



Chelsio PXE Boot

Installation and User's Guide



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I. PXE Boot Option ROM

1. Introduction

Thank you for choosing Chelsio Unified Wire adapters. These high speed, single chip, single firmware cards provide enterprises and data centers with high performance solutions for various Network and Storage related requirements.

The **Terminator** series is Chelsio's next generation of highly integrated, hyper-virtualized 1/10/25/40/50/100GbE controllers. The adapters are built around a programmable protocol-processing engine, with full offload of a complete Unified Wire solution comprising NIC, TOE, iWARP RDMA, iSCSI, FCoE and NAT support. It scales to true 40Gb line rate operation from a single TCP connection to thousands of connections, and allows simultaneous low latency and high bandwidth operation thanks to multiple physical channels through the ASIC.

Ideal for all data, storage and high-performance clustering applications, the Unified Wire adapters enable a unified fabric over a single wire by simultaneously running all unmodified IP sockets, Fibre Channel and InfiniBand applications over Ethernet at line rate.

Designed for deployment in virtualized data centers, cloud service installations and high-performance computing environments, Chelsio adapters bring a new level of performance metrics and functional capabilities to the computer networking industry.

PXE is short for Preboot eXecution Environment and is used for booting computers over an Ethernet network using a Network Interface Card (NIC). This section of the guide explains how to configure and use Chelsio PXE Boot Option ROM on Chelsio's adapters.

1.1. Hardware Requirements

1.1.1. Supported Adapters

The following are the currently shipping Chelsio Adapters that are compatible with PXE Boot Option ROM software:

- T62100-CR
- T62100-LP-CR
- T62100-SO-CR
- T6425-CR
- T6225-CR
- T6225-LL-CR
- T6225-SO-CR
- T580-CR
- T580-LP-CR
- T580-SO-CR
- T580-OCP-SO
- T540-CR
- T540-LP-CR

- T520-CR
- T520-LL-CR
- T520-SO-CR
- T520-OCP-SO
- T520-BT
- T540-BT

1.1.2. Supported Hardware

The following hardware platforms are supported by Chelsio PXE Boot Option ROM software:

- Dell T5600
- DELL PowerEdge 2950
- DELL PowerEdge T110
- DELL PowerEdge T710
- DELL PowerEdge R220
- DELL PowerEdge R720
- IBM X3650 M2
- IBM X3650 M4*
- HP ProLiant DL180 gen9
- HP ProLiant DL385G2
- Supermicro X7DWE
- Supermicro X8DTE-F
- Supermicro X8STE
- Supermicro X8DT6
- Supermicro X9SRL-F
- Supermicro X9SRE-3F
- Supermicro-X10DRi
- ASUS P5KPL
- ASUS P8Z68
- Lenovo X3650 M5
- Intel DQ57TM

* If system BIOS version is lower than 1.5 and both Legacy and uEFI are enabled, system will hang during POST. Please upgrade the BIOS version to 1.5 or higher to avoid this issue.

1.1.3. Supported Switches

The following switches are supported by Chelsio PXE Boot Option ROM software:

- Cisco Nexus 5010 with 5.1(3) N1 (1a) firmware.
- Arista DCS-7124S-F
- Mellanox SX_PPC_M460EX

Other platforms/switches have not been tested and are not guaranteed to work.

1.2. Software Requirements

Chelsio PXE Boot Option ROM software requires Disk Operating System to flash Option ROM onto Chelsio adapters.

The installation of the following Linux distributions is supported using Chelsio inbox drivers.

- RHEL 8.2, 4.18.0-193.el8
- RHEL 8.1, 4.18.0-147.el8
- RHEL 7.8, 3.10.0-1127.el7
- RHEL 7.7, 3.10.0-1062.el7

 **Note** *Other kernel versions have not been tested and are not guaranteed to work.*

1.3. Pre-requisites

- A DOS bootable USB flash drive or Floppy Disk is required for updating firmware, Option ROM, creating DUD, etc.
- Secure Boot should be disabled in the system BIOS.

1.4. Package Contents

Chelsio PXE Boot Option ROM package contains the following:

- **OptionROM:** This directory contains PXE Boot Option ROM image (*cpbt4.bin*), uEFI driver (*ChelsioPXE.efi*), default boot configuration file (*bootcfg*) and a flash utility (*cfut4.exe*), which can be used to flash the Option ROM onto Chelsio's adapters. It also contains Firmware files.
- **EULA:** Chelsio's End User License Agreement.
- **docs:** The docs directory contains support documents - README, Release Notes and User's Guide (this document) for the software package.

2. Hardware Installation

- i. Shutdown/power off your system.
- ii. Power off all remaining peripherals attached to your system.
- iii. Unpack the Chelsio adapter and place it on an anti-static surface.
- iv. Remove the system case cover as per the system manufacturer's instructions.
- v. Remove the PCI filler plate from the slot where you will install the Ethernet adapter.
- vi. For maximum performance, it is highly recommended to install the adapter into a PCIe x8/x16 slot.

Note *All 4-ports of T6425-CR adapter will be functional only if PCIe x8 -> 2x PCIe x4 slot bifurcation is supported by the system and enabled in BIOS. Otherwise, only 2-ports will be functional.*

- vii. Holding the Chelsio 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 SFP (transceiver) modules prior to inserting the adapter.
- viii. Secure the Chelsio adapter with a screw, or other securing mechanism, as described by the system manufacturer's instructions. Replace the case cover.
- ix. After securing the card, ensure that the card is still fully seated in the PCIE x8/x16 slot as sometimes the process of securing the card causes the card to become unseated.
- x. Connect a fiber/twinax cable, multi-mode for short range (SR) optics or single-mode for long range (LR) optics, to the Ethernet adapter or regular Ethernet cable for the 1Gb Ethernet adapter.
- xi. Power on your system.
- xii. On Linux systems, run `update-pciids` command to download the current version of PCI ID list

```
[root@rhel7 ~]# update-pciids
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           %             %             Dload  Upload  Total  Spent    Left   Speed
100  227k  100  227k    0     0  68592      0  0:00:03  0:00:03 --:--:--  68610
Done.
```

- xiii. Verify if the adapter was installed successfully:

- On Linux and ESXi systems, run `lspci` command and you should see a similar output:

```
[root@rhel7 ~]# lspci | grep -i Chelsio
81:00.0 Ethernet controller: Chelsio Communications Inc T62100-LP-CR Unified Wire Ethernet Controller
81:00.1 Ethernet controller: Chelsio Communications Inc T62100-LP-CR Unified Wire Ethernet Controller
81:00.2 Ethernet controller: Chelsio Communications Inc T62100-LP-CR Unified Wire Ethernet Controller
81:00.3 Ethernet controller: Chelsio Communications Inc T62100-LP-CR Unified Wire Ethernet Controller
81:00.4 Ethernet controller: Chelsio Communications Inc T62100-LP-CR Unified Wire Ethernet Controller
81:00.5 SCSI storage controller: Chelsio Communications Inc T62100-LP-CR Unified Wire Storage Controller
81:00.6 Fibre Channel: Chelsio Communications Inc T62100-LP-CR Unified Wire Storage Controller
```

- On Windows systems, follow these steps:
 - a. Open **Device Manager** in **Control Panel**.
 - b. Under **Other devices** section, Chelsio adapter should be listed as **Ethernet Controller**. If the adapter is not listed, right-click on the system name or click on the **Actions** menu and select **Scan for hardware changes**.

For Chelsio adapters, the physical functions are currently assigned as:

- Physical functions 0 - 3: for the SR-IOV functions of the adapter
- Physical function 4: for all NIC functions of the adapter
- Physical function 5: for iSCSI
- Physical function 6: for FCoE
- Physical function 7: Currently not assigned

xiv. Based on the operating system, install the appropriate network driver. Install and load `cxgb4` for Linux systems, `VBD` and `NDIS` for Windows systems, and `cxl` for ESXi systems.

xv. Finally, verify if the card is discovered:

- For Linux systems, examine the output of `dmesg` and you should see a similar output:

```
[ 1119.854346] cxgb4 0000:81:00.4: Chelsio T62100-LP-CR rev 0
[ 1119.854347] cxgb4 0000:81:00.4: S/N: RE41160042, P/N: 11012106003
[ 1119.854348] cxgb4 0000:81:00.4: Firmware version: 1.1.0.0
[ 1119.854349] cxgb4 0000:81:00.4: Bootstrap version: 255.255.255.255
[ 1119.854350] cxgb4 0000:81:00.4: TP Microcode version: 0.1.23.2
[ 1119.854351] cxgb4 0000:81:00.4: No Expansion ROM loaded
[ 1119.854351] cxgb4 0000:81:00.4: Serial Configuration version: 0x7002000
[ 1119.854352] cxgb4 0000:81:00.4: VPD version: 0x52
[ 1119.854354] cxgb4 0000:81:00.4: Configuration: NIC MSI-X, non-Offload capable
[ 1119.854355] eth0: Chelsio T62100-LP-CR (eth0) 100GBASE-CR4_QSFP
```

The above output indicates the hardware configuration of the adapters as well as the Serial numbers.

