# NVIDIA Networking Server-Side Documentation of Flexboot v3.9.101 & UEFI v14.43.19

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# 1 Overview

NVIDIA® PreBoot drivers are a multiprotocol remote boot technology that support remote Boot over InfiniBand (BoIB) and over Ethernet.

Using Virtual Protocol Interconnect (VPI) technologies available in NVIDIA® ConnectX® adapters, PreBoot drivers give IT Managers' the choice to boot from a remote storage target (iSCSI target) or a LAN target (Ethernet Remote Boot Server) using a single ROM image on ConnectX products.

FlexBoot is based on the open source project iPXE available at http://www.ipxe.org.

PreBoot drivers first initialize the adapter device, senses the port protocol – Ethernet or InfiniBand, and brings up the port. Then it connects to a DHCP server to obtain its assigned IP address and network parameters, and also to obtain the source location of the kernel/OS to boot from. The DHCP server instructs the PreBoot drivers to access the kernel/OS through a TFTP server, an iSCSI target, or some other service.

Software Downloads

- FlexBoot: Please visit FlexBoot page
- UEFI: Please visit the UEFI webpage

## 1.1 Document Revision History

A list of the changes made to this document are provided in User Manual Revision History.

## 1.2 Release Notes Revision History

| Revision | Date | Description |
|---|---|---|
| FlexBoot 3.9.101 & UEFI 14.43.19 | November, 2026 | Initial release of this Release Notes version. |

# 2 Compatible Products

| Adapter Card | Bundled Firmware Version |
|---|---|
| **ConnectX-9** | 82.50.1002 |
| **ConnectX-8** | 40.51.1002 |
| **BlueField®-3** | 32.51.1002 |
| **BlueField®-2** | 24.51.1002 |
| **ConnectX-7** | 28.51.1002 |
| **ConnectX-6 Lx** | 26.51.1002 |
| **ConnectX-6 Dx** | 22.51.1002 |

The following are the supported legacy HCAs and firmware versions:

| HCAs | Firmware Version | FlexBoot Version | UEFI Version |
|---|---|---|---|
| NVIDIA ConnectX-5 / NVIDIA ConnectX-5 Ex | 16.35.4030 | 3.6.902 | 14.29.15 |
| NVIDIA BlueField | 18.33.1048 | 3.6.502 | 14.26.17 |
| ConnectX-4 Lx | 14.32.1010 | | 14.25.17 |
| ConnectX-4 | 12.28.2006 | 3.6.102 | 14.22.14 |
| ConnectX-3/ConnectX-3 Pro | 2.42.5000 | 3.4.752 | N/A |

## 2.1 FlexBoot Operating Systems

All the Operating Systems below expect for RedHat 7.3 are supported in Ethernet protocol only. RedHat 7.3 is supported in both InfiniBand and Ethernet protocol.

| OSes | Version | ETH | IB |
|---|---|---|---|
| RHEL | 8.5/6 | + | + |
| RHEL OEL | 7.6 | + | |
| RHEL | 7.9 | + | + |
| RHEL | 7.7 | + | + |
| RHEL_ALT | 8.4 | + | + |
| RHEL_ALT | 8.6 | + | + |
| SLES | 12.4/5 | + | |
| SLES | 15.2/3 | + | |
| Centos | 7.6 | + | |

| OSes | Version | ETH | IB |
|---|---|---|---|
| Windows Server | 2019 | + | + |
| Windows Server | 2016 | + | + |
| Windows Server | 2022 | + | + |

## 2.2 UEFI Package Contents

UEFI packages contain UEFI rom files per device type.

## 2.3 Supported Tools (MFT)

| Tools | Version |
|---|---|
| MFT | 4.38.0-134 |

# 3 Release Notes


- Changes and New Features - FlexBoot
- Changes and New Features - UEFI
- Bug Fixes in this Version - FlexBoot
- Bug Fixes in this Version - UEFI
- Known Issues - FlexBoot
- Known Issues - UEFI
- UEFI Verification


## 3.1 Changes and New Features - FlexBoot

For a list of old Changes and Features, please see Changes and New Features History.

| Category | Description |
|---|---|
| **Rev. 3.9.101** | |
| General | Updated MFT and firmware versions. For the firmware versions supported see, Compatible Products. |

## 3.2 Changes and New Features - UEFI

For a list of old Changes and Features, please see Changes and New Features History.

| Category | Description |
|---|---|
| **Rev. 14.43.19** | |
| General | Updated MFT and firmware versions. For the firmware versions supported see, Compatible Products. |

### 3.2.1 Installed UEFI APIs (Protocols)

The following are the lists of UEFI APIs (protocols) installed over UEFI:

| | |
|---|---|
| **Driver handle** | • EFI Component name Protocol<br>• EFI Component name 2 Protocol<br>• EFI Diagnostics Protocol<br>• EFI Diagnostics 2 Protocol<br>• EFI Driver Health Protocol |
| **PCI controller handle** | • EFI Driver binding protocol (driver start, stop, supported) installed by system UEFI on handle |
| **Port handle (child handle to PCI controller handle, one handle per port)** | • EFI Device Path Protocol<br>• EFI Network Interface Identifier Protocol (UNDI) |

## 3.3 Bug Fixes in this Version - FlexBoot

This release does not include any bug fixes. For a list of old bug fixes, please see Bug Fixes History.

## 3.4 Bug Fixes in this Version - UEFI

This release does not include any bug fixes. For a list of old bug fixes, please see Bug Fixes History.

## 3.5 Known Issues - FlexBoot

The following is a list of general limitations and known issues of the various components of this FlexBoot release.

| Internal Ref. | Description |
|---|---|
| 2244450 | **Description:** Chain-loading boot-loaders that work with interrupts fail to boot on ConnectX-6 Lx OCP adapter cards. |
| | **Workaround:** Disable the legacy interrupts using mlxconfig.<br>For further information refer to MFT User Manual (https://docs.mellanox.com/category/mft). |
| | **Keywords:** Chain-loading, boot |
| | **Discovered in Version:** 3.6.204 |
| - | **Description:** PXE boot will not function if the adapter card is connected to a NVIDIA Quantum based switch over an HDR fiber optical cable or a copper splitter because EDR and SDR speeds will not function. |
| | **Workaround:** Set `KEEP_LINK_UP_ON_BOOT` configuration to enable via mlxconfig.<br>For further information please contact Support. |
| | **Keywords:** IB, Link Speed , Link Down, SDR , optical cable |
| | **Discovered in Version:** 3.5.901 |
| 1422604 | **Description:** The FlexBoot TFTP enters an infinite loop when it tries to resolve the server name by a DNS request, and the DNS server dose not response to the request. |
| | **Workaround:** Terminate the TFTP process by pressing Ctrl + C |
| | Keywords: Boot, TFTP, DNS |
| | **Discovered in Version:** 3.5.504 |
| 1295727 | **Description:** In Secure Host mode, the Ctrl + B option will be “read only”, changes will not be applied and may cause unknown behavior. |
| | **Workaround:** N/A |
| | **Keywords:** Secure Host mode, Ctrl + B option |
| | **Discovered in Version:** 3.5.403 |

| Internal Ref. | Description |
|---|---|
| 1066544 | **Description:** Chain-loading boot-loaders that works with interrupts fails to boot on multi- host adapter cards. |
| | **Workaround**: N/A |
| | **Keywords:** Chain-loading, boot |
| | **Discovered in Version:** 3.5.403 |
| 1755286 | **Description:** Port speed may change to SDR spontaneously, without a clear reason for devices that operates in Multi-Host mode and for devices that operates in Single-Host mode with "keep_ib_link_up" configuration at "1". |
| | **Workaround**:<br>1. Power-cycle the server.<br>2. Disable the physical link.<br>3. Enable the physical link to load the default link speed.<br>4. Keep the "keep_ib_link_up" bit at 0 in NVconfig to make sure the port is raised with the correct speed. |
| | **Keywords:** SDR, Multi-Host, Single-Host, port speed |
| | **Discovered in Version:** 3.5.305 |
| 1149467 | **Description:** Chain-loading "ipxe.pxe" and "undionly.kpxe" over InfiniBand is currently not supported when using DHCP client identification based on InfiniBand 32-bit Prefix+GUID (as with FlexBoot). |
| | **Workaround**: N/A |
| | **Keywords:** FlexBoot, chainload, InfiniBand, undionly.kpxe, ipxe.pxe |
| | **Discovered in Version:** 3.5.305 |
| 841198 | **Description:** FlexBoot fails to boot when the following occurs:<br>• Boot priority is set to iSCSI<br>• The iSCSI TCP/IP parameters via DHCP is disabled<br>• iSCSI boot fails or iSCSI boot to target configuration is set to disable |
| | **Workaround**: N/A |
| | **Keywords:** PXE boot, iSCSI |
| 843377/849223 | **Description:** The physical MAC assigned via the boot menu is displayed as zeroes instead of the set MAC when ConnectX-4 VPI adapter card is configured as InfiniBand. |
| | **Workaround**: N/A |
| | **Keywords:** Physical MAC, Boot menu |
| 656001 | **Description:** Booting from WDS and Windows DHCP server when only Option 66 is enabled (without Option 67), is not supported. |
| | **Workaround**: N/A |
| | **Keywords:** DHCP |
| 776057 | **Description:** Citrix PVS boot is not supported. |
| | **Workaround**: N/A |
| | **Keywords:** Citrix PVS boot |
| 689460 | **Description:** FlexBoot uses system UUID to generate the client DUID-UUID as per RFC 6355, the data conveyed with DHCPv6 Code 1 (Option ID). |
| | **Workaround**: N/A |

| Internal Ref. | Description |
|---|---|
| | Keywords: DUID-UUID |
| 928217 | **Description:** Installing ESXi 6.5/6.0 on iSCSI target is currently not supported. |
| | **Workaround**: N/A |
| | Keywords: ESXi 6.5/6.0, iSCSI target |
| - | **Description:** To use the DHCP server to identify ipxe requests when using undi-only.kpxe or ipxe.pxe when booting over IB requires special configuration. (see the Workaround below). |
| | **Workaround**: Add to the DHCP host declaration the MAC identification alongside the option 61 DUID.<br>For example:<br>host ib-client1 {<br>option dhcp-client-identifier = ff:00:00:00:00:00:02:00:00:02:c9:00:<Port-GUID> ;<br>hardware ethernet <Port-MAC> ; fixed-address <IPoIB Address> ; filename "ipxe.pxe" ;<br>if exists user-class and option user-class = "iPXE" { filename “pxelinux.0” ; }<br>} |
| | Keywords: undionly.kpxe or ipxe.pxe |
| - | **Description:** Due to interoperability issue between the ESXi installer and the lpxelinux bootloader, when trying to install ESXi 6.5 on iSCSI target using lpxelinux.0 as a bootloader, a PSOD occurs. |
| | **Workaround**: Use FlexBoot (or iPXE) to load mboot.c32 directly instead of pxelinux.0 using the script below:<br>#!ipxe<br>set base /nfs/Esxi-6.5_INBOX<br>chain ${base}/mboot.c32 -c ${base}/boot.cfg BOOTIF=01-<br>${mac:hexhyp}<br><br>where the "set base ..." specifies a suitable absolute path.<br>**Note:** iPXE does not need an absolute path, however, mboot.c32 requires it. |
| | **Keywords:** mboot.c32, PSOD, |
| 976878 | **Description:** When using bootloader grub2 to boot WDS, if the WDS boot fails, an RSOD might appear. |
| | **Workaround**: N/A |
| | **Keywords:** Bootloader grub2, WDS, RSOD |
| - | **Description:** Several BIOS vendors have limited boot-vector space and may not display FlexBoot in their boot menu. |
| | **Workaround**: Disable the embedded NIC boot agent in BIOS |
| | **Keywords:** BIOS |
| - | **Description:** In several BIOS, the server might hang during FlexBoot booting due to wrong configuration of the PMM. |
| | **Workaround**: N/A |
| | **Keywords:** BIOS |
| - | **Description:** Only EBX, ESI, DS, ES registers can be saved in Boot Entry. |
| | **Workaround**: N/A |
| | **Keywords:** BIOS |

| Internal Ref. | Description |
|---|---|
| - | **Description:** If a client returned control to the BIOS after a successful connection to an iSCSI target (but did not boot from it), then, unexpected behavior may occur. |
| | **Workaround**: Follow the instructions described in the FlexBoot UM for the proper iSCSI boot/install |
| | **Keywords:** BIOS |
| 673114/821899 | **Description:** FlexBoot banner might not be shown in some BIOSes. |
| | **Workaround**: N/A |
| | **Keywords:** BIOS |
| - | **Description:** In some cases, PXE boot will not work if the client was given only the file-name without next-server (siaddr). |
| | **Workaround**: N/A |
| | **Keywords:** PXE Boot |
| - | **Description:** PXE boot after iSCSI boot with static configuration is currently not supported. |
| | **Workaround**: N/A |
| | **Keywords:** PXE Boot |
| - | **Description:** Boot over VLAN with IB port is currently not supported. |
| | **Workaround**: N/A |
| | **Keywords:** PXE Boot |
| - | **Description:** Some faulty boot loaders do not close the underlying UNDI device which may result in unexpected behavior and possible system crash after the OS starts to load. |
| | **Workaround**: N/A |
| | **Keywords:** PXE Boot |
| - | **Description:** Chain-loading gPXE stack is not supported. |
| | **Workaround**: N/A |
| | **Keywords:** PXE Boot |
| 647143 | **Description:** Executing a partial boot loop while only downloading the NBP and selecting localboot is unsupported and may cause undefined behavior. |
| | **Workaround**: N/A |
| | **Keywords:** PXE Boot |
| 670421 | **Description:** Using filename for PXE boot with rootpath for hooking an iSCSI target (to install) is not supported when the PXE boot loader uses UNDI API, since all traffic must get to the boot loader. |
| | **Workaround**: N/A |
| | **Keywords:** PXE Boot |
| - | **Description:** iSCSI over IB is not tested. |
| | **Workaround**: N/A |
| | **Keywords:** iSCSI |
| - | **Description:** iSCSI over DCB is not supported. |

| Internal Ref. | Description |
|---|---|
| | **Workaround**: N/A |
| | **Keywords:** iSCSI |
| - | **Description:** FlexBoot supports only a single active iSCSI connection. Thus, when iSCSI-boot via Port 1 succeeds to connect but fails to boot, it will fail to connect via Port 2. |
| | **Workaround**: N/A |
| | **Keywords:** iSCSI |
| - | **Description:** Boot retries is currently not functional when booting from iSCSI. |
| | **Workaround**: N/A |
| | **Keywords:** iSCSI |
| 655800 | **Description:** iSCSI over IPv6 is not supported. |
| | **Workaround**: N/A |
| | **Keywords:** iSCSI |
| - | **Description:** Boot menu is displayed as READ ONLY if the HCA card does not support flash configuration. |
| | **Workaround**: N/A |
| | **Keywords:** User Interface |
| - | **Description:** FlexBoot Boot Menu will not be visible in serial output. |
| | **Workaround**: N/A |
| | **Keywords:** User Interface |
| - | **Description:** Large Receive Offload (LRO) and iSCSI may not interoperate due to a bug in current Linux kernel distributions. |
| | **Workaround**: Disable LRO in the IPoIB module when using iSCSI.<br>See the Mellanox FlexBoot user's manual for details under the Diskless Machines chapter (InfiniBand Ports). |
| | **Keywords:** Networking |
| - | **Description:** Setting the number of Virtual Functions higher than the machine's memory capability may cause memory issues and system instability. |
| | **Workaround**: N/A |
| | **Keywords:** Virtualization |
| - | **Description:** SLAM, FTP, HTTPS and SRP are currently not supported. |
| | **Workaround**: N/A |
| | **Keywords:** Protocols |
| - | **Description:** Occasionally, using the Spanning Tree Protocol (STP) in the switches may cause packet drops and boot failure in the system. |
| | **Workaround**: Enable the "edgemode" if disabled on the switch, or use either portfast or edgemode functionality on the switch ports connected to the NICs. |
| | **Keywords:** Protocols |
| 655800 | **Description:** IPv6 can only run if a RADVD service is running in the network. |
| | **Workaround**: N/A |

| Internal Ref. | Description |
|---|---|
| | **Keywords:** Protocols |
| - | **Description:** IPv6 over IB is not supported. |
| | **Workaround**: N/A |
| | **Keywords:** Protocols |
| 655800 | **Description:** Enabling IPv6 first and then IPv4 is currently not supported. |
| | **Workaround**: N/A |
| | **Keywords:** Protocols |

# 3.6 Known Issues - UEFI

The following is a list of general limitations and known issues of the various components of this UEFI release.

| Internal Ref. | Description |
|---|---|
| 4681273 | **Description:** UCM is not supported for ConnectX-8 and above. |
| | **Workaround:** N/A |
| | **Keywords:** UCM, ConnectX-8 |
| | **Discovered in Version:** 14.40.10 |
| 4196499 | **Description:** UEFI Firmware Management Protocol is not supported for ConnectX-8. |
| | **Workaround:** N/A |
| | **Keywords:** UEFI, FMP |
| | **Discovered in Version:** 14.36.21 |
| 3639809 | **Description:** SAN boot fails with the latest iPXE version. |
| | **Workaround:** N/A |
| | **Keywords:** SAN boot, iPXE |
| | **Discovered in Version:** 14.32.12 |
| 2680852 | **Description:** NVMe UEFI driver is not supported on Dell R720 BIOS version 2.9.0 as the BIOS does not support reporting valid Device Handle from EfiLoadedImagePortocol and always returns NULL. |
| | **Workaround:** N/A |
| | **Keywords:** DELL R720, NVME UEFI |
| | **Discovered in Version:** 14.24.13 (20.1.3 UEFI NVMe) |
| 2581408 | **Description:** On a BlueField device operating in Embedded CPU mode, PXE driver will fail to boot as long as the Arm side is not fully loaded and the OVS bridge is not configured. |
| | **Workaround:** Configure the UEFI BIOS to perform boot retires in order to wait for the Arm to come up.<br>If the BIOS does not support retries, perform a warm reboot on the host side and reboot via the device when the Arm is up and the OVS bridge is configured. |

| Internal Ref. | Description |
|---|---|
| | **Keywords:** Embedded CPU, PXE, UEFI, Arm |
| | **Discovered in Version:** 14.23.17 |
| 2353780 | **Description:** In BlueField-2 x86 host side, the UEFI driver of the Virtio Net emulation device will not be loaded and the Virtio Net UEFI device will not be visible as a boot option before the Virtio-Net Controller on the Arm side is started. |
| | **Workaround:** Start the Virtio-Net controller on the Arm side and then run warm reboot on the host side to load the Virtio-Net UEFI driver. |
| | **Keywords:** Virito-Net, UEFI, boot |
| | **Discovered in Version:** 14.20.19 |
| 2232461 | **Description:** A mismatch in NumberVFAdvertised between the HII and the mlxconfig because in HII, the minimum value is set to 1 and in some adapter cards its value is set to 0 by the mlxconfig.<br>**Note:** When setting this attribute by mlxconfig to 0, the HII will not show it, but instead it will show the default value. |
| | **Workaround:** N/A |
| | **Keywords:** NumberVFAdvertised, HII, Mlxconfig |
| | **Discovered in Version:** 14.20.19 |
| - | **Description:** PXE boot will not function if the adapter card is connected to a Mellanox Quantum™ based switch over an HDR fiber optical cable or a copper splitter because EDR and SDR speeds will not function. |
| | **Workaround:** Set `KEEP_LINK_UP_ON_BOOT` configuration to enable via mlxconfig.<br>For further information please contact Mellanox Support. |
| | **Keywords:** IB, Link Speed , Link Down, SDR , optical cable |
| | **Discovered in Version:** 14.20.19 |
| 1714094 | **Description:** The IB link will appear as disconnected in HII menu as long as the BIOS has not initialize the UNDI protocol which is necessary to query for the IB link status. |
| | **Workaround:** N/A |
| | **Keywords:** HII, Link Status, IB mode |
| | **Discovered in Version:** 14.18.19 |
| 1295727 | **Description:** In Secure Host mode, the Hii protocol will be “read only”, changes will not be applied and it may cause unknown behavior. |
| | **Workaround:** N/A |
| | **Keywords:** Secure Host mode, Hii protocol |
| | **Discovered in Version:** 14.15.19 |
| 798073 | **Description:** UEFI driver is not supported on Supermicro X9DEW (BIOS version 3.0c). |
| | **Workaround:** N/A |
| | **Keywords:** BIOS, Supermicro X9DEW |
| - | **Description:** Burning the UEFI driver will remove the Flexboot driver (Legacy BIOS driver) from the firmware. |

| Internal Ref. | Description |
|---|---|
| | **Workaround:** As of firmware ConnecX-4/Lx/5 v12/14/16.22.1002, UEFI is pre-compiled for various adapter cards and can be enabled using mlxconfig.<br>For the full list of OPNs supporting this new capability, see firmware Release Notes. |
| | **Keywords:** UEFI burning, Flexboot |

| Internal Ref. | Description |
|---|---|
| 3568696 | **Description:** On BlueField-3 devices that operate on IB mode using firmware version 32.38.1002, when configuring the devices to NIC mode, the ARM side gets stuck with exception and causes the drivers (OS/PXE) on the host side to fail. |
| | **Workaround:** To avoid this issue, when configuring a BlueField-3 device to NIC mode, add the following configuration:<br>• If you configure NIC mode from the ARM side, please disable UEFI_HII_EN from the ARM side through the following CMD:<br>`mlxconfig -d <device> set UEFI_HII_EN=0`<br>• If you configure NIC mode from the Host side, please follow the further instructions below to avoid the issue :<br>a. Create a raw file that contains the following 2 lines:<br>`MLNX_RAW_TLV_FILE`<br>`0x82000204 0x03040196 0x00000000 0x00000000`<br>b. Use the following CMD from the host side:<br>`mstconfig/mlxconfig -d <device> -f <raw file> set_raw` |
| | **Keywords:** NIC mode, BlueField-3 |
| | **Discovered in Version:** 14.30.13 |
| 2680852 | **Description:** NVMe UEFI driver is not supported on Dell R720 BIOS version 2.9.0 as the BIOS does not support reporting valid Device Handle from EfiLoadedImagePortocol and always returns NULL. |
| | **Workaround:** N/A |
| | **Keywords:** DELL R720, NVME UEFI |
| | **Discovered in Version:** 14.24.13 (20.1.3 UEFI NVMe) |
| 2581408 | **Description:** On a BlueField device operating in Embedded CPU mode, PXE driver will fail to boot as long as the Arm side is not fully loaded and the OVS bridge is not configured. |
| | **Workaround:** Configure the UEFI BIOS to perform boot retires in order to wait for the Arm to come up.<br>If the BIOS does not support retries, perform a warm reboot on the host side and reboot via the device when the Arm is up and the OVS bridge is configured. |
| | **Keywords:** Embedded CPU, PXE, UEFI, Arm |
| | **Discovered in Version:** 14.23.17 |
| 2353780 | **Description:** In BlueField-2 x86 host side, the UEFI driver of the Virtio Net emulation device will not be loaded and the Virtio Net UEFI device will not be visible as a boot option before the Virtio-Net Controller on the Arm side is started. |

| Internal Ref. | Description |
|---|---|
| | **Workaround:** Start the Virtio-Net controller on the Arm side and then run warm reboot on the host side to load the Virtio-Net UEFI driver. |
| | **Keywords:** Virito-Net, UEFI, boot |
| | **Discovered in Version:** 14.20.19 |
| 2232461 | **Description:** A mismatch in NumberVFAdvertised between the HII and the mlxconfig because in HII, the minimum value is set to 1 and in some adapter cards its value is set to 0 by the mlxconfig.<br>**Note:** When setting this attribute by mlxconfig to 0, the HII will not show it, but instead it will show the default value. |
| | **Workaround:** N/A |
| | **Keywords:** NumberVFAdvertised, HII, Mlxconfig |
| | **Discovered in Version:** 14.20.19 |
| - | **Description:** PXE boot will not function if the adapter card is connected to a Mellanox Quantum™ based switch over an HDR fiber optical cable or a copper splitter because EDR and SDR speeds will not function. |
| | **Workaround:** Set `KEEP_LINK_UP_ON_BOOT` configuration to enable via mlxconfig.<br>For further information please contact Mellanox Support. |
| | **Keywords:** IB, Link Speed , Link Down, SDR , optical cable |
| | **Discovered in Version:** 14.20.19 |
| 1714094 | **Description:** The IB link will appear as disconnected in HII menu as long as the BIOS has not initialize the UNDI protocol which is necessary to query for the IB link status. |
| | **Workaround:** N/A |
| | **Keywords:** HII, Link Status, IB mode |
| | **Discovered in Version:** 14.18.19 |
| 1295727 | **Description:** In Secure Host mode, the Hii protocol will be “read only”, changes will not be applied and it may cause unknown behavior. |
| | **Workaround:** N/A |
| | **Keywords:** Secure Host mode, Hii protocol |
| | **Discovered in Version:** 14.15.19 |
| 798073 | **Description:** UEFI driver is not supported on Supermicro X9DEW (BIOS version 3.0c). |
| | **Workaround:** N/A |
| | **Keywords:** BIOS, Supermicro X9DEW |
| - | **Description:** UEFI InfiniBand is not supported on the Arm side. |
| | **Workaround:** N/A |
| | **Keywords:** BlueField-2 / BlueField- Embedded CPU Mode in InfiniBand |
| - | **Description:** Burning the UEFI driver will remove the Flexboot driver (Legacy BIOS driver) from the firmware. |
| | **Workaround:** As of firmware ConnecX-4/Lx/5 v12/14/16.22.1002, UEFI is pre-compiled for various adapter cards and can be enabled using mlxconfig.<br>For the full list of OPNs supporting this new capability, see firmware Release Notes. |

| Internal Ref. | Description |
|---|---|
| | **Keywords:** UEFI burning, Flexboot |

## 3.7 UEFI Verification

This version of the UEFI passed UEFI SCT version 2.4B.

### 3.7.1 SCT Known Issues

- DriverModelTest\AdapterInformationProtocolTest 5.5.11.1.2
- DriverModelTest\AdapterInformationProtocolTest 5.5.11.3.2
- NetworkSupportTest\SimpleNetworkProtocolTest 5.11.1.8.3

# 4 User Manual

## 4.1 Burning the Expansion ROM Image


- Burning the Image on ConnectX® Family Devices
- Removing the Expansion ROM Image
- Enabling/Disabling FlexBoot/UEFI in EXPROM via mlxconfig


### 4.1.1 Burning the Image on ConnectX® Family Devices

#### 4.1.1.1 Prerequisites

| | |
|---|---|
| **Expansion ROM Image** | The expansion ROM images can be compiled using the FlexBoot code source available in the FlexBoot webpage on www.mellanox.com.<br>For further information on how to compile the code source, please refer to the pxebuild.py file inside the code source. |
| **Firmware Burning Tools** | You need to install the NVIDIA® Firmware Tools (MFT) package (version 4.1.0 or later) in order to burn the PXE ROM image.<br>To download MFT, see Firmware Tools under www.mellanox.com → Products → InfiniBand/VPI Drivers → Firmware Tools. |

#### 4.1.1.2 Burning the Expansion ROM Image

> ⚠ On selected platforms when burning the UEFI ROM image on a particular device, the UEFI controls other devices of the same type, if such devices do not have UEFI burned on them.

*To burn the composite image, perform the following steps:*

1. Obtain the MST device name. Run:

```
# mst start
```

   The device name will be of the form: mt<dev_id>_pci{_cr0|conf0}. Depending on the OS, the device name may be superseded with a prefix.

2. Create and burn the composite image. Run:

```
flint -d <mst device name> --allow_rom_change brom <expansion ROM image path>
```

- FlexBoot Example on Linux:

```
flint -d /dev/mst/mt4119_pciconf0 --allow_rom_change brom FlexBoot-3.5.110_4119.mrom
```

- FlexBoot Example on Windows:

```
flint -d mt4119_pciconf0 --allow_rom_change brom FlexBoot-3.5.110_4119.mrom
```

- UEFI Example on Linux:

```
flint -d /dev/mst/mt4119_pciconf0 --allow_rom_change brom 14_12_24_RELEASE_0x1017.efirom
```

- UEFI Example on Windows:

```
flint -d mt4119_pciconf0 --allow_rom_change brom 14_12_24_RELEASE_0x1017.efirom
```

### 4.1.2 Removing the Expansion ROM Image

Remove the expansion ROM image. Run:

```
flint -d <mst device name> drom
```

⚠ When removing the expansion ROM image, you also remove PreBoot drivers from the boot device list.

### 4.1.3 Enabling/Disabling FlexBoot/UEFI in EXPROM via mlxconfig

Set the desired PXE/UEFI value via mlxconfig. Run:

```
mlxconfig -d <device> set <option> = (Values- 0: False, 1: True)
```

Options:

- EXP_ROM_UEFI_ARM_ENABLE
- EXP_ROM_UEFI_x86_ENABLE
- EXP_ROM_PXE_ENABLE

⚠ The Enable/Disable sections above will expose/hide the device as a boot option.

## 4.2 BIOS Configuration

### 4.2.1 FlexBoot (Legacy BIOS Mode)

The expansion ROM image presents itself to the BIOS as a boot device. As a result, the BIOS will add to the list of boot devices "MLNX FlexBoot <ver>" for a ConnectX family device. The priority of this list can be modified through BIOS setup.

### 4.2.2 UEFI (UEFI BIOS Mode)

The expansion ROM image presents itself to the BIOS as a boot device. If BIOS is set to UEFI Boot mode it will add to the list of boot devices "UEFI Network X \[Device Name\]" for each available port of ConnectX family devices. The priority of this list can be modified through BIOS setup.

## 4.3 How to Boot

The document contains the following appendixes:

- PXE Boot
- iSCSI
- Booting from FlexBoot via IPv6
- Legacy Boot Priority Behavior
- UEFI PXE Boot
- How to use HTTPs and Private Root Certificate Trust
- Flexboot ipxe.pxe Chainloading

### 4.3.1 PXE Boot

#### 4.3.1.1 Prerequisites

- Make sure that your client is connected physically and logically to the server(s)
- The PreBoot drivers' images are already programmed on the adapter card
- For InfiniBand ports only: Start the Subnet Manager
- Configure and start the DHCP server
- Configure and start at least one of the services such as: iSCSI, tftp, http

#### 4.3.1.2 Starting the Boot Process

Boot the client machine and enter BIOS setup to configure "MLNX FlexBoot" to be the first on the boot device priority list.

> ⚠ On dual-port ConnectX-3 network adapters, the client first attempts to boot from Port 1. If this fails, it switches to boot from Port 2. Note also that the driver waits up to 10 seconds for port come up and up to 90 seconds to assign an IP from the DHCP server.

If a PreBoot driver was selected through BIOS setup, the client will boot from FlexBoot. The client will display FlexBoot attributes, sense the port protocol (In ConnectX-3 cards only) – Ethernet or InfiniBand. The port sensing occurs only when the port is connected to a QSFP connector. In case of an InfiniBand port, the client will also wait for port configuration by the Subnet Manager. If auto-sensing protocol fails, the port will be configured as an InfiniBand port.

