Chelsio Unified Boot
Installation and User’s Guide
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## II. APPENDIX

Chelsio End-User License Agreement (EULA)
Chapter I. Unified 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). FCoE SAN boot process involves installation of an operating system (OS) to an FC/FCoE disk and then booting from it. iSCSI SAN boot process involves installation of an OS to an iSCSI disk and then booting from it.

This section of the guide explains how to configure and use Chelsio Unified Boot Option ROM which flashes PXE, iSCSI and FCoE Option ROM onto Chelsio's adapters. It adds functionalities like PXE, FCoE and iSCSI SAN boot.

1.1. Hardware Requirements

1.1.1. Supported Adapters

The following are the currently shipping Chelsio Adapters that are compatible with Unified 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
1.1.2. Supported Hardware
The following hardware platforms are supported by Chelsio Unified 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 Unified Boot Option ROM software:

- Cisco Nexus 5010 with 5.1(3) N1 (1a) firmware.
Chapter I. Unified Boot Option ROM

- 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 Unified 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.

<table>
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<th>Linux Distribution</th>
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<tr>
<td>RHEL 8.2, 4.18.0-193.el8</td>
<td>PXE, FCoE, iSCSI</td>
</tr>
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<td>RHEL 8.1, 4.18.0-147.el8</td>
<td>PXE, iSCSI</td>
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<tr>
<td>RHEL 7.8, 3.10.0-1127.el7</td>
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</tr>
<tr>
<td>RHEL 7.7, 3.10.0-1062.el7</td>
<td></td>
</tr>
</tbody>
</table>

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 Unified Boot Option ROM package contains the following:

- **OptionROM**: This directory contains Unified Boot Option ROM image (**cubt4.bin**), uEFI driver (**ChelsioUD.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.

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@server ]# update-pciids
% Total % Received % Xferd Average Speed Time Time Time Current
    0     0    0 --:--:-- --:--:-- --:--:-- --:--:--
100  227K  100  227K  0   0 65892 00:00:03 00:00:03 00:00:03 ...
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@server ]# lspci | grep -i Chelsio
01:00.0 Ethernet controller: Chelsio Communications Inc T62100-LP-CR Unified Wire Ethernet Controller
01:00.1 Ethernet controller: Chelsio Communications Inc T62100-LP-CR Unified Wire Ethernet Controller
01:00.2 Ethernet controller: Chelsio Communications Inc T62100-LP-CR Unified Wire Ethernet Controller
01:00.3 Ethernet controller: Chelsio Communications Inc T62100-LP-CR Unified Wire Ethernet Controller
01:00.4 Ethernet controller: Chelsio Communications Inc T62100-LP-CR Unified Wire Ethernet Controller
01:00.5 SCSi storage controller: Chelsio Communications Inc T62100-LP-CR Unified Wire Storage Controller
01:00.6 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:

```
[  1119.654346] cxgb4 0000:e1:00.4: Chelsio T62100-LP-CR rev 0
[  1119.654347] cxgb4 0000:e1:00.4: S/N: RE41160042, P/N: 110121060D5
[  1119.654348] cxgb4 0000:e1:00.4: Firmware version:
[  1119.654349] cxgb4 0000:e1:00.4: Bootstrap version: 255.255.255.255
[  1119.654350] cxgb4 0000:e1:00.4: TP Microcode version: 0.1.23.2
[  1119.654351] cxgb4 0000:e1:00.4: No Expansion ROM loaded
[  1119.654351] cxgb4 0000:e1:00.4: Serial Configuration version: 0x7002000
[  1119.654352] cxgb4 0000:e1:00.4: VPD version: 0x52
[  1119.654354] cxgb4 0000:e1:00.4: Configuration: NIC MSI-X, non-Offload capable
[  1119.654355] 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:

```
2017-09-26T04:09:20.209Z cpue:66032)cx11:8: cx1_port_init:8744: node 0 pf 0 char 0 vswi cl
2017-09-26T04:09:20.209Z cpue:66032)cx11:8: cx1_port_init:8744: created using mapper 'DMNull'.
2017-09-26T04:09:20.209Z cpue:66032)cx11:8: config queue=1051 max_filters=120
2017-09-26T04:09:20.209Z cpue:66032)VMR_PCI: 765: device 0000:01:00.0 allocated 32 MSI interrupts
2017-09-26T04:09:20.209Z cpue:66032)cx11:8: cx1_intr_alloc_max=1591: mac q 14 rss q 16 non rss q 13 tx q 8
2017-09-26T04:09:20.211Z cpue:66032)cx11:8: cxi_rss_do_init=52211 pool 0 rss vswi cl
2017-09-26T04:09:20.211Z cpue:66032)cx11:8: cxi_rss_init=25011 pool 0 rss mode 31
```

**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 Unified Boot provides the following methods to flash Firmware and Option ROM onto Chelsio adapters:

- Legacy mode: cput4
- 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:

i. Create a DOS bootable USB flash drive. (Click here for instructions)

ii. Create a directory CHELSIO on the USB flash drive.

iii. If you haven’t done already, download Chelsio-Uboot-x.x.xx.zip from Chelsio Download Center

iv. Unzip the downloaded package and change your working directory to OptionROM directory.

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

v. Copy all the files and place them in the CHELSIO directory created on the USB flash drive.

vi. Plug-in the USB flash drive in the system on which the Chelsio adapter is installed.

vii. Reboot the system.
3.2. Legacy

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

![BIOS Configuration Screen]

- Launch Storage Option ROM policy
- PCI Latency Line
- PERR# Generation
- Maximum Payload
- Maximum Read Request
- AGP Support

![Advanced Configuration Options]

- Controls the execution of UEFI and Legacy Storage Option ROM
- Slot 1 and 2 PCI-X 133/100MHz
- Slot 3 PCI-X 133/100MHz OPCR
- Slot 2 PCI-X 133/100MHz OPCR
- Slot 3 PCI-X 133/100MHz OPCR

- CPU Slot 4 PCI-E 3.0 x8 OPRROM
- CPU Slot 5 PCI-E 3.0 x4 OPRROM
- CPU Slot 6 PCI-E 3.0 x16 OPRROM
- Onboard LAN Option ROM Select
- Onboard VME Option ROM
- Network stack
- InfiniBand Option ROM

- Launch Storage Option ROM policy
- Legacy only

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
```

![Flash Utility Output]

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

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

vi. Delete any previous Option ROM settings.

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

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

```
C:\CHELSIO>cfut4 -d <idx> -ub cubt4.bin
```

Here, `cubt4.bin` is the unified option ROM image file present in the `CHELSIO` directory.

```
C:\CHELSIO>cfut4 -d 0 -ub cubt4.bin
```

Chelsio T5/T6 Flash Utility v1.5
Erasing serial flash sector(s) ... Done
Writing Image at Base 00000000 ... Done
Writing Image at Base 00600000 ... Done
Writing Image at Base 00610000 ... Done
Writing Image at Base 00618000 ... Done
Writing Image at Base 00200000 ... Done
Writing Image at Base 00620000 ... Done
Writing Image at Base 00630000 ... Done
Writing Image at Base 00630000 ... Done
Writing Image at Base 00640000 ... Done
Writing Image at Base 00640000 ... Done
Writing Image at Base 00650000 ... Done
Writing Image at Base 00650000 ... Done
Writing Image at Base 00660000 ... Done
Writing Image at Base 00660000 ... Done
Writing Image at Base 00680000 ... Done
Writing Image at Base 00680000 ... Done
Erasing serial flash sector(s) ... Done
Writing Image at Base 00670000 ... 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.
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3.3. uEFI

3.3.1. Loading uEFI driver

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

   ![BIOS Configuration Screenshot]

   - Launch Storage Uefi ROM policy
   - PCI Latency Timer
   - FERMA Generation
   - SERRA Generation
   - Maximum Payload
   - Maximum Read Request
   - APM Support
   - Acoce 4G Decoding

   - Slot 1 & 2 PCI-X 133/100MHz
   - Slot 3 PCI-X 133/100MHz Clk
   - Slot 4 PCI-X 133/100MHz DPRM
   - Slot 5 PCI-X 133/100MHz DROM
   - Slot 1 PCI-E x8 2.0 + x8 DROM
   - Slot 2 PCI-E x8 2.0 + x8 DROM
   - Slot 3 PCI-E x8 2.0 + x8 DROM
   - Slot 4 PCI-E x16 2.0 + x8 DROM
   - Slot 5 PCI-E x16 2.0 + x8 DROM
   - Onboard LAN Option ROM Select
   - Load Onboard SW Option ROM
   - VGA Priority
   - Network stack
   - IP4 + PXE Support

   - Select Screen: T1
   - Select Item: T2
   - Change Opt.: F1
   - General Help: F2
   - Previous Values: F3
   - Optimized Defaults: F8
   - Save & Exit: F4
   - Exit: ESC

   ![BIOS Configuration Screenshot]

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

ii. Boot to EFI Shell.