- For Windows systems, open **Device Manager** again. Expand **Network adapters** section and now Chelsio adapter should be listed.
- For ESXi systems, examine the output of `dmesg` and you should see a similar output:

```
2017-09-26T04:09:20.207Z cpu6:66032)cxl1.0: cxl port init:874: mbox 0 pf 0 chan 0 viid c0
2017-09-26T04:09:20.209Z cpu6:66032)DMA: 646: DMA Engine 'cxl-0000:04:00.0' created using mapper 'DMANull'.
2017-09-26T04:09:20.209Z cpu6:66032)cxl1.0: cxl config_queues:1091: max_filters 120
2017-09-26T04:09:20.209Z cpu6:66032)VMK_PCI: 765: device 0000:04:00.0 allocated 32 MSIX interrupts
2017-09-26T04:09:20.209Z cpu6:66032)cxl1.0: cxl intr alloc msix:2581: net q 14 rss q 16 non rss q 13 tx q 8
2017-09-26T04:09:20.211Z cpu6:66032)cxl1.0: cxl rss do init:5221: pool 0 rss viid c1
2017-09-26T04:09:20.212Z cpu6:66032)cxl1.0: cxl rss init:2501: pool 0 rss mode 31
2017-09-26T04:09:20.212Z cpu6:66032)Chelsio T6225-CR rev 0 25G NIC PCIe 8 GT/s x8 MSI-X S/N: RE35160002, P/N: 11012096002
```



Note

Network device names for Chelsio's physical ports are assigned using the following convention: the port farthest from the motherboard will appear as the first network interface. However, for T5 40G adapters, the association of physical Ethernet ports and their corresponding network device names is opposite. For these adapters, the port nearest to the motherboard will appear as the first network interface.

3. Flashing Firmware and Option ROM

Depending on the boot mode selected, Chelsio PXE Boot provides the following methods to flash Firmware and Option ROM onto Chelsio adapters:

- Legacy mode: cfut4
- uEFI mode:
 - HII
 - drvcfg
 - Firmware Manager Protocol (FMP)

These methods also provide the functionality to update/erase Hardware configuration and Phy Firmware files.

3.1. Preparing USB flash drive

This document assumes that you are using a USB flash drive as a storage media for the necessary files. Follow the steps below to prepare the drive:

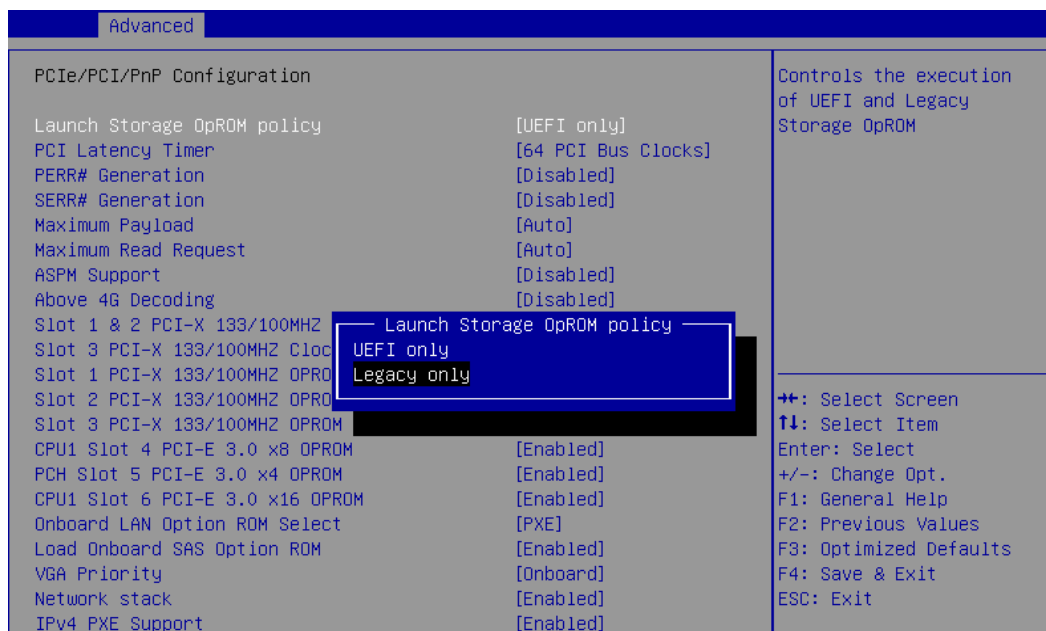
- Create a DOS bootable USB flash drive. ([Click here](#) for instructions)
- Create a directory *CHELSIO* on the USB flash drive.
- If you haven't done already, download *Chelsio-PXE-x.x.x.xx.zip* from [Chelsio Download Center](#)
- Unzip the downloaded package and change your working directory to *OptionROM* directory.

```
[root@host~]# unzip Chelsio-PXE-x.x.x.xx.zip
[root@host~]# cd Chelsio-PXE-x.x.x.xx/OptionROM
```

- Copy all the files and place them in the *CHELSIO* directory created on the USB flash drive.
- Plug-in the USB flash drive in the system on which the Chelsio adapter is installed.
- Reboot the system.

3.2. Legacy

- i. In BIOS, configure the system having Chelsio adapter to boot in Legacy mode.



- ii. Boot the system from the plugged in USB flash drive and change your working directory to CHELSIO directory.

```
C:\>cd CHELSIO
```

- iii. Run the following command to list all Chelsio adapters present on the system. The list displays a unique index for each adapter found.

```
C:\CHELSIO>cfut4 -l
```

```
C:\CHELSIO>cfut4 -l

Chelsio T5/T6 Flash Utility v1.5

Index  ChelsioAdaptertype  DevId
=====
[0]    T6225-CR          6001
```

- iv. Delete any previous version of Option ROM flashed on the adapter.

```
C:\CHELSIO>cfut4 -d <idx> -xb
```

Here, `idx` is the adapter index found in step iii (0 in this case).

```
C:\CHELSIO>cfut4 -d 0 -xb

Chelsio T5/T6 Flash Utility v1.5

Erasing serial flash sector(s) ... Done
Reboot machine for changes to take effect
```

- v. Delete any previous firmware using the following command.

```
C:\CHELSIO>cfut4 -d <idx> -xh -xf
```

```
C:\CHELSIO>cfut4 -d 0 -xh -xf

Chelsio T5/T6 Flash Utility v1.5

Erasing serial flash sector(s) ... Done
Erasing serial flash sector(s) ... Done
Reboot machine for changes to take effect
```

- vi. Delete any previous Option ROM settings.

```
C:\CHELSIO>cfut4 -d <idx> -xc
```

```
C:\CHELSIO>cfut4 -d 0 -xc

Chelsio T5/T6 Flash Utility v1.5

Erasing serial flash sector(s) ... Done
Reboot machine for changes to take effect
```

- vii. Run the following command to flash the appropriate firmware.

```
C:\CHELSIO>cfut4 -d <idx> -uf <firmware_file>.bin
```

Here, `firmware_file` is the firmware image file present in the *CHELSIO* directory.

```
C:\CHELSIO>cfut4 -d 0 -uf T6FW-1~1.BIN

Chelsio T5/T6 Flash Utility v1.5

Erasing serial flash sector(s) ... Done
Writing Image at Base 00080000 ... Done
Writing Image at Base 00080000 ... Done
Writing Image at Base 00090000 ... Done
Writing Image at Base 00098000 ... Done
Writing Image at Base 000a0000 ... Done
Writing Image at Base 000a8000 ... Done
Writing Image at Base 000b0000 ... Done
Writing Image at Base 000b8000 ... Done
Writing Image at Base 000c0000 ... Done
Writing Image at Base 000c8000 ... Done
Writing Image at Base 000d0000 ... Done
Writing Image at Base 000d8000 ... Done
Writing Image at Base 000e0000 ... Done
Writing Image at Base 000e8000 ... Done
Writing Image at Base 000f0000 ... Done
Writing Image at Base 000f8000 ... Done
Reboot machine for changes to take effect
```

- viii. Flash the PXE Option ROM onto the Chelsio adapter using the following command.

```
C:\CHELSIO>cfut4 -d <idx> -ub cpbt4.bin
```

Here, `cpbt4.bin` is the PXE Boot Option ROM image file present in the *CHELSIO* directory.

```
C:\20026>cfut4.exe -d 0 -ub cpbt4.bin

Chelsio T5/T6 Flash Utility v1.5

Erasing serial flash sector(s) ... Done
Writing Image at Base 00000000 ... Done
Writing Image at Base 00008000 ... Done
Writing Image at Base 00010000 ... Done
Writing Image at Base 00018000 ... Done
Writing Image at Base 00020000 ... Done
Reboot machine for changes to take effect
```

- ix. To configure the base MAC address (optional), use the below command.

```
C:\CHELSIO>cfut4 -d <idx> -um <Hex MAC Address>
```

Example:

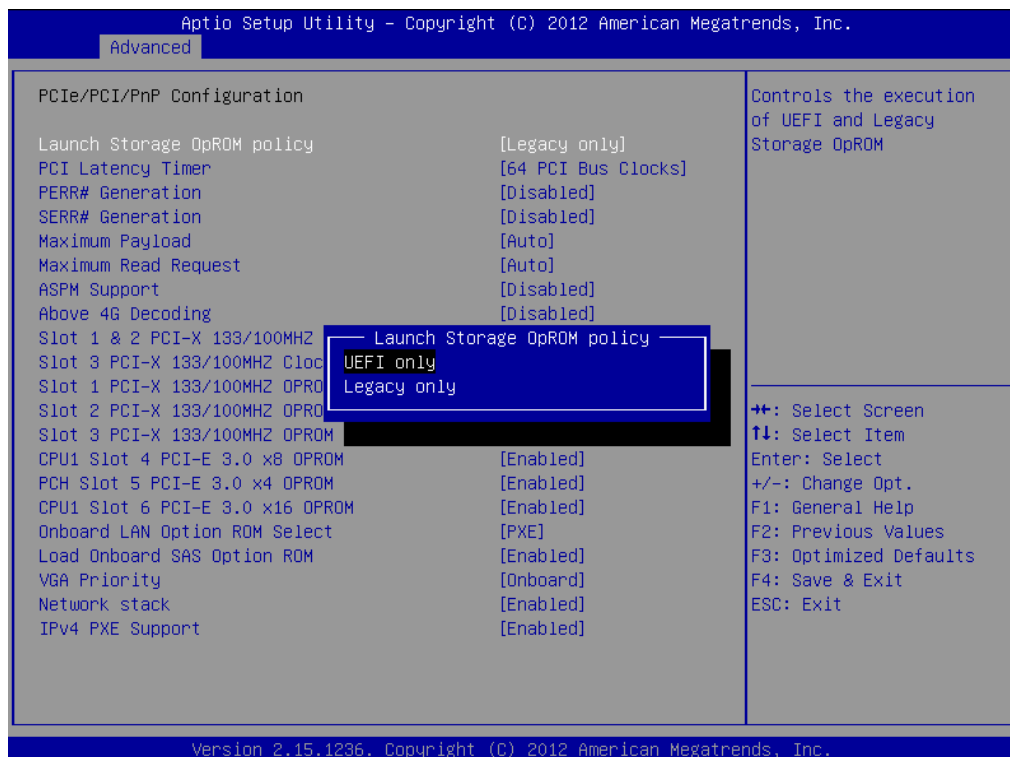
```
C:\CHELSIO>cfut4 -d 0 -um 000743000123
```

- x. Reboot the system for changes to take effect.

3.3. uEFI

3.3.1. Loading uEFI driver

- i. In BIOS, configure the system having Chelsio adapter to boot in uEFI mode.



Note For Supermicro systems, enable **Network Stack** as well before proceeding.

- ii. Boot to EFI Shell.

```
EFI Shell version 2.31 [4.654]
Current running mode 1.1.2
Device mapping table
fs0 :Removable HardDisk - Alias hd83b0f0b blk0
      PciRoot(0x0)/Pci(0x1d,0x0)/USB(0x1,0x0)/USB(0x5,0x0)/HD(1,MBR,0x0fdb738d,0x800,0x78b800)
blk0 :Removable HardDisk - Alias hd83b0f0b fs0
      PciRoot(0x0)/Pci(0x1d,0x0)/USB(0x1,0x0)/USB(0x5,0x0)/HD(1,MBR,0x0fdb738d,0x800,0x78b800)
blk1 :HardDisk - Alias (null)
      PciRoot(0x0)/Pci(0x1f,0x2)/Sata(0x0,0x0)/HD(1,MBR,0x00092b0c,0x3f,0x9c25fe)
blk2 :HardDisk - Alias (null)
      PciRoot(0x0)/Pci(0x1f,0x2)/Sata(0x0,0x0)/HD(2,MBR,0x00092b0c,0x9c263d,0x88b8fdc)
blk3 :HardDisk - Alias (null)
      PciRoot(0x0)/Pci(0x1f,0x2)/Sata(0x0,0x0)/HD(3,MBR,0x00000000,0x927be19,0x14019e7)
blk4 :HardDisk - Alias (null)
      PciRoot(0x0)/Pci(0x1f,0x2)/Sata(0x0,0x0)/HD(4,MBR,0x00000000,0xa67d83f,0x13fe849)
blk5 :BlockDevice - Alias (null)
      PciRoot(0x0)/Pci(0x1f,0x2)/Sata(0x0,0x0)
blk6 :Removable BlockDevice - Alias (null)
      PciRoot(0x0)/Pci(0x1d,0x0)/USB(0x1,0x0)/USB(0x5,0x0)

Press ESC in 1 seconds to skip startup.nsh, any other key to continue.
Shell> _
```

- iii. Issue command `drivers` to determine if Chelsio uEFI driver is already loaded. The below image shows that the driver is loaded.

```
205 0200001A B X X 2 2 Chelsio Unified Driver \20026/ChelsioPXE
fs0:\> _
```

If the driver is not loaded, continue to step (v)

- iv. Note the handle and unload the driver.

```
fs0:\CHELSIO\> unload -n <driver_handle>
```

Example:

```
fs0:\> unload -n 205
205: Image(\20026/ChelsioPXE.efi) ImageDevPath (..5600)\20026/ChelsioPXE.efi)DriverBinding Diagnostics2 ComponentName ComponentName2 DriverEFIVersion(0002001E)Configuration Configuration2
unload: Success
```

- v. Load the uEFI driver (*ChelsioPXE.efi*) present in the *CHELSIO* directory.

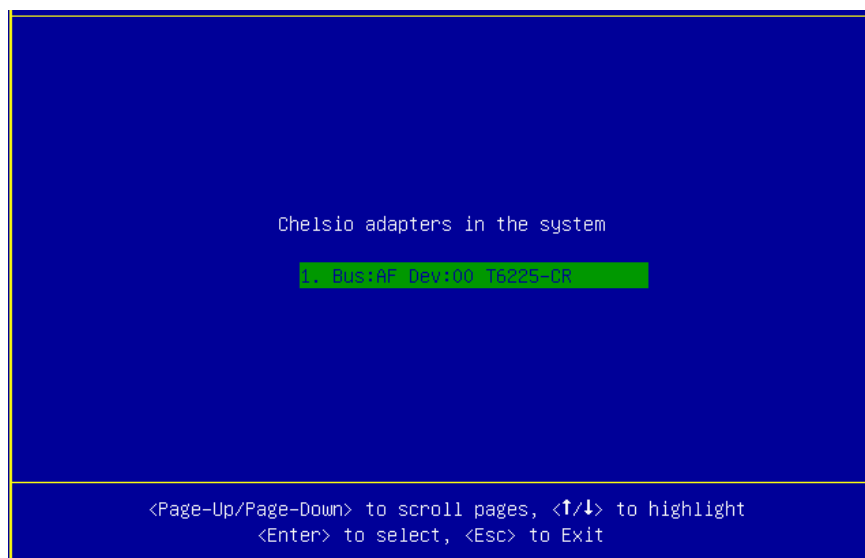
```
fs0:\> load 20026\ChelsioPXE.efi
load: Image fs0:\20026\ChelsioPXE.efi loaded at 78AEA000 - Success
_
```


3.3.2. drvcfg

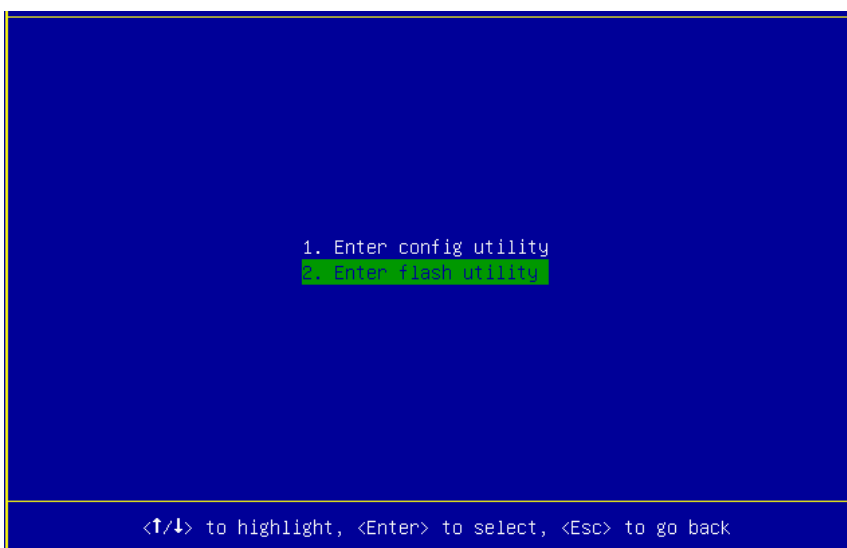
- i. Please ensure that Chelsio uEFI driver is loaded correctly as mentioned in [Loading uEFI driver](#) section.
- ii. Run the following command to launch the PXE Boot Setup utility.

```
fs0:\> drvcfg -s_
```

