side LSO function.
 - *Range:* *Enabled* | *Disabled*
 - *Default:* *Enabled*
- **Locally Administrated Address:**
 - *Description:* Specifies a new MAC address for the port. If Not Present, the default MAC from EEPROM is used. If specified, the new MAC overwrites the default MAC. This specified MAC is persistent across machine reboot.
 - *Range:* Not Present | Any legal 6-byte MAC address
 - *Default:* Not Present

- **Optimization mode:**
 - *Description:* Specified the mode of operation for the offload part of the driver. In performance mode the driver is tuned to give the best performance results. In compatibility mode the driver is tuned to pass the Sparta tests (WQHL) from Microsoft
 - *Range:* Performance Mode/ Compatibility mode.
 - *Default:* Performance Mode
- **Receive Checksum Offload:**
 - *Description:* Controls the enable or disable of checksum offload for ingress ether frames.
 - *Range:* Enabled | Disabled
 - *Default:* Enabled
- **Receive Side Scaling (RSS):**
 - *Description:* This parameter controls the RSS functions. If on, the Microsoft RSS function is enabled. If off, the Chelsio RSS function is enabled.
 - *Range:* Enabled | Disabled
 - *Default:* Disabled
 - *Note:* To use either Microsoft or Chelsio RSS functions, the VBD driver parameter “Ethernet Port 0 Queue Sets” must be set to greater than 1. Qset=1 totally disables the RSS function.
- **TCPOffload :**
 - *Description:* This parameter controls the RSS functions. If on, the Microsoft Chimney TCP Offload function is enabled
 - *Range:* Enabled | Disabled
 - *Default:* Enabled
 - *Note:* If TCP Offload is enabled please ensure that RSS is disabled.
- **Transmit Checksum Offload:**
 - *Description:* Controls the enable or disable of checksum offload for egress ether frames.
 - *Range:* Enabled | Disabled
 - *Default:* Enabled
- **VLAN Insertion:**
 - *Description:* Controls the enable of disable of VLAN ID insertion function. If enabled, the HW will insert the VLAN ID specified by the next VLAN ID parameter in all egress ether frames.
 - *Range:* Enabled | Disabled
 - *Default:* Disabled
- **VLAN ID:**
 - *Description:* If the previous “VLAN Insertion” is enabled, this parameter specifies the VLAN ID to be inserted.

- *Range: 0-4095*
- *Default: 777*