   ![EFI Shell Screenshot]

   ```
   EFI Shell version 2.31 [4,454]
   Current running mode 1.1.2
   Device mapper tools
   `/dev/sda1`:
   Harddisk - Alias "sda"
   Tradable
   `/dev/sdb1`:
   Harddisk - Alias "sdb"
   Tradable
   `/dev/sdc1`:
   Harddisk - Alias "sdc"
   Tradable
   `/dev/sde1`:
   Harddisk - Alias "sde"
   Tradable
   `/dev/sdf1`:
   Harddisk - Alias "sdf"
   Tradable
   `/dev/sdg1`:
   Harddisk - Alias "sdg"
   Tradable
   `/dev/sdh1`:
   Harddisk - Alias "sdh"
   Tradable
   `/dev/sdi1`:
   Harddisk - Alias "sdi"
   Tradable
   `/dev/sdj1`:
   Harddisk - Alias "sdj"
   Tradable
   `/dev/sdk1`:
   Harddisk - Alias "sdk"
   Tradable
   `/dev/sdl1`:
   Harddisk - Alias "sdl"
   Tradable
   `/dev/sdm1`:
   Harddisk - Alias "sdm"
   Tradable
   `/dev/sdn1`:
   Harddisk - Alias "sdn"
   Tradable
   `/dev/sdo1`:
   Harddisk - Alias "sdo"
   Tradable
   ```

   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.

```
A4 00000001 0 - - - <UNKNOWN>  SBE100
A5 00000010 B - - 5 5 AMI Console Splitter Driver ConSplitter
A6 00000010 D - - - <UNKNOWN>  GraphixsConsole
A7 0000000A D - - 4 - Generic Disk I/O Driver DiskIoxe
A8 0000000B B - - 1 3 Partition Driver (MBR/GPT/EL To Lto) PartitionOxe
A9 00000010 D - - 2 - PCH Serial ATA Controller Initialize SataController
A0 00000010 B - - 1 2 AMI Generic LPC Super I/O Driver GenericLvo
B0 00000000 0 - - - <UNKNOWN>  IDEBusSrc
B1 00000010 ? - - - <UNKNOWN>  PS/2 Driver PS2Main
B2 00000105 B - - 2 72 <UNKNOWN>  PciBus
B3 00000010 F - - 2 <UNKNOWN>  TerminalSrc
B4 00000010 B - - 1 <UNKNOWN>  TerminalSrc
B5 0000000A 0 - - 2 - Simple Network Protocol Driver SmxOxe
B6 00000000 B - - 2 8 NAP Network Service Driver MpdOxe
B7 00000003 B - - 2 2 NAP Network Service Driver NpOxe
B8 00000000 B - - 2 2 Diap Protocol Driver DiapOxe
B9 00000000 A - - 2 - IPF CONFIG Network Service Driver InpConfigOxe
BA 00000000 A - - 2 10 IPF Network Service Driver IfOxe
BB 00000000 A - - 2 4 MPFE Network Service MpfOxe
BC 00000000 B - - 12 20 UDP Network Service Driver UdpOxe
BD 00000000 0 - - 1 - FAT File System Driver Fat
BE 00000000 0 - - 2 - ISCSI Driver IscsiOxe
BF 00000000 0 - - 2 - ISCSI Driver IscsiOxe
C0 00000000 0 - - 2 - ISCSI Driver IscsiOxe
C1 00000000 0 - - 2 - ISCSI Bus Driver ScsiBus
C2 00000000 0 - - 2 - Scsi Disk Driver ScsI0
C3 00000000 0 - - 2 - IDT ISCSI Driver ScsiBus
C4 00000010 0 - - - <UNKNOWN>  CsmBlockOe
C5 00000024 0 - - 1 1 BIOS [INT10 Video Drive CsmVideo
C6 00000100 0 - - - <UNKNOWN>  <UNKNOWN>
C7 0000000E 0 x x 7 3 Chelsio Unified Driver Offset(0x3034,0x19)
```

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:*

```
FS1:\CHELSIO> unload -n 1811
Unload - Handle [72892018] Result Success.
```

v. Load the uEFI driver (ChelsioUD.efi) present in the CHELSIO directory.

```
fs0:\CHELSIO> load ChelsioUD.efi
load: Image fs0:\CHELSIO\ChelsioUD.efi loaded at 7F2BAA000 - 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 Unified Boot Setup utility.