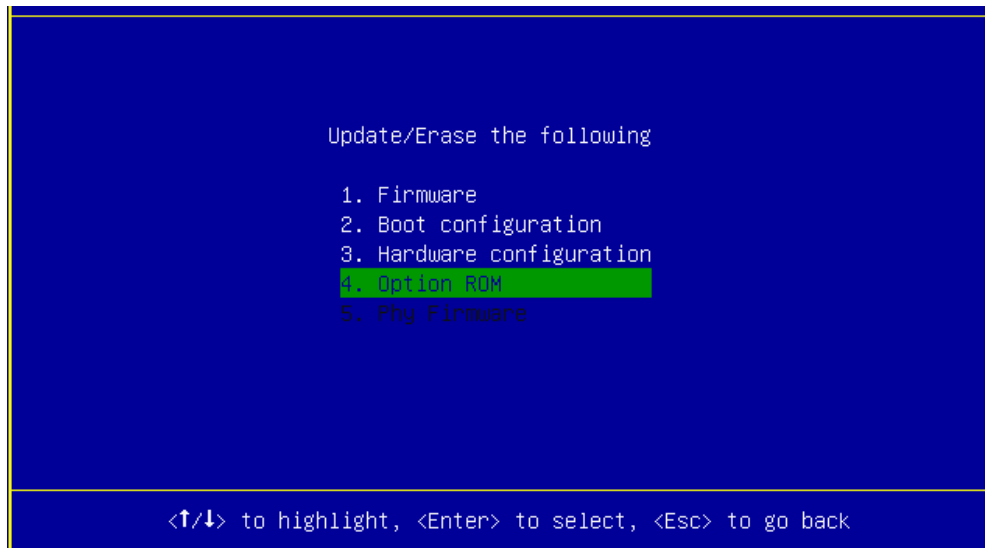
- iii. Choose the Chelsio adapter which needs to be configured.



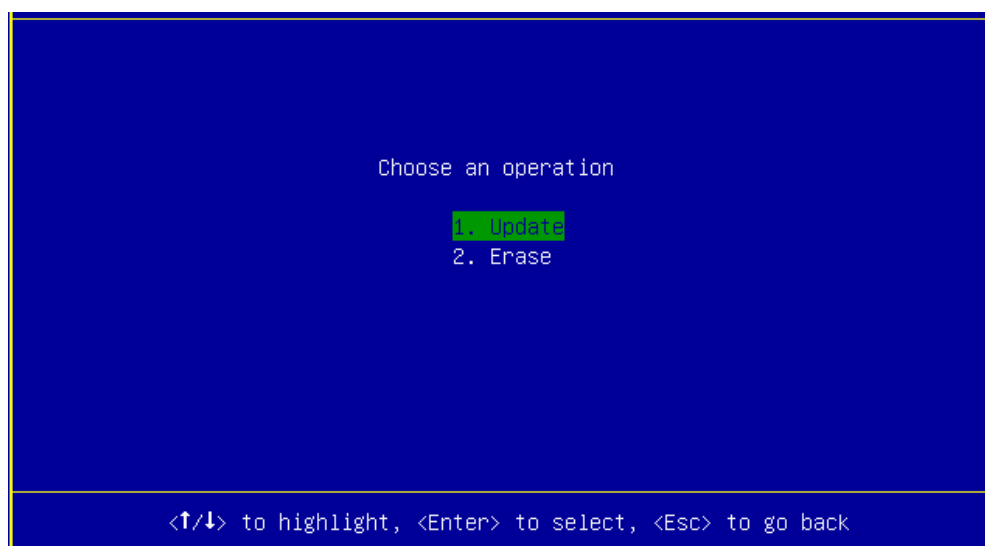
- iv. Highlight **Enter flash utility** and press [Enter].



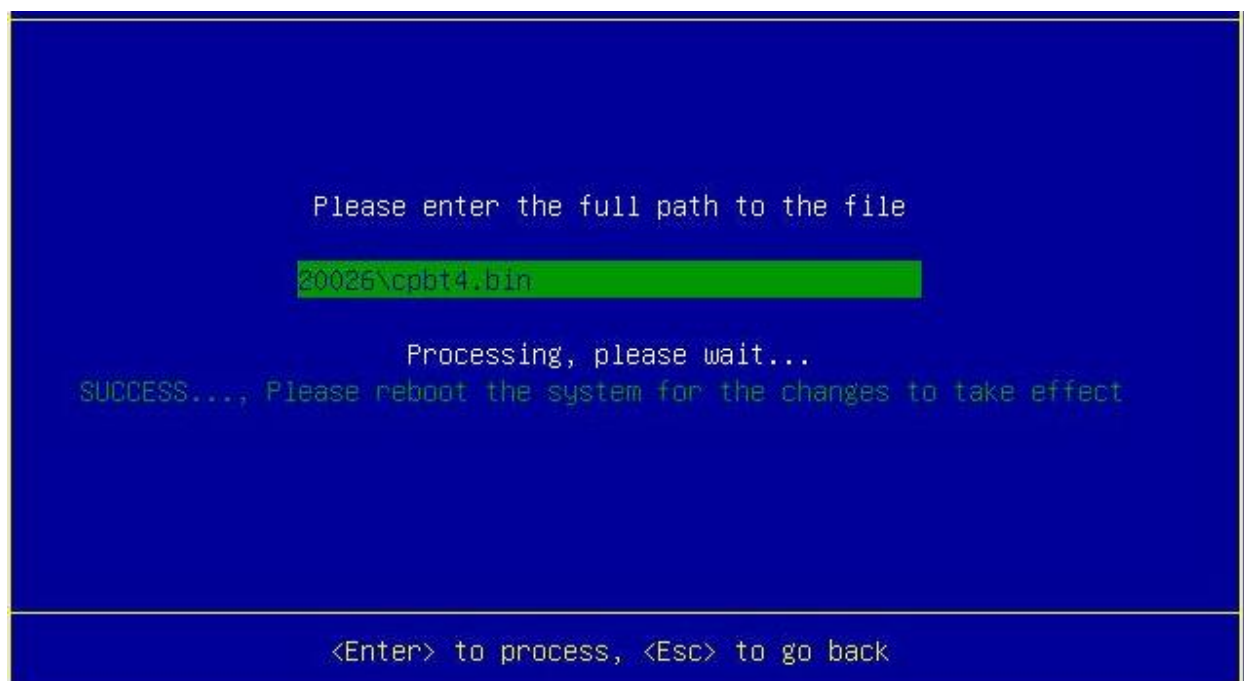
- v. Highlight **Option ROM** and press [Enter].



- vi. Highlight **Update** and press [Enter].



- vii. Enter the path to the Option ROM file and press [Enter].



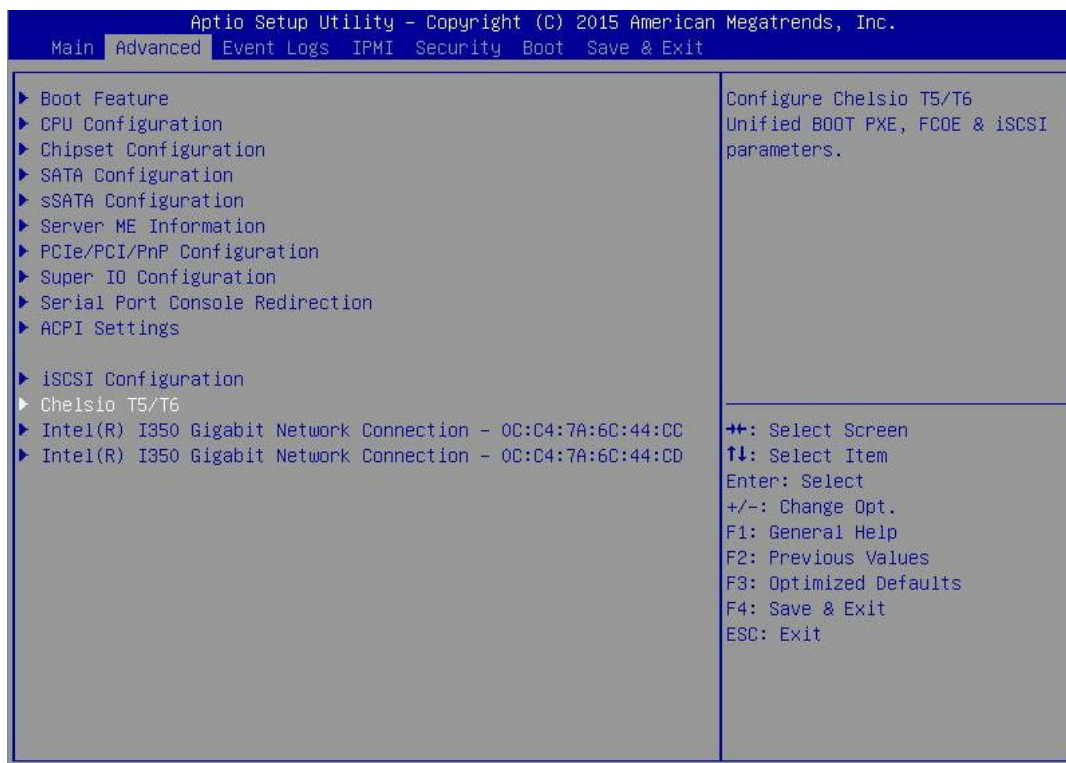
- viii. Similarly, you can use the above method to update Firmware present in the *CHELSIO* directory.
ix. Reboot the machine for changes to take effect.