After configuring the IB/ETH port, the client attempts to connect to the DHCP server to obtain an IP address and the source location of the kernel/OS to boot from. Next, FlexBoot attempts to boot as directed by the DHCP server.

#### 4.3.1.3 How to Boot to ESXi

For instructions on booting to ESXi, refer to the ESXi Installation Guide on VMWare site: http://pubs.vmware.com/vsphere-55/index.jsp#com.vmware.vsphere.upgrade.doc/GUID-B9DB94CA-4857-458B-B6F1-6A688726AED0.html

#### 4.3.1.4 How to Boot Using HTTP and iPXE Script

After performing basic HTTP configuration, add the following lines to the dhcp server configuration file:

```
host uefi24-1 {
hardware ethernet F4:52:14:7A:56:F1 ;
fixed-address 14.7.6.24;
filename "pxe_script_linux";
option vendor-class-identifier "PXEClient";
}
"pxe_script_linux" file:
#!ipxe
dhcp net0
kernel -n vmlinuz http://14.7.6.30/RHEL6.4-x86_64-DVD1/images/pxeboot/vmlinuz
initrd http://14.7.6.30/RHEL6.4-x86_64-DVD1/images/pxeboot/initrd.img
boot
```

### 4.3.2 iSCSI

FlexBoot enables an iSCSI-boot of an OS located on a remote iSCSI target. It has a built-in iSCSI initiator which can connect to the remote iSCSI target and load from it the kernel and initrd. There are two instances of connection to the remote iSCSI target: the first is for get- ting the kernel and initrd via FlexBoot, and the second is for loading other parts of the OS via initrd.

If you choose to continue loading the OS (after boot) through the HCA device driver, please verify that the initrd image includes the HCA driver.



To boot via iSCSI, Flexboot must be selected from the BIOS boot menu (it will be shown as a BEV entry). Do not look for the entry in the BVC table.

#### 4.3.2.1 Installing to iSCSI Target

It is recommended to install to an iSCSI target using the same port performing the following:

1. Connect to the iSCSI target to retrieve various information from it.
   Due to the step above, FlexBoot will register the remote target by hooking BIOS interrupt 13.
2. Download the installation image using the same port by supplying the file name in the client's DHCP configuration file along with the root path.

#### 4.3.2.2 Configuring an iSCSI Target in Linux Environment

##### 4.3.2.2.1 Prerequisites

- Make sure that an iSCSI Target is installed on your server side.
  You can download and install an iSCSI Target from the following location: http://sourceforge.net/projects/iscsitarget/files/iscsitarget/
- Dedicate a partition on your iSCSI Target on which you will later install the operating system
- Configure your iSCSI Target to work with the partition you dedicated. If, for example, you choose partition /dev/sda5, then edit the iSCSI Target configuration file /etc/ietd.conf to include the following line under the iSCSI Target iqn line:

  ```
  Lun 0 Path=/dev/sda5,Type=fileio
  ```

  Example of an iSCSI Target iqn line:

  ```
  Target iqn.2007-08.7.3.4.10:iscsiboot
  ```

- Start your iSCSI Target.
  Example:

  ```
  host1# /etc/init.d/iscsitarget start
  ```

##### 4.3.2.2.2 Configuring the DHCP Server to Boot From an iSCSI Target

1. Configure DHCP as described in section " Preparing the DHCP Server in Linux"
2. Edit your DHCP configuration file (/etc/dhcpd.conf) and add the following lines for the machine(s) you wish to boot from the iSCSI target:

   ```
   Filename "";
   option root-path "iscsi:iscsi_target_ip::::iscsi_target_iqn";
   ```

The following is an example for configuring an IB/ETH device to boot from an iSCSI target:

```
host host1{ filename "";
option root-path "iscsi:iscsi_target_ip::::iscsi_target_iqn";

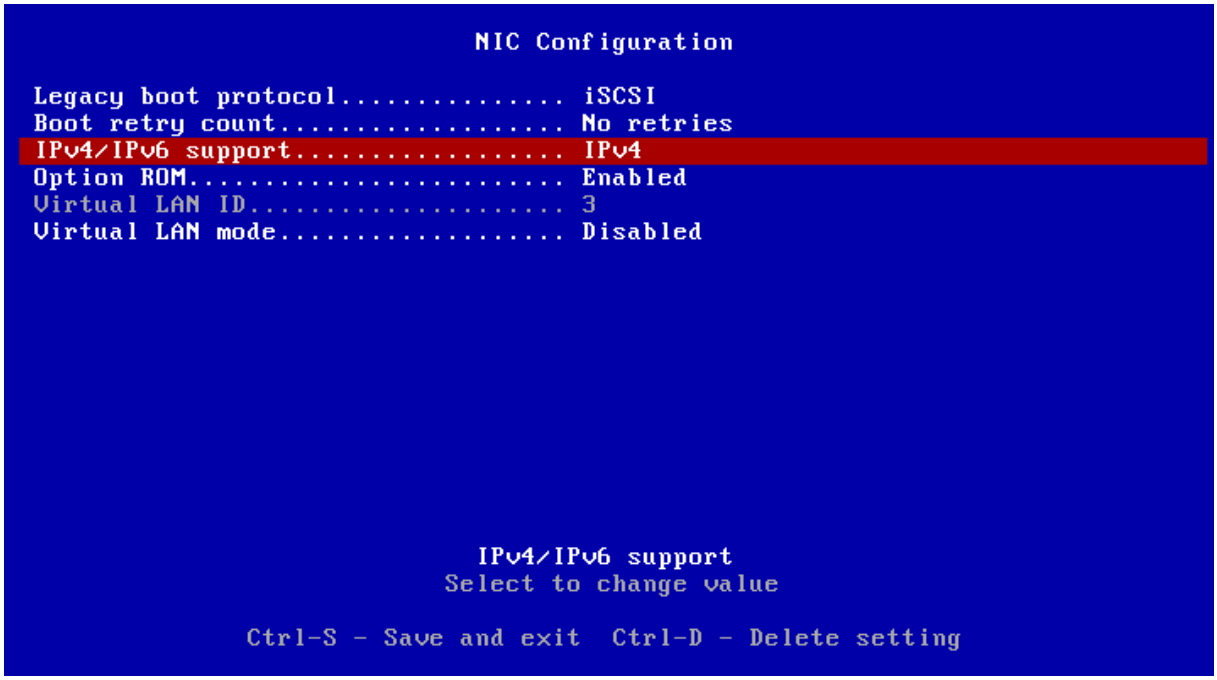
For a ConnectX device with ports configured as InfiniBand, comment out# the follow- ing line
option dhcp-client-identifier = ff:00:00:00:00:00:02:00:00:02:c9:00:00:02:c9:03:00:00:10:39;
For a ConnectX device with ports configured as Ethernet, comment out# the following line
hardware ethernet 00:02:c9:00:00:bb;
}
```

### 4.3.3 Booting from FlexBoot via IPv6

IPv6 boot must be enabled in FlexBoot menu. You can configure it to:

- IPv4 only
- IPv6 only

- IPv4 configuration and then IPv6




➢

*To boot from FlexBoot via IPv6:*

1. Run the RADVD service on a server in the network (preferably the DHCP server) and configure it to send a periodic Router Advertisement.
   Example:

```
interface eth1
{
   AdvSendAdvert on;
   MinRtrAdvInterval 3;
   MaxRtrAdvInterval 5;
   AdvManagedFlag on;
   AdvOtherConfigFlag off;
   AdvHomeAgentFlag off;

   prefix fdfc::/64 {
      AdvOnLink on;
      AdvAutonomous off;
      AdvRouterAddr off;
   };
};
```

2. Configure the DHCP service.
   Example:

```
default-lease-time 100;
preferred-lifetime 60;
option dhcp-renewal-time 30;
allow leasequery;
option dhcp6.preference 255;
option dhcp6.rapid-commit;
option dhcp6.bootfile6-url code 59 = string;
\\
subnet6 fdfc::/64 \{
```

```
        option dhcp6.bootfile-url "tftp://\[fdfc::123\]/ipv6_script";
        option dhcp6.name-servers fdfc::123;
        range6 fdfc::140 fdfc::200;
        range6 fdfc:: temporary;
\}
```

While the ipxe_script contents is:

```
#!ipxe
\\
#echo "Attempting to download linux OS over IPv6..."
kernel tftp://\[fdfc::123\]/kernel/vmlinuz_new
initrd tftp://\[fdfc::123\]/kernel/ramdisk_new.gz
imgselect vmlinuz_new
echo "Booting..."
boot
```

or over HTTP:

```
#!ipxe
\\
#echo "Attempting to download linux OS over IPv6..."
kernel http://\[fdfc::123\]/kernel/vmlinuz_new
initrd http://\[fdfc::123\]/kernel/ramdisk_new.gz
imgselect vmlinuz_new
echo "Booting..."
boot
```

## 4.3.4 Legacy Boot Priority Behavior

The sections below describe various legacy boot priority behaviors based on the protocol used.

### 4.3.4.1 Legacy Boot Protocol PXE

The client first tries to perform PXE boot and if that fails, it tries iSCSI boot. The client goes to the DHCP to get an IP address. The DHCP server might supply filename (for PXE boot) and root-path (for iSCSI boot) if set by the user.

- If the iSCSI target parameters are taken from the flash, then the root-path retrieved from the DHCP is deleted, and if the 'Connect' is set as "Enable" then the values stored in the flash are used (DHCP IP = Enable, DHCP Parameters = Disable).
- If a root-path is supplied from either the DHCP or the flash, the client is connected to the iSCSI target, but no boot is performed.
- If a filename is supplied, a PXE boot is performed on the Operating System.
- If PXE boot failed or no filename was supplied, an iSCSI boot is performed to the connected target.

### 4.3.4.2 Legacy Boot Protocol iSCSI

The client first tries to perform iSCSI boot and if that fails, it tries PXE boot. Upon iSCSI boot one of the following flows occurs:

- If all iSCSI configuration is taken from the flash, the client waits 25 seconds for the switches to be configured, and then tries to perform an iSCSI boot (hook to target and then boot). If the boot fails, the client exits. (DHCP IP = disable)

Or

1. If only the TCP parameters need to be retrieved from the DHCP (DHCP IP = enable, DHCP Parameters = disable), then the IP address is taken from the DHCP, the root-path retrieved

from the DHCP is deleted and if the 'Connect' is set as "Enable" then the values stored in the flash are used.
2. Hook to the iSCSI target.
3. Try to boot to the iSCSI target.
4. If iSCSI boot failed and DHCP supplied a filename, try to PXE boot.
5. If PXE boot failed, exit.

When the legacy boot protocol iSCSI is selected, the following is not supported:

- PXE boot after iSCSI boot with static configurations – Setting all iSCSI parameters from the flash (including IP address)

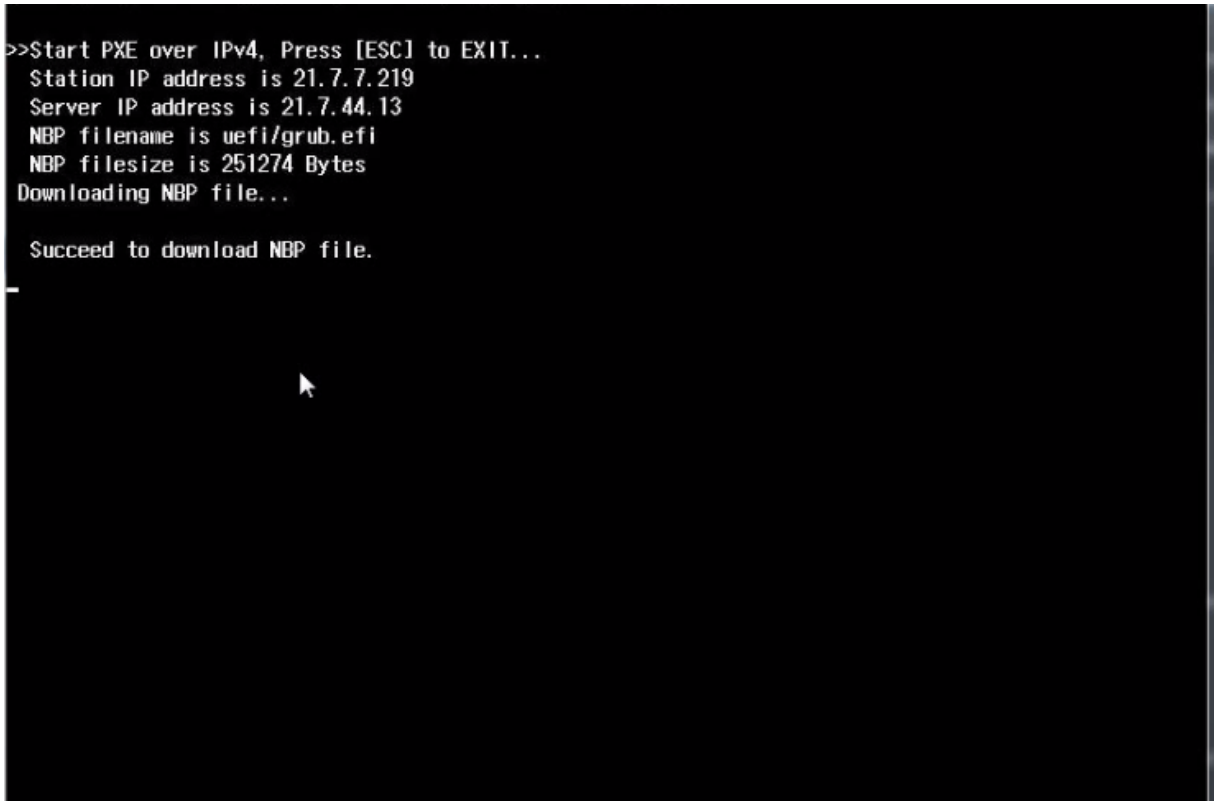
#### 4.3.4.3 CHAP Authentication and CHAP Mutual Authentication

iSCSI boot allows CHAP security option if the following conditions are met:

- If 'Connect' = disable or 'CHAP Authentication' = disable, the server ignores both the CHAP Authentication and CHAP Mutual Authentication
- If 'Connect' = enable and 'CHAP Authentication' = enable, the target CHAP parameters are used
- If 'CHAP Mutual Authentication' = enable, the Initiator CHAP parameters are used

### 4.3.5 UEFI PXE Boot

The main differences in UEFI PXE booting is determining the .efi boot file, editing the grub.cfg and dhcpd.conf files, and setting the 'Boot Mode' to 'UEFI Mode' in the BIOS.




When performing UEFI PXE boot, make sure UEFI_X86 or UEFI_AARCH64 are enabled via mlxconfig.

For further information, please refer to the *"HowTo Configure PXE Server in UEFI Mode for IPoIB Network"* post in the Community (enterprise-support.nvidia.com/s/ → Places → Solutions → PXE

### 4.3.6 How to use HTTPs and Private Root Certificate Trust

Flexboot now will contain only a single trusted root certificate (the “iPXE root CA” certificate). To use a standard SSL certificate issued by a public CA (such as Verisign), iPXE must be able to download a cross-signed certificate to complete the chain of trust up to the “iPXE root CA” certificate. These cross-signed certificates are downloaded automatically when needed from http://ca.ipxe.org/auto.
For more information, see full description on https://ipxe.org/crypto and https://ipxe.org/cfg/crosscert.

To use a private CA trust, Flexboot must get the Trust CA fingerprint as a configuration from the FlexBoot menu, must download the root certificate to complete the chain of trust. Flexboot can download the root CA from the Http URI that was configured in the FlexBoot Menu "Cross-Signed CA URI".

### 4.3.7 Flexboot ipxe.pxe Chainloading

If you have a large number of machines which already have a PXE implementation, then you may want to avoid having to reflash each machine's network card individually. You can achieve this by using chainloading.

To enable chainloading, you need to place a copy of iPXE on your TFTP server. Your machines will download this copy of iPXE from the TFTP server each time that they boot.

> ⚠ Before trying to chainloading ipxe.pxe, verify if the ipxe supports the hardware driver ID. For the NVIDIA device ID, see: https://ipxe.org/appnote/hardware_drivers

#### 4.3.7.1 Chainloading ipxe.pxe/efi, undionly.kpxe and snponly.efi with Flexboot and UEFI over InfiniBand Ports

To enable chainloading over InfiniBand mode, configure the "DHCP HW Type IB" setting through HII/CtrlB (from the NIC Configuration Menu), and add the GUID identification alongside the 61 DUID option to the DHCP host declaration. For example:

```
host ib-client1 {
hardware infiniband <Port-GUID>
option dhcp-client-identifier = 01:<Port-MAC> ;
fixed-address <IPoIB Address> ; filename "ipxe.pxe" ;
if exists user-class and option user-class = "iPXE" { filename “pxelinux.0” ; }
}
```

Or:

```
host ib-client1 {
option dhcp-client-identifier = ff:00:00:00:00:00:02:00:00:02:c9:00:<Port-GUID> ;
hardware ethernet <Port-MAC> ; fixed-address <IPoIB Address> ; filename "ipxe.pxe" ;
if exists user-class and option user-class = "iPXE" { filename “pxelinux.0” ; }
}
```

## 4.4 BlueField / BlueField-2 Embedded CPU Mode in InfiniBand

> ⚠ UEFI InfiniBand on the Arm side is not supported.

## 4.5 User Interface

> ⚠ Boot menu is displayed as READ ONLY if the HCA card does not support flash configuration.

The chapter contains the following sections:

- Configuring System Settings

- Exiting FlexBoot User Interface
- Invoking the User Interface
- Skipping FlexBoot, FlexBoot User Interface and FlexBoot Port
- FlexBoot System Settings Configuration Options
- HII (UEFI) System Settings Configuration Options

## 4.5.1 Configuring System Settings

> ⚠ You can save the changes made and exit the menu at any given time by pressing Ctrl+S.

### 4.5.1.1 Editing the Parameters using Free Text

When a configurable setting is highlighted, the instructions to edit it will be shown on screen.If the setting is configurable via input, the description will show the input restrictions.

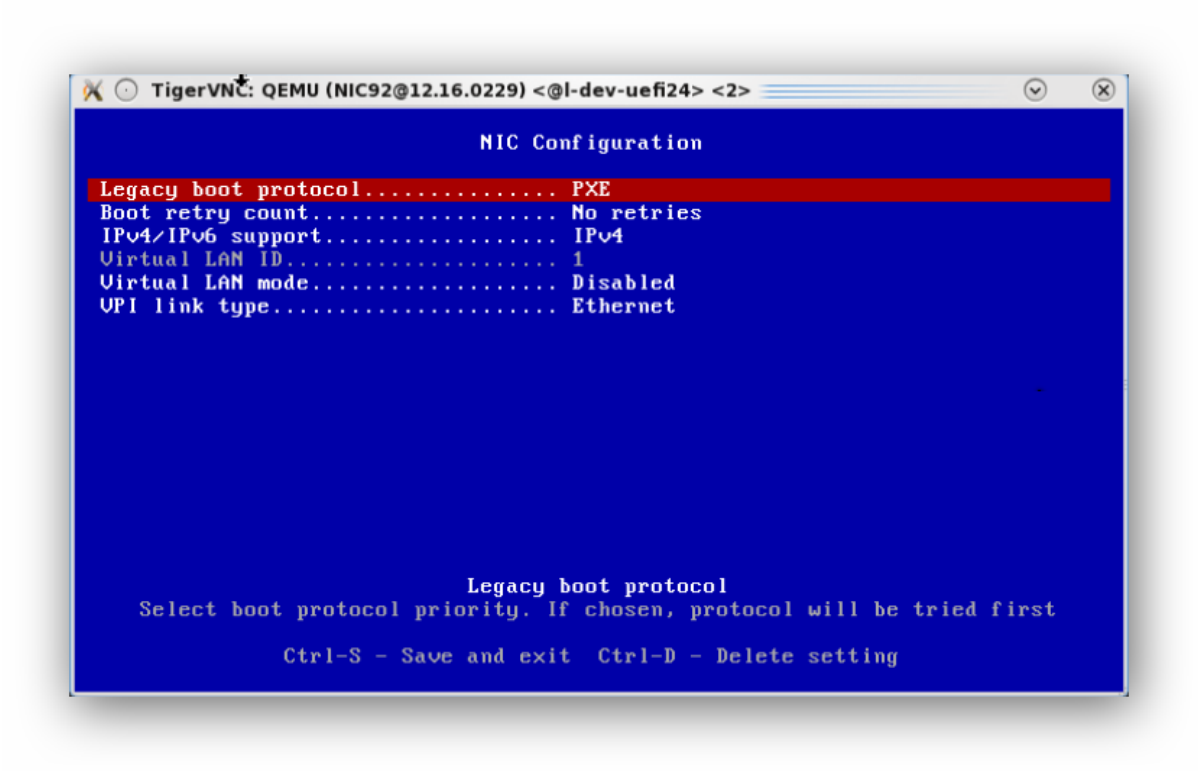


*To change the configuration:*

1. Press Enter or start typing while the setting is highlighted.
2. [Optional] Discard the input while editing, press Ctrl+C.
3. Press Enter and wait to verify the new value is accepted and shown.

In case the value entered is invalid, an alert will be shown and the new value won't be accepted.

> ⚠ Although numeric values are shown in decimal base, it is possible to insert values in different bases:
>
> - For hexadecimal base type "0x" before the number
> - For octal base type "0" before the number
> - For decimal base type the number as is




### 4.5.1.2 Editing the Parameters using Set Values

When a configurable setting is highlighted, the instructions to edit it will be shown on screen.If the setting is configurable with built-in options, the description will be "Select to change value".

➢

*To change the configuration:*

1. Press Enter while setting is highlighted.
2. Keep pressing Enter to choose the desired value

### 4.5.1.3 Deleting Configurable Settings

Configurable settings can be deleted. Value will only be deleted from the current configuration and not from the flash. If the configuration has a default value, it will be set when deleting the current value.

➢

*To delete a configurable setting:*

- Press Ctrl+D while setting is highlighted.

#### 4.5.1.4 Restoring Default Configurations

All configurations can be restored to the default values set in the device. All configurable values will be modified to "default" or "deleted" if there is no default value in the device.

*To restore defaults per port:*

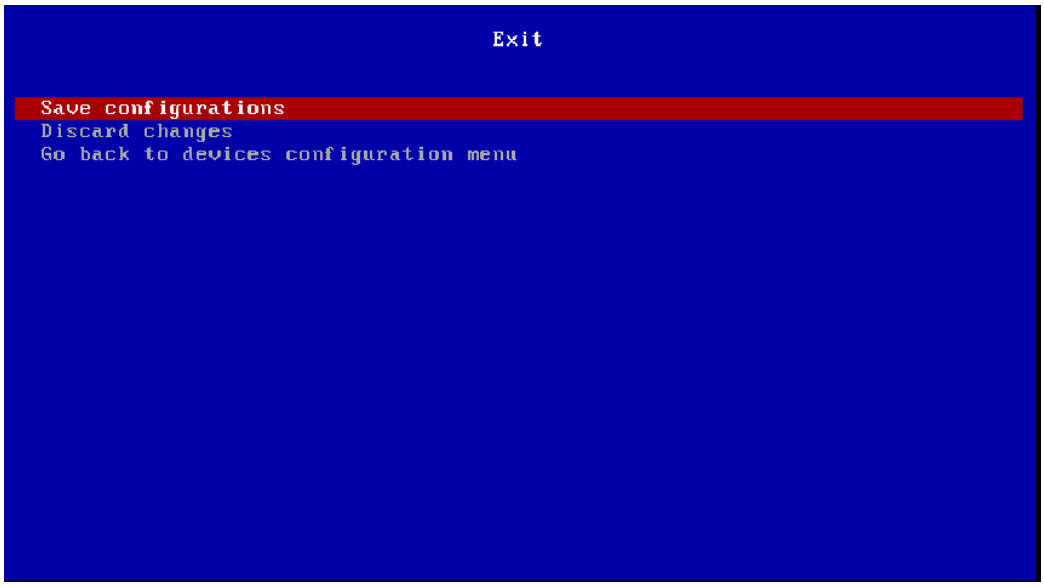
- Press Ctrl+R on the main menu of the port only when applicable

*To restore defaults per device:*

- Press Ctrl+R on "System setup" menu when applicable

### 4.5.2 Exiting FlexBoot User Interface

To exit FlexBoot User Interface press ESC from the System Setup menu.




### 4.5.3 Invoking the User Interface

Shortly after completion of the POST (Power-On-Self-Test sequence of the computer), the user will be prompted to press CTRL-B to invoke FlexBoot User Interface. The user has few seconds to

press CTRL-B before the message disappears.



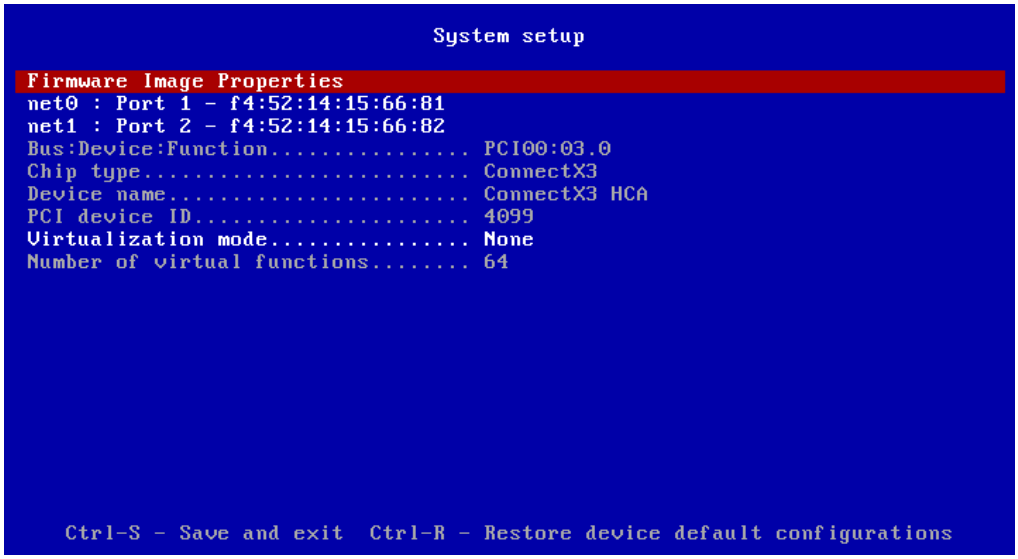

### 4.5.3.1 Browsing the User Interface Menu

To browse the menu, use the following keys:

| Key | Operation |
|---|---|
| Arrows ↑↓ | Browse options (Highlighted option is current) |
| Enter | On forms – to enter menu<br>On configurable settings – to edit configuration |
| Esc | Exit current menu |

### 4.5.3.2 Accessing FlexBoot Sub Menus

To enter the required menu, press Enter while the option is highlighted.




For further information on FlexBoot varies menus, and the configuration options they provide, please refer to section Configuring System Settings and its subsections.

## 4.5.4 Skipping FlexBoot, FlexBoot User Interface and FlexBoot Port

You can skip FlexBoot in any of the given options below:

- Following system POST, when a FlexBoot advertisement banner and configuration prompt is displayed, Press any key other than CTRL-B.
- Skip a specific port when booting starts: Press CTRL-C or ESC

## 4.5.5 FlexBoot System Settings Configuration Options

Below are listed the attributes shown in varies FlexBoot User Interface menus.