```
fs0:\> drvcfg -s
```

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

![Chelsio Unified Boot Setup Utility](image)

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

![Chelsio Unified Boot Setup Utility](image)
v. Highlight **Option ROM** and press [Enter].

![Highlight Option ROM and press [Enter].]

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

![Highlight Update and press [Enter].]
vii. Enter the path to the Option ROM file and press [Enter].

![Chelsio Unified Boot Setup Utility v2.0.0.17]

Please enter the full path to the file

signed2.0.0.17xxuEfi4.bin

Processing, please wait...

SUCCESS..., Please reboot the system for the changes to take effect

<Enter> to process, <Esc> to go back

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

i. Go into the BIOS setup.

ii. Chelsio HII should be listed as **Chelsio T5/T6** as shown below. Highlight it and press [Enter].

   ![Chelsio HII BIOS Setup]

   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].

![Flash Utility Menu](image)

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**
  i. Please ensure that Chelsio uEFI driver is loaded correctly as mentioned in Loading uEFI driver section
  ii. 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 - V2.52.B0
  * [NIC.LOM.1.3] Embedded LOM 1 : HP Ethernet 1Gb 2-port 331i Adapter - NIC - 1.1067.0
  * [NIC.Slot.3.1] Slot 3 : Chelsio T6 Controller - NIC -
```

- **Upgrading Firmware**
  - **Using CLI**
    i. Use the adapter’s device name to update the firmware:

```
FS1\CHELSIO\> fwupdate -d <device_name> -f cubt4.bin
```

Example:

```
FS1\CHELSIO\> fwupdate -d NIC.Slot.3.1 -f cubt4.bin
Loading firmware file 'cubt4.bin'. It might take several minutes.
Current Firmware Version is ***.
Continue with firmware update? (y/n): y
Firmware update completed successfully.
```

ii. Reboot machine for changes to take effect.

- **Using FMP**
  i. Reboot system and press F9 to access System Utilities
  ii. Go to Embedded Applications → Firmware Update → Chelsio T6 Controller
iii. Highlight **Select a firmware file** option and hit [Enter].

iv. Select the USB flash drive which contains the latest Option ROM and hit [Enter].

![File Explorer]

v. Select Option ROM file `cubt4.bin` and hit [Enter].

![File Explorer]

The file should show up in the **Selected firmware file** field.

![System Utilities]

Chelsio Unified Boot
vi. Select **Start firmware update** and hit [Enter].

![Image of firmware update interface]

vii. After **Firmware update completed successfully** prompt appears, reboot the machine for changes to take effect.

![Image of firmware update completion message]
3.4. Default Option ROM Settings

If you wish to restore Option ROM settings to their default values, i.e., PXE enabled, iSCSI and FCoE disabled, use any of the methods mentioned below:

3.4.1. Using Option ROM (boot level)

- **Legacy PXE**

Boot system into Chelsio’s Unified Boot Setup utility and press F8.

![Chelsio Unified BOOT Setup Utility](image)

- **uEFI PXE**

Boot system into uEFI mode and press F3.

![Chelsio Unified Boot](image)
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:

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

- **Linux**

- **Windows**
  - 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**
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.

iii. The configuration utility will appear as below.

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].

![Configuration Utility](image)

**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].

![Chelsio T6 adapter at PCI Bus: 01 Device: 00](image)

Choose a function to configure

1. PXE
2. FCoE
3. iSCSI

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

![Chelsio T6 adapter at PCI Bus: 01 Device: 00](image)

Choose a NIC function to configure

1. Bus: 01 Dev: 00 Func: 00
2. Bus: 01 Dev: 00 Func: 01

vii. Enable NIC function bios if not already enabled.

![Chelsio Unified Boot](image)

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.

![Configuration Save Confirmation]

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.

![Chelsio PXE Initialization]

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

![System Setup]

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.

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

```markdown
<table>
<thead>
<tr>
<th>Main</th>
<th>Advanced</th>
<th>Event Logs</th>
<th>TPM</th>
<th>Security</th>
<th>Boot</th>
<th>Save &amp; Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image.png" alt="Image" /></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

- **Note**
  - Please ensure that Chelsio uEFI driver is loaded correctly as mentioned in **Loading uEFI driver** section.

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

```markdown
<table>
<thead>
<tr>
<th>Chelsio T5/T6</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image.png" alt="Image" /></td>
</tr>
</tbody>
</table>
```
i. Select **Configuration Utility** and press [Enter].

![Configuration Utility](image)

iv. Enable adapter BIOS if not already enabled.

![Adapter BIOS](image)

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

v. Select **Chelsio Protocol Selection** and press [Enter].

![Protocol Selection](image)
vii. Select **PXE** and press [Enter].

![Chelsio Unified Boot Option ROM Configuration Utility]

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.

![Chelsio Unified Boot Configuration Utility - PXE]

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

![Chelsio Unified Boot Configuration Utility - PXE]
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 Unified 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.
6. FCoE 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).

6.1. Legacy FCoE boot

i. Reboot the system.

ii. Press [Alt+C] when the message to configure Chelsio adapters appears on the screen.

iii. The configuration utility will appear as below. Choose the adapter on which you flashed the option ROM image. Hit [Enter].

iv. Enable the adapter BIOS if not already enabled. Hit [ENTER].

Use the default values for Boot Mode, EDD and EBDA Relocation parameters, unless instructed otherwise.
v. Choose **FCoE** from the list to configure and hit [Enter].

vi. Choose the first option, **Configure function parameters**, from the list of parameter type and hit [Enter].

vii. Enable FCoE BIOS if not already enabled.
viii. Choose the order of the ports to discover FCoE targets.

