



Broadcom

Comprehensive Configuration Management (CCM)

User's Manual

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Revision History

Version	Date	Auth	Description
0.01	03/29/2010	JW	Origin
2.0.1	06/04/2010	Li Xu	Update for CCM2 output screens.
2.0.2	06/29/2010	Li Xu	Update for NIC Partitioning implementation change.
2.0.3	07/06/2010	Li Xu	Update for Changes on NIC Partitioning and FCOE.
2.0.4	07/20/2010	Li Xu	Changed FCOE Fabric Discovery from timeout to retry times.
2.0.5	08/04/2010	Li Xu	Added Scripting mode support. Added Device hardware configuration support.
6.0.4	08/12/2010	Li Xu	Added Scripting mode device family check enforcement. Added –default [iscsi fcoe nicp] support. Added –GetItemGuide support
6.0.7	08/20/2010	Li Xu	Added Minimum:Maximum bandwidth display to NIC Partition menu
6.0.8	09/20/2010	Li Xu	Added explanation on iSCSI Secondary Device configuration request.
6.2.1	10/15/2010	Li Xu	Added MBA and CCM version to device list display Added Blink LED descriptions. Added Boot Retry Count supported device description. Added NIC Partitioning Offload Protocol license restriction description.
6.2.2	10/16/2010	Li Xu	Removed rom option to launch menu. Added intelligence to handle mutual dependent configuration items without orderly request like before. Changed asterisks only string for password field from error to warning so that -get can be -set directly without changing existing password.
6.2.3	11/8/2010	Li Xu	Changed NIC Partitioning Minimum/Maximum Bandwidth definition. Added NIC Partitioning FCoE MAC, Node WWN and Port WWN.
6.2.8	12/2/2010	Li Xu	Added description on NIC Partitioning Configuration on Script Mode. Changed NIC Partitioning Maximum Bandwidth definition back to percentage definition.
6.2.12	12/15/2010	Li Xu	Added note about reboot request after NIC Partitioning configuration change.
6.2.13	12/23/2010	Li Xu	Added password encryption capability to script mode. Added more description on CCM invocation.
6.4.0	1/3/2011	Li Xu	Added VNTag configuration support.
6.4.1	1/3/2011	Li Xu	Changed multi-function wording in hardware configuration.
6.4.2	1/5/2011	Li Xu	Improved description of CCM invocation in Linux 64 bits environment.
6.4.3	1/14/2011	Li Xu	Display both Permanent(Static) and Virtual(Run Time) MAC address in NIC Partitioning menu.
6.4.4	1/17/2011	Li Xu	Added lower “v” to denote virtual address that will be set after boot or reboot, but not valid yet currently. Added description about parameters requesting reboot in DOS, Window and Linux environment.
6.4.14	3/9/2011	Li Xu	Added configuration for DCBX protocol configuration.
6.4.15	3/18/2011	Li Xu	Added comment about the errors when modifying file from –get to use for –set.
6.4.16	4/11/2011	Li Xu	Changed NIC Partitioning FCOE Offload Protocol limited number from 2 to 1. Changed VLAN ID allowed value from 0 to 4905, to, 1 to 4094.
6.4.17	4/14/2011	Li Xu	Changed wording of FCoE “Port WWN” to WWPN; “Node WWN” to WWNN. Changed wording of DCBX to DCB.
7.0.3	6/20/2011	JW	Removed NIC Partition parameter from NIC Partition Configuration menu. This parameter configuration will be detected via the Multi-Function mode setting.
7.0.4	7/8/2013	HC	Updated screens for CCM menus. Added descriptions to Hardware, NIC Partitioning, and AFEX Configurations.
7.0.5	7/9/2013	JW	Updated Device Configuration menu descriptions, and add comments regarding BCV-based iSCSI/FCoE ROM parameters.
7.0.6	3/8/2016	JW	Added comment about IOMMU
7.0.7	10/10/17	JW	Add comment about Ubuntu libc6-dev-i386 library

Version	Date	Auth	Description
7.0.8	7/11/19	JW	Add comment about link status. Remove deprecated menus

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1. Introduction

This document describes the Broadcom Comprehensive Configuration Management, also known as CCM. It outlines the various menu prototypes and provides visual representations of each menu.

2. CCM Mode and Invocation

CCM provides MENU mode and Scripting mode. Both MENU mode and Scripting mode shared the same data structure as well as keywords.

CCM can be installed as standalone software or embedded inside option ROM of Broadcom networking devices. The following shows invocation on three different environments.

Environments	Option ROM	DOS	Windows 32bit	Windows 64bit	Linux*
Invocation	Ctrl-S/Ctrl-B	ccmcfg.exe	ccmcfg32.exe	ccmcfg64.exe	ccmcfg

* Linux ccmcfg is a 32-bit application. To be able to use it on a 64Bit Linux platform, user needs to ensure that certain 32-bit application support modules are installed. For example, on the 64bit version of Linux Red Hat 6.0, the 32bit version of glibc (i.e. glibc-2-12-1.7.el6.i686.rpm) and nss-softokn-freebl (i.e. nss-softokn-freebl-3.12.7-1.1el6.i686.rpm) RPMs need to be installed in order for the ccmcfg to even get installed. For details and accurate information, please refer to Linux users manual and its release notes.

Notes: Please make sure to install both RPMs with one command as follows:

rpm -ivh glibc-2-12-1.7.el6.i686.rpm nss-softokn-freebl-3.12.7-1.1el6.i686.rpm

*For Ubuntu linux libc6-dev-i386 library must be installed:

get-apt install libc6-dev-i386

* For BCM573xx and BCM574xx devices, IOMMU feature must be disabled.

The following screen shows the start screen during booting time to prompt user input Ctrl-S (or Ctrl-B depending on configuration) to invoke CCM MENU in option ROM.

```
Broadcom NetXtreme Ethernet Boot Agent
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All rights reserved.
Press Ctrl-S to enter Configuration Menu
```

If there are multiple Broadcom networking cards in the platform, the CCM invocation banner will only be displayed once during booting for each device family. This is in contrast to the previous operation of displaying a banner for each MBA-enabled Broadcom device. The invoked CCM will manage all supported devices in this platform. If CCM versions in different devices are different, CCM with the newest version will then be launched. When the first running option ROM does not have the CCM with highest version, a message of “Newer Configuration Software on Other Device Detected, to be Launched Later...” will be displayed and CCM will be launched later when the option ROM with the highest CCM version is loaded.

3. CCM MENUs

After CCM menu is invoked through Ctrl-S (or Ctrl-B) in booting time or ccmcfg command in DOS or shell environment, CCM menu will list all Broadcom supported devices in current platform.

3.1 Device Listing

```
Comprehensive Configuration Management v214.0.221.0
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Device List
<18:00:00> BCM5720 - 80:18:44:EB:A6:E0
<18:00:01> BCM5720 - 80:18:44:EB:A6:E1
<19:00:00> BCM5720 - 80:18:44:EB:A6:E2
<19:00:01> BCM5720 - 80:18:44:EB:A6:E3
<3B:00:00> BCM57416 - 00:0A:F7:D5:3F:30
<3B:00:01> BCM57416 - 00:0A:F7:D5:3F:31

Select Device to Configure
[Enter]:Enter; [↑|↓]:Next Entry; [ESC]:Quit Menu
```

This menu describes the Broadcom devices detected in the system.

Note: For LOM device, MBA version is not visible directly thus will be displayed as “BIOS Built-in”.