3.3.3. HII

- Go into the BIOS setup.
- Chelsio HII should be listed as **Chelsio T5/T6** as shown below. Highlight it and press [Enter].

If Chelsio T5/T6 is not listed,

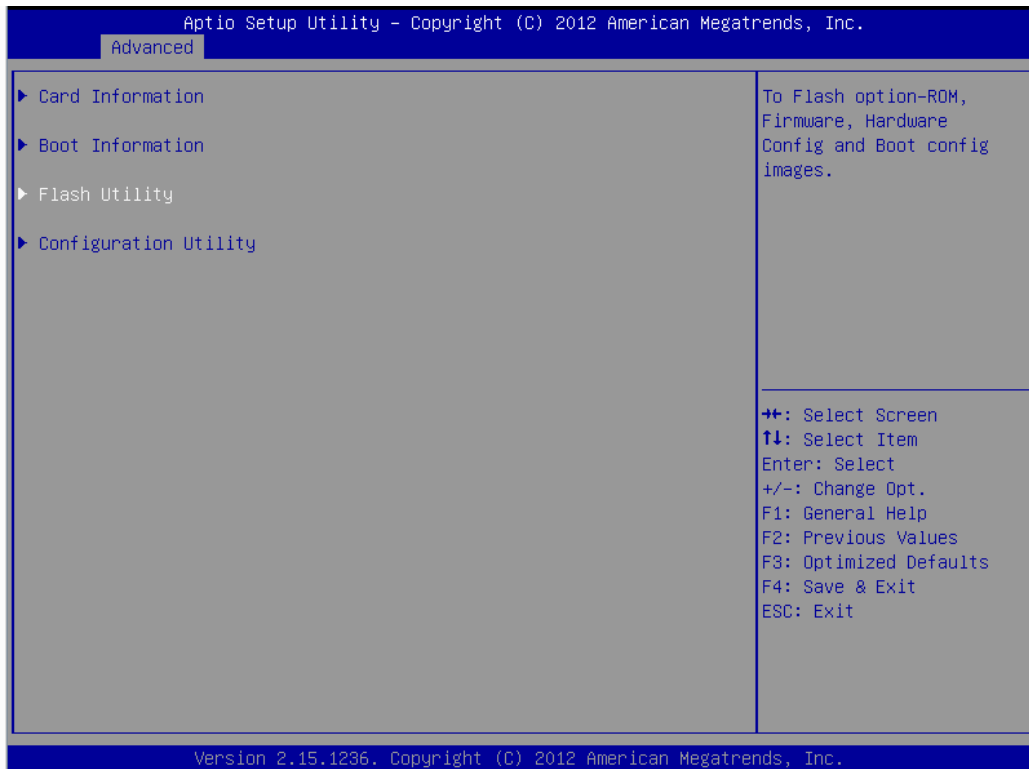
- Load the Chelsio uEFI driver as mentioned in [Loading uEFI driver](#) section.
- Flash the Option ROM and Firmware as mentioned in [drvcfg](#) section.



- iii. Highlight the Chelsio adapter to be configured and press [Enter].



- iv. Highlight **Flash Utility** and press [Enter].



- v. Erase or update firmware using the methods explained below:
- a. **Erase existing firmware**
 - i. Select [Erase] as Flash Operation
 - ii. Select [FW File] as Flash File Type
 - iii. Select Update/Erase
 - iv. Press [Y] to confirm
 - b. **Update firmware**
 - i. Select [Update] as Flash Operation
 - ii. Select [FW File] as Flash File Type
 - iii. Enter full path to the firmware file for Enter File Name, e.g., CHELSIO\t6fw-1.16.29.0.bin.
 - iv. Press [Enter]
 - v. Select Update/Erase
 - vi. Press [Y] to confirm
- vi. Similarly, you can use the above method to update/erase Option ROM present in the *CHELSIO* directory.
- vii. Reboot the machine for changes to take effect.

3.3.4. Firmware Management Protocol (FMP)

HP machines support Firmware Management Protocol (FMP) interface, in addition to HII. This can be used to update the Option ROM on Chelsio adapters.

- **Enabling FMP**

- Please ensure that Chelsio uEFI driver is loaded correctly as mentioned in [Loading uEFI driver](#) section
- Run the command `fwupdate -l` and Chelsio T6 adapter should be listed as shown below:

```
FS1:\CHELSIO\> fwupdate -l
* [BIOS] System ROM - U20 v2.20 (05/05/2016)
* [RAID.Slot.2.1]Slot 2 : Smart HBA H240 Controller - U2.52_B0
* [NIC.LOM.1.3]Embedded LOM 1 : HP Ethernet 1Gb 2-port 361i Adapter - NIC - 1.1067.0
* [NIC.Slot.3.1]Slot 3 : Chelsio T6 Controller - NIC - 1.1067.0
```

- **Upgrading Firmware**

- **Using CLI**

- Use the adapter's device name to update the firmware:

```
FS1:\CHELSIO\> fwupdate -d <device_name> -f cpbt4.bin
```

- Reboot machine for changes to take effect.

- **Using FMP**

- Reboot system and press F9 to access **System Utilities**
- Go to **Embedded Applications** → **Firmware Update** → **Chelsio T6 Controller**

```
System Utilities
Embedded Applications + Select a device to update + Firmware Update
Slot 3 : Chelsio T6 Controller - NIC
▶ Select a firmware file
Selected firmware file:
Current Firmware Version:
Image Description          [Chelsio Option ROM package]
Start firmware update
```

- Highlight **Select a firmware file** option and hit [Enter].
- Select the USB flash drive which contains the latest Option ROM and hit [Enter].



- v. Select Option ROM file *cpbt4.bin* and hit [Enter]. The file should show up in the **Selected firmware file** field.
- vi. Select **Start firmware update** and hit [Enter].
- vii. After **Firmware update completed successfully** prompt appears, reboot the machine for changes to take effect.

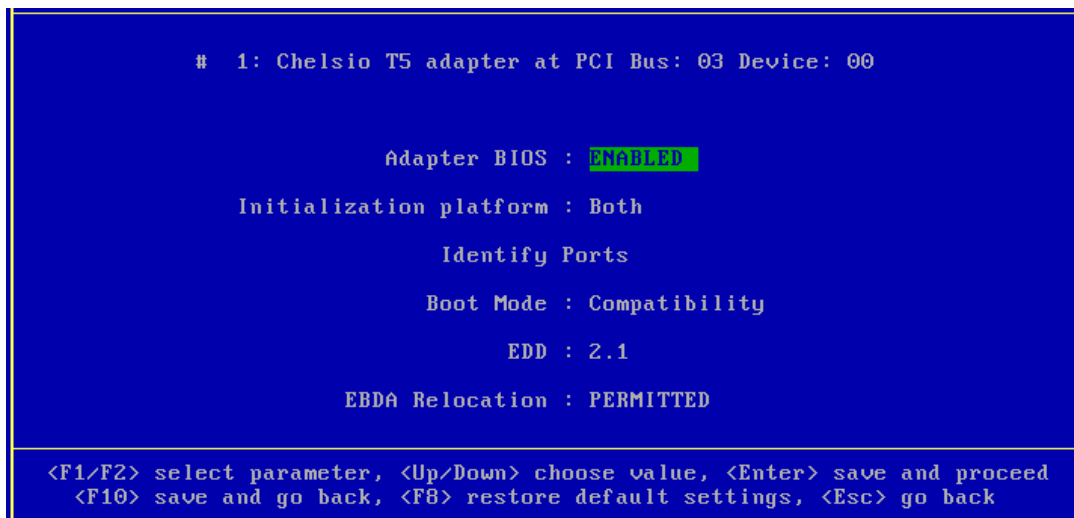
3.4. Default Option ROM Settings

If you wish to restore Option ROM settings to their default values, use any of the methods mentioned below:

3.4.1. Using Option ROM (boot level)

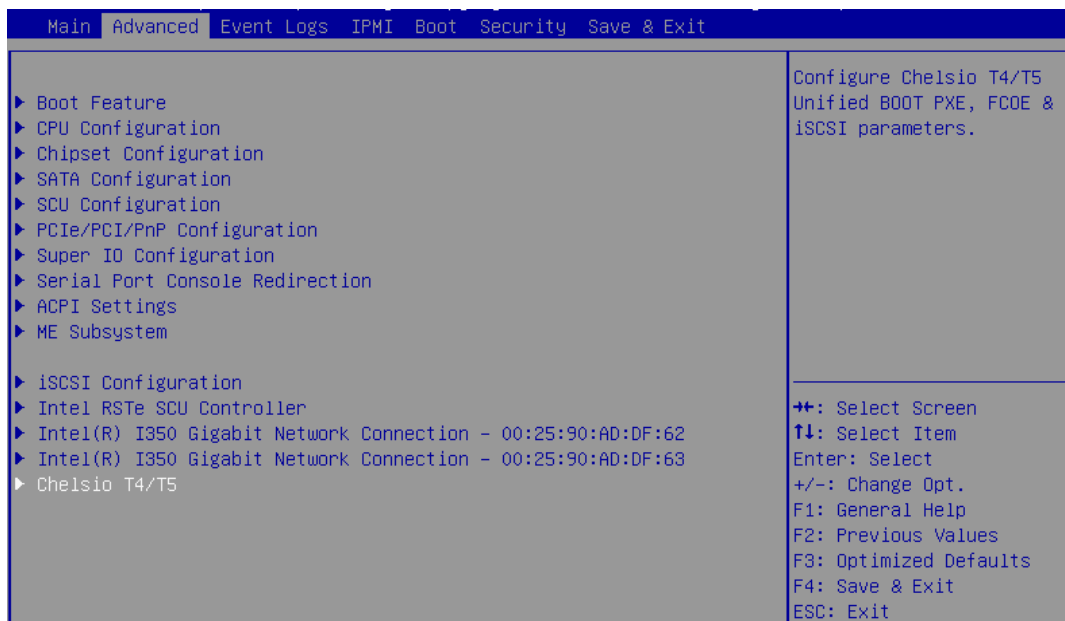
- **Legacy PXE**

Boot system into Chelsio's PXE Boot Setup utility and press F8.