```
Ctrl : T520-CR   FW : Ch66.8.9.9  DevId : 0x5601  Ports : 2
Bus : 04  Device : 00  Function : 6
```

Bios : ENABLED

Port order for boot retry : 00  01

Discovery Timeout : 30

ix. Set discovery timeout to a suitable value. Recommended value is >= 30.

```
Ctrl : T520-CR   FW : Ch66.8.9.9  DevId : 0x5601  Ports : 2
Bus : 04  Device : 00  Function : 6
```

Bios : ENABLED

Port order for boot retry : 00  01

Discovery Timeout : 30

x. Hit [F10] or [Esc] and then [Y] to save the configuration.
xi. Choose **Configure boot parameters**.

![Configure boot parameters](image1)

xii. Select the first boot device and hit [Enter] to discover FC/FCoE targets connected to the switch. Wait till all reachable targets are discovered.

![Saved boot device](image2)

xiii. List of discovered targets will be displayed. Highlight a target using the arrow keys and hit [Enter] to select.

![List of discovered targets](image3)
xiv. From the list of LUNs displayed for the selected target, choose one on which operating system has to be installed. Hit [Enter].

<table>
<thead>
<tr>
<th>Ctrl</th>
<th>T520-CR</th>
<th>FW :</th>
<th><em>device</em></th>
<th>DevId : 0x5601</th>
<th>Ports : 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bios</td>
<td></td>
<td>Bus : 04</td>
<td>device : 00</td>
<td>Function : 6</td>
<td></td>
</tr>
<tr>
<td>Ctrl</td>
<td>T520-CR</td>
<td>FW :</td>
<td><em>device</em></td>
<td>DevId : 0x5601</td>
<td>Ports : 2</td>
</tr>
<tr>
<td>Bios</td>
<td></td>
<td>Bus : 04</td>
<td>device : 00</td>
<td>Function : 6</td>
<td></td>
</tr>
</tbody>
</table>

**List of LUNs present on the target**

1. LUN: 00000000000000000000000000000000 NETAPP 1.0385 GB
2. LUN: 00000000000000000000000000000000 NETAPP 1.0385 GB
3. LUN: 00000000000000000000000000000000 NETAPP 1.0385 GB
4. LUN: 00000000000000000000000000000000 NETAPP 1.0385 GB
5. LUN: 00000000000000000000000000000000 NETAPP 1.0385 GB
6. LUN: 00000000000000000000000000000000 NETAPP 1.0385 GB
7. LUN: 00000000000000000000000000000000 NETAPP 1.0385 GB
8. LUN: 00000000000000000000000000000000 NETAPP 1.0385 GB

**Saved boot device**

1. Unused WPN: 00000000000000000000000000000000 LUN: 00000000000000000000000000000000
2. Unused WPN: 00000000000000000000000000000000 LUN: 00000000000000000000000000000000
3. Unused WPN: 00000000000000000000000000000000 LUN: 00000000000000000000000000000000
4. Unused WPN: 00000000000000000000000000000000 LUN: 00000000000000000000000000000000

xv. Hit [F10] or [Esc] and then [Y] to save the configuration.

**WARNING!**

Do you want to save the configuration? <Y>=Yes, <N>=No, <C>=Cancel

xvi. Reboot the machine.
xvii. During POST, allow the Chelsio Option ROM to discover FCoE targets.

![Installing Chelsio T5 Storage FCoE BIOS](image)

\[PCI BIOSv3.0\] PCI FWv2.1 PnP BIOS: YES PME Entry is passed by BIOS
Bringing up link on PCI:04:00:6 Port 0 ... Done
Discovering FCoE Target(s) on PCI:04:00:6 Port 0 ... Done
sd(1): T520-CA PCI:04:00:6 P(0) WWPN:500A090209AB7CAB Lun(00)
NETAPP LUN 8030 35.00003 GB
Storage FCoE BIOS Installed Successfully!

xviii. Enter BIOS setup and choose FCoE disk discovered via Chelsio adapter as the first boot device.

![Boot Device Priority](image)

1st Boot Device (Removable Dev.)
2nd Boot Device [Network:ChelsioT5PXE]
3rd Boot Device [Network:ChelsioT5PXE]
4th Boot Device [Disabled]

Options
- Select Screen
- Select Item
- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

Reboot and boot from the FCoE disk or install the required OS using PXE.