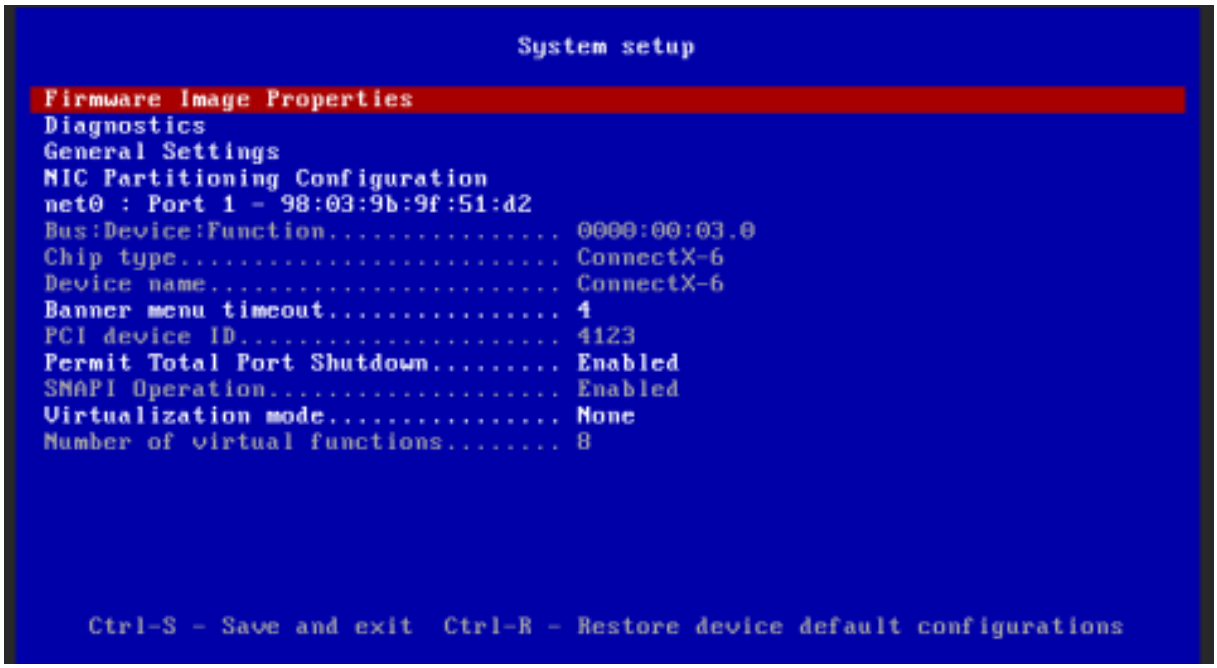
The chapter contains the following sections:


- System Setup
- Firmware Image Properties
- Main Configuration
- NIC Configuration
- iSCSI General Parameters
- iSCSI Initiator Parameters
- iSCSI First Target Parameters
- FlexBoot Link Aggregation Control Protocol


### 4.5.5.1 System Setup

In the following menu, you can set the following options:

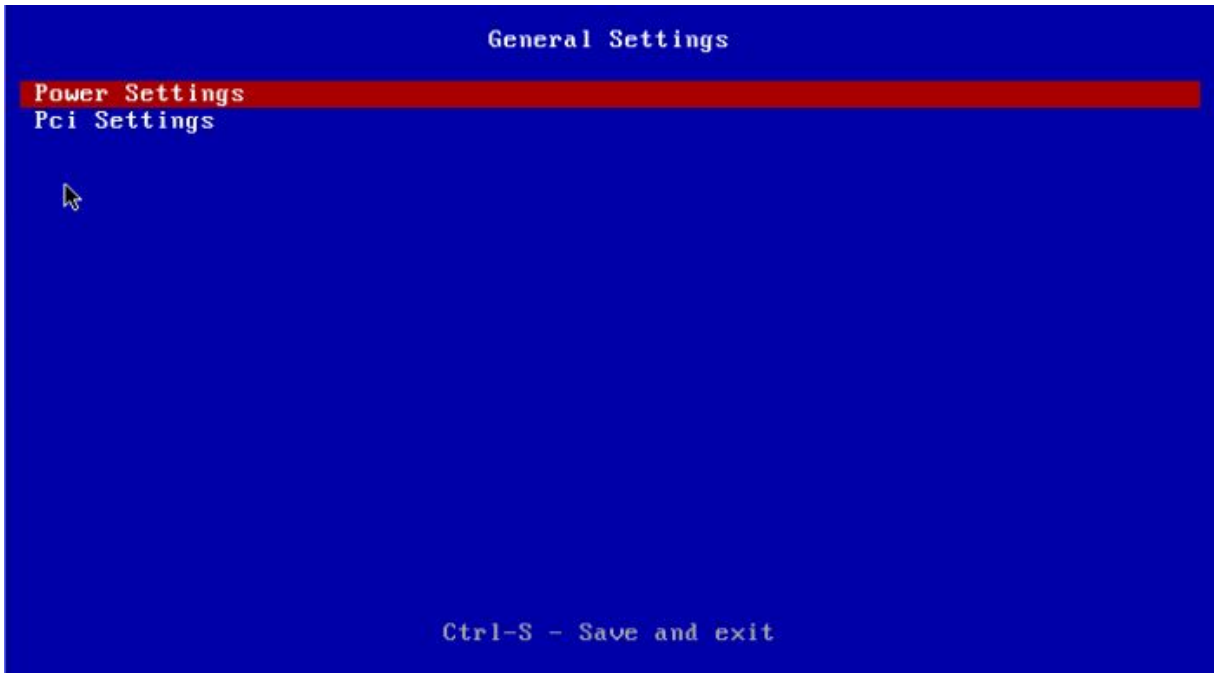

- 4.5.5.1.1 General Settings
- 4.5.5.1.2 NIC Partitioning Configuration
- 4.5.5.1.3 Diagnostic
- 4.5.5.1.4 Bus:Device:Function
- 4.5.5.1.5 Chip Type
- 4.5.5.1.6 Device Name
- 4.5.5.1.7 PCI Device ID
- 4.5.5.1.8 Banner Menu Timeout
- 4.5.5.1.9 Permit Total Port Shutdown
- 4.5.5.1.10 Virtualization Mode
- 4.5.5.1.11 Number of Virtual Functions
- 4.5.5.1.12 SNAPI Operation




#### 4.5.5.1.1 General Settings

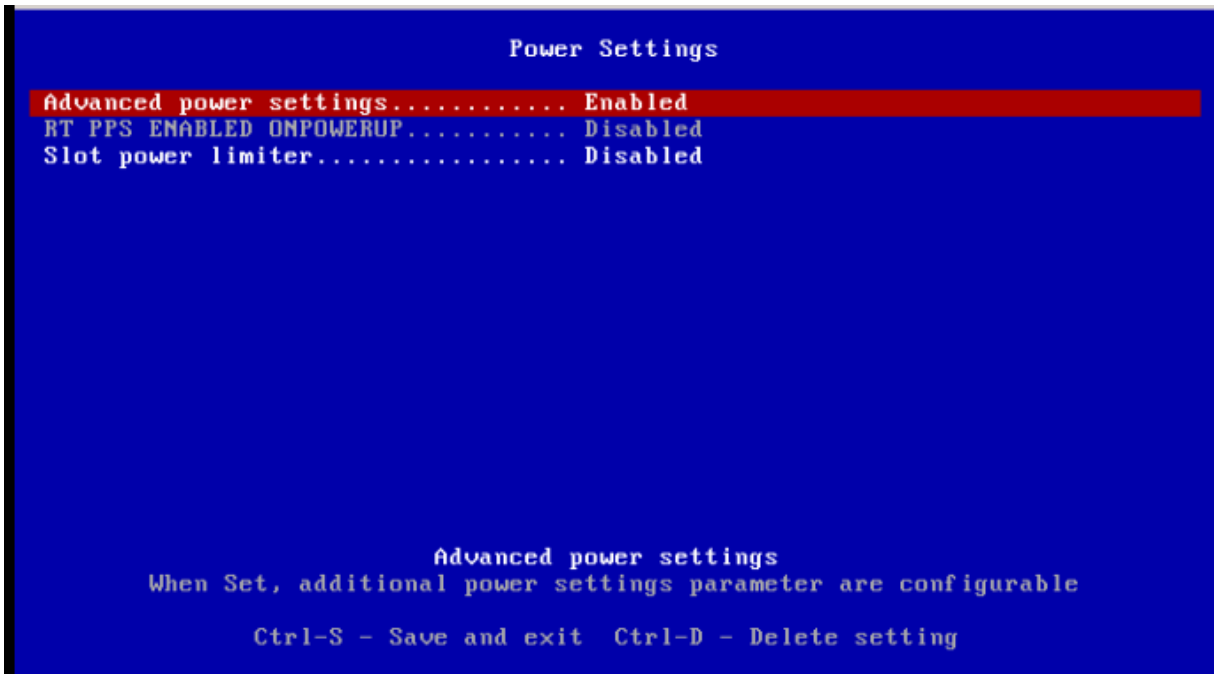
In the following menu, you can configure Power Settings and Pci Settings.

> ⚠ The General Settings will not be available in the Setup System menu if the Power Configuration and the Pci Settings are not supported by the the firmware.




#### 4.5.5.1.1.1 Power Settings [ConnectX-5 ONLY]

In the following menu, you can set advanced power settings:



**Advanced Power Settings**

| | |
|---|---|
| **Location:** | Power Configuration |
| **Description:** | When set to Enabled, additional power settings parameters are configurable. |
| **Configurable:** | Yes |
| **Available options:** | 1 - Enabled<br>2 - Disabled |

**Slot Power Limiter**

| | |
|---|---|
| **Location:** | Power Configuration |
| **Description:** | When set, the slot power limiter is disabled, and the device can consume more than 25W from the PCIe power rails. |
| **Configurable:** | Yes |
| **Available options:** | 1 - Enabled<br>2 - Disabled |

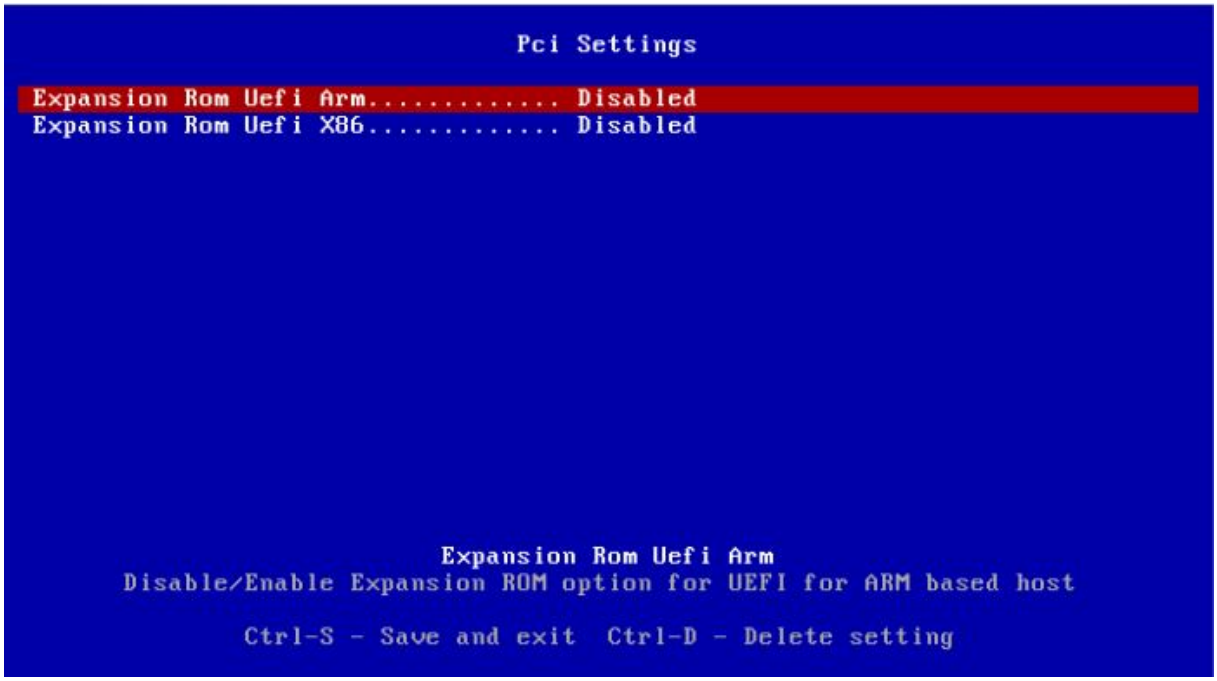
**RT PPS ENABLED ONPOWERUP**

| | |
|---|---|
| **Location:** | Power Configuration |
| **Description:** | When set to TRUE the PPS_OUT will be activated on power up. |
| **Configurable:** | Yes |
| **Available options:** | 1 - Enabled<br>2 - Disabled |

#### 4.5.5.1.1.2 Pci Settings

In the following menu, you can configure Expansion ROM options for UEFI.

> ⚠ Pci Settings will not be available in the General Settings menu if the Expansion Rom Uefi for Arm/x86 functionality does not exist in the flash or if the Pci Settings feature is not supported by the firmware.




**Expansion Rom Uefi Arm**

> ⚠ The Expansion ROM UEFI Arm is not available if the Expansion ROM UEFI for Arm does not exist in the flash.

| | |
|---|---|
| **Location:** | General Settings/ Pci Settings |
| **Description:** | When set, the expansion ROM for UEFI for Arm-based-host is enabled. |
| **Configurable:** | Yes |
| **Reboot Required:** | Yes, power cycle is required for this change to take effect. |
| **Available options:** | 1 - Enabled<br>2 - Disabled |

**Expansion Rom Uefi X86**

> ⚠ The Expansion ROM UEFI x86 is not available if the Expansion ROM UEFI for x86 does not exist in the flash.

| | |
|---|---|
| **Location:** | General Settings/ Pci Settings |

| | |
|---|---|
| **Description:** | When set, the expansion ROM for UEFI for x86-based-host is enabled. |
| **Configurable:** | Yes |
| **Reboot Required:** | Yes, power cycle is required for this change to take effect. |
| **Available options:** | 1 - Enabled<br>2 - Disabled |

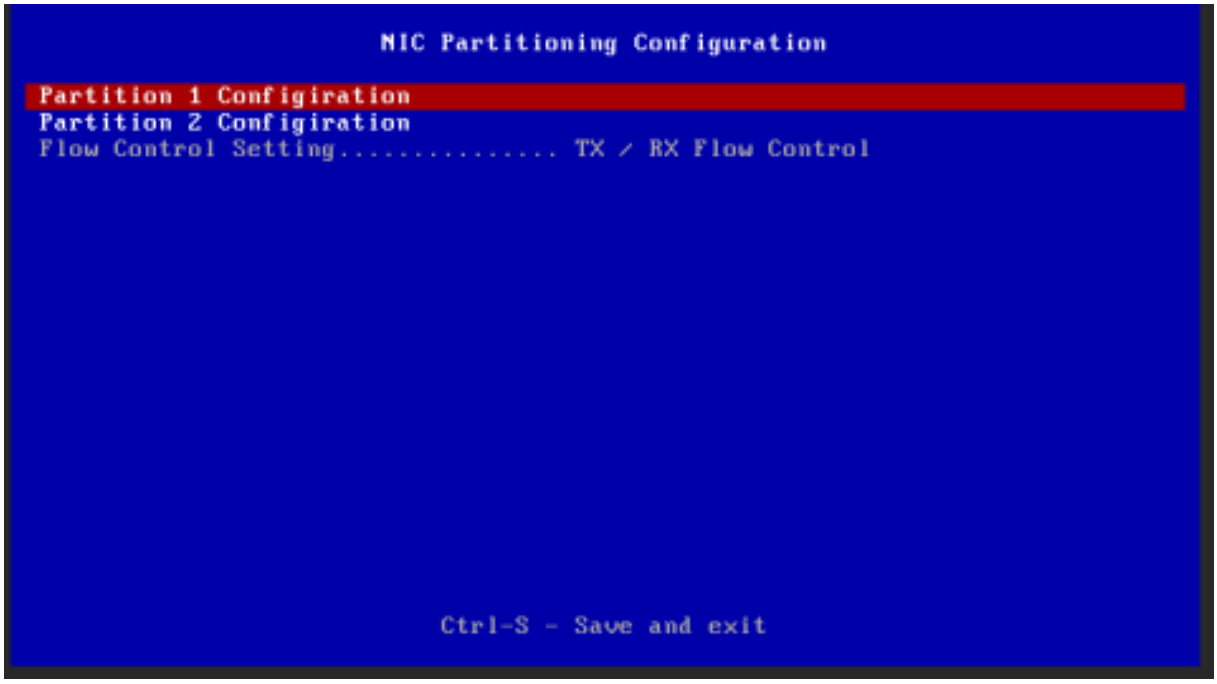
#### 4.5.5.1.2 NIC Partitioning Configuration

NIC Partitions Configuration menu presents the following Partition Configuration sections.

- Partition 1 Configuration
- Partition 2 Configuration
- .
- .
- Partition n Configuration
- Flow Control Setting

> ⚠ NIC partition is the division of a single NIC port into multiple Physical Functions, where "<n>" is the division number.

> ⚠ The NIC Petitioning Configuration will not be available in the Setup System menu if the device is not operating in Socket-Direct mode.



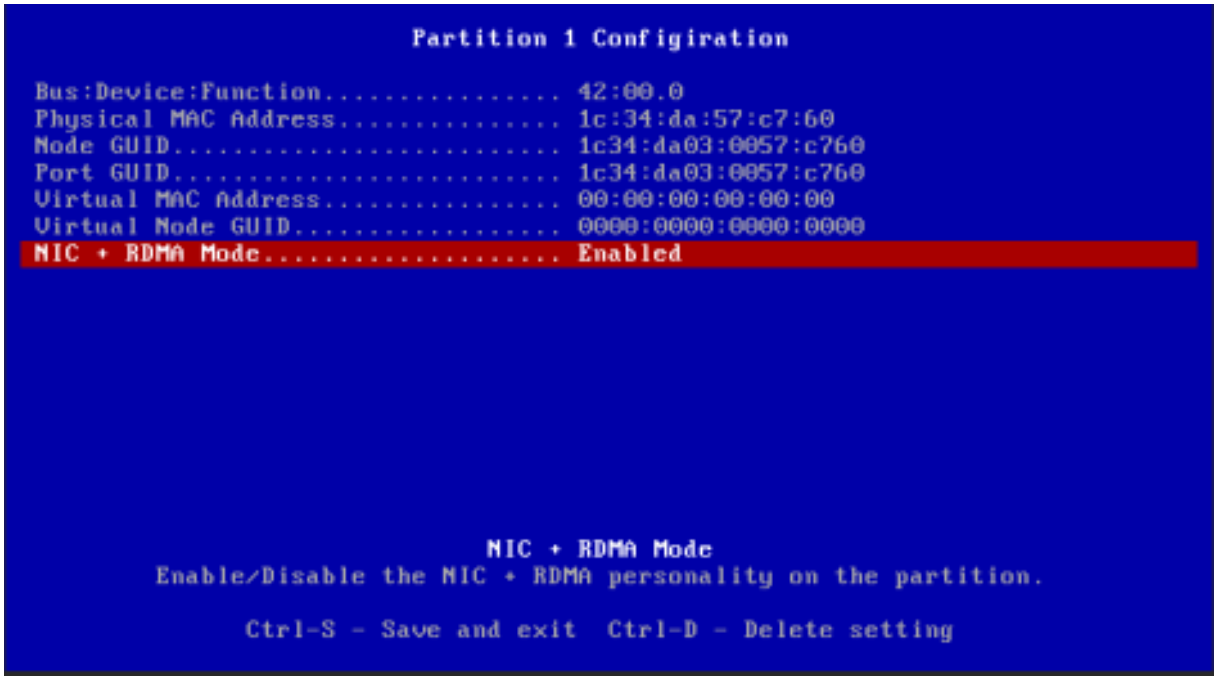

#### 4.5.5.1.2.1 Flow Control Setting

| | |
|---|---|
| **Location:** | NIC Partitioning Configuration |
| **Description:** | Specifies the type of Ethernet Flow Control to be used by the port when operating in NPar mode. |
| **Configurable:** | No |

#### 4.5.5.1.2.2 Partition n Configuration

Partition n Configuration menu shows the following settings:

- Bus:Device:Function
- Physical MAC Address
- Virtual MAC Address
- Node GUID
- Port GUID
- Virtual Node GUID
- NIC + RDMA Mode




**Bus:Device:Function**

| | |
|---|---|
| **Location:** | NIC Partitioning Configuration/ Partition n Configuration |
| **Description:** | Specifies the PCI Bus:Device:Function identifier of the Nic Partition number "n" assigned in the BIOS. |
| **Configurable:** | No |

**Port GUID**

| | |
|---|---|
| **Location:** | NIC Partitioning Configuration/ Partition n Configuration |
| **Description:** | The permanent Port GUID assigned to the partition during manufacturing. |
| **Configurable:** | No |

**Node GUID**

| | |
|---|---|
| **Location:** | NIC Partitioning Configuration/ Partition n Configuration |
| **Description:** | The permanent Node GUID assigned to the partition during manufacturing. |
| **Configurable:** | No |

**Virtual Node GUID**

| | |
|---|---|
| **Location:** | NIC Partitioning Configuration/ Partition n Configuration |

| | |
|---|---|
| **Description:** | Programmatically assignable Node GUID address of the partition. |
| **Configurable:** | No |

**Physical MAC Address**

| | |
|---|---|
| **Location:** | NIC Partitioning Configuration/ Partition n Configuration |
| **Description:** | The permanent MAC address of the Nic Partition number "n" assigned during manufacturing. |
| **Configurable:** | No |

**Virtual MAC**

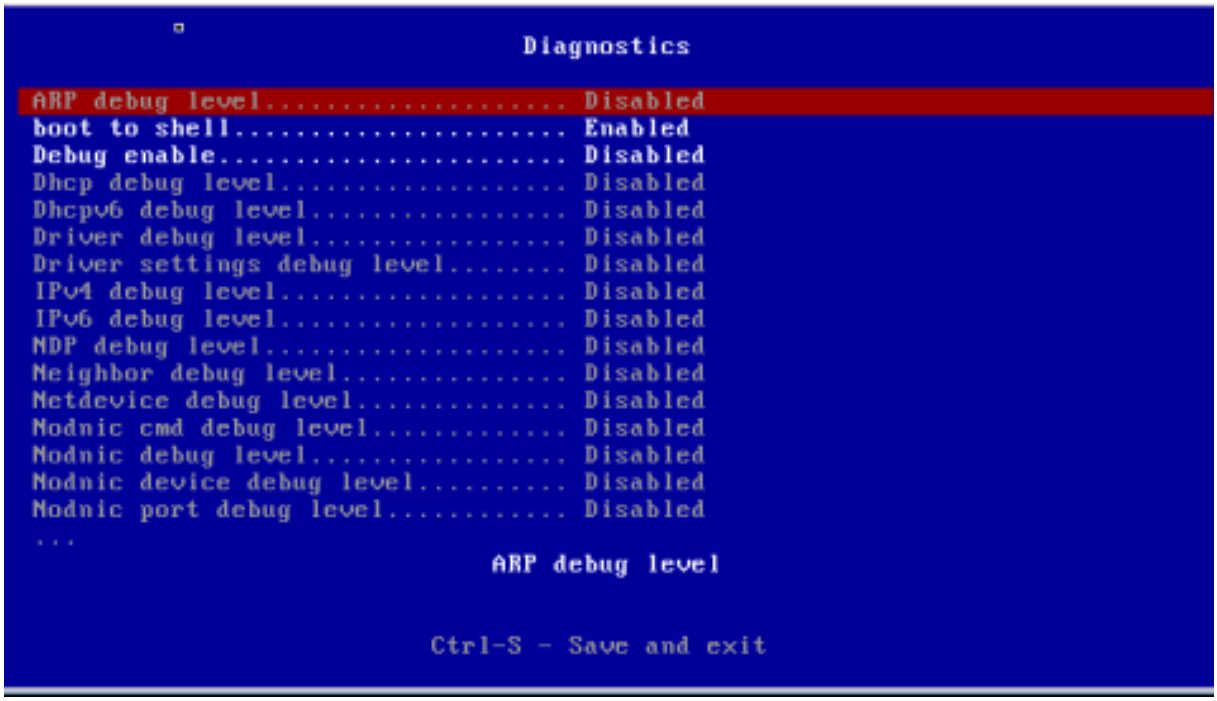
| | |
|---|---|
| **Location:** | NIC Partitioning Configuration/ Partition n Configuration |
| **Description:** | Displays Nic Partition "n"'s virtual MAC address. |
| **Configurable:** | No |

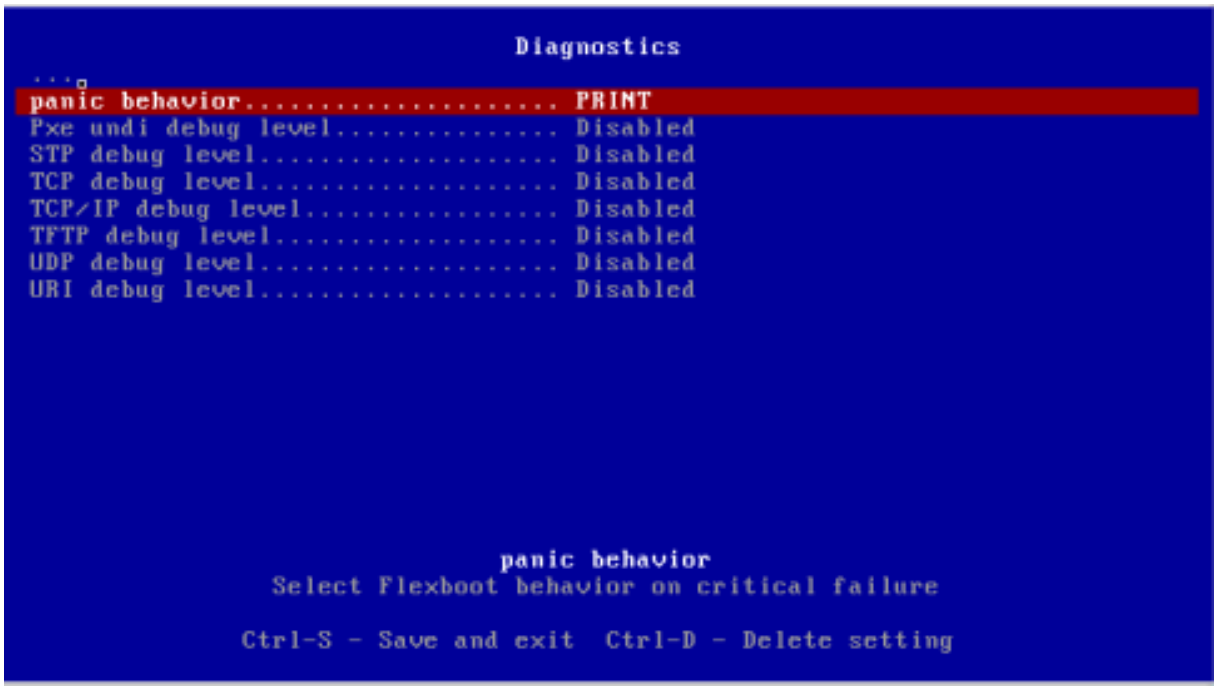
**NIC + RDMA Mode**

| | |
|---|---|
| **Location:** | NIC Partitioning Configuration/ Partition n Configuration |
| **Description:** | Enable/Disable the NIC + RDMA personality on the partition. |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes – reboot is needed in order for this change to apply |
| **Available options:** | Enabled, Disabled |

### 4.5.5.1.3 Diagnostic

Diagnostic menu enables the user to diagnose problems in released ROMs by enabling the debug log levels for specific modules. This ability should be used only when debug session is needed.




#### 4.5.5.1.3.1 boot_to_shell

| Location: | Diagnostic |
|---|---|

| | |
|---|---|
| **Description:** | When set to enable, Flexboot well boot to ipxe shell instead of the normal boot. |
| **Configurable:** | Yes |
| **Available options:** | 1 - Enabled<br>2 - Disabled |
| **Persistency:** | Persistent through AC cycle |

#### 4.5.5.1.3.2 panic_behavior

| | |
|---|---|
| **Location:** | Diagnostic |
| **Description:** | Flexboot behavior on critical failure.<br>• when set to PRINT, print error to screen<br>• when set to HALT, freeze system<br>• when set to OPEN_SHELL, open ipxe shell<br>• when set to REG_DUMP, dump firmware registers and exit to shell |
| **Configurable:** | Yes |
| **Available options:** | 1 - PRINT<br>2 - HALT<br>3 - OPENSHELL<br>4 - REG_DUMP |
| **Persistency:** | Persistent through AC cycle |

### 4.5.5.1.4 Bus:Device:Function

| | |
|---|---|
| **Location:** | System setup |
| **Description:** | Specifies the BIOS assigned PCI Bus:Device:Function identifier of the card |
| **Configurable:** | No |

### 4.5.5.1.5 Chip Type

| | |
|---|---|
| **Location:** | System setup |
| **Description:** | Specifies the chip type |
| **Configurable:** | No |

### 4.5.5.1.6 Device Name

| | |
|---|---|
| **Location:** | System setup |

| | |
|---|---|
| **Description:** | The device's product name |
| **Configurable:** | No |

#### 4.5.5.1.7 PCI Device ID

| | |
|---|---|
| **Location:** | System setup |
| **Description:** | The PCI Device ID of the controller |
| **Configurable:** | No |

#### 4.5.5.1.8 Banner Menu Timeout

| | |
|---|---|
| **Location:** | System setup |
| **Description:** | Defines the Banner's timeout |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes – reboot is needed in order for this change to apply |
| **Available options:** | 1-14 sec |

#### 4.5.5.1.9 Permit Total Port Shutdown

| | |
|---|---|
| **Location:** | System setup |
| **Description:** | Specifies whether or not to allow the port to be completely disabled when a Port Down command is received from the Host OS or driver.<br>**Note:** Use with caution, port shutdown will halt all operations configured on the port including WakeOnLAN and shared LOM. |
| **Configurable:** | Yes |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes – reboot is needed in order for this change to apply |
| **Available options:** | Enabled, Disabled |

#### 4.5.5.1.9.1 NIC + RDMA Mode

| | |
|---|---|
| **Location:** | System setup (only in cards without partitioning conf) |
| **Description:** | Specify the use of the port for both L2-Ethernet and RDMA traffic. |
| **Configurable:** | Yes (applicable only for ETH Mode). |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes – reboot is needed in order for this change to be applied |
| **Available options:** | Enabled, Disabled |

### 4.5.5.1.10 Virtualization Mode

| | |
|---|---|
| **Location:** | System setup |
| **Description:** | Specifies the type of virtualization used by the controller on all ports. Only valid for adapters that support SR-IOV virtualization mode. |
| **Configurable:** | Yes – built-in options |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes – reboot is needed in order for this change to apply |
| **Available options:** | 1 - None<br>2 - SR-IOV |

### 4.5.5.1.11 Number of Virtual Functions

| | |
|---|---|
| **Location:** | System setup |
| **Description:** | The number of virtual functions advertised and usable by the driver. Only valid for adapters that support SR-IOV virtualization mode. |
| **Configurable:** | Yes – via input – If virtualization mode is SR-IOV |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes – reboot is needed in order for this change to apply |
| **Value restrictions:** | Minimum integer value is 0. Maximum integer value is the value supported by the firmware installed. |

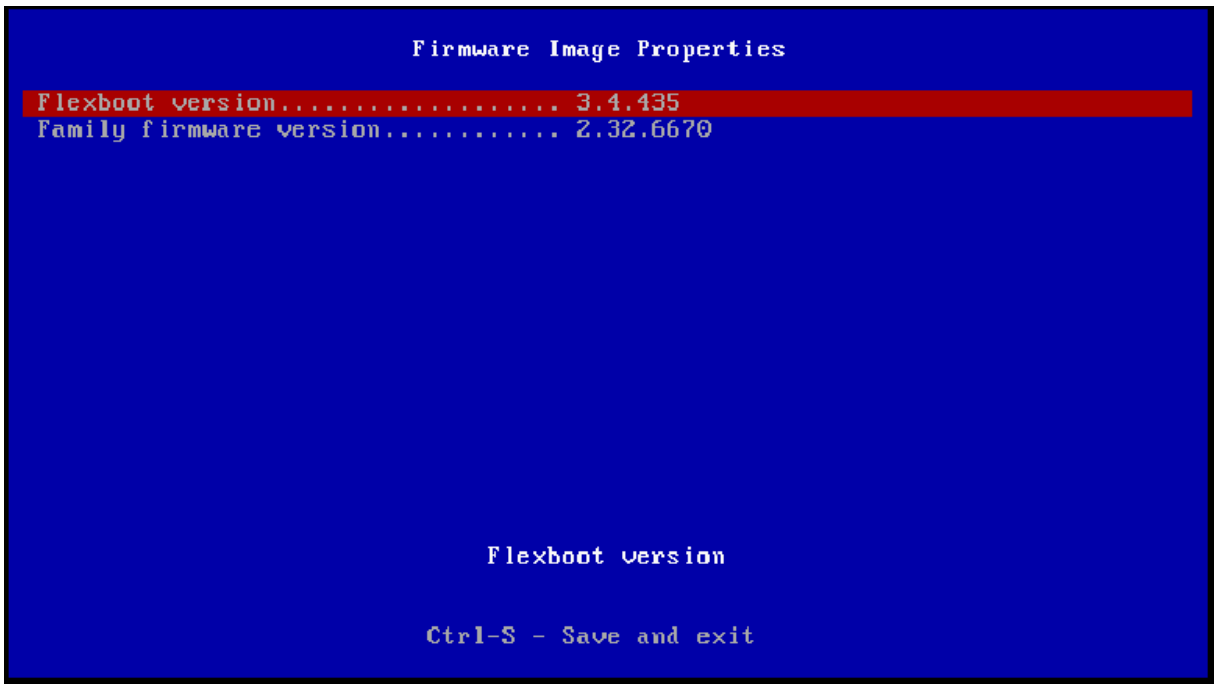
#### 4.5.5.1.12 SNAPI Operation

| | |
|---|---|
| **Location:** | System setup |
| **Description:** | Indicates whether Socket Direct functionality is enabled or not. |
| **Configurable:** | No |

### 4.5.5.2 Firmware Image Properties

In the following menu, you can set the following options:

- 4.5.5.2.1 Flexboot Version
- 4.5.5.2.2 Family Firmware Version




#### 4.5.5.2.1 Flexboot Version

| | |
|---|---|
| **Location:** | System setup /Firmware Image Properties |
| **Description:** | FlexBoot driver version information |
| **Configurable:** | No |

| | |
|---|---|
| **Available options:** | 1 - None – no PXE boot, no iSCSI boot<br>2 - PXE – PXE first and if failed try iSCSI<br>3 - iSCSI – iSCSI first and if failed try PXE |

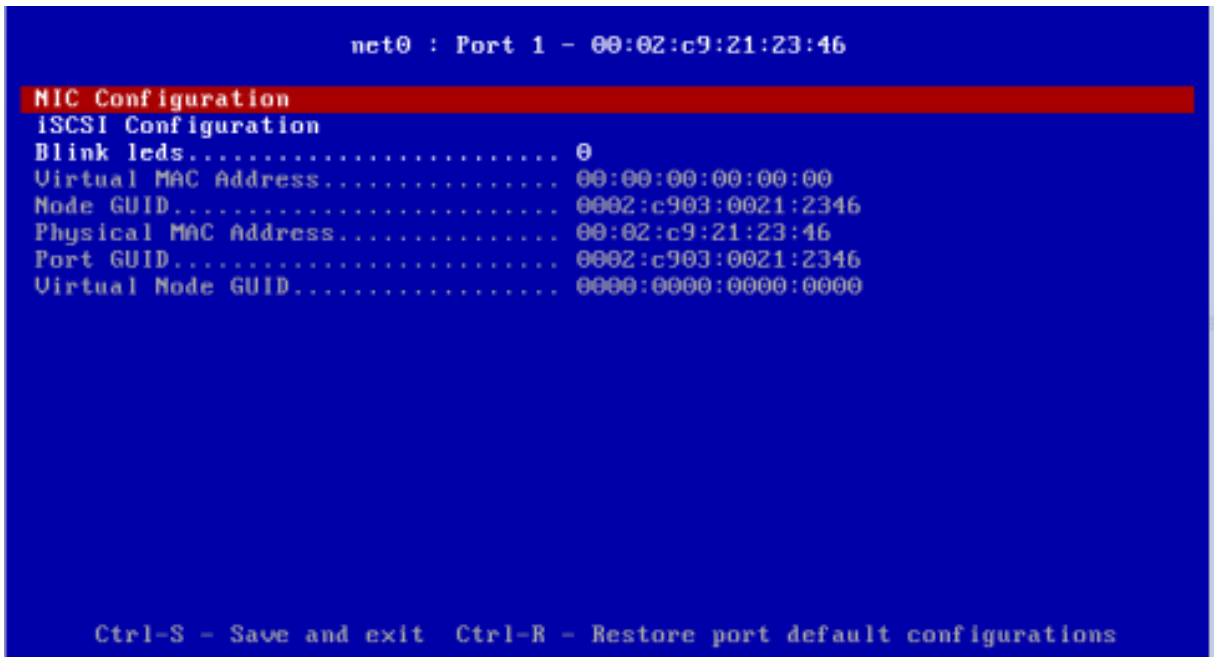
#### 4.5.5.2.2 Family Firmware Version

| | |
|---|---|
| **Location:** | System setup /Firmware Image Properties |
| **Description:** | Device's firmware version information. |
| **Configurable:** | No |

### 4.5.5.3 Main Configuration

In the following menu, you can set the following options:

- 4.5.5.3.1 Blink LEDs
- 4.5.5.3.2 MAC Address
- 4.5.5.3.3 Node GUID
- 4.5.5.3.4 Port GUID
- 4.5.5.3.5 Virtual Node GUID



#### 4.5.5.3.1 Blink LEDs

⚠ Blink LEDs will not appear in the boot menu if the feature is not supported by the firmware.