3.2 Main Menu

```
Comprehensive Configuration Management v214.0.221.0
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Main Menu
Firmware Image Menu
Device Hardware Configuration
MBA Configuration
iSCSI Boot Configuration
NIC Partition Configuration
Blink LEDs : 0
Link Status : Connected
Physical Link Speed : 1Gbps

Listing of firmware image versions
[Enter]:Enter; [↑↓]:Next Entry; [ESC]:Quit Menu
Current Adapter:Primary, Bus=3B Device=00 Func=00, MAC=00:0A:F7:D5:3F:30
```

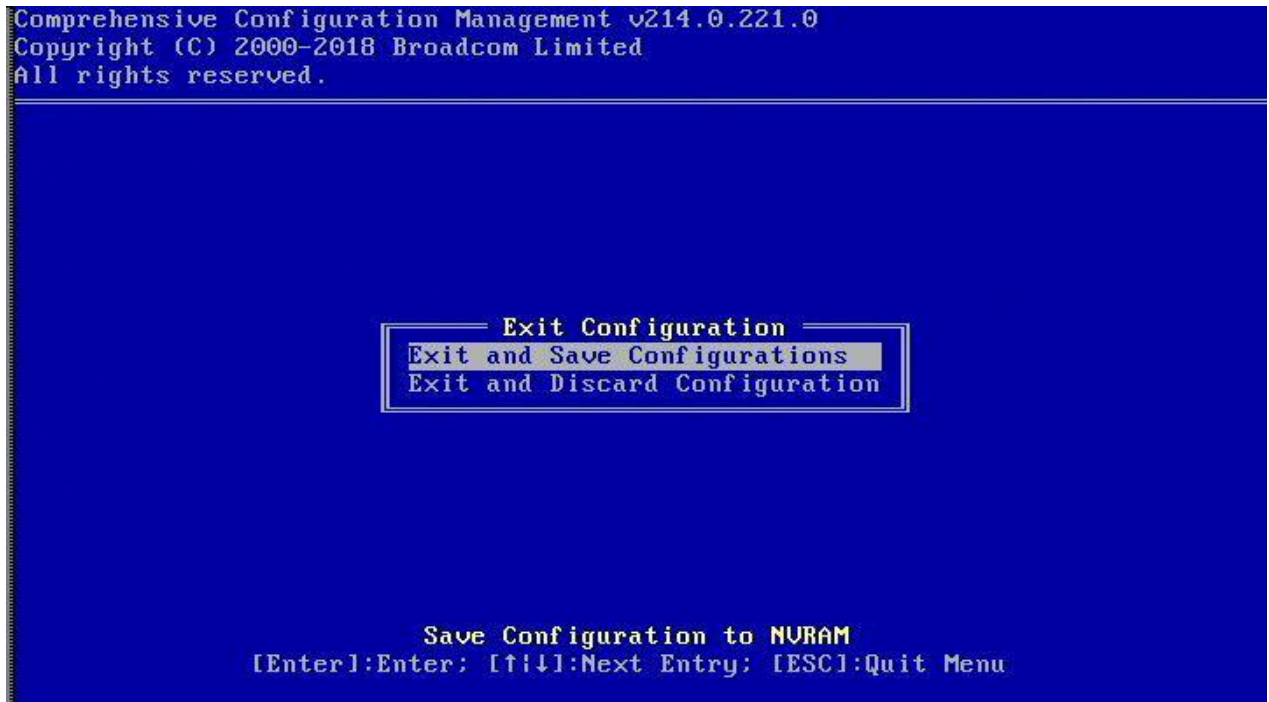
This menu describes the configuration options available for the device selected in Device List menu.

Note: Whether the following configuration items show on the menu depends on (1) the device being configured supports this function, and (2) the corresponding firmware package is installed on the device. Please check specific device datasheet for detailed information.

- Device Hardware Configuration, which is only shown under NXE devices.
- MBA Configuration
- iSCSI Boot Configuration
- NIC Partition Configuration
- Blink LEDs
- Link Status*
- Physical Link Speed*

*CCM will only report current link status and speed. It will not attempt to bring up the link state even if cable is connected.

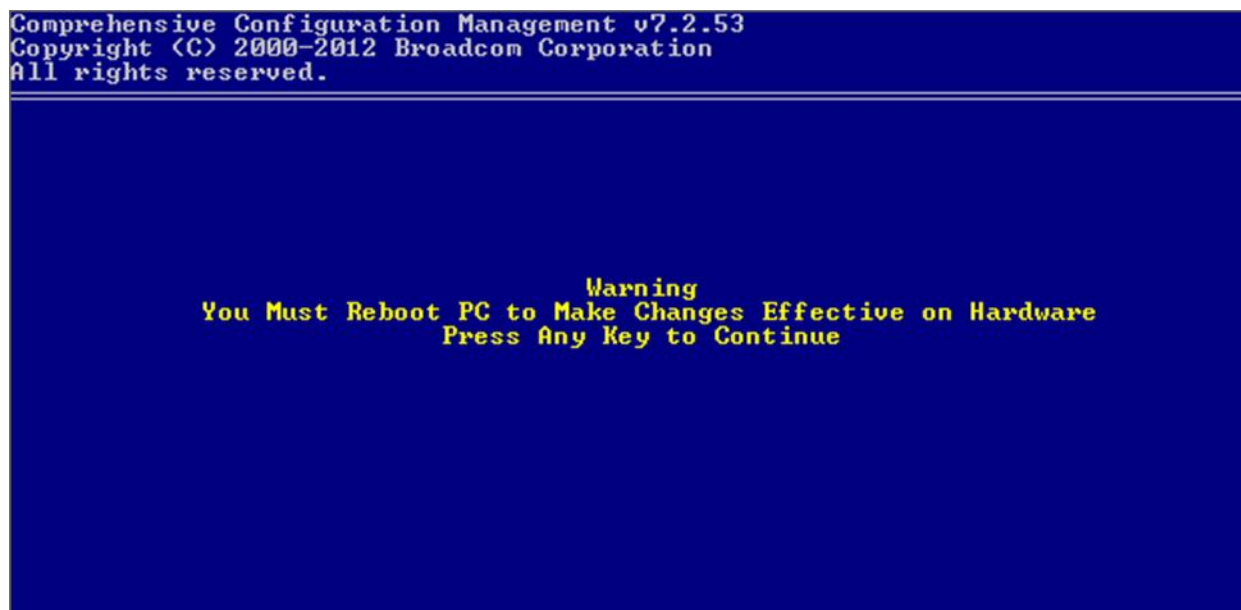
Exit Menu



This menu is displayed after exiting from the Main Menu and if there is any configuration change in submenus. The user is prompted to save or discard configuration changes prior to going back to Device List menu.