6.2. uEFI FCoE Boot

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

6.2.1. HII

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

i. Reboot the system and go into BIOS setup.

ii. Select Chelsio T5/T6 and press [Enter]

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

---

Please ensure that Chelsio uEFI driver is loaded correctly as mentioned in Loading uEFI driver section.

iii. Select the Chelsio adapter to be configured and press [Enter].
iv. Select **Configuration Utility** and press [Enter].

<table>
<thead>
<tr>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶ Card Information</td>
</tr>
<tr>
<td>▶ Boot Information</td>
</tr>
<tr>
<td>▶ Flash Utility</td>
</tr>
<tr>
<td>▶ Configuration Utility</td>
</tr>
</tbody>
</table>

v. Enable adapter BIOS if not already enabled.

<table>
<thead>
<tr>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶ Save Changes</td>
</tr>
<tr>
<td>▶ Load DNA defaults.</td>
</tr>
<tr>
<td>DNA Parameters</td>
</tr>
<tr>
<td>▶ CNA Parameters</td>
</tr>
<tr>
<td>▶ Bios</td>
</tr>
<tr>
<td>▶ Platform</td>
</tr>
<tr>
<td>▶ Chelsio Protocol Selection</td>
</tr>
</tbody>
</table>

[Enabled] [Both]

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].

<table>
<thead>
<tr>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶ Save Changes</td>
</tr>
<tr>
<td>▶ Load DNA defaults.</td>
</tr>
<tr>
<td>DNA Parameters</td>
</tr>
<tr>
<td>▶ CNA Parameters</td>
</tr>
<tr>
<td>▶ Bios</td>
</tr>
<tr>
<td>▶ Platform</td>
</tr>
<tr>
<td>▶ Chelsio Protocol Selection</td>
</tr>
<tr>
<td>▶ Blink Port0</td>
</tr>
<tr>
<td>▶ Blink Port1</td>
</tr>
<tr>
<td>▶ Blink Port2</td>
</tr>
<tr>
<td>▶ Blink Port3</td>
</tr>
</tbody>
</table>

Configure PXE/FCoE/ISCSI Parameters

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

<table>
<thead>
<tr>
<th>Advanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶ Save Changes</td>
</tr>
<tr>
<td>▶ Load DNA defaults.</td>
</tr>
<tr>
<td>DNA Parameters</td>
</tr>
<tr>
<td>▶ CNA Parameters</td>
</tr>
<tr>
<td>▶ Bios</td>
</tr>
<tr>
<td>▶ FCoE</td>
</tr>
<tr>
<td>▶ ISCSI</td>
</tr>
</tbody>
</table>

Chelsio Protocol Selection

Configure FCoE Parameters
viii. Under **Function Parameters**, enable FCoE BIOS, if not already enabled.

![Advanced settings](image)

 ix. Set discovery timeout to a suitable value. Recommended value is >= 30

![Advanced settings](image)

 x. Choose the order of the ports to discover FCoE targets.

![Advanced settings](image)
xi. Under the first boot device, select Discover Target and press [Enter] to discover FC/FCoE targets connected to the switch. Wait till all reachable targets are discovered.

![Image of Chelsio Unified Boot]

xii. List of discovered targets will be displayed. Highlight a target to select it and hit [Enter].

![Image of Chelsio Unified Boot]

xiii. List of LUNs for the selected target will be displayed. Highlight a LUN to select it and hit [Enter].

![Image of Chelsio Unified Boot]
xiv. Select **Save Changes** and press [Enter].

![Advanced BIOS Settings]

xv. Reboot the system for changes to take effect.

xvi. The discovered LUN should appear in the **Boot Configuration** section and system BIOS section.

![Boot Configuration Settings]

xvii. Select the LUN as the first boot device and exit from BIOS.

xviii. Either boot from the LUN or install the required OS.
6.2.2. drvcfg

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

i. Boot the system into EFI shell.
ii. Run the following command to launch the configuration utility.