⚠ LEDs starts to blink as soon as you press the Enter key.

| | |
|---|---|
| **Location:** | System setup/Port main configurations |
| **Description:** | Specifies the number of seconds the LEDs on physical network port should blink to assist with port identification. Only valid for adapters with blink LEDs. |
| **Configurable:** | Yes – via input |
| **Persistency:** | Valid only for current cycle |
| **Effects:** | Blink LEDs duration value of the port will be as set in the current cycle |
| **Value restrictions:** | The minimum integer value is 0 and the maximum is 15. |

#### 4.5.5.3.2 MAC Address

| | |
|---|---|
| **Location:** | System setup/Port main configurations |
| **Description:** | Permanent MAC address assigned during manufacturing |
| **Configurable:** | No |

#### 4.5.5.3.3 Node GUID

| | |
|---|---|
| **Location:** | NIC Partitioning Configuration |
| **Description:** | Permanent Node GUID assigned during manufacturing. |
| **Configurable:** | No |
| **Availability:** | |

#### 4.5.5.3.4 Port GUID

| | |
|---|---|
| **Location:** | NIC Partitioning Configuration |
| **Description:** | Permanent Port GUID assigned during manufacturing. |
| **Configurable:** | No |
| **Availability:** | |

#### 4.5.5.3.5 Virtual Node GUID

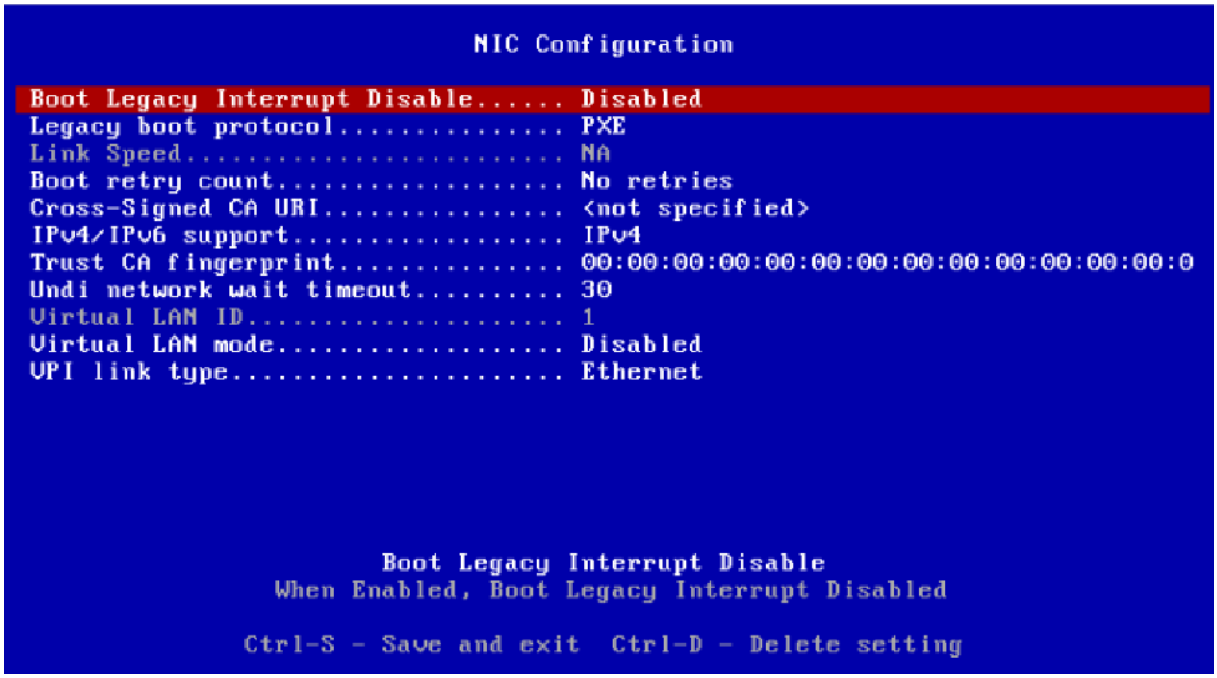
| | |
|---|---|
| **Location:** | NIC Partitioning Configuration |
| **Description:** | Displays the Virtual Node GUID. |
| **Configurable:** | No |
| **Availability:** | |

### 4.5.5.4 NIC Configuration

#### 4.5.5.4.1 Ethernet NIC Configuration

In the following menu, you can set the following options:


- 4.5.5.4.1 Ethernet NIC Configuration
- 4.5.5.4.2 InfiniBand NIC Configuration




#### 4.5.5.4.1.1 Boot Legacy Interrupt Disabled

| | |
|---|---|
| **Location:** | System setup/Port main configurations/NIC Configuration |
| **Description:** | Disable/Enable legacy Interrupt support<br>**Note:**<br>If enabled, the Flexboot driver will use polling mode to get RX traffic instead of waiting for the Interrupt. |
| **Configurable:** | Yes - built-in option |
| **Available options** | 1- Enable<br>2- Disable |

#### 4.5.5.4.1.2 Legacy Boot Protocol

| | |
|---|---|
| **Location:** | System setup/Port main configurations/NIC Configuration |
| **Description:** | Use a non-UEFI network boot protocol.<br>**Notes:**<br>1. If set to NONE, the boot will skip this port.<br>2. If all the ports per Bus Device Function (BDF) are set to NONE, a BEV entry will not be registered. |
| **Configurable:** | Yes – built-in options |
| **Persistency:** | Persistent through AC cycle |

| | |
|---|---|
| **Available options:** | • None - no PXE boot, no iSCSI boot<br>• PXE - PXE first and if failed, try iSCSI<br>• iSCSI - iSCSI first and if failed, try PXE<br>• PXE without fail-over - PXE boot without fail-over to iSCSI boot<br>• iSCSI without fail-over - iSCSI boot without fail-over to PXE boot |

#### 4.5.5.4.1.3 Link Speed

| | |
|---|---|
| **Location:** | System setup/Port main configurations/NIC Configuration |
| **Description:** | Defines the working link speed. |
| **Configurable:** | No |

#### 4.5.5.4.1.4 Boot Retry Count

| | |
|---|---|
| **Location:** | System setup/Port main configurations/NIC Configuration |
| **Description:** | The number of retries to attempt in case of a boot failure. |
| **Configurable:** | Yes – built-in options |
| **Persistency:** | Persistent through AC cycle |
| **Available options:** | 0 - No retries<br>1 - Retry<br>2 - Retries<br>3 - Retries<br>4 - Retries<br>5 - Retries<br>6 - Retries<br>7 - Indefinite Retries |

#### 4.5.5.4.1.5 Cross Signed CA URI

| | |
|---|---|
| **Location:** | NIC Configuration |
| **Description:** | Specifies the source URI for root CA certificates. |
| **Configurable:** | Yes – via input |
| **Value Restrictions:** | N/A |

#### 4.5.5.4.1.6 IPv4/IPv6 support

| | |
|---|---|
| **Location:** | System setup/Port main configurations/NIC Configuration |

| | |
|---|---|
| **Description:** | Select which IP protocol version will be used when booting. If both are configured, FlexBoot will try to boot with the 2nd protocol only if failed to boot with the 1st one. |
| **Configurable:** | Yes – built-in option |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | No |
| **Available options:** | 1 - IPv4<br>2 - IPv6<br>3 - IPv4/IPv6 |

#### 4.5.5.4.1.7 Trust CA fingerprint

| | |
|---|---|
| **Location:** | NIC Configuration |
| **Description:** | Obtains the SHA-256 encryption key. The fingerprint of the root certificate that you want Flexboot to trust. |
| **Configurable:** | Yes – via input |
| **Value Restrictions:** | Should be in hex format with the size of 32 byte. Any other size will not be a valid value. |

#### 4.5.5.4.1.8 Undi network wait timeout

| | |
|---|---|
| **Location:** | System setup/Port main configurations/NIC Configuration |
| **Description:** | When the UNDI interface is used, defines the delay time when PXENV_UNDI_OPEN call is issued. |
| **Configurable:** | Yes – via input |
| **Value restrictions:** | The minimum integer value is 0 and Maximum integer value is 30. |

#### 4.5.5.4.1.9 Virtual LAN ID

| | |
|---|---|
| **Location:** | System setup/Port main configurations/NIC Configuration |
| **Description:** | Uses the VLAN tag with the selected boot protocol. |
| **Configurable:** | Yes – via input – If virtual LAN mode is enabled |
| **Value restrictions:** | The minimum integer value is 1 and Maximum integer value is 4094. |

#### 4.5.5.4.1.10 Virtual LAN Mode

| | |
|---|---|
| **Location:** | System setup/Port main configurations/NIC Configuration |
| **Description:** | Enable/Disable VLAN tagging on the selected boot protocol. |
| **Configurable:** | Yes – built-in options |
| **Persistency:** | Persistent through AC cycle |
| **Available options:** | 1 - Enabled<br>2 - Disabled |

#### 4.5.5.4.1.11 VPI link type

| | |
|---|---|
| **Location:** | System setup/Port main configurations/NIC Configuration |
| **Description:** | Specifies the network link type for supported cards.<br>**Note:** This option is available only on supported devices. |
| **Configurable:** | Yes – built-in option |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes – reboot is needed in order for this change to apply |
| **Available options:** | 1 - InfiniBand<br>2 - Ethernet |

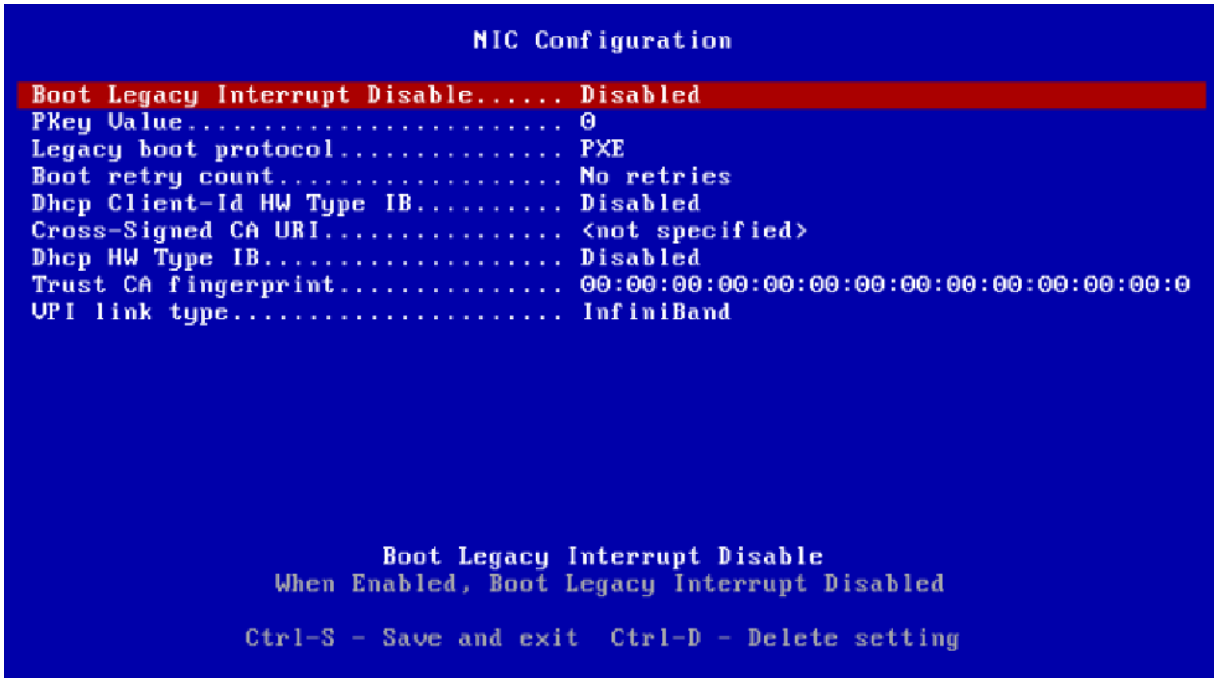
#### 4.5.5.4.1.12 Wake on LAN

| | |
|---|---|
| **Location:** | System setup/Port main configurations/NIC Configuration |
| **Description:** | Status of Wake on LAN feature. When set, it enables the server to be powered using an in-band magic packet.<br>Only valid for adapters that support Wake on LAN.<br>**Note:** This option is available only on supported devices. |
| **Configurable:** | Yes – built-in options |
| **Persistency:** | Persistent through AC cycle |
| **Available options:** | 1 - Enabled<br>2 - Disabled |

#### 4.5.5.4.2 InfiniBand NIC Configuration

In the following menu, you can set the following options:

- PKey Value
- Legacy Boot Protocol
- Link Speed
- Boot Retry Count
- VPI link type




##### 4.5.5.4.2.1 PKey Value

| | |
|---|---|
| **Location:** | System setup/Port main configurations/NIC Configuration |
| **Description:** | PKey value to be used when booting IPoIB |
| **Configurable:** | Yes |
| **Persistency:** | Persistent through AC cycle |
| **Available options:** | 0-65535<br>0 – the default PKey value |

#### 4.5.5.4.2.2 DHCP Client-Id HW Type IB

| | |
|---|---|
| **Description:** | When enabled, DHCP packets are sent with Client-Id option (61) that includes "HW type(0x20)" + "GUID", instead of "NVIDIA Prefix" + "GUID". |
| **Configurable:** | Yes |
| **Available options:** | 1 - Enabled<br>2 - Disabled |

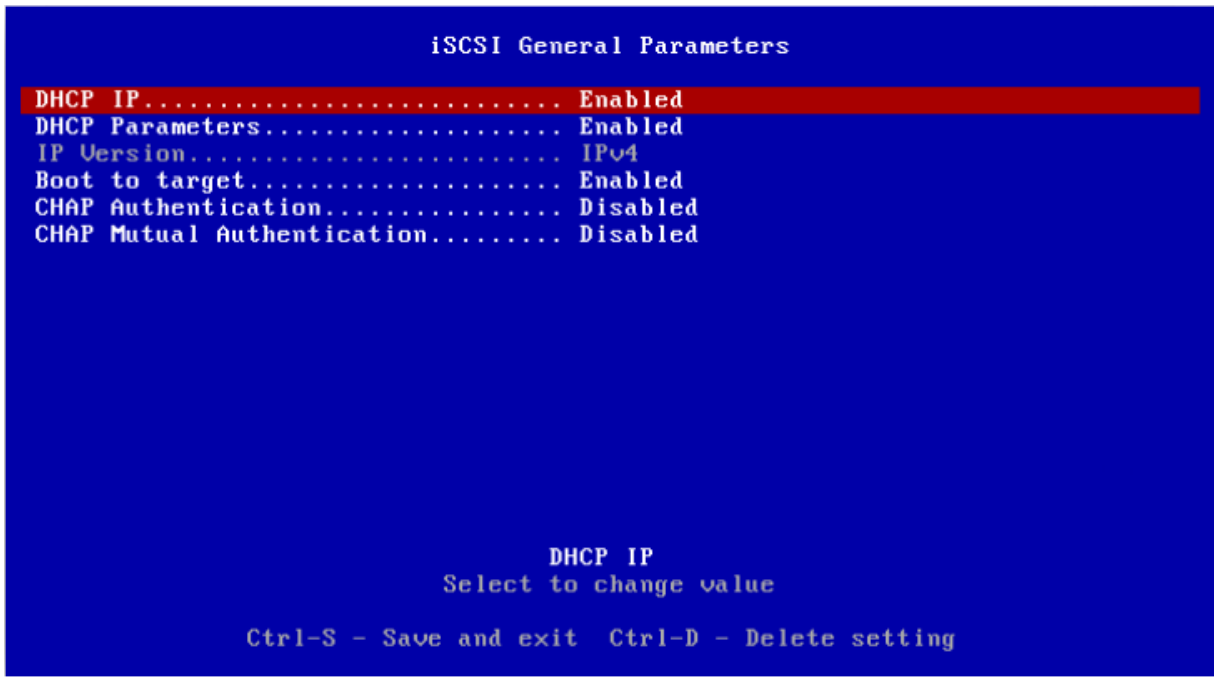
#### 4.5.5.4.2.3 DHCP HW Type IB

| | |
|---|---|
| **Description:** | When Enabled, DHCP discovery packets are sent with HW-addr= GUID instead of a MAC address. |
| **Configurable:** | Yes |
| **Available options:** | 1 - Enabled<br>2 - Disabled |

### 4.5.5.5 iSCSI General Parameters

In the following menu, you can set the following options:

- 4.5.5.5.1 DHCP IP
- 4.5.5.5.2 DHCP Parameters
- 4.5.5.5.3 IP Version
- 4.5.5.5.4 CHAP Authentication
- 4.5.5.5.5 CHAP Mutual Authentication
- 4.5.5.5.6 Boot to target




#### 4.5.5.5.1 DHCP IP

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI General Parameters |
| **Description:** | When the DHCP IP is enabled, the initiator and target's IP, netmask, gateway and DNS will be taken from DHCP instead of from the menu. |
| **Configurable:** | Yes |

#### 4.5.5.5.2 DHCP Parameters

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI General Parameters |
| **Description:** | When the DHCP IP and DHCP Parameters are enabled, all the initiator and target parameters are taken from DHCP instead of from the menu. |
| **Configurable:** | Yes |

#### 4.5.5.5.3 IP Version

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI General Parameters |

| | |
|---|---|
| **Description:** | Specifies whether IPv4 or IPv6 network addressing will be used for iSCSI initiator and targets |
| **Configurable:** | No |

#### 4.5.5.5.4 CHAP Authentication

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI General Parameters |
| **Description:** | Enables CHAP Authentication for iSCSI initiator. |
| **Configurable** | Yes |

#### 4.5.5.5.5 CHAP Mutual Authentication

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI General Parameters |
| **Description:** | Enables mutual CHAP authentication between the iSCSI initiator and target |
| **Configurable:** | Yes |

#### 4.5.5.5.6 Boot to target

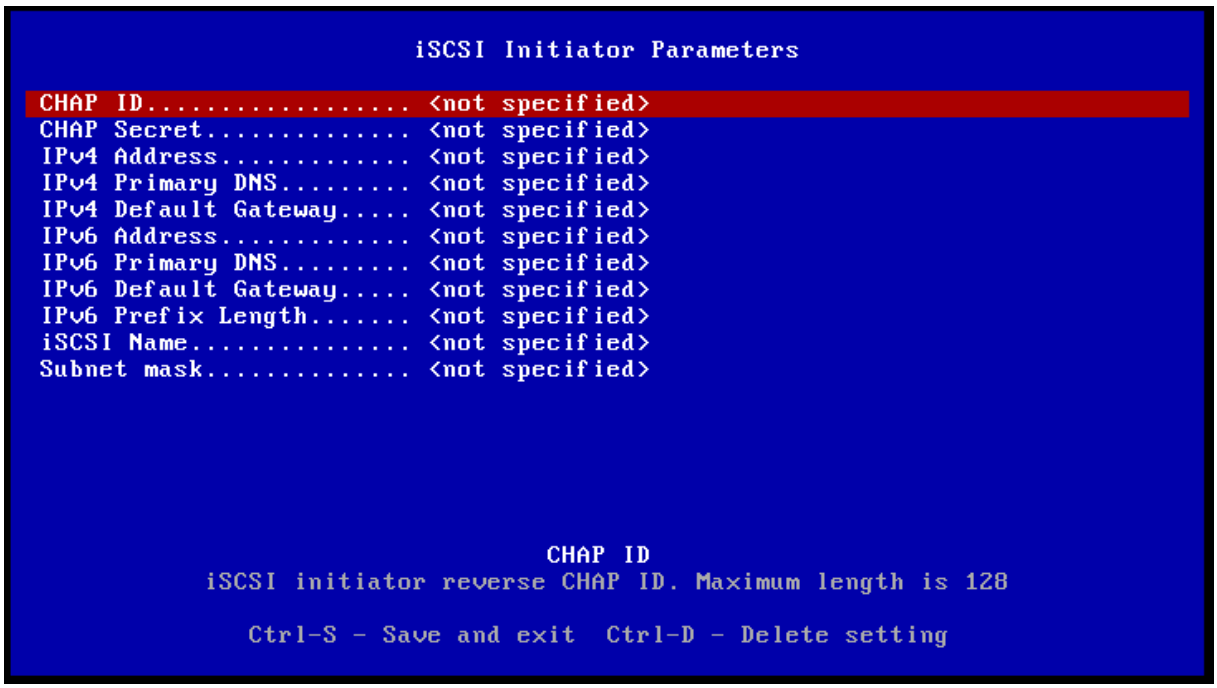
| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI General Parameters |
| **Description:** | Controls booting to ISCSI target after connection. |
| **Configurable:** | Yes |
| **Available options:** | 1 - Enable<br>2 - Disable<br>3 - One time disabled |

### 4.5.5.6 iSCSI Initiator Parameters

> ⚠ *iSCSI Initiator Parameters* menu is applicable to ConnectX®-3/ConnectX®-3 Pro adapter cards only.

In the following menu, you can set the following options:

- 4.5.5.6.1 CHAP ID
- 4.5.5.6.2 CHAP Secret
- 4.5.5.6.3 IPv4 Address
- 4.5.5.6.4 IPv4 Primary DNS
- 4.5.5.6.5 IPv4 Default Gateway
- 4.5.5.6.6 IPv6 Default Gateway
- 4.5.5.6.7 IPv6 Address
- 4.5.5.6.8 IPv6 Primary DNS
- 4.5.5.6.9 IPv6 Prefix Length
- 4.5.5.6.10 iSCSI Name
- 4.5.5.6.11 Subnet Mask


## 4.5.5.6.1 CHAP ID

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | The iSCSI initiator Challenge-Handshake Authentication Protocol (CHAP) ID |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the Connect and the CHAP Mutual Authentication are enabled – This will be the reverse username used for the iSCSI initiator Challenge-Handshake Authentication Protocol. |

| | |
|---|---|
| **Value restrictions:** | Maximum string length is 128. |

#### 4.5.5.6.2 CHAP Secret

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | The iSCSI initiator Challenge-Handshake Authentication Protocol (CHAP) secret (password). |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the Connect and the CHAP Mutual Authentication are enabled – This will be the reverse password used for the iSCSI initiator Challenge-Handshake Authentication Protocol. |
| **Value restrictions:** | String length should be 0 or 12 to 16 |

#### 4.5.5.6.3 IPv4 Address

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | iSCSI initiator's IPv4 address |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, this will be set as the IP address of the initiator. |
| **Value restrictions:** | Should be in IPv4 format |

#### 4.5.5.6.4 IPv4 Primary DNS

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | The iSCSI initiator Primary DNS IP Address. |
| **Configurable:** | Yes – via input |

| | |
|---|---|
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, this will be set as the DNS for the IP address of the initiator. |
| **Value restrictions:** | Should be in IPv4 format |

#### 4.5.5.6.5 IPv4 Default Gateway

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | The iSCSI initiator default Gateway IP address. |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, this will be set as the default gateway IP address of the initiator. |
| **Value restrictions:** | Should be in IPv4 format |

#### 4.5.5.6.6 IPv6 Default Gateway

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | iSCSI initiator's default gateway IPv6 address |
| **Configurable:** | Yes |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, and IPv4/IPv6 support is selected as IPv6, this will be set as the default gateway for the IPv6 address of the initiator. |
| **Value restrictions:** | Should be in IPv6 format |

#### 4.5.5.6.7 IPv6 Address

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |

| | |
|---|---|
| **Description:** | iSCSI initiator's IPv6 address |
| **Configurable:** | Yes |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, and IPv4/IPv6 support is selected as IPv6, this will be set as the IP Address of the initiator. |
| **Value restrictions:** | Should be in IPv6 format |

#### 4.5.5.6.8 IPv6 Primary DNS

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | iSCSI initiator's DNS IPv6 address |
| **Configurable:** | Yes |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, and IPv4/IPv6 support is selected as IPv6, this will be set as the DNS for the IPv6 address of the initiator. |
| **Value restrictions:** | Should be in IPv6 format |

#### 4.5.5.6.9 IPv6 Prefix Length

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | iSCSI initiator's prefix length of the IPv6 address |
| **Configurable:** | Yes |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | f the legacy boot protocol is iSCSI or iSCSI without fail-over and IPv4/IPv6 support is selected as IPv6, this will be set as the prefix length for the IPv6 address of the initiator. |
| **Value restrictions:** | Should be in integer between 0-128 |

#### 4.5.5.6.10 iSCSI Name

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | The initiator's iSCSI Qualified Name (IQN). |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, this will be set as the iSCSI Qualified Name of the initiator. |
| **Value restrictions:** | Maximum string length is 223 |

#### 4.5.5.6.11 Subnet Mask

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | The iSCSI initiator Subnet Mask for an IPv4 initiator configuration. |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, this will be set as the subnet mask for the IP address of the initiator. |
| **Value restrictions:** | Should be in IPv4 format |

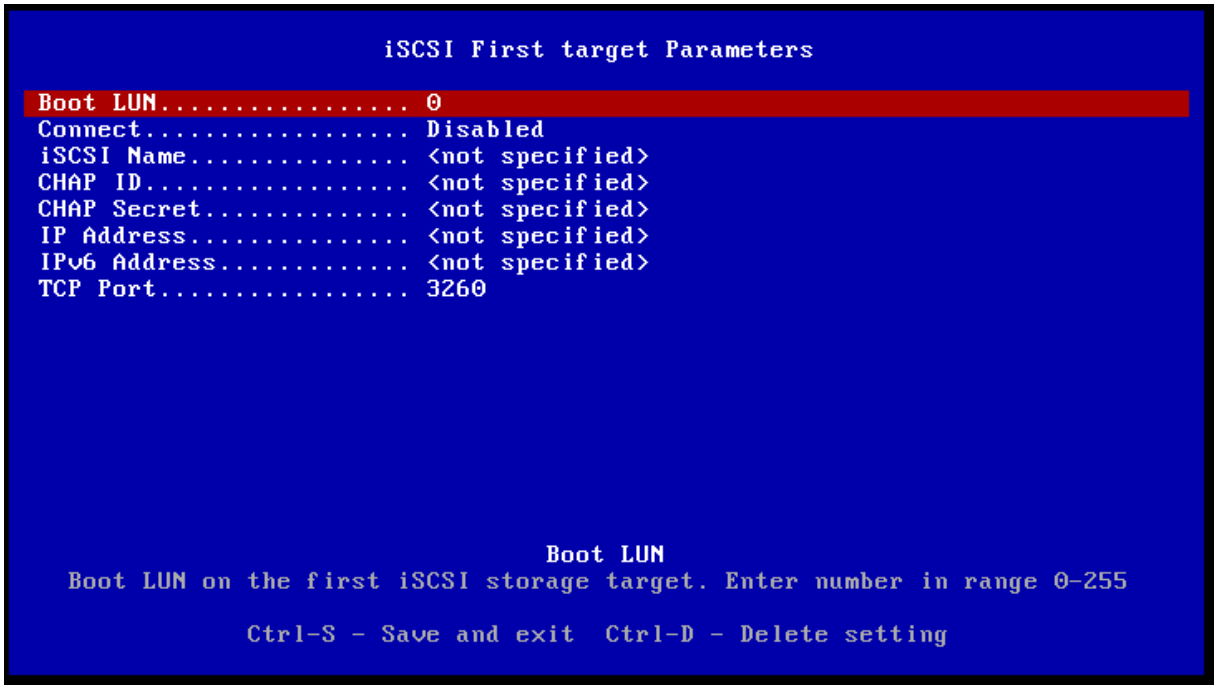
### 4.5.5.7 iSCSI First Target Parameters

> **iSCSI First Target Parameters** menu is applicable to ConnectX®-3/ConnectX®-3 Pro adapter cards only.