3.3 Parameters Take Effect after Reboot

If CCM is invoked from DOS, Windows or Linux environment instead of option ROM, some of parameters will only take effect when PC is rebooted. These parameters include Hardware Configuration menu, NIC Partitioning menu, and AFEX Configuration menu. When parameters in this menu change and are saved, the following window will show up to remind users of rebooting PC.



```
Comprehensive Configuration Management v7.2.53  
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All rights reserved.
```

```
Warning  
You Must Reboot PC to Make Changes Effective on Hardware  
Press Any Key to Continue
```

3.4 Device Hardware Configuration

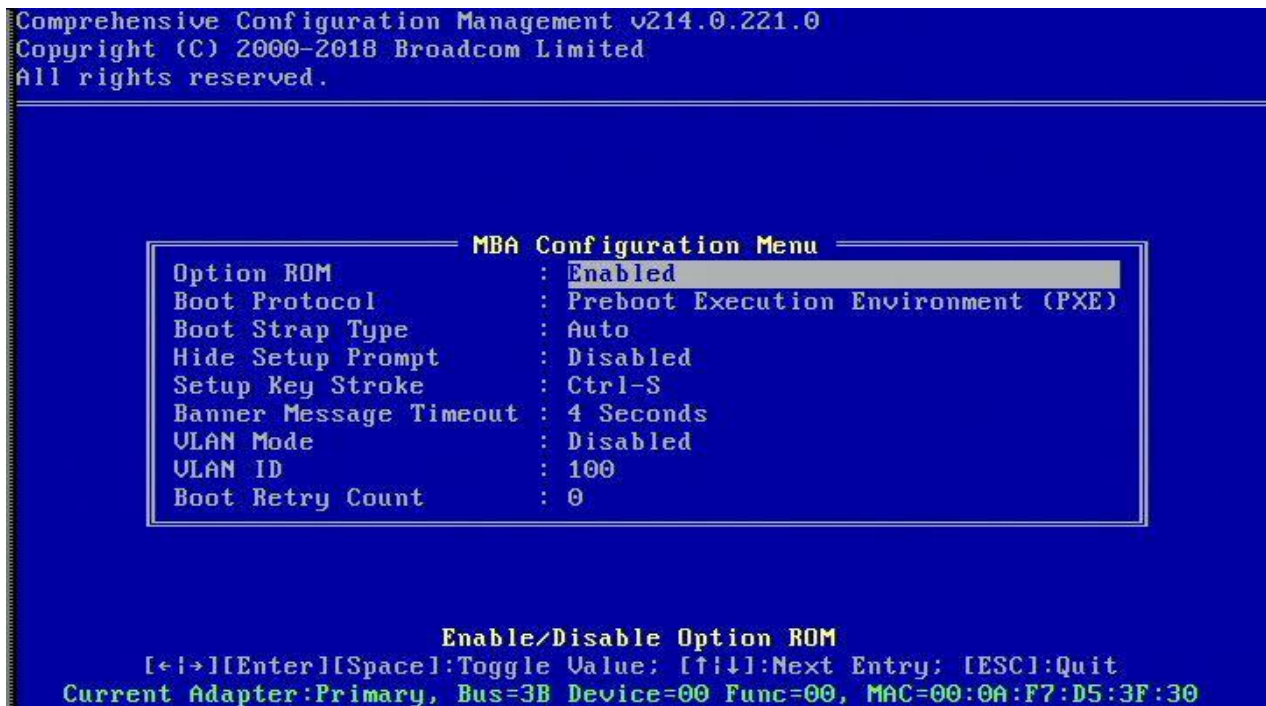
```
Comprehensive Configuration Management v214.0.221.0
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Device Hardware Configuration
Multi-Function Mode      : NPAR_1.0
NParEP                  : Enabled
Number of VFs per PF    : 0
SR-IOV                  : Disabled
Number of MSI-X Vectors per VF : 4
Maximum number of PF MSI-X Vectors : 74
Link FEC                 : DISABLED
Operational Link Speed  : AutoNeg
DCBX Mode                : Disabled
Auto-negotiation Protocol : IEEE 802.3by & Consortium
Media Auto Detect        : Disabled
Default EUB Mode         : UEB

Configure NIC Hardware Mode
[<|>][Enter][Space]: Toggle Value; [↑|↓]: Next Entry; [ESC]: Quit
Current Adapter: Primary, Bus=3B Device=00 Func=00, MAC=00:0A:F7:D5:3F:30
```

Multi-Function Mode	: Displayed when device supports multi functions.
• MF • SF • NPAR	: Multiple Function Allowed mode, only applied to certain device. : Forced Single Function mode. : NIC Partitioning multi-function mode.
SR-IOV	: Enable/Disable SRIOV.
Number of VFs per PF	: Number of VFs per PF in multiple of 8.
Max Number of PF MSIX Vectors	: Maximum number of PF MSIX vectors.
Link FEC	: Enable/Disable Link Forward Error Correction
Operational Link Speed	: Configure link speed
DCBX Mode	: Enable/Disable DCB Protocol.
Energy Efficient Ethernet	: Enable/Disable Energy Efficient Ethernet.
Auto-negotiation Protocol	: Configure Auto-negotiation protocol
Media Auto Detect	: Enable/Disable Media Auto Detect
PHY Selection Policy	: Configure PHY selection priority in multiple PHY environment.
• First PHY • Second PHY	: Only Fiber PHY will be selected for use with Copper PHY ignored. : Only Copper PHY will be selected for use with Fiber PHY ignored.

3.5 MBA Configuration



This menu describes the MBA configuration options.

- Option ROM : Enable/disable running device's Option ROM.
- Boot Protocol : Specify the boot protocol of the device.
- Boot Strap Type : Specify the boot strap type of the device.
- Hide Setup Prompt : Enable/Disable MBA banner display during system boot.
- Setup Key Stroke : Specify key strokes to invoke CCM menu during system boot.
- Banner Message Timeout : Specify the seconds of MBA banner display time.
- Link Speed : Specify the MBA link speed of the device.
- Pre-boot Wake On LAN : Enable/Disable the device Pre-boot Wake On LAN .
- VLAN Mode : Enable/Disable VLAN mode.
- VLAN ID : Specify VLAN ID. Only valid if VLAN Mode is enabled.
- Boot Retry Count : Specify MBA Boot retry times when boot fails before returning to BIOS. (Not supported on NX1 devices).

3.6 iSCSI Boot Configuration Menu

```
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iSCSI Boot Main Menu
General Parameters
Initiator Parameters
1st Target Parameters
2nd Target Parameters
Secondary Device Parameters

Configure General Boot Parameters
[Enter]:Enter; [↑↓]:Next Entry; [ESC]:Quit Menu
Current Adapter:Primary, Bus=3B Device=00 Func=00, MAC=00:0A:F7:D5:3F:30
```

This menu describes the iSCSI Boot configuration options.

3.6.1 iSCSI Boot General Parameters

```
Comprehensive Configuration Management v214.0.221.0
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General Parameters
TCP/IP Parameters via DHCP : Disabled
iSCSI Parameters via DHCP : Disabled
CHAP Authentication : Disabled
Boot to iSCSI Target : Disabled
DHCP Vendor ID : BCM ISAN
Link Up Delay Time : 0
Use TCP Timestamp : Disabled
Target as First HDD : Disabled
LUN Busy Retry Count : 0
IP Version : IPv4

Acquire TCP/IP Configuration via DHCP
[←→][Enter][Space]:Toggle Value; [↑↓]:Next Entry; [ESC]:Quit
Current Adapter:Primary, Bus=3B Device=00 Func=00, MAC=00:0A:F7:D5:3F:30
```

This menu describes the iSCSI Boot General parameters available for configuration.

- TCP/IP Parameters via DHCP : Enable/Disable iSCSI Boot initiator to acquire IP address via DHCP.
- iSCSI Parameters via DHCP : Enable/Disable iSCSI Boot initiator to acquire iSCSI target parameters via DHCP.
- CHAP Authentication : Enable/Disable CHAP authentication.
- Boot to iSCSI target : Enable/Disable device to boot from iSCSI target after successful iSCSI Login to iSCSI target. Not applicable for BCV-based iSCSI ROM.
- DHCP Vendor ID : Specify DHCP Vendor ID.
- Link Up Delay Time : Specify seconds of iSCSI Boot initiator should delay before attempting to connect to the target.
- Use TCP Timestamp : Enable/Disable TCP Timestamp.
- Target as First HDD : Specify iSCSI target drive to be treated as first HDD in system. Not applicable for BCV-based iSCSI ROM.
- LUN Busy Retry Count : Specify number of retry attempts if iSCSI target reports LUN busy condition
- IP Version : Specify IP version.