```
fs0:\> drvcfg -s
```

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

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

v. Further configuration steps are similar from step (iv) of **Legacy FCoE Boot** section.
7. **iSCSI 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).

### 7.1. Legacy iSCSI boot

i. Reboot the system.

ii. Press [Alt+C] when the message to configure Chelsio adapters appears on the screen.

![Chelsio Unified Boot BIOS](image)

iii. The configuration utility will appear as below:

![Configuration Utility](image)

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

iv. Enable the adapter BIOS if not already enabled. Hit [Enter].

![Adapter Configuration](image)

*Note: Use the default values for Boot Mode, EDD and EBDA Relocation parameters, unless instructed otherwise.*
v. Choose **iSCSI** from the list to configure and hit [Enter].

vi. Choose the first option, **Configure Function Parameters**, from the list of parameter type and hit [Enter].

vii. Enable iSCSI BIOS if not already enabled. Select the iSCSI OS Initiator based on the OS you are installing. iBFT (iSCSI Boot Firmware Table) will be selected by default.

- **Linux**: Only iBFT is supported.
- **Windows**: Select CBFT to use Chelsio iSCSI Initiator, *cht4iscsi* during OS installation. If iBFT is selected, MS iSCSI Initiator will be used.
- **ESX**: Select CBFT to use Chelsio iSCSI Initiator, *cheiscsi* during OS installation. If iBFT is selected, ESXi iSCSI Initiator will be used.

You can also configure the number of iSCSI login attempts (retries) in case the network is unreachable or slow.
viii. Choose the order of the ports to discover iSCSI targets.

```
Ctrl : T6225-CR  FW :       DevId : 0x6501 Ports : 2
Bios :        Bus: 01  Device : 00  Function : 5

Bios : ENABLED
Port order for boot retry : 00 31
Discovery Timeout : 30
iSCSI OS Initiator : iBFT
iSCSI Login Retry (Slow NW) : 0
```

ix. Set discovery timeout to a suitable value. Recommended value is $\geq 30$.

```
Ctrl : T6225-CR  FW :       DevId : 0x6501 Ports : 2
Bios :        Bus: 01  Device : 00  Function : 5

Bios : ENABLED
Port order for boot retry : 00 01
Discovery Timeout : 30
iSCSI OS Initiator : iBFT
iSCSI Login Retry (Slow NW) : 0
```

x. Hit [Esc] and then [Y] to save the configuration.

```
Ctrl : T6225-CR  FW :       DevId : 0x6501 Ports : 2
Bios :        Bus: 01  Device : 00  Function : 5

WARNING!
Do you want to save the configuration?
$\langle Y \rangle$=Yes, $\langle N \rangle$=No, $\langle C \rangle$=Cancel