In the following menu, you can set the following options:

- 4.5.5.7.1 Boot LUN
- 4.5.5.7.2 Connect
- 4.5.5.7.3 iSCSI Name
- 4.5.5.7.4 CHAP ID
- 4.5.5.7.5 CHAP Secret

- 4.5.5.7.6 IP Address
- 4.5.5.7.7 IPv6 Address
- 4.5.5.7.8 TCP Port




### 4.5.5.7.1 Boot LUN

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI First target Parameters |
| **Description:** | The boot Logical Unit Number (LUN) on the first iSCSI storage target. |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, and Connect is enabled, this will be the boot LUN in the root path for the first target. |
| **Value restrictions:** | The minimum integer value is 0 and the maximum is 256. |

### 4.5.5.7.2 Connect

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI First target Parameters |

| | |
|---|---|
| **Description:** | Enable/Disable connecting to the first iSCSI target. This will be ignored if both DHCP IP and DHCP Parameters are enabled in iSCSI general parameters. |
| **Configurable:** | Yes – built-in options |
| **Persistency:** | Persistent through AC cycle |
| **Available options:** | 1 - Enabled<br>2 - Disabled |

#### 4.5.5.7.3 iSCSI Name

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI First target Parameters |
| **Description:** | The iSCSI Qualified Name (IQN) of the first target |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, and Connect is enabled, this will be the iSCSI Qualified name in the root path for the first target. |
| **Value restrictions:** | Maximum string length is 223 |

#### 4.5.5.7.4 CHAP ID

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI First target Parameters |
| **Description:** | The first iSCSI storage target Challenge-Handshake Authentication Protocol (CHAP) ID. |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the Connect and the CHAP Authentication are enabled – This will be the username used for the first target Challenge-Handshake Authentication Protocol. |
| **Value restrictions:** | Maximum string length is 128. |

#### 4.5.5.7.5 CHAP Secret

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI First target Parameters |
| **Description:** | The Challenge-Handshake Authentication Protocol secret (CHAP password) of the first iSCSI storage target. |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the Connect and the CHAP Authentication are enabled – This will be the password used for the first target Challenge-Handshake Authentication Protocol. |
| **Value restrictions:** | String length should be 0 or 12 to 16 |

#### 4.5.5.7.6 IP Address

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI First target Parameters |
| **Description:** | The IP address of the first iSCSI target |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, and Connect is enabled, this will be the IP address in the root path for the first target. |
| **Value restrictions:** | Should be in IPv4 format |

#### 4.5.5.7.7 IPv6 Address

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI First target Parameters |
| **Description:** | The IPv6 address of the first iSCSI target |
| **Configurable:** | Yes |
| **Persistency:** | Persistent through AC cycle |

| | |
|---|---|
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over,and IPv4/IPv6 support is selected as IPv6, and Connect is enabled, this will be the IP address in the root path for the first target. |
| **Value restrictions:** | Should be in IPv6 format |

#### 4.5.5.7.8 TCP Port

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI First target Parameters |
| **Description:** | TCP Port number of first iSCSI target |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, and Connect is enabled, this will be the TCP Port in the root path for the first target. |
| **Value restrictions:** | The minimum integer value is 1, and the maximum is 65535. |

### 4.5.5.8 FlexBoot Link Aggregation Control Protocol

| | |
|---|---|
| **Location:** | Configuration via mlxconfig , mlxconfig d <device> set BOOT_LACP_DIS=(Values 0:False, 1:True) |
| **Description:** | FlexBoot does not respond to LACP configuration frames from the switch.<br>**Note:** FlexBoot answers only to LACP PDUs, no port aggregation occurs during any of the PXE stages. |
| **Effects:** | 1. When FlexBoot support for LACP is enabled, the LACP in the switch must be set to mode "Active" in order for Flexboot to success in PXE Booting. If planning to perform PXE over the second NIC port while connected to an LACP in the switch, it is recommended to directly initiate PXE on that port (via BIOS configuration) without performing PXE over the first port.<br>2. When Flexboot support for LACP is disabled, the LACP configuration in the switch should support Individual link mode. |

## 4.5.6 HII (UEFI) System Settings Configuration Options

Below are listed the attributes shown in varies HII menus.

The chapter contains the following sections:

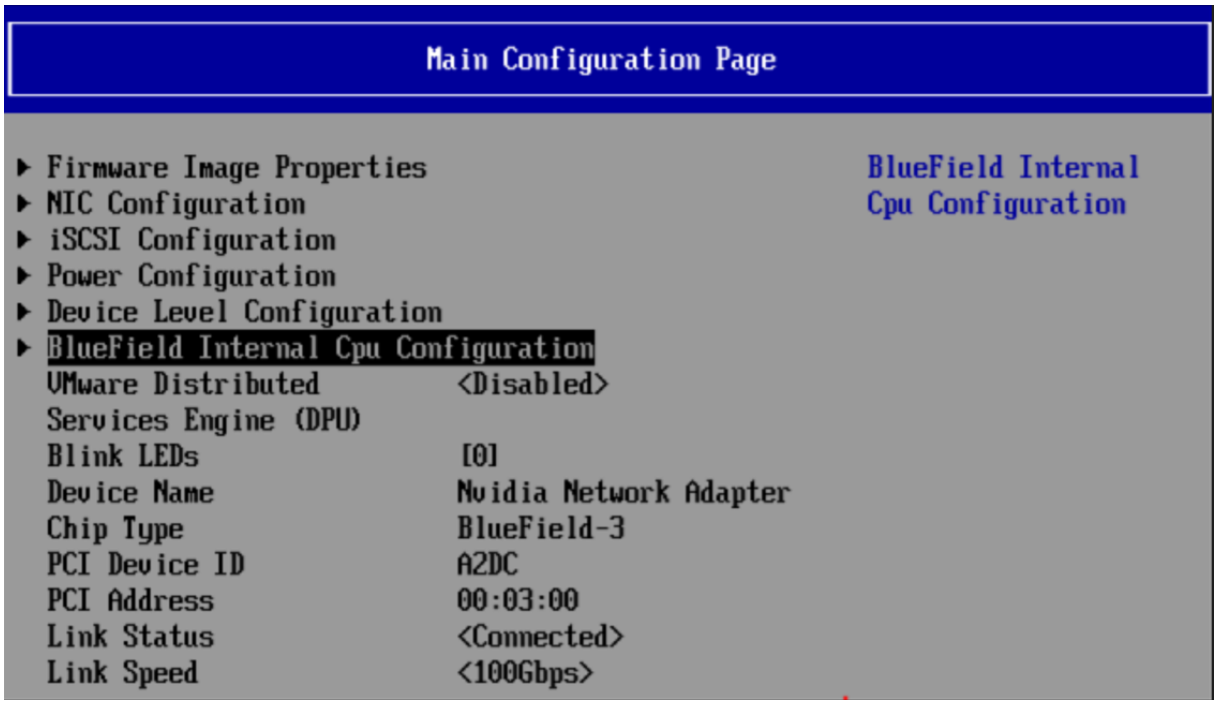

- HII Main Configuration Page
- HII Firmware Image Properties

- HII NIC Configuration
- HII Device Level Configuration
- HII VMware Configuration
- HII iSCSI General Parameters
- HII iSCSI Initiator Parameters
- HII iSCSI First Target Parameters
- HII Power Configuration
- BlueField External Host Priv Configuration
- BlueField Internal CPU Configuration

#### 4.5.6.1 HII Main Configuration Page

In the following menu, you can set the following options:

- 4.5.6.1.1 VMware Distributed Services Engine (DPU)
- 4.5.6.1.2 Blink LEDs
- 4.5.6.1.3 Device Name
- 4.5.6.1.4 Chip Type
- 4.5.6.1.5 PCI Device ID
- 4.5.6.1.6 PCI Address
- 4.5.6.1.7 Link Status
- 4.5.6.1.8 Network Link Type
- 4.5.6.1.9 Link Speed
- 4.5.6.1.10 MAC Address
- 4.5.6.1.11 Virtual MAC Address
- 4.5.6.1.12 Socket Direct Operation




#### 4.5.6.1.1 VMware Distributed Services Engine (DPU)

| | |
|---|---|
| **Location:** | Main Configuration Form |
| **Description:** | Displays submenu of VMware configurations. |
| **Configurable:** | Yes |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes |
| **Available options:** | • Enable<br>• Disable |
| **Default Value:** | Disable |

#### 4.5.6.1.2 Blink LEDs

Blink LEDs will not appear in the boot menu if the feature is not supported by the firmware.

| | |
|---|---|
| **Location:** | Main Configuration Form |
| **Description:** | Specifies the number of seconds the LEDs on physical network port should blink to assist with port identification. Only valid for adapters with blink LEDs. |
| **Configurable:** | Yes – via input |
| **Persistency:** | Valid only for current cycle |
| **Reboot required:** | No |
| **Available options:** | 0-15 sec |
| **Default Value:** | 0 |

#### 4.5.6.1.3 Device Name

| | |
|---|---|
| **Location:** | Main Configuration Form |
| **Description:** | The device's product name |
| **Configurable:** | No |

#### 4.5.6.1.4 Chip Type

| | |
|---|---|
| **Location:** | Main Configuration Form |
| **Description:** | Specifies the chip type |
| **Configurable:** | No |

#### 4.5.6.1.5 PCI Device ID

| | |
|---|---|
| **Location:** | Main Configuration Form |
| **Description:** | The PCI Device ID of the controller |
| **Configurable:** | No |

#### 4.5.6.1.6 PCI Address

| | |
|---|---|
| **Location:** | Main Configuration Form |

| | |
|---|---|
| **Description:** | Specifies the BIOS assigned PCI Bus:Device:Function identifier of the card |
| **Configurable:** | No |

#### 4.5.6.1.7 Link Status

| | |
|---|---|
| **Location:** | Main Configuration Form |
| **Description:** | Displays current link status on port |
| **Configurable** | No |

#### 4.5.6.1.8 Network Link Type

> ⚠ Network Link Type will not appear in the boot menu if the feature is not supported by the firmware.

| | |
|---|---|
| **Location:** | Main Configuration Form |
| **Description:** | Allows user to manually choose link type on selected VPI devices |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes - Reboot is needed (AC cycle) in order for this change to apply. |
| **Available options:** | Ethernet/InfiniBand/VPI |

#### 4.5.6.1.9 Link Speed

| | |
|---|---|
| **Location:** | Main Configuration Form |
| **Description:** | Defines link working speed. |
| **Configurable:** | No |
| **Value restrictions:** | - |

#### 4.5.6.1.10 MAC Address

| | |
|---|---|
| **Location:** | Main Configuration Form |
| **Description:** | Permanent MAC address assigned during manufacturing |
| **Configurable:** | No |

#### 4.5.6.1.11 Virtual MAC Address

| | |
|---|---|
| **Location:** | Main Configuration Form |
| **Description:** | Displays device's virtual MAC address |
| **Configurable:** | No |

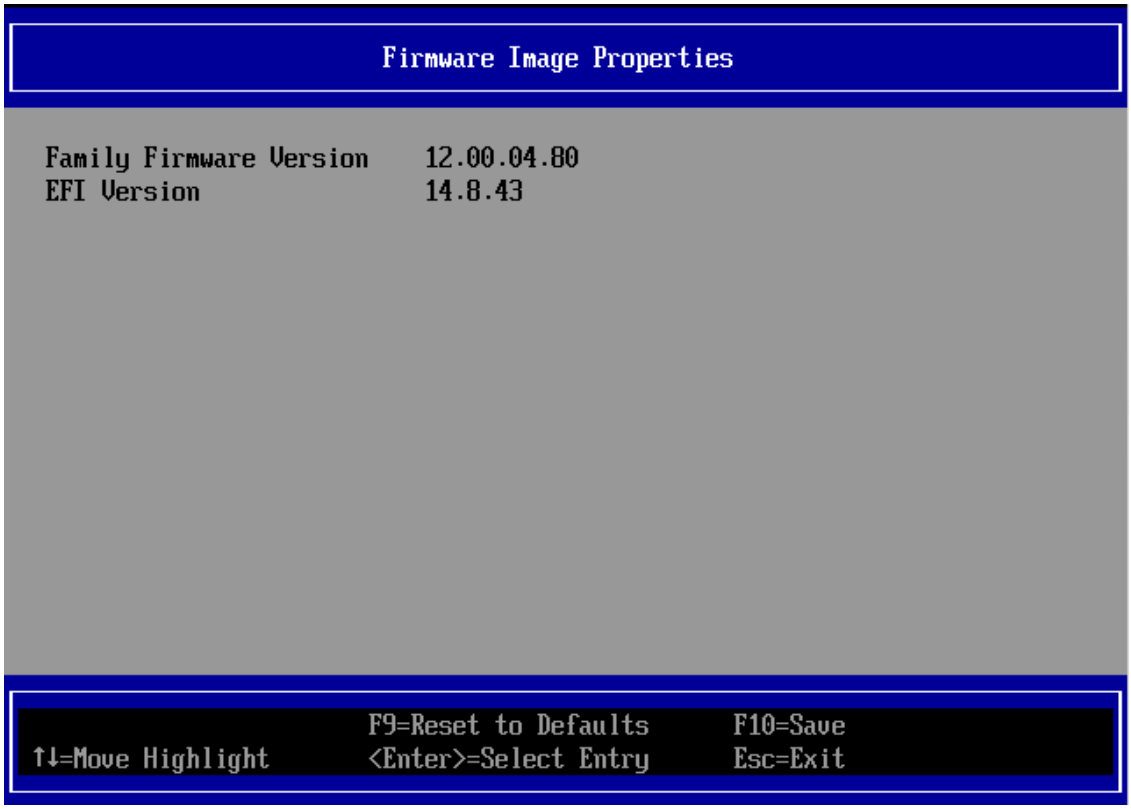
#### 4.5.6.1.12 Socket Direct Operation

| | |
|---|---|
| **Location:** | Main Configuration Form |
| **Description:** | Indicates whether Socket Direct functionality is enabled or not. |
| **Configurable:** | No |

### 4.5.6.2 HII Firmware Image Properties

In the following menu, you can set the following options:


- 4.5.6.2.1 Family Firmware Version
- 4.5.6.2.2 EFI Version




#### 4.5.6.2.1 Family Firmware Version

| | |
|---|---|
| **Location:** | Main Configuration Form /Firmware Image Properties |
| **Description:** | Device's firmware version information. |
| **Configurable:** | No |

#### 4.5.6.2.2 EFI Version

| | |
|---|---|
| **Location:** | Main Configuration Form /Firmware Image Properties |
| **Description:** | Device's UEFI driver version information. |
| **Configurable:** | No |

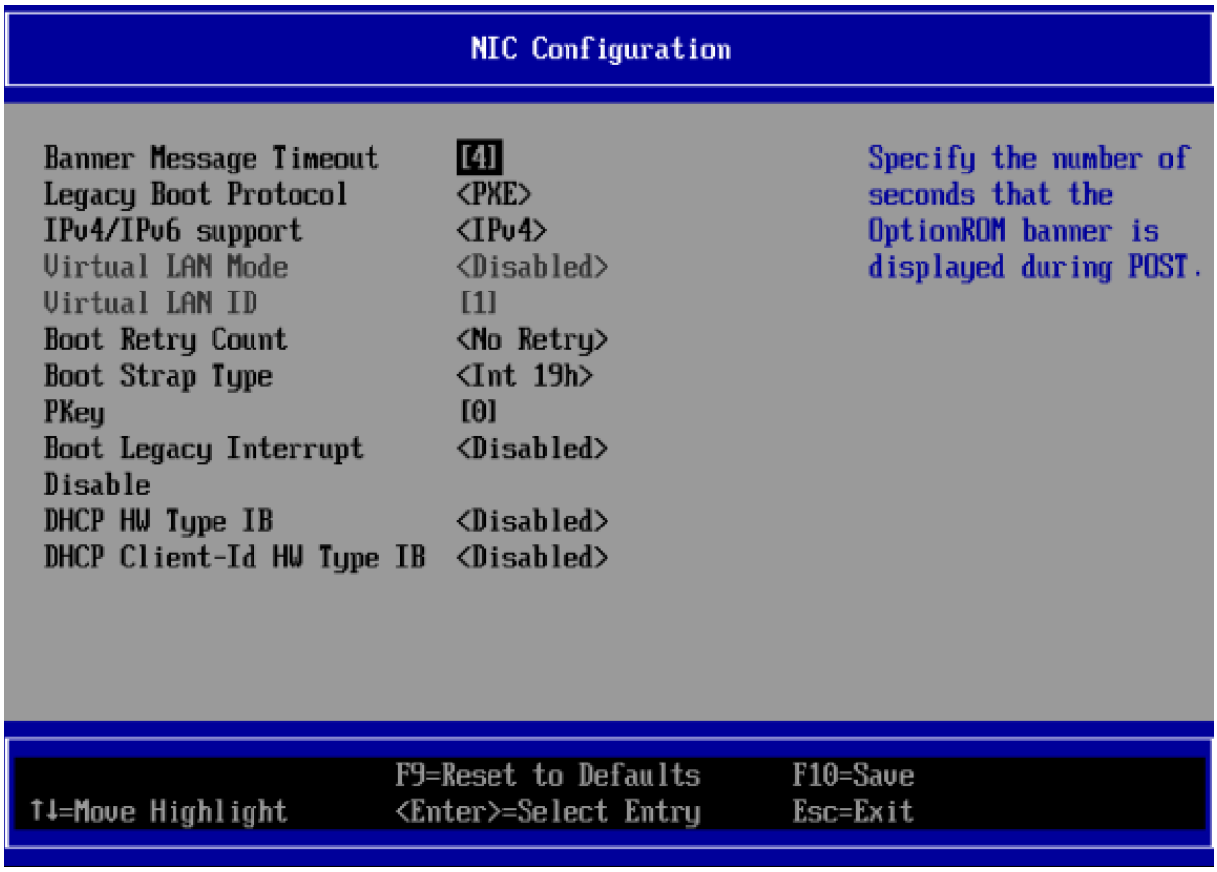
### 4.5.6.3 HII NIC Configuration

In the following menu, you can set the following options:

- 4.5.6.3.1 DHCP Client-Id HW Type IB
- 4.5.6.3.2 DHCP HW Type IB

- 4.5.6.3.3 Boot Legacy Interrupt Disabled
- 4.5.6.3.4 Banner Message Timeout
- 4.5.6.3.5 Legacy Boot Protocol
- 4.5.6.3.6 IPv4/IPv6 Support
- 4.5.6.3.7 Virtual LAN Mode
- 4.5.6.3.8 Virtual LAN ID
- 4.5.6.3.9 PKey
- 4.5.6.3.10 Boot Retry Count
- 4.5.6.3.11 Wake on LAN

This menu includes attributes that are applicable only to Legacy mode, except for PKEY which is valid for both the UEFI and the Legacy mode.



#### 4.5.6.3.1 DHCP Client-Id HW Type IB

⚠ This setting will appear in the boot menu only for selected adapters that support the feature, and only in VPI adapter cards.

| | |
|---|---|
| **Description:** | When enabled, DHCP packets are sent with Client-Id option (61) that includes "HW type(0x20)" + "GUID" instead of "NVIDIA Prefix" + "GUID". |
| **Configurable:** | Yes |
| **Available Options** | 1 - Enabled<br>2 - Disabled |

#### 4.5.6.3.2 DHCP HW Type IB

⚠ This setting will appear in the boot menu only for selected adapters that support the feature, and only in VPI adapter cards.

| | |
|---|---|
| **Description:** | When enabled, DHCP discovery packets are sent with HW-addr= GUID instead of a MAC address. |
| **Configurable:** | Yes |
| **Available Options** | 1 - Enabled<br>2 - Disabled |

#### 4.5.6.3.3 Boot Legacy Interrupt Disabled

| | |
|---|---|
| **Location** | System setup/Port main configurations/NIC Configuration |
| **Description:** | Disable/Enable legacy Interrupt support.<br>**Note:**<br>If enabled, the Flexboot driver will use polling mode to get RX traffic instead of waiting for the Interrupt. |
| **Configurable:** | Yes - built-in option |
| **Available Options** | 1 - Enabled<br>2 - Disabled |

#### 4.5.6.3.4 Banner Message Timeout

| | |
|---|---|
| **Location:** | Main Configuration Form /NIC Configuration |
| **Description:** | Defines the Banner's timeout |
| **Configurable:** | Yes – via input – If virtualization mode is SR-IOV |

| | |
|---|---|
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes – reboot is needed in order for this change to apply |
| **Available options:** | 0-14 sec |

#### 4.5.6.3.5 Legacy Boot Protocol

| | |
|---|---|
| **Location:** | Main Configuration Form /NIC Configuration |
| **Description:** | Use a non-UEFI network boot protocol.<br>Notes:<br>1 - If set to NONE, the boot will be skipped in this port.<br>2 - If all the ports per Bus Device function (BDF) are set to NONE, a BEV entry is not registered. |
| **Configurable:** | Yes – built-in options |
| **Persistency:** | Persistent through AC cycle |
| **Available options:** | 1 - None – no PXE boot, no iSCSI boot<br>2 - PXE – PXE first and if failed, try iSCSI<br>3 - iSCSI – iSCSI first and if failed, try PXE<br>4 - PXE without fail-over - PXE boot without fail-over to iSCSI boot<br>5 - iSCSI without fail-over - iSCSI boot without fail-over to PXE boot |

#### 4.5.6.3.6 IPv4/IPv6 Support

| | |
|---|---|
| **Location:** | System setup/Port Main Configurations/NIC Configuration |
| **Description:** | Select which IP protocol version will be used when booting. If both are configured, FlexBoot will try to boot with the 2nd protocol only if failed to boot with the 1st one. |
| **Configurable:** | Yes – built-in options |
| **Persistency:** | Persistent through AC cycle |
| **Available options:** | 1 - IPv4<br>2 - IPv6<br>3 - IPv4/IPv6 |

#### 4.5.6.3.7 Virtual LAN Mode

| | |
|---|---|
| **Location:** | Main Configuration Form /NIC Configuration |
| **Description:** | Enable/Disable VLAN tagging on the selected boot protocol. |
| **Configurable:** | Yes – built-in options: Ethernet mode only. |
| **Persistency:** | Persistent through AC cycle |

| | |
|---|---|
| **Available options:** | 1 - Enabled<br>2 - Disabled |

#### 4.5.6.3.8 Virtual LAN ID

| | |
|---|---|
| **Location:** | Main Configuration Form /NIC Configuration |
| **Description:** | Uses the VLAN tag with the selected boot protocol. |
| **Configurable:** | Yes – via input – If virtual LAN mode is enabled |
| **Value restrictions:** | The minimum integer value is 1 and Maximum integer value is 4094. |

#### 4.5.6.3.9 PKey



PKey setting will appear in the boot menu only for selected adapters that support the feature and only in VPI adapter cards.

| | |
|---|---|
| **Location:** | Main Configuration Form /NIC Configuration |
| **Description:** | PKey ID to be used by PXE boot. If 0 is selected, the default PKey will be used. |
| **Configurable:** | Yes – via input – If PKey is supported: InfiniBand mode only. |
| **Value restrictions:** | The minimum integer value is 0 and Maximum integer value is 65535. |

#### 4.5.6.3.10 Boot Retry Count

| | |
|---|---|
| **Location:** | Main Configuration Form /NIC Configuration |
| **Description:** | The number of retries to attempt in case of a boot failure. |
| **Configurable:** | Yes – built-in options |
| **Persistency:** | Persistent through AC cycle |
| **Available options:** | 0 - No retries<br>1 - Retry<br>2 - Retries<br>3 - Retries<br>4 - Retries<br>5 - Retries<br>6 - Retries<br>7 - Indefinite Retries |

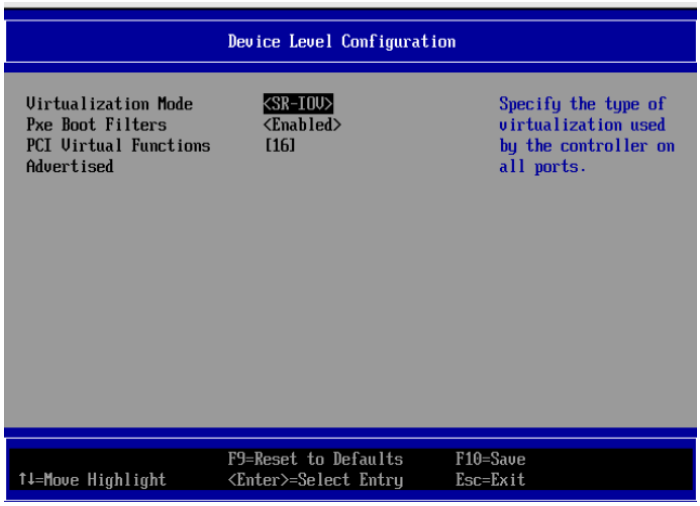
#### 4.5.6.3.11 Wake on LAN

| | |
|---|---|
| **Location:** | Main Configuration Form /NIC Configuration |
| **Description:** | Status of Wake on LAN feature. When set, it enables the server to be powered using an in-band magic packet.<br>Only valid for adapters that support Wake on LAN. |
| **Configurable:** | Yes – built-in options |
| **Persistency:** | Persistent through AC cycle |
| **Available options:** | 1 - Enabled<br>2 - Disabled |

### 4.5.6.4 HII Device Level Configuration

In the following menu, you can set the following options:

- 4.5.6.4.1 Virtualization Mode
- 4.5.6.4.2 PCI Virtual Functions Advertised
- 4.5.6.4.3 Pxe Boot Filters




#### 4.5.6.4.1 Virtualization Mode

| | |
|---|---|
| **Location:** | Main Configuration Form /Device Level Configuration |
| **Description:** | Specifies the type of virtualization used by the controller on all ports. Only valid for adapters that support SR-IOV virtualization mode. |
| **Configurable:** | Yes – built-in options |

| | |
|---|---|
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes – reboot is needed in order for this change to apply |
| **Available options:** | 1 - None<br>2 - SR-IOV |

#### 4.5.6.4.2 PCI Virtual Functions Advertised

| | |
|---|---|
| **Location:** | Main Configuration Form /Device Level Configuration |
| **Description:** | The number of virtual functions advertised and usable by the driver. Only valid for adapters that support SR-IOV virtualization mode. |
| **Configurable:** | Yes – via input – If virtualization mode is SR-IOV |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes – reboot is needed in order for this change to apply |
| **Value restrictions:** | Minimum integer value is 0. Maximum integer value is the value supported by the firmware installed. |

#### 4.5.6.4.3 Pxe Boot Filters

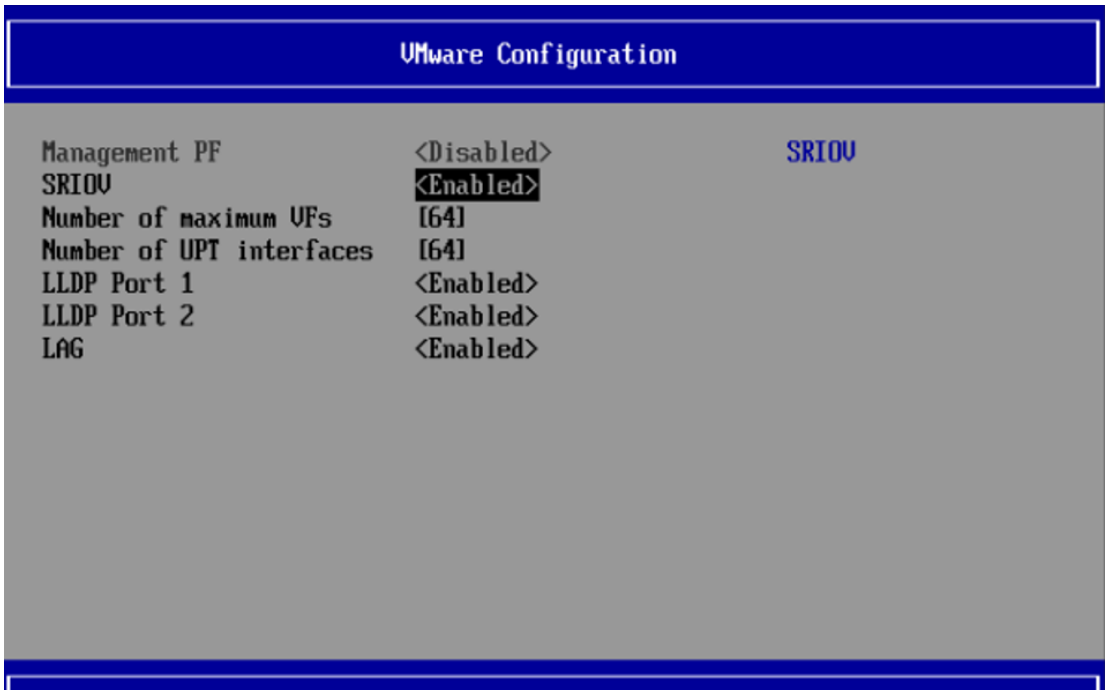
| | |
|---|---|
| **Location:** | Main Configuration Form /Device Level Configuration |
| **Description:** | Enable PXE-BOOT known-protocols filters (DHCP, TFTP, ICMP) |
| **Configurable:** | Yes |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes – reboot is needed in order for this change to apply |
| **Value restrictions:** | 0- Disabled<br>1- Enabled |

### 4.5.6.5 HII VMware Configuration

In the following menu, you can set the following options:


- 4.5.6.5.1 Management PF
- 4.5.6.5.2 SR-IOV
- 4.5.6.5.3 Number of Maximum VFs
- 4.5.6.5.4 Number of UPT Interfaces
- 4.5.6.5.5 LLDP Port
- 4.5.6.5.6 LAG

⚠ This section is displayed only when the attribute "VMware Distributed Services Engine (DPU)" is Enabled.