- **uEFI PXE**

Boot system into uEFI mode and press F3.

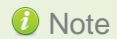


4. Configuring PXE Server

The following components are required to configure a server as PXE Server:

- DHCP Server
- TFTP Server

PXE server configuration steps for different operating systems can be found in following links:



Chelsio Communications does not take any responsibility regarding contents given in below mentioned links. They are given for example purposes only.

- **Linux**

- https://access.redhat.com/documentation/en-us/red_hat_enterprise_linux/7/html/installation_guide/chap-installation-server-setup

- **Windows**

- <http://technet.microsoft.com/en-us/library/cc771670%28WS.10%29.aspx>
- <http://tftpd32.jounin.net/> (Use port # 67, set PXE option and provide bootable file name in settings)
- <http://unattended.sourceforge.net/pxe-win2k.html>

- **VMware**

- <http://www.vstellar.com/2017/07/25/automating-esxi-deployment-using-pxe-boot-and-kickstart/>
- <http://fdo-workspace.blogspot.in/2016/11/building-tftp-dhcp-for-pxe-esxi-65.html>

5. PXE boot process

Before proceeding, please ensure that the Chelsio adapter has been flashed with the provided firmware and Option ROM (See [Flashing Firmware and option ROM](#)).

5.1. Legacy PXE boot

- i. After configuring the PXE server, make sure the PXE server works. Then reboot the client machine.
- ii. Press [Alt+C] when the message to configure Chelsio adapters appears on the screen.

```
Chelsio Unified Boot BIOS
Copyright (C) 2003-2016 Chelsio Communications
Press <Alt-C> to Configure T5/T6 Card(s). Press <Alt-S> to skip BIOS.
```

- iii. The configuration utility will appear as below.

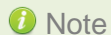
```
Chelsio adapters in the system
1. Bus:81 Dev:00 T6225-CR
```

Choose the adapter on which you flashed the option ROM image. Hit [Enter].

- iv. Enable the adapter BIOS using arrow keys if not already enabled. Hit [Enter].

```
# 1: Chelsio T6 adapter at PCI Bus: 81 Device: 00

Adapter BIOS : ENABLED
Initialization platform : Both
Identify Ports
Boot Mode : Compatibility
EDD : 2.1
EBDA Relocation : PERMITTED
```

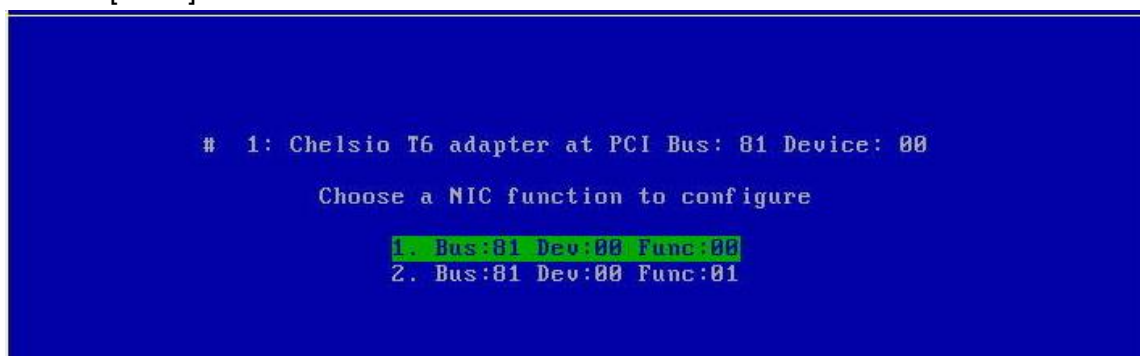


Note Use the default values for Boot Mode, EDD and EBDA Relocation parameters, unless instructed otherwise.

- v. Choose **PXE** from the list to configure. Hit [Enter].



- vi. Use the arrow keys to highlight the appropriate function among the supported NIC functions and hit [Enter] to select.

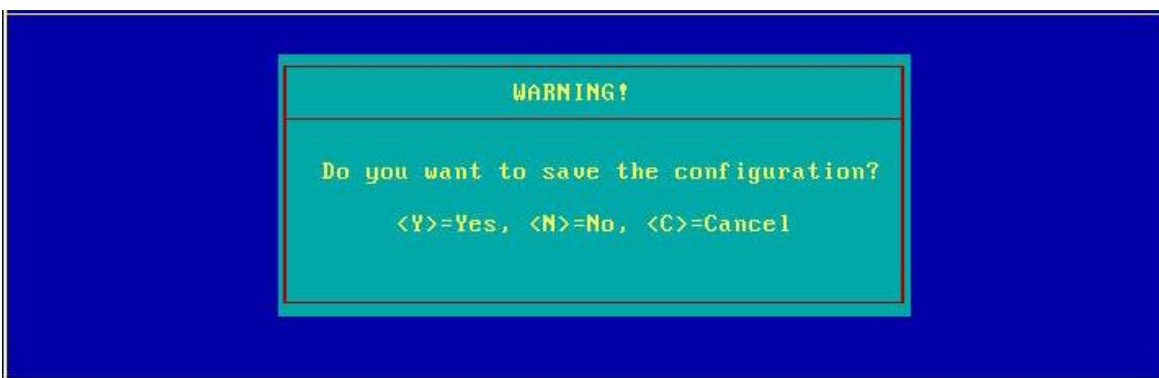


- vii. Enable NIC function bios if not already enabled.



Choose the boot port to try the PXE boot. It is recommended to only enable functions and ports which are going to be used. Please note that enabling NIC Func 00 will enable port 0 for PXE, enabling NIC Func 01 will enable port 1 and so on for NIC function.

- viii. Hit [F10] or [Esc] and then [Y] to save configuration changes.

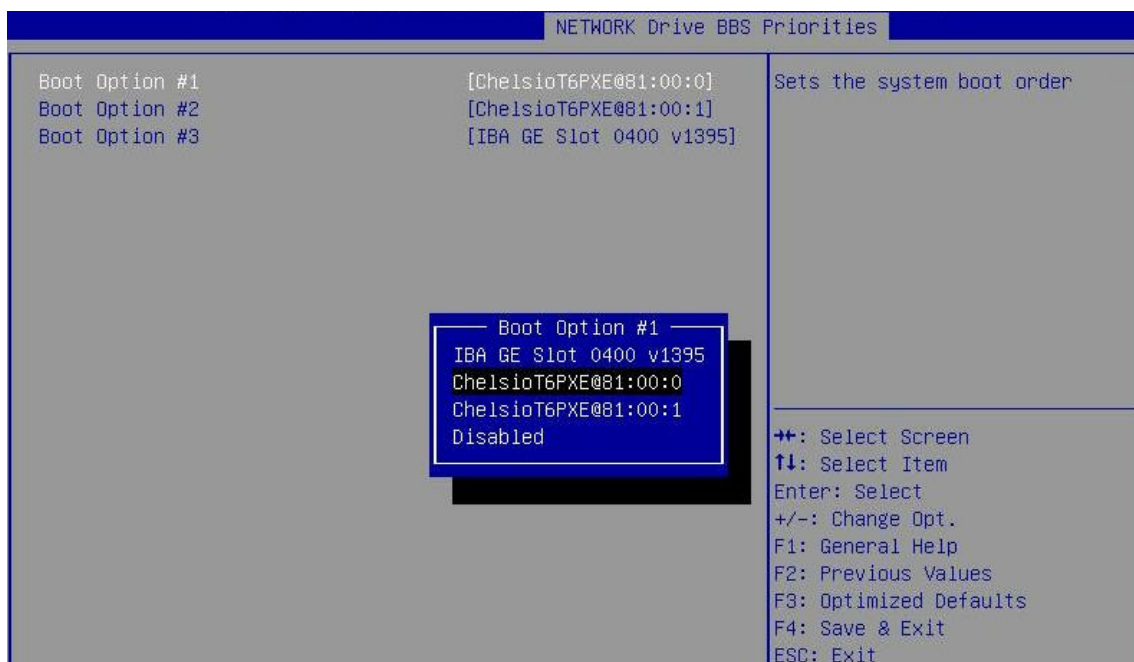


- ix. Reboot the system.
- x. Allow the Chelsio option ROM to initialize and setup PXE devices. DO NOT PRESS ALT-S to skip Chelsio option ROM.

```

Loading Chelsio PXE BIOS v1.0.0.95
PCI BIOS v2.1 , PCI FW v3.0 , PnP BIOS : YES PMM Entry is passed by BIOS
Chelsio FW v1.16.29.0
PXE BIOS Loaded Successfully!
1: ChelsioT6PXE@00:00:0
2: ChelsioT6PXE@00:00:1
  
```

- xi. In the system setup, choose any of the Chelsio PXE devices as the first boot device.