iSCSI Login Retry (Slow NW) : 0
```
xi. Go back and choose **Configure Initiator Parameters** to configure initiator related properties.

![Configuration Screen]

xii. Initiator properties like IQN, Header Digest, Data Digest, etc. will be displayed. Change the values appropriately or continue with the default values. Hit [F10] to save.

![Initiator Properties]

xiii. CHAP authentication is disabled by default. To enable and configure, go back and choose **Configure CHAP Parameters**

![CHAP Configuration]

---

Chelsio Unified Boot

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xiv. Enable CHAP authentication by selecting ONE-WAY or MUTUAL in the CHAP Policy field. Next, choose the CHAP method. Finally, provide Initiator and Target CHAP credentials as per the authentication method selected. Hit [F10] to save.

![CHAP Policy configuration](image1)

xv. Go back and choose Configure Network Parameters to configure iSCSI Network related properties.

![Network Parameters configuration](image2)

xvi. Select the port using which you want to connect to the target. Hit [Enter].

![Port selection](image3)
xvii. Select Yes in the **Enable DHCP** field to configure port using DHCP or No to manually configure the port. Hit [F10] to save.

![Port A network parameter configuration](image)

xviii. Go back and choose **Configure Target Parameters** to configure iSCSI target related properties.

![Choose the parameter type to configure](image)

xix. If you want to discover target using DHCP, select Yes in the **Discover Boot Target via DHCP** field. To discover target via static IP, select No and provide the target IP and Hit [F10] to save. The default TCP port selected is 3260.

![Discover Boot Target via DHCP](image)
xx. Go back and choose **Discover iSCSI Target(s)** to connect to a target.

xxi. Select the portal group on which iSCSI service is provided by the target.

xxii. A list of available targets will be displayed. Select the target you wish to connect to and hit [Enter].
xxiii. A list of LUNs configured on the selected target will be displayed. Select the LUN you wish to connect to and hit [Enter].

List of LUNs present on the target

1. LUN: 0000000000000000 L10-ORG 60.0000 GB

xxiv. Hit [Esc] and then [Y] to save the configuration.

xxv. Reboot the machine.

xxvi. During POST, allow the Chelsio Option ROM to discover iSCSI targets.

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.

Installing Chelsio T6 Storage iSCSI BIOS
PCI BIOS v3.0 , PCI FW v3.0 , PnP BIOS : YES PMM Entry is passed by BIUS
Bringing up link on PCI:01:00:5 Port 0 ... Done
Waiting for LLD negotiation ... Done
Discovering iSCSI Target(s) on PCI:01:00:5 Port 0 ... Done
sd(1): T6225-CR PCI:01:00:5 P(tr) MNC:00:07:43:01:33:F8 Host:102.88.88.92
ct2 Lun(00) L10-ORG vol1 1.0 60.0000 GB
Storage iSCSI BIOS Installed Successfully!
xxvii. Enter BIOS setup and choose iSCSI target LUN discovered via Chelsio adapter as the first boot device.

xxviii. Reboot and boot from the iSCSI Target LUN or install the required OS using PXE.

7.2. uEFI iSCSI Boot

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

7.2.1. HII

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

i. Reboot the system and go into BIOS setup.

ii. Select Chelsio T5/T6 and press [Enter]
iii. Select the Chelsio adapter to be configured and press [Enter].

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

Please ensure that Chelsio uEFI driver is loaded correctly as mentioned in *Loading uEFI driver* section.
v. Enable adapter BIOS if not already enabled.

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

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

viii. Under **Function Parameters**, enable iSCSI BIOS, if not already enabled.

---

**Note**

*It is highly recommended that you use the **Save Changes** option every time a parameter/option is changed.*
ix. Set discovery timeout to a suitable value. Recommended value is $>= 30$

x. Choose the order of the ports to discover iSCSI targets.
xi. Under **Initiator Parameters**, iSCSI Initiator properties like IQN, Header Digest, Data Digest, etc will be displayed. Change the values appropriately or continue with the default values.

![Chelsio Unified Boot Configuration Utility](image)

The worldwide unique name of the initiator. Only IQN format is accepted.

- Save Changes
- Load iSCSI defaults.
- Delete Boot Device

Function Parameters
- **Bios**: [Enabled]
- **Discovery Timeout**: 30
- **Discovery Retry Count**: 0
- **1st Port for Boot retry**: 0
- **2nd Port for Boot retry**: 1

Initiator Parameters
- **iSCSI Initiator Type**: [Disabled]
- **Initiator IQN**: iqn.2009-04.com.chel...
- **Header Digest**: [None]
- **Data Digest**: [None]
- **InitialR2T**: [Yes]
- **MaxOutstandingR2T**: 1
- **DefaultTimeout**: 20
- **DefaultRTimeRetain**: 20
- **FirstBurstLength**: 64
- **MaxBurstLength**: 256

xii. Under the first port, select **Enable DHCP** field, hit [Enter] and select **Enabled**. This will configure port using DHCP. Select **Disabled** to manually configure the port.

![Chelsio Unified Boot Configuration Utility](image)
xiii. Under **Target Parameters**, select **Enabled** for the **Boot Target via DHCP** parameter to discover target using DHCP.

To discover target via static IP, select **Disabled** and provide the target IP.
xiv. CHAP authentication is disabled by default. To enable and configure, highlight **CHAP Policy** and hit [Enter]. Select the policy type from the corresponding pop-up and hit [Enter] again.

![CHAP Policy Selection](image1)

xv. Provide Initiator and Target CHAP credentials as per the CHAP policy selected.

![CHAP Password Entry](image2)
xvi. Select **Discover Target** and press [Enter] to discover iSCSI targets connected to the switch. Wait till all reachable targets are discovered.

![Discover iSCSI Target](image)

xvii. A list of available targets will be displayed. Select the target you wish to connect to and hit [Enter].

![Discover iSCSI Target List](image)

xviii. A list of LUNs configured on the selected target will be displayed. Select the LUN you wish to connect to and hit [Enter].

![LUN List](image)
xix. Select **Save Changes** and press [Enter]

![Save Changes screen](image)

xx. Reboot the system for changes to take effect.

xxi. The discovered LUN should appear in the **Boot Configuration/ Boot Information** section and system BIOS.

![Boot Configuration screen](image)

xxii. Select the LUN as the first boot device and exit from BIOS.

xxiii. Either boot from the LUN or install the required OS.
7.2.2. drvcfg

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

i. Boot the system into EFI shell.
ii. Run the following command to launch the configuration utility.

```
.fs0:/> drvcfg -s
```

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

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

v. Further configuration steps are similar from step (iv) of Legacy iSCSI Boot section.
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