#### 4.5.6.5.1 Management PF

| | |
|---|---|
| **Location:** | VMware Configuration |
| **Description:** | Controls exposing a management networking PF connected directly to the BMC. |
| **Configurable:** | Yes – built-in options |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes – reboot is needed for this change to apply |
| **Available options:** | • Enable<br>• Disable |
| **Default Value:** | Device Default |

#### 4.5.6.5.2 SR-IOV

| | |
|---|---|
| **Location:** | VMware Configuration |
| **Description:** | Specifies the type of virtualization used by the controller on all ports.<br>Only valid for adapters that support SR-IOV virtualization mode. |

| | |
|---|---|
| **Configurable:** | Yes – built-in options |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes – reboot is needed in order for this change to be applied |
| **Available options:** | • Enable<br>• Disable |
| **Default Value:** | Enabled |

#### 4.5.6.5.3 Number of Maximum VFs

| | |
|---|---|
| **Location:** | VMware Configuration |
| **Description:** | The number of Virtual Functions advertised and usable by the driver.<br>Only valid for adapters that support SR-IOV virtualization mode. |
| **Configurable:** | Yes – via input – If virtualization mode is SR-IOV |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes – reboot is needed in order for this change to be applied |
| **Value restrictions:** | Minimum integer value is 0.<br>Maximum integer value is the value supported by the firmware installed. |
| **Default Value:** | 64 |

#### 4.5.6.5.4 Number of UPT Interfaces

| | |
|---|---|
| **Location:** | VMware Configuration |
| **Description:** | The number of UPT interfaces the NIC supports (limited by number of maximum VFs). |
| **Configurable:** | Yes – via input – If virtualization mode is SR-IOV |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes – reboot is needed in order for this change to be applied |
| **Value restrictions:** | Minimum integer value is 0.<br>Maximum integer value is the value supported by the firmware installed. |
| **Default Value:** | 64 |

#### 4.5.6.5.5 LLDP Port

| | |
|---|---|
| **Location:** | VMware Configuration |
| **Description:** | Selects whether the NIC internal LLDP client is enabled or not.<br>• Disable - The NIC LLDP client will not send LLDP frames or listen to incoming LLDP (incoming LLDP frames will be routed to the host)<br>• Enable - The NIC LLDP client will transmit optional and mandatory LLDPs and will receive all incoming LLDPs frames |
| **Configurable:** | Yes – via input – If virtualization mode is SR-IOV |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes – reboot is needed in order for this change to be applied |
| **Available options:** | • Enable<br>• Disable |
| **Default Value:** | 64 |

#### 4.5.6.5.6 LAG

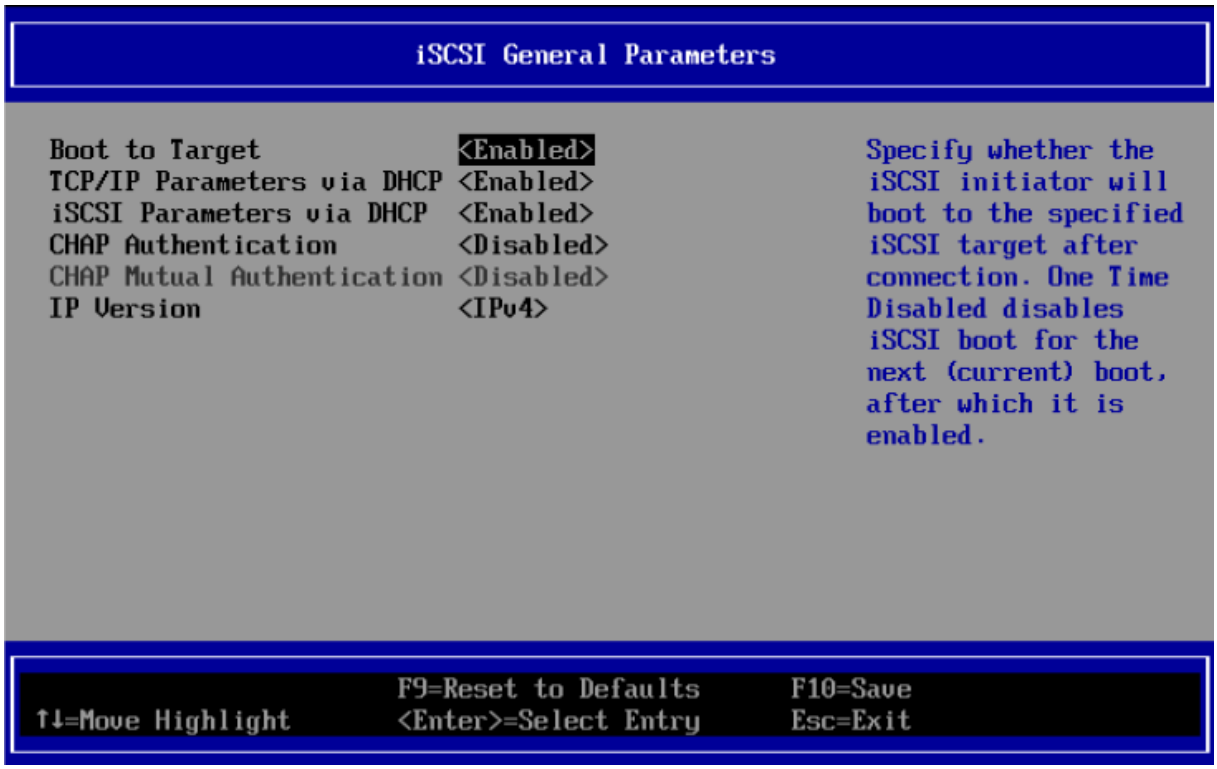
| | |
|---|---|
| **Location:** | VMware Configuration |
| **Description:** | Defines the way resources are allocated for LAG. |
| **Configurable:** | Yes – via input – If virtualization mode is SR-IOV |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes – reboot is needed in order for this change to be applied |
| **Available options:** | • Enable<br>• Disable |
| **Default Value:** | 64 |

### 4.5.6.6 HII iSCSI General Parameters

In the following menu, you can set the following options:


- 4.5.6.6.1 Boot to Target
- 4.5.6.6.2 TCP/IP Parameters via DHCP
- 4.5.6.6.3 iSCSI Parameters via DHCP
- 4.5.6.6.4 CHAP Authentication
- 4.5.6.6.5 CHAP Mutual Authentication
- 4.5.6.6.6 IP Version

⚠ This section's attributes are applicable only to Legacy mode.




#### 4.5.6.6.1 Boot to Target

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI General Parameters |
| **Description:** | Controls booting to ISCSI target after connection. |
| **Configurable:** | Yes |
| **Available options:** | • Enable<br>• Disable<br>• One time disabled |

#### 4.5.6.6.2 TCP/IP Parameters via DHCP

| | |
|---|---|
| **Location:** | Main Configuration Form /iSCSI Configuration/iSCSI General Parameters |
| **Description:** | When the TCP/IP Parameters via DHCP is enabled, the initiator and target's IP, netmask, gateway and DNS will be taken from DHCP instead of from the menu. |
| **Configurable:** | Yes |

#### 4.5.6.6.3 iSCSI Parameters via DHCP

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI General Parameters |
| **Description:** | When iSCSI Parameters via DHCP are enabled, all the initiator and target's parameters are taken from DHCP instead of from the menu. |
| **Configurable:** | Yes, if TCP/IP Parameters via DHCP is enabled. |

#### 4.5.6.6.4 CHAP Authentication

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI General Parameters |
| **Description:** | Enables CHAP Authentication for iSCSI initiator. |
| **Configurable:** | Yes |

#### 4.5.6.6.5 CHAP Mutual Authentication

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI General Parameters |
| **Description:** | Enables mutual CHAP authentication between the iSCSI initiator and target |
| **Configurable:** | Yes |

#### 4.5.6.6.6 IP Version

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI General Parameters |
| **Description:** | Specifies whether IPv4 or IPv6 network addressing will be used for iSCSI initiator and targets |
| **Configurable:** | No |

### 4.5.6.7 HII iSCSI Initiator Parameters

In the following menu, you can set the following options:

- 4.5.6.7.1 CHAP ID
- 4.5.6.7.2 CHAP Secret
- 4.5.6.7.3 IPv4 Address
- 4.5.6.7.4 IPv4 Primary DNS
- 4.5.6.7.5 IPv4 Default Gateway
- 4.5.6.7.6 IPv6 Default Gateway
- 4.5.6.7.7 IPv6 Address
- 4.5.6.7.8 IPv6 Primary DNS

- 4.5.6.7.9 IPv6 Prefix Length
- 4.5.6.7.10 iSCSI Name
- 4.5.6.7.11 Subnet Mask




### 4.5.6.7.1 CHAP ID

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | The iSCSI initiator Challenge-Handshake Authentication Protocol (CHAP) ID |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the Connect and the CHAP Mutual Authentication are enabled – This will be the reverse username used for the iSCSI initiator Challenge-Handshake Authentication Protocol. |
| **Value restrictions:** | Maximum string length is 128. |

#### 4.5.6.7.2 CHAP Secret

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | The iSCSI initiator Challenge-Handshake Authentication Protocol (CHAP) secret (password). |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the Connect and the CHAP Mutual Authentication are enabled – This will be the reverse password used for the iSCSI initiator Challenge-Handshake Authentication Protocol. |
| **Value restrictions:** | String length should be 0 or 12 to 16 |

#### 4.5.6.7.3 IPv4 Address

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | iSCSI initiator's IPv4 address |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, this will be set as the IP address of the initiator. |
| **Value restrictions:** | Should be in IPv4 format |

#### 4.5.6.7.4 IPv4 Primary DNS

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | The iSCSI initiator Primary DNS IP Address. |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, this will be set as the DNS for the IP address of the initiator. |
| **Value restrictions:** | Should be in IPv4 format |

#### 4.5.6.7.5 IPv4 Default Gateway

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | The iSCSI initiator default Gateway IP address. |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, this will be set as the default gateway IP address of the initiator. |
| **Value restrictions:** | Should be in IPv4 format |

#### 4.5.6.7.6 IPv6 Default Gateway

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | iSCSI initiator's default gateway IPv6 address |
| **Configurable:** | Yes |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, and IPv4/IPv6 support is selected as IPv6, this will be set as the default gateway for the IPv6 address of the initiator. |
| **Value restrictions:** | Should be in IPv6 format |

#### 4.5.6.7.7 IPv6 Address

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | iSCSI initiator's IPv6 address |
| **Configurable:** | Yes |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, and IPv4/IPv6 support is selected as IPv6, this will be set as the IP Address of the initiator. |

| | |
|---|---|
| **Value restrictions:** | Should be in IPv6 format |

#### 4.5.6.7.8 IPv6 Primary DNS

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | iSCSI initiator's DNS IPv6 address |
| **Configurable:** | Yes |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, and IPv4/IPv6 support is selected as IPv6, this will be set as the DNS for the IPv6 address of the initiator. |
| **Value restrictions:** | Should be in IPv6 format |

#### 4.5.6.7.9 IPv6 Prefix Length

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | iSCSI initiator's prefix length of the IPv6 address |
| **Configurable:** | Yes |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | f the legacy boot protocol is iSCSI or iSCSI without fail-over and IPv4/IPv6 support is selected as IPv6, this will be set as the prefix length for the IPv6 address of the initiator. |
| **Value restrictions:** | Should be in integer between 0-128 |

#### 4.5.6.7.10 iSCSI Name

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | The initiator's iSCSI Qualified Name (IQN). |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |

| | |
|---|---|
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, this will be set as the iSCSI Qualified Name of the initiator. |
| **Value restrictions:** | Maximum string length is 223 |

#### 4.5.6.7.11 Subnet Mask

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI Initiator Parameters |
| **Description:** | The iSCSI initiator Subnet Mask for an IPv4 initiator configuration. |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, this will be set as the subnet mask for the IP address of the initiator. |
| **Value restrictions:** | Should be in IPv4 format |

### 4.5.6.8 HII iSCSI First Target Parameters

In the following menu, you can set the following options:


- 4.5.6.8.1 Boot LUN
- 4.5.6.8.2 Connect
- 4.5.6.8.3 iSCSI Name
- 4.5.6.8.4 CHAP ID
- 4.5.6.8.5 CHAP Secret
- 4.5.6.8.6 IP Address
- 4.5.6.8.7 IPv6 Address
- 4.5.6.8.8 TCP Port




#### 4.5.6.8.1 Boot LUN

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI First target Parameters |
| **Description:** | The boot Logical Unit Number (LUN) on the first iSCSI storage target. |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, and Connect is enabled, this will be the boot LUN in the root path for the first target. |
| **Value restrictions:** | The minimum integer value is 0 and the maximum is 18446744073709551615. |

#### 4.5.6.8.2 Connect

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI First target Parameters |
| **Description:** | Enable/Disable connecting to the first iSCSI target. This will be ignored if both DHCP IP and DHCP Parameters are enabled in iSCSI general parameters. |

| | |
|---|---|
| **Configurable:** | Yes – built-in options |
| **Persistency:** | Persistent through AC cycle |
| **Available options:** | 1 - Enabled<br>2 - Disabled |

#### 4.5.6.8.3 iSCSI Name

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI First target Parameters |
| **Description:** | The iSCSI Qualified Name (IQN) of the first target |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, and Connect is enabled, this will be the iSCSI Qualified name in the root path for the first target. |
| **Value restrictions:** | Maximum string length is 223 |

#### 4.5.6.8.4 CHAP ID

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI First target Parameters |
| **Description:** | The first iSCSI storage target Challenge-Handshake Authentication Protocol (CHAP) ID. |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the Connect and the CHAP Authentication are enabled – This will be the username used for the first target Challenge-Handshake Authentication Protocol. |
| **Value restrictions:** | Maximum string length is 128. |

#### 4.5.6.8.5 CHAP Secret

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI First target Parameters |
| **Description:** | The Challenge-Handshake Authentication Protocol secret (CHAP password) of the first iSCSI storage target. |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |

| | |
|---|---|
| **Effects:** | If the Connect and the CHAP Authentication are enabled – This will be the password used for the first target Challenge-Handshake Authentication Protocol. |
| **Value restrictions:** | String length should be 0 or 12 to 16 |

#### 4.5.6.8.6 IP Address

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI First target Parameters |
| **Description:** | The IP address of the first iSCSI target |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, and Connect is enabled, this will be the IP address in the root path for the first target. |
| **Value restrictions:** | Should be in IPv4 format |

#### 4.5.6.8.7 IPv6 Address

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI First target Parameters |
| **Description:** | The IPv6 address of the first iSCSI target |
| **Configurable:** | Yes |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over,and IPv4/IPv6 support is selected as IPv6, and Connect is enabled, this will be the IP address in the root path for the first target. |
| **Value restrictions:** | Should be in IPv6 format |

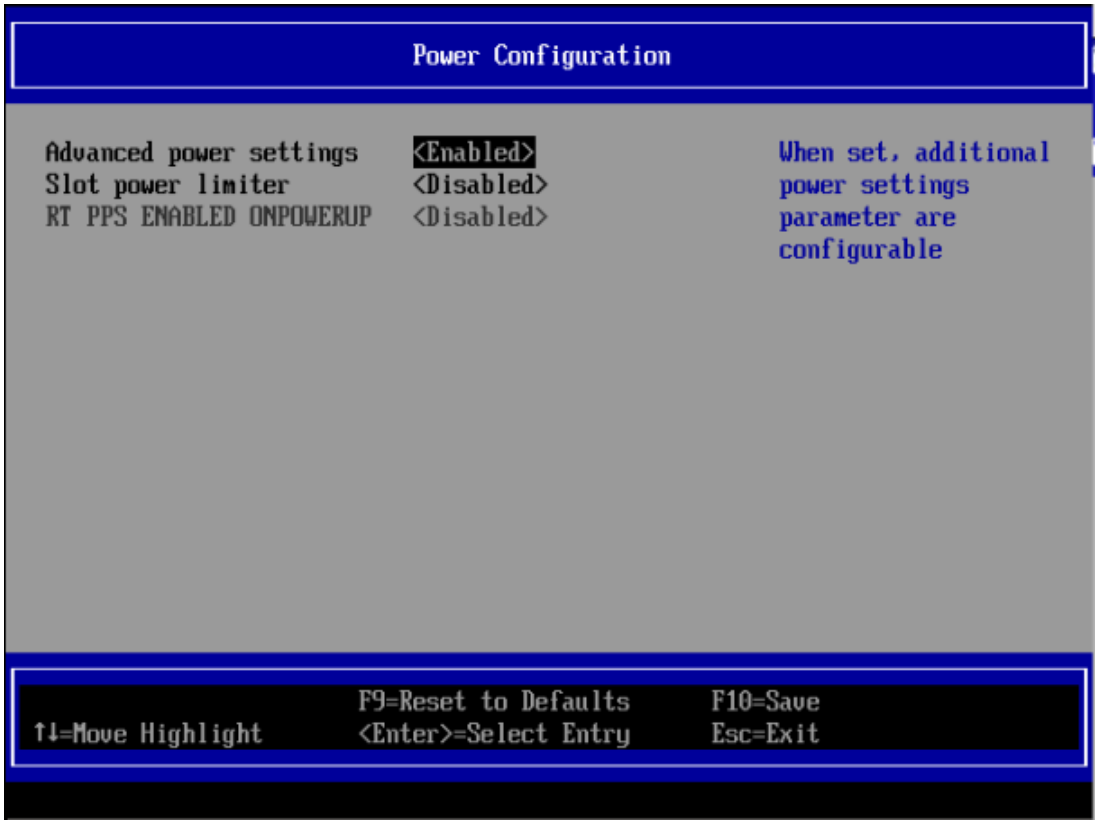
#### 4.5.6.8.8 TCP Port

| | |
|---|---|
| **Location:** | System setup/Port main configurations/iSCSI Configuration/iSCSI First target Parameters |
| **Description:** | TCP Port number of first iSCSI target |
| **Configurable:** | Yes – via input |
| **Persistency:** | Persistent through AC cycle |
| **Effects:** | If the legacy boot protocol is iSCSI or iSCSI without fail-over, and Connect is enabled, this will be the TCP Port in the root path for the first target. |
| **Value restrictions:** | The minimum integer value is 1, and the maximum is 65535. |

### 4.5.6.9 HII Power Configuration

[ConnectX-5 Only] In the following menu, you can set the following options:

- 4.5.6.9.1 Advanced Power Settings
- 4.5.6.9.2 Slot Power Limiter
- 4.5.6.9.3 RT PPS ENABLED ONPOWERUP




#### 4.5.6.9.1 Advanced Power Settings

| | |
|---|---|
| **Location:** | Power Configuration |
| **Description:** | When set to Enabled, additional power settings parameter are configurable. |
| **Configurable:** | Yes |
| **Available options:** | 1 - Enabled<br>2 - Disabled |

#### 4.5.6.9.2 Slot Power Limiter

| | |
|---|---|
| **Location:** | Power Configuration |
| **Description:** | When set to disable, the device can consume more than 25W from the PCIe power rails. |
| **Configurable:** | Yes |
| **Available options:** | 1 - Enabled<br>2 - Disabled |

#### 4.5.6.9.3 RT PPS ENABLED ONPOWERUP

| | |
|---|---|
| **Location:** | Power Configuration |
| **Description:** | When set to TRUE the PPS_OUT will be activated on power up. |
| **Configurable:** | Yes when `rt_pps_out_default_sup-ported` firmware cap is set to True. |
| **Available options:** | 1 - Enabled<br>2 - Disabled |

### 4.5.6.10 BlueField External Host Priv Configuration

> ⚠ This section is displayed only on BlueField DPU (ARM side).



#### 4.5.6.10.1 Host Priv Flash Access

| | |
|---|---|
| **Location:** | BlueFiled External Host Priv |
| **Description:** | Defines Host privilege to perform any device flash access |
| **Configurable:** | Yes - Built-in option |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes - A reboot is needed for this change to apply |
| **Available options:** | Default, Enable, Disable |
| **Default Value:** | Default |

#### 4.5.6.10.2 Host Priv PCC Update

| | |
|---|---|
| **Location:** | BlueFiled External Host Priv |
| **Description:** | Defines Host privilege to perform PCC algorithm updates |
| **Configurable:** | Yes - Built-in option |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes - A reboot is needed for this change to apply |
| **Available options:** | Default, Enable, Disable |
| **Default Value:** | Default |

#### 4.5.6.10.3 Host Priv Firmware Update

| | |
|---|---|
| **Location:** | BlueFiled External Host Priv |
| **Description:** | Defines Host privilege to perform firmware updates |
| **Configurable:** | Yes - Built-in option |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes - A reboot is needed for this change to apply |

| | |
|---|---|
| **Available options:** | Default, Enable, Disable |
| **Default Value:** | Default |

#### 4.5.6.10.4 Host Priv NIC Reset

| | |
|---|---|
| **Location:** | BlueFiled External Host Priv |
| **Description:** | Defines Host privilege to perform a NIC Reset |
| **Configurable:** | Yes - Built-in option |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes - A reboot is needed for this change to apply |
| **Available options:** | Default, Enable, Disable |
| **Default Value:** | Default |

#### 4.5.6.10.5 Host Priv Rshim

| | |
|---|---|
| **Location:** | BlueFiled External Host Priv |
| **Description:** | Enforce state of RSHIM PF towards an external host |
| **Configurable:** | Yes - Built-in option |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes - A reboot is needed for this change to apply |
| **Available options:** | Default, Enable, Disable |
| **Default Value:** | Default |

#### 4.5.6.10.6 Host Priv NV Global

| | |
|---|---|
| **Location:** | BlueFiled External Host Priv |
| **Description:** | Defines Host privilege to access global NV parameters |

| | |
|---|---|
| **Configurable:** | Yes - Built-in option |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes - A reboot is needed for this change to apply |
| **Available options:** | Default, Enable, Disable |
| **Default Value:** | Default |

#### 4.5.6.10.7 Host Priv NV Host

| | |
|---|---|
| **Location:** | BlueFiled External Host Priv |
| **Description:** | Defines Host privilege to access host NV parameters |
| **Configurable:** | Yes - Built-in option |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes - A reboot is needed for this change to apply |
| **Available options:** | Default, Enable, Disable |
| **Default Value:** | Default |

#### 4.5.6.10.8 Host Priv NV Port

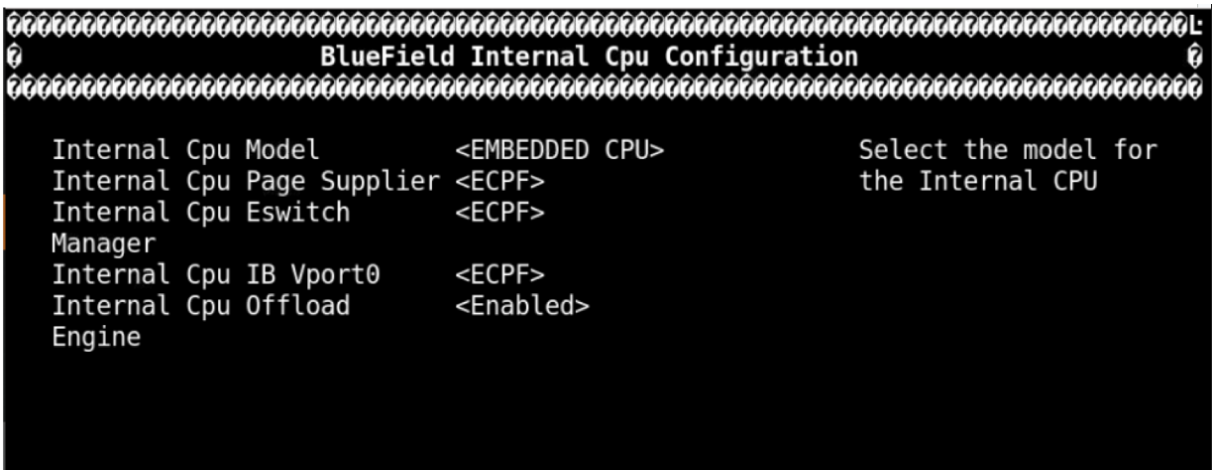
| | |
|---|---|
| **Location:** | BlueFiled External Host Priv |
| **Description:** | Defines Host privilege to access port NV parameters |
| **Configurable:** | Yes - Built-in option |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes - A reboot is needed for this change to apply |
| **Available options:** | Default, Enable, Disable |
| **Default Value:** | Default |

#### 4.5.6.10.9 Host Priv NV Int CPU

| | |
|---|---|
| **Location:** | BlueFiled External Host Priv |
| **Description:** | Defines Host privilege to access Int CPU NV parameters |
| **Configurable:** | Yes - Built-in option |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes - A reboot is needed for this change to apply |
| **Available options:** | Default, Enable, Disable |
| **Default Value:** | Default |

### 4.5.6.11 BlueField Internal CPU Configuration

> ⚠ This section is displayed only on BlueField-2 and BlueField-3 devices.




In this menu you can set the following options:

#### 4.5.6.11.1 Internal CPU Model

| | |
|---|---|
| **Location:** | BlueFiled Internal CPU Configuration |
| **Description:** | Select the model for the Internal CPU |

| | |
|---|---|
| **Configurable:** | Yes - A built-in option |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes - A reboot is needed for this change to apply |
| **Available options:** | EMBEDDED CPU/SPERATED HOST |
| **Default Value:** | EMPEDDED CPU |

#### 4.5.6.11.2 Internal CPU Page Supplier

| | |
|---|---|
| **Location:** | BlueFiled Internal CPU Configuration |
| **Description:** | Defines the owner of providing ICM pages to the external host functions |
| **Configurable:** | Yes - A built-in option |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes - A reboot is needed for this change to apply |
| **Available options:** | ECPF/External PF |
| **Default Value:** | ECPF |

#### 4.5.6.11.3 Internal CPU Eswitch Manager

| | |
|---|---|
| **Location:** | BlueFiled Internal CPU Configuration |
| **Description:** | Defines the owner of Eth embedded switch responsibilities |
| **Configurable:** | Yes - A built-in option |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes - A reboot is needed for this change to apply |
| **Available options:** | ECPF/External PF |
| **Default Value:** | ECPF |

#### 4.5.6.11.4 Internal CPU IB Vport0

| | |
|---|---|
| **Location:** | BlueFiled Internal CPU Configuration |
| **Description:** | Defines the owner of the IB Vport0 responsibilities |
| **Configurable:** | Yes - A built-in option |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes - A reboot is needed for this change to apply |
| **Available options:** | ECPF/External PF |
| **Default Value:** | ECPF |

#### 4.5.6.11.5 Internal CPU Offload Engine

| | |
|---|---|
| **Location:** | BlueFiled Internal CPU Configuration |
| **Description:** | Defines whether the Internal CPU is used as an offload engine |
| **Configurable:** | Yes - A built-in option |
| **Persistency:** | Persistent through AC cycle |
| **Reboot required:** | Yes - A reboot is needed for this change to apply |
| **Available options:** | Enabled/Disabled |
| **Default Value:** | Enabled |

# 5 PreBoot Drivers Environment

The document contains the following sections:


- Preparing the DHCP Server in Linux
- Subnet Manager – OpenSM
- Diskless Machines


## 5.1 Preparing the DHCP Server in Linux

When the boot session starts, the PXE firmware attempts to bring up an adapter network link (port). If it succeeds to bring up a connected link, the PXE firmware communicates with the DHCP server. The DHCP server assigns an IP address to the PXE client and provides it with the location of the boot program.

### 5.1.1 Case I: InfiniBand Ports

#### 5.1.1.1 Installing DHCP

PreBoot drivers require that the DHCP server runs on a machine which supports IP over IB. Prior to installing DHCP, make sure that MLNX_OFED is already installed on your DHCP server – see www.mellanox.com.
ISC DHCP of versions above 3.1.3 have native support for IPoIB clients. If using DHCP v3.1.3, the provided patch must be deployed. Newer versions do not require patching.
To download and install other supported DHCP server versions, please download MLNX_OFED driver from www.mellanox.com → Products → InfiniBand/VPI Drivers → Linux SW/Drivers and refer to docs/dhcp/README.
Standard DHCP fields holding MAC addresses are not large enough to contain an IPoIB hardware address. To overcome this problem, DHCP over InfiniBand messages convey a client identifier field (in DHCP option 61) used to identify the DHCP session. This client identifier field can be used to associate an IP address with a client identifier value, such that the DHCP server will grant the same IP address to any client that conveys this client identifier.

> ⚠ In the DHCP discover packets, Flexboot sends "hlen" 6 rather than 0. "chaddr" will be the ethernet mac address rather than zeros.
> In the DHCP server, the GUID in the client identifier can still be used to identify clients.

#### 5.1.1.2 Configuring the DHCP Server

##### 5.1.1.2.1 For ConnectX Family Devices

When a FlexBoot client boots, it sends the DHCP server various information including its DHCP client identifier. This identifier is used to distinguish between the various DHCP sessions. The value of the client identifier is composed of a prefix — ff:00:00:00:00:00:02:00:00:02:c9:00 — and an 8-byte port GUID (all separated by colons and represented in hexadecimal digits).

#### 5.1.1.2.2 Extracting the Port GUID – Method I

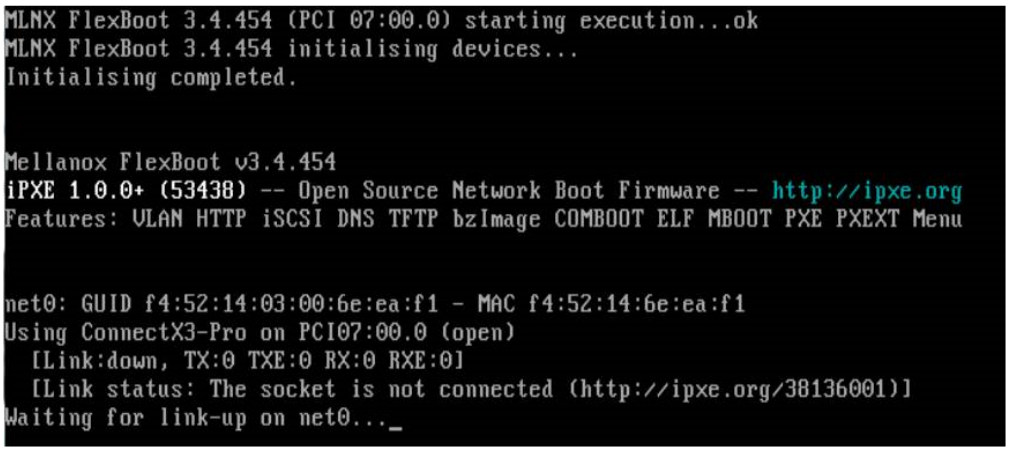
*To obtain the port GUID:*

1. Start mst.
   host1# mst start
   host1# mst status
2. The following MFT commands assume that the MFT package has been installed on the client machine.Obtain the Port GUID using the device name. The device name will be of the form: /dev/mst/ mt<dev_id>_pci{_cr0|conf0}.
   flint -d <MST_DEVICE_NAME> q

Assuming FlexBoot is connected via Port 1, then the Port GUID is 00:02:c9:03:00:00:10:39

#### 5.1.1.2.3 Extracting the Port GUID – Method II

An alternative method for obtaining the port GUID involves booting the client machine via Flex-Boot. This requires having a Subnet Manager running on one of the machines in the InfiniBand subnet. The 8 bytes can be captured from the boot session as shown in the figure below.




#### 5.1.1.2.4 Placing Client Identifiers in /etc/dhcpd.conf

The following is an excerpt of an /etc/dhcpd.conf example file showing the format of a client machine representation for the DHCP server:

```
host host1 {
next-server 11.4.3.7; filename "pxelinux.0"; fixed-address 11.4.3.130;
option dhcp-client-identifier = ff:00:00:00:00:00:02:00:00:02:c9:00:00:02:c9:03:00:0c:78:11;
}
```

If the "DHCP Client-Id HW Type IB" is enabled (see Ethernet NIC Configuration), place the following in the /eth/dhcp.conf file:

```
host host1 {
next-server 11.4.3.7; filename "pxelinux.0"; fixed-address 11.4.3.130;
option dhcp-client-identifier = 20:00:02:c9:03:00:0c:78:11;
}
```

#### 5.1.1.3 Running the DHCP Server

> ⚠ This section is applicable only when the Initiator's IP address is empty.