- xii. Reboot. DO NOT PRESS ALT-S to skip Chelsio Option ROM, during POST.
- xiii. Hit [F12] key when prompted to start PXE boot.

5.2. uEFI PXE Boot

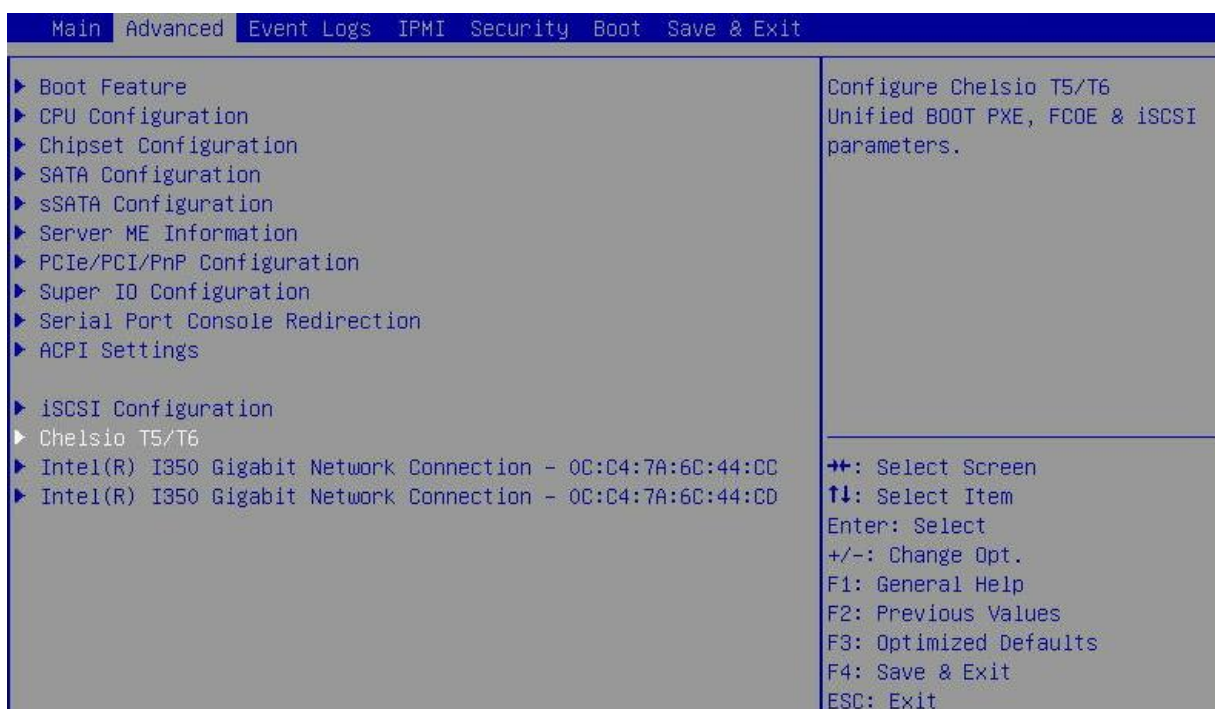
Important

- Only uEFI v2.3.1, v2.4 and v2.5 supported.
- Any other uEFI version is **NOT SUPPORTED** and may render your system unusable.

5.2.1. HII

This section describes the method to configure and use Chelsio uEFI PXE interfaces using HII.

- Reboot the system and go into the BIOS setup.
- Chelsio HII should be listed as **Chelsio T5/T6**. Highlight it and press [Enter].



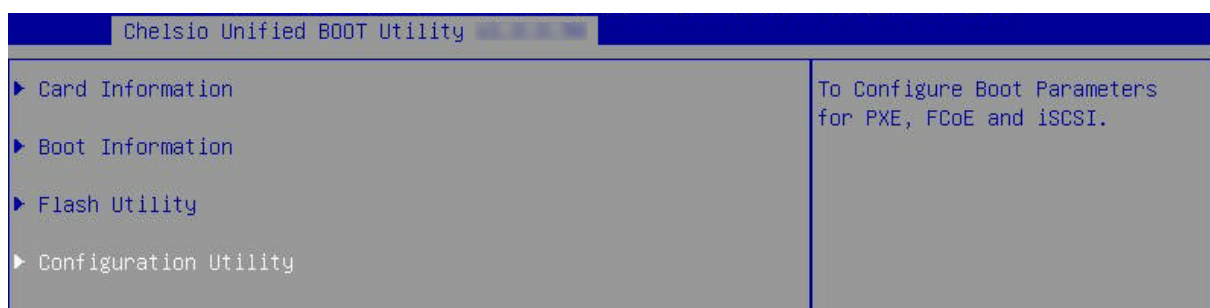
Note

Please ensure that Chelsio uEFI driver is loaded correctly as mentioned in [Loading uEFI driver](#) section.

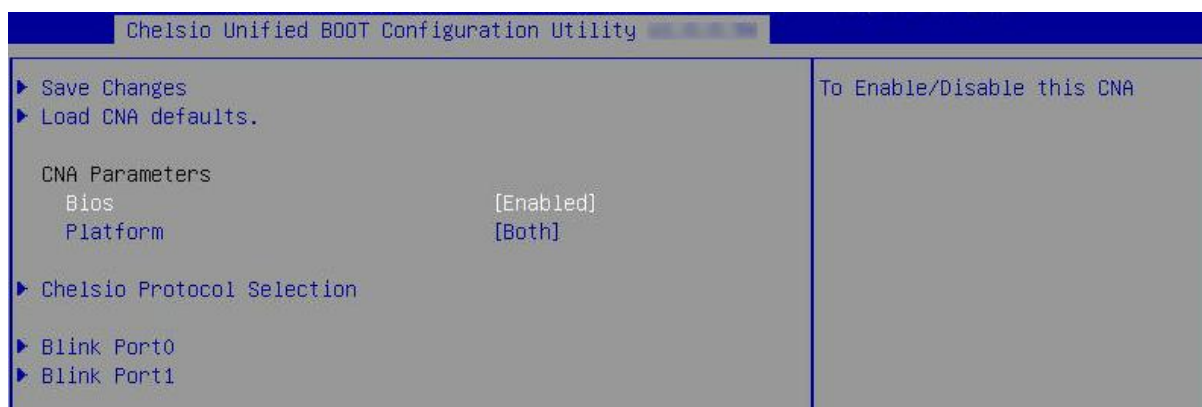
- Select the Chelsio adapter to be configured and press [Enter].



- iv. Select **Configuration Utility** and press [Enter].

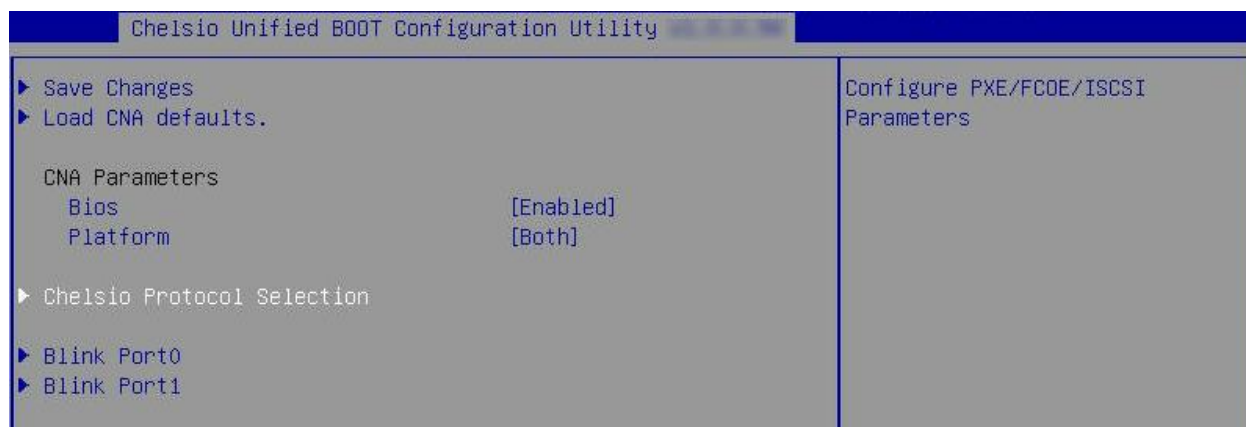


- v. Enable adapter BIOS if not already enabled.