3.6.2 iSCSI Boot Initiator Menu

```
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Initiator Parameters
IP Address       : 172.17.12.115
Subnet Mask      : 255.255.0.0
Default Gateway  : 0.0.0.0
Primary DNS      : 0.0.0.0
Secondary DNS    : 0.0.0.0
iSCSI Name       : iqn.1995-05.com.broadcom:init2
CHAP ID          :
CHAP Secret      :

Configure Initiator IP address
[Enter]:Enter New Value; [↑↓]:Next Entry; [ESC]:Quit
Current Adapter:Primary, Bus=3B Device=00 Func=00, MAC=00:0A:F7:D5:3F:30
```

This menu describes the iSCSI Boot initiator menu.

- IP Address : iSCSI Boot initiator IP Address.
- Subnet Mask : Subnet mask of iSCSI Boot initiator.
- Default Gateway : Default gateway of iSCSI Boot initiator.
- Primary DNS : Primary DNS of iSCSI Boot initiator.
- Secondary DNS : Secondary DNS of iSCSI Boot initiator.
- iSCSI Name : IQN name of iSCSI Boot initiator.
- CHAP ID : iSCSI Boot initiator CHAP ID. Valid if CHAP authentication is enabled.
- CHAP Secret : iSCSI Boot initiator CHAP secret. Valid if CHAP authentication is enabled.

3.6.3 iSCSI Boot First Target Menu

```
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1st Target Parameters
Connect      : Enabled
IP Address   : 172.17.12.112
TCP Port     : 3260
Boot LUN     : 0
iSCSI Name   : iqn.2018-10.com.example:target3
CHAP ID      :
CHAP Secret  :

Enable/Disable Target Establishment
[←|→][Enter][Space]:Toggle Value; [↑|↓]:Next Entry; [ESC]:Quit
Current Adapter:Primary, Bus=3B Device=00 Func=00, MAC=00:0A:F7:D5:3F:30
```

This menu describes the iSCSI Boot first target menu.

- Connect : Enable/Disable connection to this target.
- IP Address : iSCSI Boot target IP address.
- TCP Port : TCP Port number of iSCSI target.
- Boot LUN : Boot LUN of iSCSI target.
- iSCSI Name : IQN name of iSCSI Boot target.
- CHAP ID : iSCSI Boot target CHAP ID.
- CHAP Secret : iSCSI Boot target CHAP secret. If present, implies mutual CHAP authentication method.

3.6.4 iSCSI Boot Second Target Menu

```
Comprehensive Configuration Management v214.0.221.0
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                2nd Target Parameters
Connect       : Disabled
IP Address    : 0.0.0.0
TCP Port      : 3260
Boot LUN      : 0
iSCSI Name    :
CHAP ID       :
CHAP Secret   :

                Enable/Disable Target Establishment
[←|→][Enter][Space]:Toggle Value; [↑|↓]:Next Entry; [ESC]:Quit
Current Adapter:Primary, Bus=3B Device=00 Func=00, MAC=00:0A:F7:D5:3F:30
```

This menu describes the iSCSI Boot second target menu. The configuration options are described in section above first target menu.

3.6.5 iSCSI Boot Secondary Device Menu

```
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Secondary Device Parameters
Secondary Device : 00:00:00:00:00:00
Use Independent Target Portal : Disabled
Use Independent Target Name : Disabled
Configure Secondary Device : Invoke

Select Secondary Device
[Enter]:Enter New Value; [↑↓]:Next Entry; [ESC]:Quit
Current Adapter:Primary, Bus=3B Device=00 Func=00, MAC=00:0A:F7:D5:3F:30
```

This menu describes the iSCSI Boot secondary device menu.

- Secondary Device : MAC Address of secondary device. If non-zero, implies MPIO configuration.
- Use Independent Target Portal : Enable/Disable secondary device to use own target portal.
- User Independent Target Name : Enable/Disable secondary device to use its own target name.
- Configure Secondary : Invoke iSCSI Boot configuration menu for secondary device.

The qualified second devices need to meet the following conditions:

- They must belong to the same family as the primary NIC device.
- The secondary candidate device needs to have iSCSI configuration file loaded.

3.7 NIC Partitioning Configuration Menu

```
Comprehensive Configuration Management v214.0.221.0
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NIC Partition Configuration
Number of Partitions Per Port : 3
PF#0 L2=00:0A:F7:D5:3F:30(V)
PF#2 L2=00:0A:F7:D5:3F:32(V)
PF#4 L2=00:0A:F7:D5:3F:34(V)
PF#6 L2=00:0A:F7:D5:3F:36(V)
PF#8 L2=00:0A:F7:D5:3F:38(V)
PF#10 L2=00:0A:F7:D5:3F:3A(V)
PF#12 L2=00:0A:F7:D5:3F:3C(V)
PF#14 L2=00:0A:F7:D5:3F:3E(V)

Configure Number of Partitions Per Port (4 or 8 or 16) (Read Only)
[Enter]:Enter New Value; [↑↓]:Next Entry; [ESC]:Quit
Current Adapter:Primary, Bus=3B Device=00 Func=00, MAC=00:0A:F7:D5:3F:30
```

This menu describes the NIC Partitioning configuration menu when NIC partition function is enabled.

- Number of Partitions Per Port : Specify number of physical functions on this port.
- PF#x : Condensed information regarding the partition(s) on this port.
 - L2 : Layer2 MAC Address - Virtual

3.7.1 NIC Partitioning Physical Function Menu

```
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PF# 0
Bandwidth Reservation : 0
Bandwidth Limit      : 100
Bandwidth Reservation Valid : False
Bandwidth Limit Valid   : False
RDMA Support         : Disabled

Configure Bandwidth Reservation in Percentage (All Partition Sum <= 100) (0..100)
[Enter]:Enter New Value; [↑↓]:Next Entry; [ESC]:Quit
Current Adapter:Primary, Bus=3B Device=00 Func=00, MAC=00:0A:F7:D5:3F:30
```

This menu describes the state of each physical function on this device port.

- Bandwidth Reservation : Specify Bandwidth Reservation in percentage of physical port bandwidth allowed for this physical function. The total bandwidth weight of all physical functions needs to be either 100 or 0. All 0s are default values meaning all physical functions have the same weight thus equivalent to all 25s values.
- Bandwidth Limit : Specify Bandwidth Limit in Percentage of Physical Bandwidth. The configuration allows sum of maximum bandwidths of a physical port to exceed physical port bandwidth. Therefore, the actual bandwidth of a partition will be gated by Bandwidth Reservation, Bandwidth Limit or physical port bandwidth, which ever is the smallest.
- Bandwidth Reservation Valid : Specify whether Bandwidth Reservation value should be enforced
- Bandwidth Limit Valid : Specify whether Bandwidth Limit value should be enforced.
- RDMA Support : Specify FCoE MAC address for this physical function which is read only value.