For the DHCP server to provide configuration records for clients, an appropriate configuration file needs to be created. By default, the DHCP server looks for a configuration file called dhcpd.conf under /etc. You can either edit this file or create a new one and provide its full path to the DHCP server using the -cf flag. See a file example at docs/dhcpd.conf of this package.

The DHCP server must run on a machine which has loaded the IPoIB module.

➢ *To run the DHCP server from the command line, enter:*

```
dhcpd <IB network interface name> -d
```

Example:

```
host1# dhcpd ib0 -d
```

#### 5.1.1.4 Adding Device Driver Support in Linux Kernels/Initrd

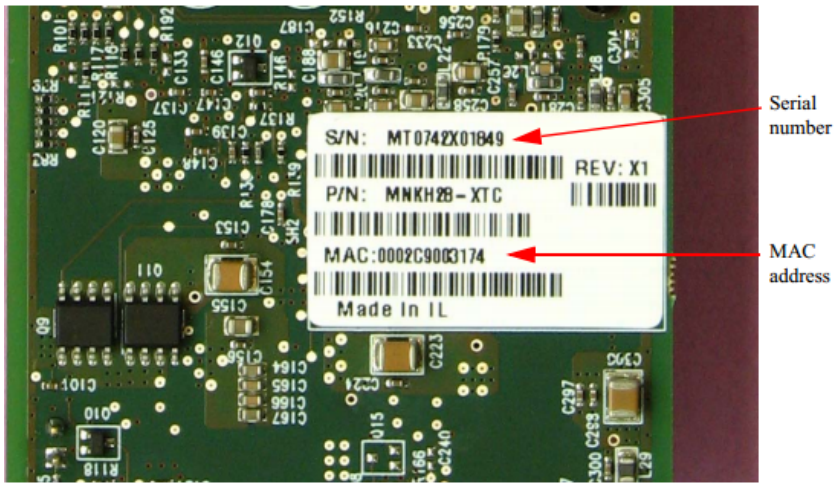
> ⚠ A DHCP client can be used if you need to prepare a diskless machine with an IB driver. See Step 11 under Example: Adding an IB Driver to initrd (Linux).

### 5.1.2 Case II: Ethernet Ports

When a FlexBoot client boots, it sends the DHCP server various information, including its DHCP hardware Ethernet address (MAC). The MAC address is 6 bytes long, and it is used to distinguish between the various DHCP sessions.

### 5.1.2.1 Extracting the MAC Address – Method I

All Ethernet NICs have a label on the printed side of the adapter card that has the card serial number and the card MAC address.




### 5.1.2.2 Extracting the MAC Address – Method II – FlexBoot Only

The six bytes of MAC address can be captured from the display upon the boot of the ConnectX device session as shown in the figure below.

```
FlexBoot v3.4.903
Features: DNS HTTP iSCSI TFTP VLAN ELF MBOOT PXE bzImage COMBOOT Menu PXEXT
net0: e4:1d:2d:a1:c2:9c
Using ConnectX-4 on 0000:00:03.0 (open)
  [Link:up, TX:0 TXE:0 RX:0 RXE:0]
```

### 5.1.2.3 Extracting the MAC Address – Method III

*In case the previous methods fail to work, perform the following as a last resort:*

1. Start mst.

   ```
   host1# mst start
   host1# mst status
   ```

   The following MFT commands assume that the MFT package has been installed on the client machine.
2. Obtain the MAC using the device name.
   The device name will be of the form: /dev/mst/ mt<dev_id>_pci{_cr0|conf0}.

```
flint -d <MST_DEVICE_NAME> q
```

Assuming that FlexBoot is connected via Port 1, then the MAC address is 00:02:c9:0c:7c:11.

#### 5.1.2.4 Placing MAC Addresses in /etc/dhcpd.conf

The following is an excerpt of a /etc/dhcpd.conf example file showing the format of representing a client machine for the DHCP server running on a Linux machine.

```
host host1 {
next-server 11.4.3.7; filename "pxelinux.0"; fixed-address 11.4.3.130;
hardware ethernet 00:02:c9:0c:78:12;
}
```

## 5.2 Subnet Manager – OpenSM

⚠ This section applies to ports configured as InfiniBand only.

FlexBoot requires a Subnet Manager to be running on one of the machines in the IB network. OpenSM is part of the MLNX_OFED software package and can be used to accomplish this. Note that OpenSM may be run on the same host running the DHCP server but it is not mandatory. For large InfiniBand clusters (> 100 nodes), it is recommended to use OpenSM caching. For further information, please refer to the MLNX_OFED User Manual.

## 5.3 Diskless Machines

FlexBoot supports booting diskless machines.

⚠ The following configuration insturctions apply only to operation systems which do not include an inbox driver, and should be skipped in case an OS with an inbox driver is used.

To enable using an IB/ETH driver, the initrd image must include a device driver module and be configured to load that driver. This can be achieved by adding the device driver module into the initrd image and loading it.

The 'initrd' image of some Linux distributions such as SuSE Linux Enterprise Server and Red Hat Enterprise Linux, cannot be edited prior or during the installation process.
If you need to install Linux distributions over Flexboot, please replace your 'initrd' images with the images found at: www.mellanox.com → Products → InfiniBand/VPI Drivers → FlexBoot (Download Tab).
All OSes which does not include inbox driver should do the following.
OSes which include the inbox driver should skip these configurations

### 5.3.1 InfiniBand Ports

The IB driver requires loading the following modules in the specified order:

- ib_addr.ko

- ib_core.ko
- ib_mad.ko
- ib_sa.ko
- ib_cm.ko
- ib_uverbs.ko
- ib_ucm.ko
- ib_umad.ko
- iw_cm.ko
- rdma_cm.ko
- rdma_ucm.ko
- mlx4_core.ko
- mlx4_ib.ko
- ib_mthca.ko
- ipoib_helper.ko – this module is *not* required for all OS kernels. Please check the release notes.
- ib_ipoib.ko

#### 5.3.1.1 Example: Adding an IB Driver to initrd (Linux)

##### 5.3.1.1.1 Prerequisites

- The FlexBoot image is already programmed on the HCA card
- The DHCP server is installed, configured and connected to the client machine
- An initrd file.
- To add an IB driver into initrd, you need to copy the IB modules to the diskless image. Your machine needs to be pre-installed with a MLNX_OFED for Linux ISO image (available for download from www.mellanox.com → Products → InfiniBand/VPI Drivers → Linux SW/ Drivers) that is appropriate for the kernel version the diskless image will run.

The remainder of this section assumes that MLNX_OFED has been installed on your machine.

##### 5.3.1.1.2 Adding the IB Driver to the initrd File



The following procedure modifies critical files used in the boot procedure. It must be executed by users with expertise in the boot process. Improper application of this procedure may prevent the diskless machine from booting.

1. Back up your current initrd file.
2. Make a new working directory and change to it.

```
host1$ mkdir /tmp/initrd_ib
host1$ cd /tmp/initrd_ib
```

3. Extract the initrd.

```
host1$ gzip -dc <initrd image> | cpio -id
The initrd files are now located at: /tmp/initrd_ib
```

4. Create a directory for the InfiniBand modules and copy them.

```
host1$ mkdir -p /tmp/initrd_ib/lib/modules/ib
host1$ cd /lib/modules/`uname -r`/updates/kernel/drivers
host1$ cp infiniband/core/ib_addr.ko /tmp/initrd_ib/lib/modules/ib
host1$ cp infiniband/core/ib_core.ko /tmp/initrd_ib/lib/modules/ib
host1$ cp infiniband/core/ib_mad.ko /tmp/initrd_ib/lib/modules/ib
host1$ cp infiniband/core/ib_sa.ko /tmp/initrd_ib/lib/modules/ib
host1$ cp infiniband/core/ib_cm.ko /tmp/initrd_ib/lib/modules/ib
host1$ cp infiniband/core/ib_uverbs.ko /tmp/initrd_ib/lib/modules/ib
host1$ cp infiniband/core/ib_ucm.ko /tmp/initrd_ib/lib/modules/ib
host1$ cp infiniband/core/ib_umad.ko /tmp/initrd_ib/lib/modules/ib
host1$ cp infiniband/core/iw_cm.ko /tmp/initrd_ib/lib/modules/ib
host1$ cp infiniband/core/rdma_cm.ko /tmp/initrd_ib/lib/modules/ib
host1$ cp infiniband/core/rdma_ucm.ko /tmp/initrd_ib/lib/modules/ib
host1$ cp net/mlx4/mlx4_core.ko /tmp/initrd_ib/lib/modules/ib
host1$ cp infiniband/hw/mlx4/mlx4_ib.ko /tmp/initrd_ib/lib/modules/ib host1$ cp infiniband/hw/mthca/
ib_mthca.ko /tmp/initrd_ib/lib/modules/ib host1$ cp infiniband/ulp/ipoib/ipoib_helper.ko /tmp/initrd_ib/
lib/modules/ib
host1$ cp infiniband/ulp/ipoib/ib_ipoib.ko /tmp/initrd_ib/lib/modules/ib
```

5. Load the IPv6 module. If you do not have it in your initrd, add it using the following command.

```
host1$ cp /lib/modules/`uname -r`/kernel/net/ipv6/ipv6.ko
/tmp/initrd_ib/lib/modules
```

6. Load the modules using the insmod executable. If you do not have it in your initrd, add it using the following command.

```
host1$ cp /sbin/insmod /tmp/initrd_ib/sbin/
```

7. [Optional] Give your IB device a static IP address.

```
host1$ cp /sbin/ifconfig /tmp/initrd_ib/sbin
```

8. [Optional] Obtain an IP address for the IB device through DHCP. Copy the DHCP client which was compiled specifically to support IB.
   To continue with this step, DHCP client needs to be already installed on the machine you are working with.
   Copy the DHCP client file and all the relevant files as described below.

```
host1# cp <path to DHCP client>/dhclient /tmp/initrd_ib/sbin
host1# cp <path to DHCP client>/dhclient-script /tmp/initrd_ib/sbin
host1# mkdir -p /tmp/initrd_ib/var/state/dhcp
host1# touch /tmp/initrd_ib/var/state/dhcp/dhclient.leases
host1# cp /bin/uname /tmp/initrd_ib/bin
host1# cp /usr/bin/expr /tmp/initrd_ib/bin
host1# cp /sbin/ifconfig /tmp/initrd_ib/bin
host1# cp /bin/hostname /tmp/initrd_ib/bin
```

9. Create a configuration file for the DHCP client and place it under/tmp/initrd_ib/sbin.
   Example of the dclient.conf

```
The value indicates a hexadecimal number
For a ConnectX® device interface "ib0" {send dhcp-client-identifier
ff:00:00:00:00:00:02:00:00:02:c9:00:00:02:c9:03:00:00:10:39;
}
```

10. Add the commands for loading the copied modules into the file init at the point you wish the IB driver to be loaded.
    Please pay attention to the following commands order (for loading modules) as it is critical.
    Loading "ipoib_helper.ko" is not required for all OS kernels.

```
echo "loading ipv6"
/sbin/insmod /lib/modules/ipv6.ko echo "loading IB driver"
/sbin/insmod /lib/modules/ib/ib_addr.ko
/sbin/insmod /lib/modules/ib/ib_core.ko
```

```
/sbin/insmod /lib/modules/ib/ib_mad.ko
/sbin/insmod /lib/modules/ib/ib_sa.ko
/sbin/insmod /lib/modules/ib/ib_cm.ko
/sbin/insmod /lib/modules/ib/ib_uverbs.ko
/sbin/insmod /lib/modules/ib/ib_ucm.ko
/sbin/insmod /lib/modules/ib/ib_umad.ko
/sbin/insmod /lib/modules/ib/iw_cm.ko
/sbin/insmod /lib/modules/ib/rdma_cm.ko
/sbin/insmod /lib/modules/ib/rdma_ucm.ko
/sbin/insmod /lib/modules/ib/mlx4_core.ko
/sbin/insmod /lib/modules/ib/mlx4_ib.ko
/sbin/insmod /lib/modules/ib/ib_mthca.ko
```

In case of interoperability issues between iSCSI and Large Receive Offload (LRO), set the "ib_ipoib.ko lro" to "0" to disable LRO.

```
/sbin/insmod /lib/modules/ib/ib_ipoib.ko lro=0
```

11. Assign an IP address to the IB device. Add either a call to ifconfig or to the DHCP client in the init file after loading the modules. If you want to use the DHCP client, then you need to add a call to the DHCP client in the init file after loading the IB modules.
    For example:

```
/sbin/dhclient -cf /sbin/dhclient.conf ib1
```

12. Save the init file.
13. Close initrd.

```
host1$ cd /tmp/initrd_ib
host1$ find ./ | cpio -H newc -o > /tmp/new_initrd_ib.img
host1$ gzip /tmp/new_init_ib.img
```

14. Copy the modified initrd (including the IB driver) which is located at/tmp/new_init_ib.img.gz and rename it properly.
15. Back up your current initrd file.
16. Make a new working directory and change to it.
17. Extract the initrd image.
18. Create a directory for the ConnectX EN modules and copy them.
19. Load the modules using the insmod executable. If you do not have it in your initrd, add it using the following command.
20. Give your Ethernet device a static IP address.
21. Add the commands for loading the copied modules into the file init at the point you wish the Ethernet driver to be loaded.
22. Assign an IP address to the ConnectX IB network interface.
23. Save the init file.
24. Close initrd.
25. Copy the modified initrd (including the Ethernet driver) which is located at/tmp/new_init_en.img.gz and rename it properly.

### 5.3.2 Ethernet Ports

The Ethernet driver requires loading the following modules in the specified order – see the example below:

- mlx4_core.ko
- mlx4_en.ko

#### 5.3.2.1 Example: Adding an Ethernet Driver to initrd (Linux)

##### 5.3.2.1.1 Prerequisites

- The FlexBoot image is already programmed on the adapter card.
- The DHCP server is installed, configured and connected to the client machine.
- An initrd file.
- To add an Ethernet driver into initrd, you need to copy the Ethernet modules to the diskless image. Your machine needs to be pre-installed with a *MLNX_EN Linux Driver* (available for download from www.mellanox.com  Products  Ethernet Drivers) that is appropriate for the kernel version the diskless image will run.

##### 5.3.2.1.2 Adding the Ethernet Driver to the initrd File

The following procedure modifies critical files used in the boot procedure. It must be executed by users with expertise in the boot process. Improper application of this procedure may prevent the diskless machine from booting.

1. Back up your current initrd file.
2. Make a new working directory and change to it.

```
host1$ mkdir /tmp/initrd_en
host1$ cd /tmp/initrd_en
```

3. Extract the initrd image.

```
host1$ gzip -dc <initrd image> | cpio -id
The initrd files can be located at: /tmp/initrd_en
```

4. Create a directory for the ConnectX EN modules and copy them.

```
host1$ mkdir -p /tmp/initrd_en/lib/modules/mlnx_en
host1$ cd /lib/modules/`uname -r`/updates/kernel/drivers
host1$ cp net/mlx4/mlx4_core.ko /tmp/initrd_en/lib/modules/mlnx_en
host1$ cp net/mlx4/mlx4_en.ko /tmp/initrd_en/lib/modules/mlnx_en
```

5. Load the modules using the insmod executable. If you do not have it in your initrd, add it using the following command.

```
host1$ cp /sbin/insmod /tmp/initrd_en/sbin/
```

6. [Optional] Give your Ethernet device a static IP address.

```
host1$ cp /sbin/ifconfig /tmp/initrd_en/sbin
```

7. Add the commands for loading the copied modules into the file init at the point you wish the Ethernet driver to be loaded.
   Please pay attention to the following commands order (for loading modules) as it is critical.

```
echo "loading Mellanox ConnectX EN driver"
/sbin/insmod lib/modules/mlnx_en/mlx4_core.ko
/sbin/insmod lib/modules/mlnx_en/mlx4_en.ko
```

8. Assign an IP address to the ConnectX EB network interface.

9. Save the init file.
10. Close initrd.

```
host1$ cd /tmp/initrd_en
host1$ find ./ | cpio -H newc -o > /tmp/new_initrd_en.img
host1$ gzip /tmp/new_init_en.img
```

11. Copy the modified initrd (including the Ethernet driver) which is located at/tmp/new_init_en.img.gz and rename it properly.
12. Back up your current initrd file.
13. Make a new working directory and change to it.
14. Extract the initrd image.
15. Create a directory for the ConnectX EN modules and copy them.
16. Load the modules using the insmod executable. If you do not have it in your initrd, add it using the following command.
17. Give your Ethernet device a static IP address.
18. Add the commands for loading the copied modules into the file init at the point you wish the Ethernet driver to be loaded.
19. Assign an IP address to the ConnectX EN network interface.
20. Save the init file.
21. Close initrd.
22. Copy the modified initrd (including the Ethernet driver) which is located at/tmp/new_init_en.img.gz and rename it properly.

# 6 User Manual Revision History

| Revision | Date | Description |
|---|---|---|
| Flexboot 3.9.101 & UEFI 14.43.19 | November, 2026 | No changes to the User Manual. |
| Flexboot 3.9.101 & UEFI 14.43.10 | August, 2026 | No changes to the User Manual. |
| Flexboot 3.9.101 & UEFI 14.42.15 | June 03, 2026 | No changes to the User Manual. |
| Flexboot 3.9.101 & UEFI 14.41.14 | March 01, 2026 | No changes to the User Manual. |
| Flexboot 3.8.201 & UEFI 14.40.10 | November 10, 2025 | No changes to the User Manual. |
| Flexboot 3.8.100 & UEFI 14.39.13 | August 08, 2025 | No changes to the User Manual. |
| Flexboot 3.7.500 & UEFI 14.38.16 | May 08, 2025 | Updated:<br>• HII Main Configuration Page |
| Flexboot 3.7.500 & UEFI 14.37.14 | January 31, 2025 | No changes to the User Manual. |
| Flexboot v3.7.500 & UEFI v14.36.21 | December 24, 2024 | No changes to the User Manual. |
| Flexboot v3.7.500 & UEFI v14.36.21 LTS | December 05, 2024 | No changes to the User Manual. |
| Flexboot v3.7.500 & UEFI v14.36.16 | November 05, 2024 | No changes to the User Manual. |
| Flexboot v3.7.500 & UEFI v14.35.15 | August 14, 2024 | No changes to the User Manual. |

| Revision | Date | Description |
|---|---|---|
| Flexboot v3.7.400 & UEFI v14.34.12 | May 08, 2024 | No changes to the User Manual. |
| 22 | February 8, 2024 | No changes to the User Manual. |
| 21 | December 11, 2023 | Updated HII Main Configuration Page. |
| 20 | November 5, 2023 | Updated "Supported Adapter Cards and Firmware" under NVIDIA Networking Server-Side Documentation of Flexboot v3.9.101 & UEFI v14.42.15. |
| 19 | August 10, 2023 | Updated:<br>• BlueField External Host Priv Configuration<br>• BlueField Internal CPU Configuration |
| 18 | April 30, 2023 | Updated:<br>• Supported Adapter Devices and Firmware<br>• Configuring the DHCP Server<br>• Ethernet NIC Configuration<br>• InfiniBand NIC Configuration<br>• HII NIC Configuration<br>• Flexboot ipxe.pxe Chainloading |
| 17 | January 31, 2023 | No changes to the User Manual. |
| 16 | November 30, 2022 | Added "Management PF" as a new setting under HII VMware Configuration.<br>The version has been changed due to firmware versions updates.<br>See, NVIDIA PreBoot Drivers (FlexBoot & UEFI). |
| 15 | October 31, 2022 | Added the following new sections:<br>• HII VMware Configuration<br>• VMware Distributed Services Engine (DPU) |
| 14 | July 31, 2022 | Added RT PPS ENABLED ONPOWERUP to the following sections:<br>• System Setup<br>• HII Power Configuration |
| 13.0 | November 30, 2021 | Added the following few sections:<br>• Cross Signed CA URI & Trust CA fingerprint in the NIC Configuration<br>• How to use HTTPs and Private Root Certificate Trust |
| 12.0 | June 30, 2021 | Added the following few sections:<br>• NIC + RDMA Mode (in the Partition N Configuration)<br>• NIC + RDMA Mode (in the system Setup) |

| Revision | Date | Description |
|---|---|---|
| 11.0 | December 31, 2020 | Added the following new sections:<br>• BlueField / BlueField-2 Embedded CPU Mode in InfiniBand<br>• Flexboot ipxe.pxe Chainloading<br>Added the following new sections in the FlexBoot System Settings:<br>• Flow Control Setting<br>• Port GUID<br>• Node GUID<br>• Virtual Node GUID<br>• Permit Total Port Shutdown<br>• IPv6 Default Gateway<br>• IPv6 Address<br>• IPv6 Primary DNS<br>• IPv6 Prefix Length<br>Added the following new sections in the HII System Settings:<br>• IPv6 Address<br>• IPv4/IPv6 Support<br>• IPv6 Default Gateway<br>• IPv6 Address<br>• IPv6 Primary DNS<br>• IPv6 Prefix Length<br>• IPv6 Address |
| 10.0 | July 02, 2020 | • Removed: InfiniBand Mode Only (see Main Configuration section)<br>• Updated: HII NIC Configuration |
| 9.0 | February 29, 2020 | • Added: Virtual Node GUID (InfiniBand Mode Only) (see Main Configuration section)<br>• Updated: HII NIC Configuration<br>• Removed: Virtual Port GUID (InfiniBand Mode Only) |
| 8.0 | September 26, 2019 | • Added the following sections:<br>  • SNAPI Operation<br>  • Node GUID<br>  • Port GUID<br>  • Virtual Port GUID<br>  • Socket Direct Operation |
| 7.0 | April 30, 2019 | • Added the following section:<br>  • NIC Partitioning Configuration |
| 6.0 | November 29, 2018 | • Added the following new sections:<br>  • General Settings<br>  • Pci Settings<br>  • Expansion Rom Uefi Arm<br>  • Expansion Rom Uefi X86 |

| Revision | Date | Description |
|---|---|---|
| 5.0 | July 05th, 20018 | • Added the following sections:<br>  • Link Speed (FlexBoot related configuration)<br>  • Link Speed (UEFI related configuration)<br>  • Updated the following FlexBoot sections:<br>  • Legacy Boot Protocol<br>  • IPv4 Address<br>  • IPv4 Primary DNS<br>  • IPv4 Default Gateway<br>  • iSCSI Name<br>  • Subnet Mask<br>  • Boot LUN<br>  • iSCSI Name<br>  • IP Address<br>  • TCP Port<br>• Updated the following UEFI sections:<br>  • Legacy Boot Protocol<br>  • Virtual LAN Mode<br>  • IPv4 Address<br>  • IPv4 Primary DNS<br>  • IPv4 Default Gateway<br>  • iSCSI Name<br>  • Subnet Mask<br>  • Boot LUN<br>  • iSCSI Name<br>  • IP Address<br>  • TCP Port |

# 7 Release Notes History

## 7.1 Changes and New Feature History - FlexBoot

| Category | Changes |
|---|---|
| **Rev 3.9.101** | |
| General | Added support for ConnectX-9 SuperNic. |
| | Updated MFT and firmware versions. For the firmware versions supported see, Compatible Products. |
| **Rev 3.8.201** | |
| General | Updated MFT and firmware versions. For the firmware versions supported see, Compatible Products. |
| **Rev 3.8.100** | |
| General | Updated MFT and firmware versions. For the firmware versions supported see, Compatible Products. |
| **Rev 3.7.400** | |
| Link Status | FlexBoot PXE driver will report logical link status instead of physical link status. This impacts the Bluefield devices as follows:<br>As long as the OVS on the ARM side is ready, the FlexBoot driver on the Host will report the link status is up even if the physical link status is down. |
| **Rev 3.7.300** | |
| General | Added support for booting with FlexBoot on legacy mode on BlueField-2 and BlueField-3 when the device is operating on NIC mode and the Link Type is InfiniBand. |
| **Rev 3.7.201** | |
| General | Added support for device booting with FlexBoot on legacy mode when using BlueField-3 external on Enhanced NIC mode. |
| Adapter Cards | Added support for NVIDIA BlueField-3 DPU devices at GA level. |
| FlexBoot UI | Added a new setting "Boot Legacy Interrupt" in the NIC Configuration menu used to enable/disable interrupt support for boot legacy mode.<br>For further information, refer to the PreBoot User Manual. |
| | Added a new setting "Dhcp Client-Id HW Type IB" in the NIC Configuration menu used to enable/disable sending DHCP client-id option (61) with IB Type + GUID instead full prefix + GUID.<br>For further information, refer to the PreBoot User Manual. |
| | Added a new setting "DHCP HW Type IB" in the NIC Configuration menu user to enable/disable sending DHCP IB discover packets with HW Type IB and HW address GUID instead MAC.<br>For further information, refer to the PreBoot User Manual. |

| Rev 3.6.901 | |
|---|---|
| Link Speed/InfiniBand | Updated the Flexboot driver to boot with the highest link speed on InfiniBand mode (instead of configuring it to SDR) on devices that operate on Multi-Host mode and on devices that operate with keep_link_up enabled. |
| General | Updated firmware versions. For the firmware versions supported see, Overview. |
| **Rev 3.6.805** | |
| General | Updated firmware versions. |
| **Rev 3.6.804** | |
| FlexBoot UI | Added support for exposing the NDR link speed in the Ctrl +B menu. |
| **Rev 3.6.700** | |
| FlexBoot UI | Added a new setting to enable/disable RT_PPS_ENABLED_ONPOWERUP.<br>For further information, refer to the PreBoot Drivers User Manual. |
| **Rev 3.6.502** | |
| General | Added support for NVIDIA® ConnectX®-7 adapter cards.<br>ConnectX-7 has the same feature set as ConnectX-6 adapter card. For the list of the ConnectX-6 firmware features, please see ConnectX-6 Firmware Release Notes. |
| FlexBoot UI | Added support for "Cross-Signed CA URI" and "Trust CA fingerprint" new settings for NIC Configuration.<br>For further information, refer to the PreBoot Drivers User Manual. |
| iSCSI Authentication | Added support for setting the iSCSI authentication settings via IPXE script (not only via Flexboot UI). |
| **Rev 3.6.403** | |
| FlexBoot UI | Added support for "RDMA NIC mode" new setting to the Flexboot menu.<br>For further information, refer to the PreBoot Drivers User Manual. |
| NVIDIA® BlueField® | Added support for boot over Virtio Net emulation hotplug/static device in legacy boot environment .<br>For further information, refer to the NVIDIA BlueField User Manual. |
| **Rev 3.6.301** | |
| **VirtioNet/VirtioBlk Exprom** | Added support for Enabling/Disabling UEFI X86 VirtioNet/VirtioBlk Exprom in Flexboot using the Ctrl+B menu. |
| **Rev 3.6.204** | |
| **Adapter Cards** | Added support for BlueField 2 adapters cards at GA level. |
| **iSCSI** | Added support for iSCSI boot over IPv6. |
| **FlexBoot UI** | Added new settings for IPv6 in iSCSI Initiator/General section in Ctrl B menu.<br>For further information refer to the PreBoot Drivers User Manual. |

| | |
|---|---|
| **FlexBoot UI** | Added "Permit Total Shutdown" new setting to the FlexBoot boot menu.<br>For further information refer to the PreBoot Drivers User Manual. |
| **FlexBoot UI** | Added "Flow Control" new setting to the FlexBoot boot menu.<br>For further information refer to the PreBoot Drivers User Manual. |
| **HTTPS** | Added support for HTTPS protocol by default. Flexboot now will contain only a single trusted root certificate (the “iPXE root CA” certificate). To use a standard SSL certificate issued by a public CA (such as Verisign), iPXE must be able to download a cross-signed certificate to complete the chain of trust up to the “iPXE root CA” certificate. These cross-signed certificates are downloaded automatically when needed from http://ca.ipxe.org/auto.<br>For more info please see full description on https://ipxe.org/crypto and https://ipxe.org/cfg/crosscert |
| **Bug Fixes** | Bug Fixes |
| **Rev 3.6.102** | |
| **General** | This version of FlexBoot does not have any changes. The version was increased due to the release of a new firmware version. |
| **Rev 3.6.204** | |
| **Adapter Cards** | Added support for ConnectX-6 Lx adapter cards. |
| **Adapter Cards** | **[Beta]** Added support for BlueField 2 adapters cards. |
| **FlexBoot UI** | Exposed the following settings for both IB/ETH mode :<br>• Mac Address<br>• Virtual Mac Address<br>• Port Guid Address<br>• Node Guid Address<br>• Virtual Node Guid Address<br>For further information refer to PreBoot Drivers User Manual. |
| **Rev 3.5.901** | |
| **Adapter Cards** | Added support for ConnectX-6 Dx adapter cards. |
| **FlexBoot Legacy Interrupt** | Added the ability to enable/disable the received indication using the Legacy Interrupt option.<br>For further information refer to MFT User Manual. |
| **FlexBoot UI** | Added Virtual Node GUID settings to FlexBoot menu and removed Virtual Port GUID setting.<br>For further information refer to PreBoot Drivers User Manual. |
| **Rev 3.5.803** | |
| **FlexBoot UI** | Added Port GUID, Node GUID and Virtual Port GUID new settings to the FlexBoot boot menu for devices that operate in IB mode.<br>For further information refer to PreBoot Drivers User Manual. |
| **FlexBoot UI** | Added "SNAPI Operation" new setting to the FlexBoot boot menu.<br>For further information refer to PreBoot Drivers User Manual. |
| **Rev. 3.5.701** | |
| **FlexBoot UI** | Added NIC Partitions Configuration settings in Flexboot boot menu for devices that operate in Socket-Direct mode . For further information please refer to FlexBoot and UEFI User Manual. |

| Rev. 3.5.603 | |
|---|---|
| **Adapter Cards** | Added support for ConnectX-6 ready adapter cards. For further information, contact Mellanox Support. |
| **Enable/Disable UEFI X86, UEFI ARM Exprom using Ctrl+B** | Added support to Enable/Disable UEFI X86, UEFI Arm Exprom in FlexBoot using the Ctrl+B menu. |
| **Rev. 3.5.504** | |
| FlexBoot UI | Added “PXE boot without fail-over to iSCSI” and “iSCSI boot without fail-over to PXE boot” options for legacy_boot_prtocol configuration.<br>For further information, refer to Mellanox PreBoot Drivers User Manual. |
| | Enabled PXE to expose the current link speed of the system when in ETH mode. |
| **Rev. 3.5.403** | |
| Enable/Disable FlexBoot in EXPROM via mlxconfig | Added PXE support to additional ConnectX-4/ConnectX-4 Lx/ConnectX- 5 adapter cards.<br>**Note:** Not all cards are compiled with FlexBoot. For the full list of the OPNs compiled with FlexBoot, please refer to the firmware Release Notes<br>Enabling/Disabling FlexBoot in ConnectX-4/ConnectX-4 Lx/ConnectX-5 in EXPROM is done via mlxconfig.<br>The default value is:<br>• FLEXBOOT enable<br>Note: The value above can be set only in adapter cards that support this capability.<br>For further information on how to enable/disable UEFI, refer to section Enabling/Disabling FlexBoot/UEFI in EXPROM via mlxconfig in the Mellanox PreBoot Drivers (FlexBoot & UEFI) User Manual. |
| VLAN Priority | Set the default VLAN priority to 0. |
| Link Aggregation Control Protocol (LACP) | LACP support is disabled by default. It can be enabled via mlxconfig. |
| **Rev. 3.5.305** | |
| PXE Boot | Added ESC option as an abort key during PXE boot process. |
| FlexBoot Link Aggregation Control Protocol (LACP) | Added the ability to enable/disable FlexBoot LACP via mlxconfig. |
| Serial Console | Removed Serial Console support in the ConnectX-4 Lx adapter card. |
| Upstream sync | Synced the source with iPXE (upstream sync) |
| **Rev. 3.5.210** | |
| Promiscuous VLAN mode | Added support for promiscuous VLAN mode. |
| MTU | [InfiniBand] Added support for configurable MTU. |
| Expansion ROM version | Enabled expansion ROM ( *exp_rom* ) version exposition according to the new specification (e.g. expose ARCH in flint tool). |
| FlexBoot UI | Added a FlexBoot menu support for *NV_POWER_CONF* . Now power consumption configuration is supported from the FlexBoot menu. |
| | Enhanced FlexBoot/firmware debug capability using Flexboot UI. Added the *reg_dump* option to the *panic_behavior* configuration in the FlexBoot menu |

| | |
|---|---|
| Upstream sync | Synced the source with iPXE (upstream sync) |
| **Rev. 3.5.11** | |
| Networking | Ethernet only: The MTU value is set to 1500 upon driver's bring up. |
| **Rev. 3.5.109** | |
| FlexBoot UI | Added support for "Undi network wait timeout" |
| | Enhanced FlexBoot/firmware debug capability using Flexboot UI |
| Performance | Performance enhancements in Ethernet mode |
| Upstream sync | Synced the source with iPXE (upstream sync) |
| **Rev. 3.4.903** | |
| iSCSI re-imaging | Enables the user to install a new image on active ISCSI target |
| FlexBoot UI | Added new configuration for network link type for supported cards (ConnectX-4 VPI cards) |
| | Enabled boot configuration menu in ConnectX-4 when the physical port is IB |
| Booting | Enabled booting with non-default Pkey in ConnectX-4 when the physical port is IB |
| Link Status | Removed link status line printout at boot time |
| Boot Menu | Changed the Bus:Device:Function format in boot menu, from *PCIBus:Dev.Func* to *0000:Bus:Dev.Func* |
| Upstream sync | Synced the source with iPXE (upstream sync) |
| **Rev. 3.4.812** | |
| FlexBoot UI | Added debug prints option in the FlexBoot boot menu. For further information, please refer to FlexBoot and UEFI User Manual. |
| Upstream sync | Synced the source with iPXE (upstream sync) |
| System Diagnosis | Added the ability to diagnose problems in released ROMs by enabling the debug log levels for specific modules.<br>Note: This ability should be used only when debug session is needed. |
| Interrupts | Added support for ConnectX-4/ConnectX-4 Lx interrupts |
| **Rev. 3.4.719** | |
| IPv6 | Added IPv6 support |
| x64 Architecture | Added x64 architecture support in ConnectX-4 and Connect-IB adapter cards |

| | |
|---|---|
| SHELL CLI | Removed support for the following SHELL CLI commands:<br>• Non-volatile option storage commands<br>• SAN boot commands<br>• Menu commands<br>• Login command<br>• Sync command<br>• DNS resolving command<br>• Time commands<br>• Image crypto digest commands<br>• Loopback testing commands<br>• VLAN commands<br>• PXE commands<br>• Reboot command<br>For further information, please refer to: http://ipxe.org/cmd |
| Upstream sync | Synced the source with iPXE (upstream sync) |
| **Rev. 3.4.650** | |
| Image size | Added support for .mrom images larger than 128kB |
| Adapter Cards | Added support for ConnectX-4 EN and ConnectX-4 Lx EN |
| Flat real mode | Moved to flat real mode when calling INT 1a,b101 to avoid BIOSes issues |
| Spanning Tree Protocol | Added support for detecting Spanning Tree Protocol non-forwarding ports (RSTP/MSTP) |
| Upstream sync | Synced the source with iPXE (upstream sync) |