Note *It is highly recommended that you use the **Save Changes** option every time a parameter/option is changed.*

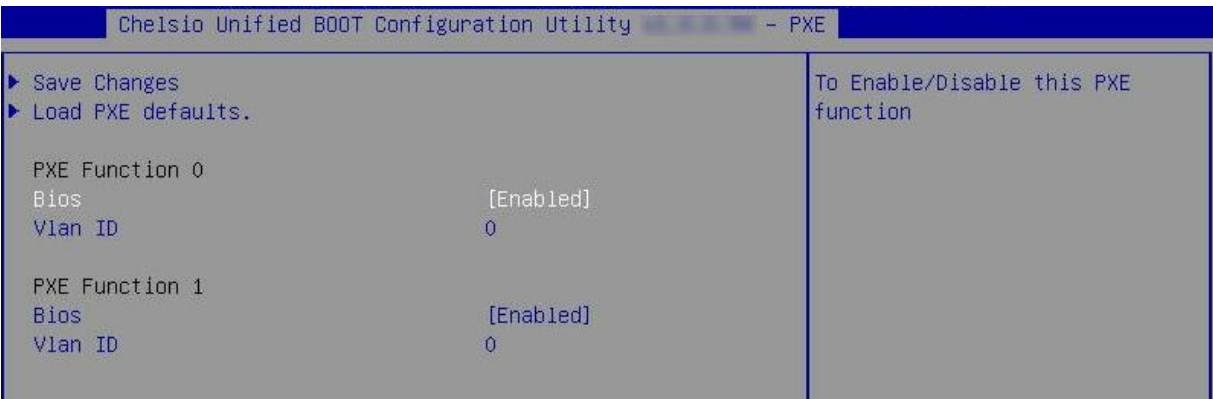
- vi. Select **Chelsio Protocol Selection** and press [Enter].



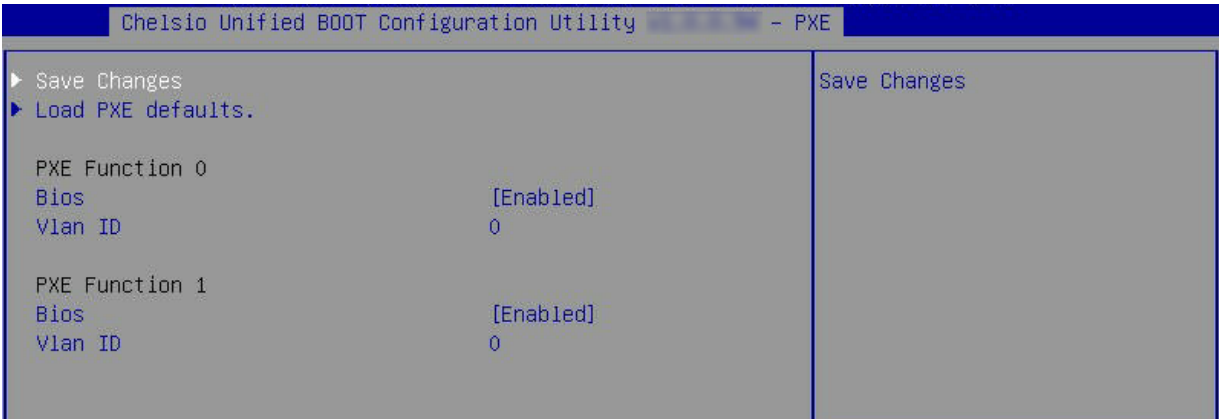
vii. Select **PXE** and press [Enter].



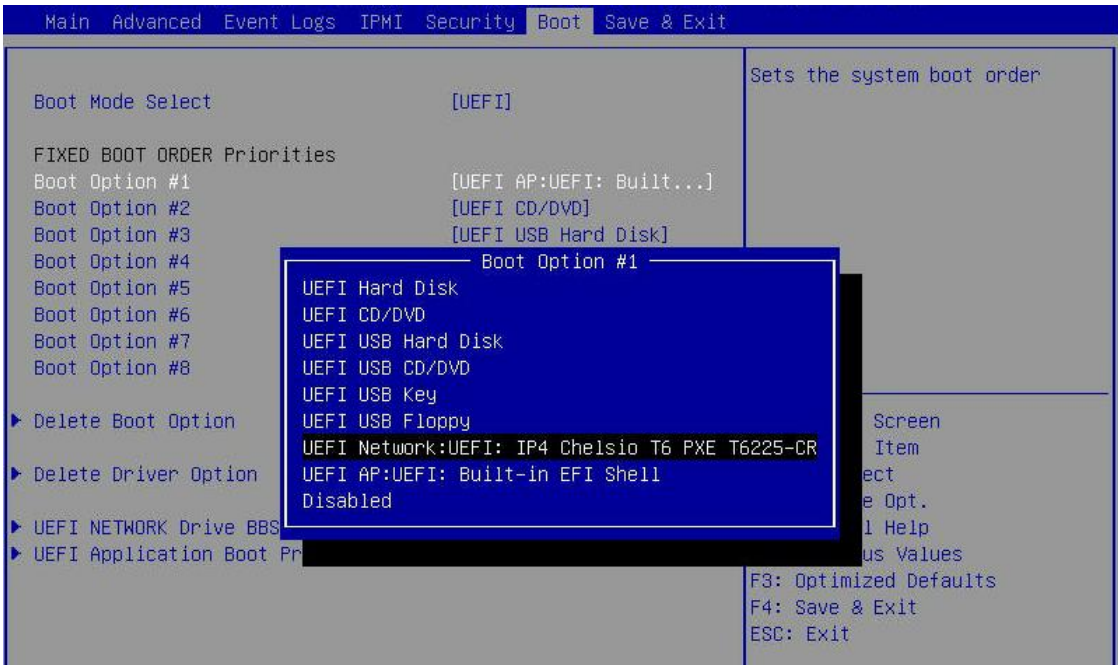
viii. Choose the boot port to try PXE boot. It is recommended to enable only those functions and ports which are going to be used. Please note that enabling PXE Function 0 will enable port 0 for PXE, enabling PXE Function 1 will enable port 1 and so on, for NIC function.



ix. Select **Save Changes** and press [Enter].



x. Reboot the system and in BIOS, choose any of the available Chelsio PXE devices.



xi. Reboot and hit [F12] key when prompted to start PXE boot.

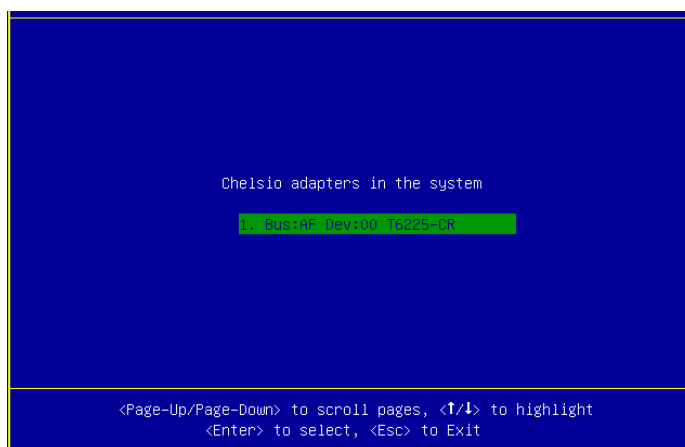
5.2.2. drvcfg

This section describes the method to configure and use Chelsio uEFI PXE interfaces using drvcfg.

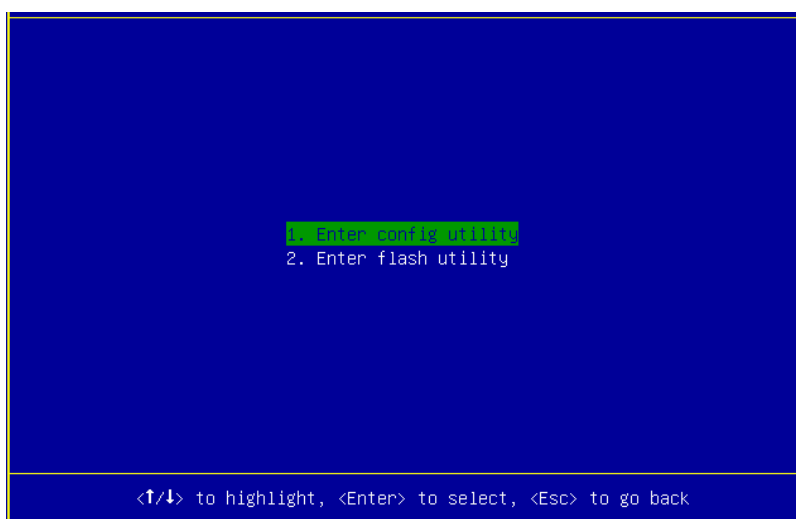
- i. Boot the system into EFI shell.
- ii. Run the following command to launch the PXE Boot Setup utility.

```
fs0:\> drvcfg -s_
```

- iii. Choose the Chelsio adapter which needs to be configured.



- iv. Highlight **Enter config utility** and press [Enter].



- v. Further configuration steps are similar from step (iv) of [Legacy PXE Boot](#) section.

II. Appendix

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