4. CCM Scripting Mode

*ccmcf*g can be invoked from DOS prompt in either DOS environment or Windows environment. The command format and its usage are shown below:

```
C:\test\7.8.21>ccmcf32 -help
```

```
CCMCFG32 v7.8.21 - Comprehensive Configuration Management
```

```
Copyright (C) 2000-2013 Broadcom Corporation
```

```
Usage: ccmcf32 [Options]
```

Options are as below:

- list List available configurable devices.

- get [<file name>] Retrieve parameters from the devices. If <file name> is not presented and -stdout is not set, file named <MAC Address[last 4 bytes]>.cfg will be used as output file for each individual device. Any existing <file name> will be overwritten without warning.

- getItemGuide [<file name>] Retrieve all configurable parameters of the devices. The saving file options are same as -get above with file name as <MAC Address[last 3 bytes]GD>.cfg.

- set [<file name>] Set parameters (in specified file) to devices. If the file contains no Section name, iSCSI section will be used for backward compatible. Multiple devices and multiple sections can be put into single script file as in file from -get. If <file name> is not presented, -stdin will be used as input file. A log file named <MAC[Last 4 Digits].log> for each device will be used to log following information:
 - o The difference between configuration file

- and current configuration on the card.
- o Any syntax errors detected while parsing the script file.
- o Any error and warning while trying to set the value such as invalid value.

If -stderr is presented, the content of log file will be output to STDERR at the same time.

`[-setmode <Check|Safe|Force>]`

Mode when doing -set.

Check Mode: In this mode, no configuration will be saved. Only error check is performed against script file.

Safe Mode: In this mode, no configuration will be saved if any error is detected in script file.

Force Mode: In this mode, script entries without error in script file will be saved, script entries with errors detected will be ignored. This is default mode

`-default [iscsi | fcoe | nicp | afex]`

Set iSCSI, FCOE, NIC Partitioning, and/or AFEX parameters to default values. If there is no function specified, all functions above will be set to default values. Only functions with configuration block existing on the device will be set. If no device scope is specified all devices will be set to default values.

`-stdout` Valid with -get. Use Standard Output as output file.

`-stderr` Valid with -set. Output Log File to STDERR.

`-dev <MAC ADDRESS>` Device with MAC address in xx:xx:xx:xx:xx:xx format will be operation scope.

`-card <card#...>` Cards of number(from 0) will be operation scope.

`-pfn <bus:dev:func>` Device location in bus:device:function will

be operation scope.

`-termLines <lines>` Screen Scroll lines, 0 means no terminal control.

`-termWidth <columns>` Screen width, 0 means no terminal control.

 In DOS environment, by default `-termLines 25` and
 `-termWidth 80`, matching default terminal size.

 In Windows environment, by default `-termLines 0` and
 `-termWidth 0`, thus no terminal control.

`-help` Display this help and exit.

4.1 Operation Device Scope

For –get operation, the devices scope is specified by device scope command option –dev, –card or –pfm.

For –set operation, the devices scope is specified by both command line option and device indicators in scripting file. Depending on whether scripting file contains single device script or multiple device scripts, the rule to determine device scope changes (summarized below). There are two ways to select devices:

- **MAC Address Based Selection:** Device is selected based on MAC address in scripting file. Device family matching of device ID from file and from actual device will be checked.
- **Device Family Based Selection:** Device Family is used to select device with MAC address ignored.

–Set Command Device Scope Selection Rule

Command Line Device Option	Single Device Scripting File	Multiple Device Scripting File
No	MAC address based selection	
Yes	Device Family Based Selection	MAC address based selection

Command Line Device Options include –dev <MAC Address>, –card <card#..> and –pfm <bus:dev:func>.

4.2 Script file format

Script file contains information to be used to configure the devices. It contains the following blocks:

4.2.1 Comments

```
;*****
;CCMCFG32 v7.8.21 - Comprehensive Configuration Management
;Copyright (C) 2000-2013 Broadcom Corporation
; Dumping Configuration Parameters of Device [00:10:18:6F:D2:74] to
outfile.txt
;*****
```

Characters after ‘;’ will be treated as comments.

4.2.2 Device Block

```
[Device Parameters]
MAC Address = 00:10:18:6F:D2:74
PCI Function Number = 01:00:00
```

```
Device Type = BCM57712
Vendor ID = 0x14E4
Device ID = 0x1662
Subsystem Vendor ID = 0x14E4
Subsystem Device ID = 0x1213
```

Inside [Device Parameters] block, only <MAC Address> and <Device ID> keys will be used to specify device scope, the rest of lines are informational descriptions. For details of device scope specification, please refer to [Operation Device Scope] section above.

4.2.3 Section Declaration Head

The section head is in the format of [section <section name>] as below:

```
[Section MBA Configuration Menu]
Option ROM                = Disabled
Boot Protocol              = Preboot Execution Environment (PXE)
Boot Strap Type            = Auto
Hide Setup Prompt          = Disabled
Setup Key Stroke           = Ctrl-S
Banner Message Timeout     = 5 Seconds
Link Speed                 = 10Gbps
Pre-boot Wake On LAN       = Disabled
VLAN Mode                  = Disabled
VLAN ID                    = 1
Boot Retry Count           = 0
```

4.2.4 Group Declaration Head

```
[Section iSCSI Boot Main Menu]
```

```
[General Parameters]
TCP/IP Parameters via DHCP = Enabled
iSCSI Parameters via DHCP = Enabled
CHAP Authentication        = Disabled
Boot to iSCSI Target       = Enabled
DHCP Vendor ID             = BCM ISAN
Link Up Delay Time         = 0
Use TCP Timestamp          = Disabled
Target as First HDD        = Disabled
LUN Busy Retry Count       = 0
IP Version                 = IPv4 ; Read Only
```

The group declaration head is in format of [<group name>] as [General Parameters] head in the example above. Group head is optional depending on whether the configuration is hierarchical. MAB configuration section does not have group head, while others have group heads.

4.2.5 Key and Value

CHAP Authentication = Disabled

4.2.6 Mapping of Key Words from MENU

The key words, value, section name and group head names are all identical to the terms in MENU. For backward compatibility, the script file dumped from ibcfg program containing different key words from CCM MENU, will be accepted and correctly mapped to the new terms.

4.2.7 Case Sensitivity and Space Sensitivity

Space sensitive means “word1 □ □ word2” is treated as different string from “word1 □ word2”. The following is the summary of case sensitivity and space sensitivity of different fields in scripting file:

Field	Case and Space Sensitive
Command line options	No
Section name	No
Group name	No
Key	No
Value in String type	Yes
Value in other types	No

4.2.8 Hidden String or Password field Treatment

Before version 6.2.13, password or CHAP secret strings are displayed as “****...****” in –get operation and in log files in conformance with MENU policy. If password field contains asterisk only characters, it will be ignored by –set operation with warning logged in log file.

From version 6.2.13, CCM –get encrypts the password string by using MAC address based key and putting MAC address based signature on the string. When CCM –set operation encounters password field, it will first verify the signature of the string. If the string is verified to have a valid signature for the current port, the string will be decrypted. If the signature verification process fails, the string will be treated as a clear non encrypted string.

Based on the algorithm above, the encrypted password can only be –set back to the same NIC and port of –get operation correctly. If user tries to –set encrypted password to different NIC or port, the password string will be treated as non encrypted string. In this case, because of binary to ASCII conversion and extra tails added during encryption process, the encrypted string is longer than its original string thus likely caused over length error. The log file of –set will indicate whether CCM treats the password field as encrypted string (with “; L[LineNo] Encrypted” comment following the difference line), or non encrypted string (with “; L[LineNo] Clear” comment following the difference line) during –set operation.