## 7.2 Bug Fixes History - FlexBoot

| Internal Ref. | Description |
|---|---|
| 1149467 | **Description:** Chain-loading "ipxe.pxe" and "undionly.kpxe" over InfiniBand is currently not supported when using DHCP client identification based on InfiniBand 32-bit Prefix+GUID (as with FlexBoot). |
| | **Keywords:** FlexBoot, chainload, InfiniBand, undionly.kpxe, ipxe.pxe |
| | **Discovered in Version:** 3.5.305 |
| | **Fixed in Version:** 3.7.102 |
| 1755286 | **Description:** Fixed an issue where the Flexboot driver set SDR link speed for devices operating on Multi-Host mode or when the keep_link_up was enabled. |
| | **Keywords:** SDR, Multi-Host, Single-Host, port speed |
| | **Discovered in Version:** 3.5.305 |
| | **Fixed in Version:** 3.6.901 |
| 3044598 | **Description:** Added support for PXE legacy interrupt for ConnectX-7 adapter cards. |
| | **Keywords:** Chain-loading, boot, ConnectX-7 |
| | **Discovered in Version:** 3.6.204 |
| | **Fixed in Release:** 3.6.804 |

| Internal Ref. | Description |
|---|---|
| 1725147 | **Description:** In devices that operate in Socket-Direct mode, the physical MAC of the auxiliary partitions is displayed as zeros instead of the actual MAC when the  card is configured as InfiniBand. |
| | **Keywords:** Physical MAC, Boot menu, Socket-Direct |
| | **Discovered in Version:** 3.5.701 |
| | **Fixed in Release:** 3.6.204 |
| 843377/849223 | **Description:** The physical MAC assigned via the boot menu is displayed as zeroes instead of the set MAC when ConnectX-4 VPI adapter card is configured as InfiniBand. |
| | **Keywords:** Physical MAC, Boot menu |
| | **Discovered in Version:** 3.5.901 |
| | **Fixed in Release:** 3.6.102 |
| 1725147 | **Description:** In devices that operate in Socket-Direct mode, the physical MAC of the auxiliary partitions is displayed as zeros instead of the actual MAC when the card is configured as InfiniBand. |
| | **Keywords:** Physical MAC, Boot menu, Socket-Direct |
| | **Discovered in Version:** 3.5.701 |
| | **Fixed in Release:** 3.6.102 |
| 1447149 | **Description:** FlexBoot menu Link Speed configuration will be "NA" in case speed is configured to 50GBase-KR4 |
| | **Keywords:** FlexBoot menu, Link Speed; 50GBase-KR4 |
| | **Discovered in Version:** 3.5.504 |
| | **Fixed in Release:** 3.5.803 |
| 1072419 | **Description:** The FlexBoot DHCP loops indefinitely when it continuously gets NACK on the DHCP requests On some setups, it might also cause an RSOD after a a continues looping. |
| | **Keywords:** Bootloader grub2, WDS, RSOD |
| | **Discovered in Release:** 3.5.305 |
| | **Fixed in Release:** 3.5.504 |
| 1157875 | **Description:** Pressing any of the arrow keys during boot might cause the boot process to be aborted. |
| | **Keywords:** Abort boot, arrows, FlexBoot |
| | **Discovered in Release:** 3.5.305 |
| | **Fixed in Release:** 3.5.403 |
| 1113560 | **Description:** Fixed an issue that prevented the first iSCSI target parameters to be reset to their default values. |
| | **Keywords:** iSCSI target |
| | **Discovered in Release:** 3.5.110 |
| | **Fixed in Release:** 3.5.305 |
| - | **Description:** FlexBoot supports only 2K MTU. |
| | **Keywords:** Networking |

| Internal Ref. | Description |
|---|---|
| | **Discovered in Release:** 3.4.903 |
| | **Fixed in Release:** 3.5.210 |
| 843209 | **Description:** Fixed and issue which cause the link not to raise in the second port which is set as IB when the first port is ETH in PXE. |
| | **Keywords:** Link up, Ports |
| | **Discovered in Release:** 3.4.903 |
| | **Fixed in Release:** 3.5.109 |
| 847950 | **Description:** Fixed wrong default value of Boot-To-Target in FlexBoot configuration. |
| | **Keywords:** Boot-To-Target, FlexBoot configuration |
| | **Discovered in Release:** 3.4.719 |
| | **Fixed in Release:** 3.4.903 |
| 691148 | **Description:** When connecting a pre-configured port with VLAN to an IB fabric, the port runs as Ethernet port with the VLAN tag. |
| | **Keywords:** VLAN, Port Management |
| | **Discovered in Release:** 3.4.719 |
| | **Fixed in Release:** 3.4.903 |
| 792432 | **Description:** Booting PXE using Grub2.X over HP G9/G8 servers results in system hang. |
| | **Keywords:** PXE boot, Grub2.X, HP G9/G8 |
| | **Discovered in Release:** 3.4.719 |
| | **Fixed in Release:** 3.4.903 |
| 690792 | **Description:** If the PMM fails to allocate memory, the system hangs since FlexBoot cannot load from the expansion ROM. |
| | **Keywords:** PMM, expansion ROM |
| | **Discovered in Release:** 3.4.719 |
| | **Fixed in Release:** 3.4.812 |
| 697291 | **Description:** In ConnectX-4, the PXE boot time measurement over TFTP Ethernet is 1:30 min for image size of 1GB, TFTP InfiniBand is 1:20 min, and iSCSI boot time measure- ment is 8 seconds for image size of 25 MB. |
| | **Keywords:** PXE Boot |
| | **Discovered in Release:** 3.4.719 |
| | **Fixed in Release:** 3.4.812 |
| 689068 | **Description:** In hybrid BIOSes, if the BIOS loads legacy driver without closing the UEFI driver, the legacy driver fails to load. |
| | **Keywords:** BIOS, legacy mode |
| | **Discovered in Release:** 3.4.719 |
| | **Fixed in Release:** 3.4.812 |
| 634794 | **Description:** Enabled 'boot_pci_busdevfn' initialization when booting from UNDI loader. |
| | **Keywords:** UNDI loader |

| Internal Ref. | Description |
|---|---|
| | **Discovered in Release:** 3.4.650 |
| | **Fixed in Release:** 3.4.719 |
| - | **Description:** Removed the instruction that enabled write-protected section modifications after POST. |
| | **Keywords:** PXE Boot |
| | **Discovered in Release:** 3.4.650 |
| | **Fixed in Release:** 3.4.719 |

## 7.3 Changes and New Features History- UEFI

| Category | Description |
|---|---|
| **Rev. 14.43.10** | |
| General | Improved boot time for BlueField-3 SuperNIC. |
| **Rev 14.42.15** | |
| General | **Updated MFT and firmware versions. For the firmware versions supported see,** Compatible Products**.** |
| **Rev** 14.41.14 | |
| General | Added support for ConnectX-9 SuperNic. |
| | Updated MFT and firmware versions. For the firmware versions supported see, Compatible Products. |
| | Added support for Microsoft OptionRom certificate 2023 CA. |
| **Rev** 14.40.10 | |
| General | Updated MFT and firmware versions. For the firmware versions supported see, Compatible Products. |
| **Rev** 14.39.13 | |
| General | Updated MFT and firmware versions. For the firmware versions supported see, Compatible Products. |
| **Rev** 14.38.16 | |
| General | Updated MFT and firmware versions. For the firmware versions supported see, Compatible Products. |
| App Shield | Added support for automatically detecting allowed memory regions via UEFI driver. |
| DPU | Added support for hosting boot only after DPU is ready. |
| PLDM | Added support for orchestrating full-chip-reset for DPU by EXP_ROM driver (host reboot based). |

| Category | Changes |
|---|---|
| **Rev** 14.37.14 | |
| General | Updated MFT and firmware versions. For the firmware versions supported see, Compatible Products. |
| **Rev** 14.36.21 | |
| General | Added support for ConnectX-8 SuperNic. |
| General | Updated MFT and firmware versions. For the firmware versions supported see, Compatible Products. |
| **Rev.** 14.36.16 | |
| Networking | UEFI support filters by default to drop all packets except for UDP/TCP/ICMP packets that are needed for boot. This feature can be disabled by the setting "Pxe Boot Filter" which is added to HII "Device Level Configuration". |
| **Rev.** 14.35.15 | |
| General | Added support for booting with UEFI BlueField-3 SuperNic. |
| HII | Removed VMware Configuration section for non-Bluefield devices. |
| Networking | Added support to apply filters to drop all packets except for UDP/TCP/ICMP packets that are needed for boot. This feature is disabled by default and can be enabled by the new setting "Pxe Boot Filter" that is added to HII "Device Level Configuration". |
| **Rev.** 14.34.12 | |
| General | Introducing a UEFI version update due to a firmware version change |
| Link Status | FlexBoot PXE driver will report logical link status instead of physical link status. This impacts the Bluefield devices as follows:<br>As long as the OVS on the ARM side is ready, the FlexBoot driver on the Host will report the link status is up even if the physical link status is down |
| Virtio Blk UEFI | Added support to boot Windows OS installer through the Virtio BLK emulation device from the Host for Bluefield devices |
| **Rev.** 14.33.10 | |
| **General** | Introducing a UEFI version update due to a firmware version change. |
| **Rev.** 14.32.17 | |
| **Hii Menu** | Added an option to enable/disable NIC mode on BlueField-2 and BlueFIeld-3, as well as additional internal/external BlueField HCA settings.<br>For Further information, please refer to the latest NVIDIA PreBoot Drivers User Manual and the latest NVIDIA BlueField User Manual. |
| | Added an option to enable/disable macOS Monterey on BlueField-3 from the host side.<br>For Further information, please refer to the latest PreBoot Drivers User Manual and the latest NVIDIA BlueField User Manual. |
| **NVIDIA BlueField-2** | Added support for boot over BlueField-2 when the device is operating in NIC mode and InfiniBand link type. |

| | |
|---|---|
| **NVIDIA BlueField-2 and BlueField-3** | Added the ability to expose AIP UEFI protocol on BlueFIeld DPU when the device is operating on NIC mode. |
| **Rev.**<br>14.31.20 | |
| **Hii Menu** | Added a new Hii setting to the NIC Configuration menu - "Boot Legacy Interrupt". It is used to enable/disable interrupt support in boot legacy mode. |
| | Added a new Hii setting to the NIC Configuration menu - "DHCP Client-ID HW Type IB". It is used to enable/disable sending DHCP client-ID option (61) with Hardware IB Type + GUID, instead of full prefix + GUID. |
| | Added a new Hii setting to the Nic Configuration menu - "DHCP HW Type IB". It is used to enable/disable sending DHCP IB discover packets with Hardware Type IB and Hardware GUID address instead of MAC address. |
| **Adapter Cards** | Added support for BlueField-3 adapter cards at GA level. |
| **Rev.**<br>14.29.14 | |
| **Hii Menu** | Added an option to enable/disable Bluefield Management PF setting from the host side through the Vmware Configuration sub-menu.<br>For Further information, please refer to the *NVIDIA PreBoot Drivers User Manual* and the *NVIDIA BlueField User Manual*. |
| **General** | Added an option for the UEFI driver to run over UEFI BIOS when HeapGuard protection mode is enabled. |
| **Link Speed/InfiniBand** | Updated the Flexboot driver to boot with the highest link speed on InfiniBand mode (instead of configuring it to SDR) on devices that operate on Multi-Host mode and on devices that operate with keep_link_up enabled. |
| **Rev.**<br>14.28.16 | |
| **General** | Updated firmware versions. |
| **Rev.**<br>14.28.15 | |
| **Hii Menu** | Added new settings to enable/disable Monterey on BlueField-2 from the host side.<br>For Further information, refer to the PreBoot Drivers User Manual and the NVIDIA BlueField User Manual |
| **Rev.**<br>14.27.15 | |
| **NVIDIA BlueField-2** | Added support for boot over Virtio Net/Blk emulation hotplug/static device on Arm servers.<br>For further information, refer to the NVIDIA BlueField User Manual. |
| **Hii Menu/General** | Changed the device name exposed by the UEFI driver from “Nidia Network Adapter” to “Mellanox Network Adapter” on all the device except for ConnectX-7. |
| **Hii Menu** | Added a new setting to enable/disable RT_PPS_ENABLED_ONPOWERUP.<br>For further information, refer to the PreBoot Drivers User Manual. |
| **Rev.**<br>14.26.17 | |
| **General** | Added support for NVIDIA® ConnectX®-7 adapter cards.<br>ConnectX-7 has the same feature set as ConnectX-6 adapter card. For the list of the ConnectX-6 firmware features, please see ConnectX-6 Firmware Release Notes. |

| | |
|---|---|
| **Hii Menu/General** | Changed the device name that is exposed by UEFI driver from “Mellanox Network Adapter” to “Nvidia Network Adapter”. |
| **Hii Menu /FMP** | UEFI driver on ConnectX-7 will expose the firmware version with format xx.yy.zzzz through HII and FMP UEFI protocols. |
| **Rev.**<br>14.25.17 | |
| **Hii Menu** | Added new Hii setting "Network Link Type" in the main configuration menu used for changing the link type (Ethernet/InfiniBand).<br>For Further information please refer to the PreBoot User Manual |
| **NVIDIA® BlueField®-2** | Enabled the option management and boot over DBU management PF (IDRAC/ BMC) on SmartNic<br>To verify if the firmware supports Management PF, please refer to the relevant adapter card firmware Release Notes and User Manual. |
| **Rev.**<br>14.24.13 | |
| **Hii Menu** | Removed NIC Configuration section from the Hii menu when the device is operating in ETH mode and on an Arm arch server. |
| **Hii Menu** | Changed the Default value of advertised mode setting and SR-IOV setting in the Hii menu to be aligned with firmware's default value. |
| **UNDI** | Added support for reporting the link status to the BIOS in real time through UNDI Get Status protocol function. |
| **Rev.**<br>14.23.17 | |
| **Hii Menu** | Changed the Hii Configuration ( UEFI HII protocol) to be Enabled by default. |
| **Rev.**<br>14.22.16 | |
| **General** | This version of UEFI does not have any changes. The version number was increased due to the release of a new firmware version. |
| **Rev.**<br>14.22.14 | |
| **Adapter Cards** | Added support for BlueField 2 adapters cards at GA level. |
| **BlueField 2** | Added support for boot over Virtio Net/Blk emulation hotplug/static device.<br>For further information, refer to the BlueField User Manual. |
| **Hii Menu** | Added a new setting for IPv6 in the iSCSI Initiator/General Section for adding iSCSI boot over IPV6 support on legacy mode.<br>For further information, refer to the PreBoot Driver User Manual. |
| **Hii menu** | Now the value of BlinkLeds can be applied by the EFI_BROWSER_ACTION_CHANGED (change and press enter operation) callback operation instead of the save operation. |
| **General** | Added the option to expose the expansion ROM only on the first PF on Multi PF devices. |
| **Bug Fixes** | Bug Fixes |
| **Rev.**<br>14.21.17 | |
| **General** | This version of UEFI does not have any changes. The version number was increased due to the release of a new firmware version. |

| Rev. 14.21.16 | |
|---|---|
| **Adapter Cards** | Added support for ConnectX-6 Lx adapter cards. |
| **Adapter Cards** | **[Beta]** Added support for BlueField 2 adapters cards. |
| **Hii Menu** | Changed the default value of "Blink Leds" setting to "0"<br>For further information, refer to Mellanox PreBoot Drivers User Manual. |
| **General [BlueField/ SmartNic]** | Added support for loading the UEFI driver so the UEFI NIC will be visible as boot option in Mellanox Bluefield 1/Mellanox Bluefield 2 when operating on Embedded CPU mode and the Arm side is down.<br>**Note:** As long as the Arm side is down the link of the UEFI NIC in the X86 side will be down. |
| **Rev.** 14.20.22 | |
| **General** | Updated the UEFI version to support new ConnectX-5 / ConnectX-6 / ConnectX-6 Dx firmware versions. |
| **Rev.** 14.20.19 | |
| **Adapter Cards** | Added support for ConnectX-6 Dx adapter cards. |
| **UEFI Driver in EXPROM** | Enabled the UEFI driver in ConnectX-6 and ConnectX-6 DX for both x86 and Arm architectures. |
| **General** | Added support to expose the maximum link speed via CLP/AIM on devices that support HDR100 and EDR50 speeds. |
| **Rev. 14.19.14** | |
| **HII Menu** | Added "Socket Direct Operation" new setting in Hii main menu. For further information refer to the PreBoot Drivers User Manual |
| **Firmware Management Protocol** | Optimized the performance (run time) of both the SetImage and the GetImage FMP functions. |
| **Rev. 14.18.19** | |
| **General** | Update the supported EFI specification version to 2.7 |
| **Firmware Management Protocol** | Added the option to return unsupported status on secure adapter cards when using the `"GetImage"` operation. |
| **Rev. 14.17.11** | |
| **Secure Boot** | Added support for secure boot on Arm servers for Mellanox adapter cards. |
| **Rev. 14.16.17** | |
| **HII Menu** | Added “PXE boot without fail-over to iSCSI” and “iSCSI boot without fail-over to PXE boot” options for legacy_boot_prtocol configuration.<br>For further information, refer to Mellanox PreBoot Drivers User Manual. |
| | Enabled UEFI to expose the current link speed of the system in the HII menu. |
| **Bug Fixes** | See See Bug Fixes History. |
| **Rev. 14.15.19** | |

| | |
|---|---|
| **Enable/Disable UEFI in EXPROM via mlxconfig** | Added UEFI support to additional ConnectX-4/ConnectX-4 Lx/ConnectX- 5 adapter cards.<br>Note: Not all cards are compiled with UEFI. For the full list of the OPNs compiled with the new UEFI capability, please refer to the firmware Release Notes<br>• ConnectX-4 adapter cards are compiled with x86-UEFI and Arm-UEFI[1]<br>• ConnectX-4 Lx adapter cards are compiled with x86-UEFI and Arm-UEFIa<br>• ConnectX-5 adapter cards are compiled with x86-UEFIa<br>Enabling/Disabling UEFI in ConnectX-4/ConnectX-4 Lx/ConnectX-5 in EXPROM is done via mlxconfig.<br>The default values are:<br>• UEFI_X86 disabled<br>• UEFI_AARCH64 disabled<br><br>Note: The values above can be set only in adapter cards that support this capability.<br>For further information on how to enable/disable UEFI, refer to section Enabling/Disabling FlexBoot/UEFI in EXPROM via mlxconfig in the Mellanox PreBoot Drivers (FlexBoot & UEFI) User Manual. |
| **Rev. 14.14.22** | |
| **Client Identifier** | Added support for client_identifier option (option 61) in InfiniBand mode. |
| **HII menu** | Added the option to Enable/Disable HII Configuration via mlxconfig. |
| **Rev. 14.13.24** | |
| **Secure Firmware Update** | Integrated the MFT package to support Secure Firmware Update image. |
| **HII menu** | Added HII Power Configuration menu. |
| **Rev. 14.12.24** | |
| **Networking** | Ethernet only: The MTU value is set to 1500 upon driver bring up. |
| **General** | Updated the supported EFI version to 2.6. |
| **Rev. 14.12.20** | |
| **Adapter Cards** | [Beta] Added support for ConnectX-5/ConnectX-5 Ex adapter cards. |
| **Boot performance** | Boot performance improvements. Enabled post Tx doorbell using UAR. |
| **Rev. 14.11.28** | |
| **Boot** | Enabled booting with non default pkey in InfiniBand mode |
| | Added boot to target configuration |
| **Platform to driver protocol** | Added the option to return *EfiPlatformConfigurationActionUnsupportedGuid* in case the GUID is not supported |
| **Driver Health** | Updated the DriverHealth behavior to comply with the UEFI spec |
| **Diagnostics protocol** | Deprecated Extented Diagnostics (return unsupported) |
| **Rev. 14.10.16** | |
| **Boot over IPv4 and IPv6** | Enabled network boot via PXE over IPv4 and IPv6 |
| **Device Diagnosis** | Enables the driver to run self diagnostics tests via Diagnostics protocol |
| **Firmware Management** | Enables the driver to manage firmware using Firmware Management Protocol (FMP) |
| **Secure Boot** | The UEFI driver is signed and complied with SecureBoot standard |

## 7.4 Bug Fixes History - UEFI

| Internal Ref. | Description |
|---|---|
| 4549164 | **Description:** Fixed an issue where UEFI driver links-up with HDR/EDR instead of SDR while the cable supports SDR. |
| | **Keywords:** HDR/EDR, SDR |
| | **Discovered in Version:** 14.39.11 |
| | **Fixed in release:** 14.39.13 |
| 4357164 | **Description:** Fixed an issue related to PXE IPV6 boot failure when working with WinOF-2 version 25.1.50020 |
| | **Keywords:** PXE IPV6 boot |
| | **Discovered in Version:** 14.38.50 |
| | **Fixed in release:** 14.38.16 |
| 4314502 | **Description:** Fixed an issue related to Ethernet UEFI disconnecting after 'reconnect' -r. |
| | **Keywords:** reconnect' -r |
| | **Discovered in Version:** 14.38.50 |
| | **Fixed in release:** 14.38.16 |
| 4206022 | **Description:** DPU is changed from Nic mode to DPU mode after load default setting on host bios. |
| | **Keywords:** HII Restore to Default |
| | **Discovered in Version:** 14.36.21 |
| | **Fixed in release:** 14.37.14 |
| 4252759 | **Description:** Fixed an issue related to CX6_LX Macro adapter (PSID MT_0000000551) VLAN Config for IPv4/IPv6 failure when connected with PXE Server using firmware 26.43.1014. |
| | **Keywords:** VLAN Config |
| | **Discovered in Version:** 14.36.21 |
| | **Fixed in release:** 14.37.14 |
| 4247798 | **Description:** Fixed an issue related to UEFI Self Certification Tests (SCT) failure at EFI_ADAPTER_INFORMATION_PROTOCOL.GetInformation on CX-7 OCP card. |
| | **Keywords:** UEFI Self Certification Tests |
| | **Discovered in Version:** 14.36.21 |
| | **Fixed in release:** 14.37.14 |
| 4172439 | **Description:** Filtering all DNS packets when PXE filter is enabled will cause boot failure in the boot process when trying to fetch OS by using boot server name and not the IP. |
| | **Keywords:** DNS, PXE boot, PXE filter |
| | **Discovered in Version:** 14.36.16 |
| | **Fixed in release:** 14.36.21 |
| 3745757 | **Description:** The UEFI HII "Host Priv Rshim" setting appears in the DPU UEFI HII menu, but since the setting is empty, changing it has no affect on the firmware. |

| Internal Ref. | Description |
|---|---|
| | **Keywords:** HII menu to Disable/enable RSHIM, HII menu |
| | **Discovered in Version:** 14.33.10 |
| | **Fixed in release:** 14.34.12 |
| 3660603 | **Description:** Driver boot fails when UEFI boot Images that include a boot loader attempt to read data larger than 2MB. |
| | **Workaround**: Do no use Memory Manager nor GGA for Snap3. You may use DV (configure SNAP_DMA_Q_OPMODE=2 <--- DV). |
| | **Keywords:** NVMe ,Virtio-blk Emulation Device |
| | **Discovered in Version:** 14.32.17 |
| 3365363 | **Description:** Fixed an issue where unexpected behavior and possible system failure to boot could occur when booting over BlueField-3 Virtio Net emulation device using a GRUB2 boot loader. |
| | **Keywords:** System boot, BlueField-3 |
| | **Discovered in Version:** 14.30.13 |
| | **Fixed in release:** 14.32.17 |
| N/A | **Description:** Fixed an issue that occurred when booting over BlueField-3 Virtio Net emulation, while the device was using a GRUB2 boot loader. The GRUB2 loader would attempt to close and re-open the Virtio Net device. This caused unexpected behavior and possible system boot failure. |
| | **Keywords:** System boot, BlueField-3 |
| | **Discovered in Version:** 14.30.13 |
| | **Fixed in release:** 14.31.20 |
| 1755286 | **Description:** Fixed an issue where the UEFI driver set SDR link speed for devices operating on Multi-Host mode or when the keep_link_up was enabled. |
| | **Keywords:** SDR, Multi-Host, Single-Host, port speed |
| | **Discovered in Version:** 3.5.305 |
| | **Fixed in release:** 3.6.901 |
| - | **Description:** In BlueField server that operates in EMBEDDED CPU mode, the UEFI driver will not be loaded. and the UEFI NIC will not be visible as a boot option before the driver on the embedded (Arm) side is loaded. and has completed NIC configuration on the Arm OS. |
| | **Keywords:** UEFI BlueField EMBEDDED_CPU |
| | **Discovered in Version:** 14.19.14 |
| | **Fixed in Release:** 14.22.14 |
| 1725147 | **Description:** In devices that operate in Socket-Direct mode, the MAC address of the auxiliary partitions in the Hii menu is the same as the MAC address. |
| | **Keywords:** MAC address, Hii menu, Socket-Direct |
| | **Discovered in Version:** 14.18.19 |
| | **Fixed in Release:** 14.20.19 |
| 1447149 | **Description:** HII menu Link speed configuration will be "NA" in case speed is configured to 50GBase-KR4. |

| Internal Ref. | Description |
|---|---|
| | **Keywords:** HII, Link Speed |
| | **Discovered in Version:** 14.16.17 |
| | **Fixed in Release:** 14.19.14 |
| 1714636 | **Description:** Fixed and issue that prolonged the system's boot time over 3 minutes after rebooted the system. |
| | **Keywords:** Boot, UEFI |
| | **Discovered in Version:** 14.17.11 |
| | **Fixed in Release:** 14.18.19 |
| 1440062 | **Description:** Fixed and issue that resulted in RSOD (Red Screen of Death) when burned the firmware using UEFI on secured adapter cards. |
| | **Keywords:** Secured Adapter Cards, Firmware Burning, RSOD |
| | **Discovered in Version:** 14.15.19 |
| | **Fixed in Release:** 14.16.17 |
| 1323188 | **Description:** Fixed an issue in ConnectX-4 Lx adapter cards, where the Virtual LAN Mode and the Virtual LAN ID settings were missing from the HII menu. |
| | **Keywords:** Virtual LAN Mode, Virtual LAN ID, HII |
| | **Discovered in Version:** 14.15.19 |
| | **Fixed in Release:** 14.16.17 |
| - | **Description:** Fixed an issue which limited the Number of Virtual Functions Supported to 126 after restore to default. |
| | **Keywords:** Number of Virtual Functions Supported |
| | **Discovered in Release:** 14.11.28 |
| | **Fixed in Release:** 14.12.20 |
| - | **Description:** Fixed Hii ExtractConfig to handle <ConfigHdr> without <BlockName> |
| | **Keywords:** Hii ExtractConfig |
| | **Discovered in Release:** 14.10.16 |
| | **Fixed in Release:** 14.11.28 |
| 827564 | **Description:** Enabled a persistent virtual MAC reboot. |
| | **Keywords:** MAC reboot |
| | **Discovered in Release:** 14.10.16 |
| | **Fixed in Release:** 14.11.28 |

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