If users want to manually type in their own clear password, they can always modify the password field with clear password string. The encrypted password string can only be generated by –get operation and user can not manually generate encrypted password string for fundamental security reason.

4.2.9 Script Execution Order

In CCM earlier version than version 6.2.2, the script order is requested for mutual dependent parameter configurations, or error will happen. For example, IP version configuration needs to come first before the corresponding dependent IP address configuration. From version 6.2.2, intelligence has been added to handle dependent parameter configuration in smart way, so that script order is not requested any more. In the example above, IP address configuration can come first before IP version configuration as long as these two parameters match mutually. This will ease script automation process from –get converted to –set.

4.2.10 Convert –get result to be used by –set

The script from –get can be used directly by –set. However, if –get is taken from different devices or different port in a NIC, some parameters need to modify manually. For example, in 10G devices supporting NIC partitioning, if script –get from port 0 is –set to port 1, port specific parameters such as NIC Partition functions will be rejected because port 0 contains 0, 2, 4, 6 NIC Partition number and port 1 contains 1, 3, 5, 7 NIC Partition numbers. In this case, a quick manual modification is requested.

When users use configuration file obtained from –get as a base to create new file for –get operation, the configuration errors could be introduced due to loss of consistency. For example, when NPAR is changed from enable to disable, the detailed configuration items for each partition in original file obtained from –get when NPAR was enabled become invalid. Using this modified inconsistent file to do the –set operation will cause error messages to be displayed. Users have two choices to deal with this case:

- They can just live with the errors. By default, the –setmode of –set operation will be <Force>, which will ignore any errors and save the valid part of configuration file. The shortage for this way is that users might overlook some errors they are concerned. Or
- They can modify the rest of configuration file to keep configuration file consistent. For example, if the file obtained by –get when NPAR has been enabled and users change NPAR to disabled, to keep configuration file consistent, users need to comment out those NPAR configuration items for each partition which are invalid after NPAR disabled.

4.3 Log File

When doing `-set` operation, the log file for each device in the name of `<MAC[last 4 digits].log>` will be used to log the following information:

- o The difference between configuration file and current configuration on the card.
- o Any syntax errors detected while parsing the script file.
- o Any error and warning while trying to set the value such as invalid value.

The log file itself is in format in conformance to scripting file format, with all error and warning messages started with `;`, and thus can be used as configuration file in turn. With `-stderr` command option, the content of log file will be output to `STDERR` at the same time.

4.4 Script Command Example

4.4.1 List Operation

```
C:\test\7.8.21>ccmcf32 -list
```

Card#	BUS	Device	Config	MAC Address
=====	=====	=====	=====	=====
0	1:00:00	BCM57416	IN	00:10:18:6F:D2:74
1	1:00:01	BCM57416	IN	00:10:18:6F:D2:76
2	2:00:00	BCM57414	IN	00:10:18:C7:5F:60
3	2:00:01	BCM57414	IN	00:10:18:C7:5F:62
4	3:00:00	BCM5717	I	00:00:00:00:00:00
5	3:00:01	BCM5717	I	00:00:00:00:00:00
6	4:00:00	BCM5722	I	B8:AC:6F:93:86:BA
7	5:00:00	BCM5720	I	00:10:18:57:20:00
8	5:00:01	BCM5720	I	00:10:18:57:20:01

*: Configure Block Letters: I:iSCSI; F:FCoE; N:Nic Partition; A:AFEX

4.4.2 Get Operation

```
C:\test\7.8.21>ccmcf32 -get
Dumping Configuration of Device [00:10:18:6F:D2:74] to 186FD274.CFG ...done.
Dumping Configuration of Device [00:10:18:6F:D2:76] to 186FD276.CFG ...done.
Dumping Configuration of Device [00:10:18:C7:5F:60] to 18C75F60.CFG ...done.
Dumping Configuration of Device [00:10:18:C7:5F:62] to 18C75F62.CFG ...done.
Dumping Configuration of Device [00:00:00:00:00:00] to 00000000.CFG ...done.
Dumping Configuration of Device [00:00:00:00:00:00] to 00000000.CFG ...done.
Dumping Configuration of Device [B8:AC:6F:93:86:BA] to 6F9386BA.CFG ...done.
Dumping Configuration of Device [00:10:18:57:20:00] to 18572000.CFG ...done.
Dumping Configuration of Device [00:10:18:57:20:01] to 18572001.CFG ...done.
```

This dumps configuration of each device into file named MAC address's last four digits.CFG.

```
C:\test\7.8.21>ccmcf32 -get outdata.txt
Dumping Configuration of Device [00:10:18:6F:D2:74] to outdata.txt ...done.
Dumping Configuration of Device [00:10:18:6F:D2:76] to outdata.txt ...done.
Dumping Configuration of Device [00:10:18:C7:5F:60] to outdata.txt ...done.
Dumping Configuration of Device [00:10:18:C7:5F:62] to outdata.txt ...done.
Dumping Configuration of Device [00:00:00:00:00:00] to outdata.txt ...done.
Dumping Configuration of Device [00:00:00:00:00:00] to outdata.txt ...done.
Dumping Configuration of Device [B8:AC:6F:93:86:BA] to outdata.txt ...done.
Dumping Configuration of Device [00:10:18:57:20:00] to outdata.txt ...done.
Dumping Configuration of Device [00:10:18:57:20:01] to outdata.txt ...done.
```

This dumps configuration of all devices in this platform into single file named outdata.txt.

```
C:\test\7.8.21\ccmcf32 -get -stdout
;*****
;CCMCFG32 v7.8.21 - Comprehensive Configuration Management
;Copyright (C) 2000-2013 Broadcom Corporation
; Dumping Configuration Parameters of Device [00:00:00:00:00:00] to STDOUT
;*****

[Device Parameters]
MAC Address = 00:00:00:00:00:00
PCI Function Number = 03:00:01
Device Type = BCM5717
Vendor ID = 0x14E4
Device ID = 0x1655
Subsystem Vendor ID = 0x14E4
Subsystem Device ID = 0x1655

[Section MBA Configuration Menu]
Option ROM           = Enabled
Boot Protocol        = iSCSI
Boot Strap Type      = Auto
Hide Setup Prompt    = Disabled
Setup Key Stroke     = Ctrl-S
Banner Message Timeout = 4 Seconds
Link Speed           = AutoNeg
Pre-boot Wake On LAN = Enabled
VLAN Mode            = Disabled
VLAN ID              = 1
...
```

This will dump configuration of all devices to the stdout. If it is in DOS environment, terminal scrolling will be control based on `-termlines=25` and `-termwidth=80` by default.

```
C:\test\7.8.21>ccmcf32 -get -stdout -card 1
```

```
;*****  
;CCMCFG32 v7.8.21 - Comprehensive Configuration Management  
;Copyright (C) 2000-2013 Broadcom Corporation  
; Dumping Configuration Parameters of Device [00:10:18:6F:D2:76] to STDOUT  
;*****
```

```
[Device Parameters]  
MAC Address = 00:10:18:6F:D2:76  
PCI Function Number = 01:00:01  
Device Type = BCM57712  
Vendor ID = 0x14E4  
Device ID = 0x1662  
Subsystem Vendor ID = 0x14E4  
Subsystem Device ID = 0x1213
```

```
[Section Device Hardware Configuration]  
Multi-Function Mode          = NPAR  
DCB Protocol                  = Disabled  
SR-IOV                        = Disabled  
Max Number of PF MSIX Vectors = 0
```

```
[Section MBA Configuration Menu]  
Option ROM                    = Enabled  
Boot Protocol                  = Preboot Execution Environment (PXE)  
Boot Strap Type                = Auto  
Hide Setup Prompt              = Disabled  
Setup Key Stroke               = Ctrl-S  
Banner Message Timeout        = 5 Seconds  
Link Speed                     = 10Gbps  
Pre-boot Wake On LAN          = Disabled  
VLAN Mode                      = Disabled  
VLAN ID                       = 1  
Boot Retry Count               = 0
```

...

This will dump the second card of information to stdout.

4.4.3 Set Operations

```
C:\test\7.8.21>ccmcf32 -set outdata.txt -setMode check
```

```
Set 00:10:18:6F:D2:74 by outdata.txt...Nothing to Save; 0 Err, 0 Wrn, 0 Dif
```

```
Set 00:10:18:6F:D2:76 by outdata.txt...Nothing to Save; 0 Err, 0 Wrn, 0 Dif
```

```
Set 00:10:18:C7:5F:60 by outdata.txt...Nothing to Save; 0 Err, 0 Wrn, 0 Dif
Set 00:10:18:C7:5F:62 by outdata.txt...Nothing to Save; 0 Err, 0 Wrn, 0 Dif
Set 00:00:00:00:00:00 by outdata.txt...NOT Saved; 0 Err, 0 Wrn, 6 Dif
Set B8:AC:6F:93:86:BA by outdata.txt...NOT Saved; 0 Err, 0 Wrn, 0 Dif
Set 00:10:18:57:20:00 by outdata.txt...NOT Saved; 0 Err, 0 Wrn, 0 Dif
Set 00:10:18:57:20:01 by outdata.txt...NOT Saved; 0 Err, 0 Wrn, 0 Dif
CONGRATULATIONS: Script File Check Passed
```

This will check the difference of outdata.txt with current devices on platform.

```
E:\ccm2>ccmcf32 -set cfg.cfg -setMode check -stderr
Press any key to continue... or Attach Debugger Now:
Set 00:24:81:00:60:20 by cfg.cfg..
;*****
; NO Difference Detected
;*****
NOT Saved; 0 Err, 0 Wrn, 0 Dif
Set 00:24:81:00:60:21 by cfg.cfg..
;*****
; NO Difference Detected
;*****
NOT Saved; 0 Err, 0 Wrn, 0 Dif
Set 00:10:18:3E:01:24 by cfg.cfg..
;*****
; NO Difference Detected
;*****
NOT Saved; 0 Err, 0 Wrn, 0 Dif
Set 00:10:18:3E:01:26 by cfg.cfg..
;*****
;CCMCFG32 v2.0.9 - Comprehensive Configuration Utility
;Copyright (C) 2000-2010 Broadcom Corporation
; Configuration Difference between File cfg.cfg and <00:10:18:3E:01:26>
;*****

[Device Parameters]
MAC Address = 00:10:18:3E:01:26
PCI Function Number = 0A:00:01
Device Type = BCM57712
Vendor ID = 0x14E4
Device ID = 0x1662
Subsystem Vendor ID = 0x14E4
Subsystem Device ID = 0x1200
```

```
[Section iSCSI Boot Main Menu]
```

```
[Initiator Parameters]
```

```
CHAP Secret      = ***** ;[L277] Old Value = *****...*****
;*****
; Total 1 DIFFERENCES Detected
;*****
NOT Saved; 0 Err, 0 Wrn, 1 Dif
CONGRITULATIONS: Script File Check Passed
```

This will check the difference between cfg.cfg and current devices and output log files to STDERR. The first three devices contain no difference of configuration from the file, while the fourth device contains one difference. This is because the cfg.cfg is dumped from –get operation containing hidden CHAP secret string of “*****”, which does not match actual string in the device.

4.4.4 –GetItemGuide Operation

```
E:\ccm2>ccmcf32.exe -card 2 -getItemGuide -stdout
```

```
;*****
;CCMCFG32 v6.0.2 - Comprehensive Configuration Utility
;Copyright (C) 2000-2010 Broadcom Corporation
; Dumping Configuration Item Guide of Device [00:10:18:3E:01:24] to STDOUT
;*****
```

```
[Device Parameters]
```

```
MAC Address = 00:10:18:3E:01:24
PCI Function Number = 07:00:00
Device Type = BCM57712
Vendor ID = 0x14E4
Device ID = 0x1662
Subsystem Vendor ID = 0x14E4
Subsystem Device ID = 0x1200
```

```
[Section Device Hardware Configuration]
```

```
;Configure PHY Selection Policy:
PHY Selection Policy = < Hardware Default | First PHY | Second PHY | First PHY
P
riority | Second PHY Priority > ; Current = Second PHY
```

```
[Section MBA Configuration Menu]
```

```
;Enable/Disable Option ROM:
Option ROM          = < Enabled | Disabled > ; Current = Enabled
```

```
;Select Boot Protocol:
Boot Protocol          = < Preboot Execution Environment (PXE) | Remote
Program
Load (RPL) | Bootstrap Protocol (BOOTP) | iSCSI | FCoE | None > ; Current =
iSCS
I

;Select Boot Strap Type:
Boot Strap Type        = < Auto | BBS | Int18h | Int19h > ; Current = Auto

;Configure Whether Setup Prompt is Displayed during ROM Initialization:
Hide Setup Prompt      = < Enabled | Disabled > ; Current = Disabled

;Configure Key Strokes to Invoke This Configuration Menu:
Setup Key Stroke       = < Ctrl-S | Ctrl-B > ; Current = Ctrl-S

;Configure Banner Time Out Value:
Banner Message Timeout = <Integer (0 to 14)> ; current = 3

;Configure Link Speed:
Link Speed             = AutoNeg ; Read Only

;Configure Pre-Boot Wake On LAN:
Pre-boot Wake On LAN   = < Enabled | Disabled > ; Current = Disabled

;Configure VLAN:
VLAN Mode              = < Enabled | Disabled > ; Current = Disabled

;Configure VLAN ID:
VLAN ID                = <Integer (0 to 1023)> ; current = 0

;Select Number of Boot Retries:
Boot Retry Count       = <Integer (0 to 7)> ; current = 0

[Section iSCSI Boot Main Menu]

[General Parameters]

;Acquire TCP/IP Configuration via Stateful or Stateless Autoconfiguration:
IP Autoconfiguration   = < Enabled | Disabled > ; Current = Enabled

;Acquire iSCSI Parameters via DHCP:
iSCSI Parameters via DHCP = < Enabled | Disabled > ; Current = Enabled

;Enable/Disable CHAP Authentication:
CHAP Authentication    = < Enabled | Disabled > ; Current = Disabled
```

;Enable/Disable Booting to iSCSI Target After Logon:

Boot to iSCSI Target = < Disabled | Enabled | One Time Disabled > ;
Current
= Enabled

;Configure DHCP Vendor ID:

DHCP Vendor ID = < String (0 to 32 Chars) > ; current = BRCM ISAN

;Configure Link Up Delay Time in Seconds:

Link Up Delay Time = <Integer (0 to 255)> ; current = 0

;Enable/Disable TCP Timestamp:

Use TCP Timestamp = < Enabled | Disabled > ; Current = Disabled

;Enable/Disable Target Appears as First Hard Drive in the System:

Target as First HDD = < Enabled | Disabled > ; Current = Disabled

;Configure Number of Retries in 2s Interval When LUN is Busy:

LUN Busy Retry Count = <Integer (0 to 60)> ; current = 0

;IP Version Support:

IP Version = < IPv4 | IPv6 > ; Current = IPv6

;Enable HBA Boot Mode:

HBA Boot Mode = < Enabled | Disabled > ; Current = Disabled

[Initiator Parameters]

;Configure Initiator IP address:

IP Address = < xxx::xxx:xxx.xxx.xxx.xxx IPv6 address> ; Current = ::

;Configure IP Subnet Mask Prefix Length:

Subnet Mask Prefix = <Integer (0 to 128)> ; current = 64

;Configure Default Gateway IP Address:

Default Gateway = < xxx::xxx:xxx.xxx.xxx.xxx IPv6 address> ; Current = ::

;Configure Primary DNS IP Address:

Primary DNS = < xxx::xxx:xxx.xxx.xxx.xxx IPv6 address> ; Current = ::

;Configure Secondary DNS IP Address:

Secondary DNS = < xxx::xxx:xxx.xxx.xxx.xxx IPv6 address> ; Current = ::

;Configure iSCSI Name:

iSCSI Name = < String (0 to 128 Chars) > ; current = iqn.1995-
05.com.bro
adcom.iscsiboot

```
;Configure CHAP ID:
CHAP ID          = < String (0 to 128 Chars) > ; current =

;Configure CHAP Secret:
CHAP Secret      = < String (12 to 16 Chars) > ; current =

[1st Target Parameters]

;Enable/Disable Target Establishment:
Connect          = < Enabled | Disabled > ; Current = Disabled

;Configure Target IP Address:
IP Address       = < xxx::xxx:xxx.xxx.xxx.xxx IPv6 address> ; Current = ::

;Configure Target TCP Port Number:
TCP Port        = <Integer (1 to 65535)> ; current = 3260

;Configure Target Boot LUN Number:
Boot LUN        = <Integer (0 to 255)> ; current = 0

;Configure iSCSI Name:
iSCSI Name      = < String (0 to 128 Chars) > ; current =

;Configure CHAP ID:
CHAP ID         = < String (0 to 128 Chars) > ; current =

;Configure CHAP Secret:
CHAP Secret     = < String (12 to 16 Chars) > ; current =

[2nd Target Parameters]

;Enable/Disable Target Establishment:
Connect          = < Enabled | Disabled > ; Current = Disabled

;Configure Target IP Address:
IP Address       = < xxx::xxx:xxx.xxx.xxx.xxx IPv6 address> ; Current = ::

;Configure Target TCP Port Number:
TCP Port        = <Integer (1 to 65535)> ; current = 3260

;Configure Target Boot LUN Number:
Boot LUN        = <Integer (0 to 255)> ; current = 0

;Configure iSCSI Name:
iSCSI Name      = < String (0 to 128 Chars) > ; current =

;Configure CHAP ID:
CHAP ID         = < String (0 to 128 Chars) > ; current =
```

```
;Configure CHAP Secret:
CHAP Secret = < String (12 to 16 Chars) > ; current =

[Secondary Device Parameters]

;Select Secondary Device:
Secondary Device          = < xx:xx:xx:xx:xx:xx > ; Current =
00:00:00:00:00
:00

;Use Independent Target Portal when Multipath I/O Mode is Enabled:
Use Independent Target Portal = < Enabled | Disabled > ; Current = Disabled

;Use Independent Target Name when Multipath I/O Mode is Enabled:
Use Independent Target Name   = < Enabled | Disabled > ; Current = Disabled

[Section FCoE Boot Main Menu]

[General Parameters]

;Enable/Disable Booting to FCoE Target after Logon:
Boot to FCoE Target        = < Disabled | Enabled | One Time Disabled > ; Current
=
Enabled

;Enable/Disable Target Appears as First Hard Drive in The System:
Target as First HDD        = < Enabled | Disabled > ; Current = Disabled

;Configure Link Up Delay Time in Seconds:
Link Up Delay Time         = <Integer (0 to 255)> ; current = 0

;Configure Number of Retries in 2s Interval When LUN is Busy:
LUN Busy Retry Count       = <Integer (0 to 60)> ; current = 0

;Configure Fabric Discovery Retry Value:
Fabric Discovery Retry = <Integer (0 to 8)> ; current = 4

;Enable HBA Boot Mode:
HBA Boot Mode              = Enabled ; Read Only

[No.1 Target Parameters]

;Enable/Disable Target Establishment:
Connect = < Enabled | Disabled > ; Current = Disabled

;Configure WWPN:
WWPN = < String (0 to 16 Chars) > ; current = 0000000000000000
```

```
;Configure target Boot LUN number:  
Boot LUN = <Integer (0 to 255)> ; current = 0
```

[No.2 Target Parameters]

```
;Enable/Disable Target Establishment:  
Connect = < Enabled | Disabled > ; Current = Disabled
```

```
;Configure WWPN:  
WWPN = < String (0 to 16 Chars) > ; current = 0000000000000000
```

```
;Configure target Boot LUN number:  
Boot LUN = <Integer (0 to 255)> ; current = 0
```

[No.3 Target Parameters]

```
;Enable/Disable Target Establishment:  
Connect = < Enabled | Disabled > ; Current = Disabled
```

```
;Configure WWPN:  
WWPN = < String (0 to 16 Chars) > ; current = 0000000000000000
```

```
;Configure target Boot LUN number:  
Boot LUN = <Integer (0 to 255)> ; current = 0
```

[No.4 Target Parameters]

```
;Enable/Disable Target Establishment:  
Connect = < Enabled | Disabled > ; Current = Disabled
```

```
;Configure WWPN:  
WWPN = < String (0 to 16 Chars) > ; current = 0000000000000000
```

```
;Configure target Boot LUN number:  
Boot LUN = <Integer (0 to 255)> ; current = 0
```

[No.5 Target Parameters]

```
;Enable/Disable Target Establishment:  
Connect = < Enabled | Disabled > ; Current = Disabled
```

```
;Configure WWPN:  
WWPN = < String (0 to 16 Chars) > ; current = 0000000000000000
```

```
;Configure target Boot LUN number:  
Boot LUN = <Integer (0 to 255)> ; current = 0
```

[No.6 Target Parameters]

```
;Enable/Disable Target Establishment:
Connect  = < Enabled | Disabled > ; Current = Disabled

;Configure WWPN:
WWPN = < String (0 to 16 Chars) > ; current = 0000000000000000

;Configure target Boot LUN number:
Boot LUN = <Integer (0 to 255)> ; current = 0
```

[No.7 Target Parameters]

```
;Enable/Disable Target Establishment:
Connect  = < Enabled | Disabled > ; Current = Disabled

;Configure WWPN:
WWPN = < String (0 to 16 Chars) > ; current = 0000000000000000

;Configure target Boot LUN number:
Boot LUN = <Integer (0 to 255)> ; current = 0
```

[No.8 Target Parameters]

```
;Enable/Disable Target Establishment:
Connect  = < Enabled | Disabled > ; Current = Disabled

;Configure WWPN:
WWPN = < String (0 to 16 Chars) > ; current = 0000000000000000

;Configure target Boot LUN number:
Boot LUN = <Integer (0 to 255)> ; current = 0
```

[Section NIC Partition Configuration]

```
;Enable or Disable NIC Partition Function:
NIC Partition = < Enabled | Disabled > ; Current = Disabled
```