

Broadcom NetXtreme Gigabit Ethernet Plus NIC



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Introduction

This white paper introduces the Broadcom NetXtreme Gigabit Ethernet Plus network adapter.

The Broadcom NetXtreme Gigabit Ethernet Plus is the successor to the Broadcom NetXtreme Gigabit Ethernet network adapter. In addition to the standard network adapter functionality, the Broadcom NetXtreme Gigabit Ethernet Plus also features desktop and mobile Architecture for System Hardware (DASH) support.

More details on DASH and manageability in the Manageability white paper located at www.hp.com.

Product Description

The Broadcom NetXtreme Gigabit Ethernet Plus network adapter is a Broadcom BCM 5761 10/100/1000Base-T network controller with integrated transceiver, advanced security, and platform management capabilities including DASH support.

The adapter is a PCIe x1 card designed in accordance to the PCIe v1.1 specification.

The card comes with a high profile bracket, but is also compatible with low profile brackets. A low profile bracket is available for this card.

Figure 1 Broadcom NetXtreme Gigabit Ethernet Plus Network Adapter



Feature List

- Integrated 10/100/1000BASE-T transceivers
- Automatic MDI crossover function
- PCI Express v1.1 host interface with multi-function support
- 10/100/1000BASE-T full/half-duplex MAC
- IPv4 and IPv6 Large Send Offload and Checksum Offload (LSO/TCO)
- Receive Side Scaling (RSS) for multicore client processors
- Wake on LAN (WOL) support meeting the ACPI requirements
- Statistics for SNMP MIB II, Ethernet-like MIB, and Ethernet MIB (802.3z, Clause 30)
- System Management Bus (SMBus) interface supporting Desktop and mobile Architecture for System Hardware (DASH) or Alert Standard Format (ASF) v2.0
- Centralized Power Management Unit (CPMU)
- Serial NVRAM interface with Flash auto-sensing
- PCIe CLKREQ support
- DASH 1.0 and 1.1 support with additional HP value-add management features

USB Cable and Headers

The Broadcom NetXtreme Gigabit Ethernet Plus comes with a double female-ended 10-pin USB cable. One end of this cable connects to the male USB header on the Broadcom NetXtreme Gigabit Ethernet Plus, and the other end connects to an identical header on the system board.

The male USB header on the system board is reserved for two functions:

- ReadyBoost
- DASH

DASH and ReadyBoost are mutually exclusive. There is only one USB header for two functions so users must decide which module to install.

Although there is a similar male USB header on the system board reserved for the Media Card Reader, this header is not the same as the one for ReadyBoost. DASH will not function in this USB header.

The USB cable serves two purposes and is critical for DASH functionality:

- Communication between the Management Controller and system BIOS
- Data transfer for USB-redirection

DASH functionality is controlled through the Management Controller (MC) in the BCM 5761 ASIC. Communication between the MC and system BIOS is possible through the ReadyBoost USB header and the USB cable, because pin 10 is dedicated for SMI generation.



USB-redirection is a DASH 1.1 feature that allows the contents of a USB device to be directed over a network connection to another system. The data transferred over the network can be transmitted or received through the USB cable. This feature will be offered on supported systems in a future update.

Supported Platforms

The Broadcom NetXtreme Gigabit Ethernet Plus is available for the following 2008 platforms:

- HP Compaq dc5850 Business PC
- HP Compaq dc5800 Business PC
- HP Compaq dc7800 Business PC
- HP Compaq dc7900 Business PC

Although the Broadcom NetXtreme Gigabit Ethernet Plus is offered for the above platforms, management functionality is not available for all systems. See the following chart for network and management capabilities.

Platform	Network and Management Capability		
	Standard NIC	ASF	DASH
HP Compaq dc5850 Business PC	X	X	X
HP Compaq dc5800 Business PC	X	X	
HP Compaq dc7800 Business PC	X		
HP Compaq dc7900 Business PC	X	X	X

If the Broadcom NetXtreme Gigabit Ethernet Plus is installed in the dc5800, the adapter will automatically become the primary management target for system BIOS ASF functions.

BIOS Requirements

Update the system BIOS to at least the versions listed below to get the best performance and functionality from the Broadcom NetXtreme Gigabit Ethernet Plus.

System	BIOS Family	Revision
HP Compaq dc5850 Business PC	786F6	2.06
HP Compaq dc5800 Business PC	786F2	1.53
HP Compaq dc7800 Business PC	786F1	2.04
HP Compaq dc7900 Business PC	786G1	1.08



Selecting a Management Controller

For the dc5850 and 7900, the on-board network adapter is by default the primary management controller. For systems supporting the full management capabilities, the user will have to manually set the Broadcom NetXtreme Gigabit Ethernet Plus as the primary management controller in F10 Setup for it to control DASH manageability. Multiple network adapters can function simultaneously, but only one Management Controller can be active at a given time.

The primary Management Controller can be set through: **F10 Setup > Advanced > Manageability Devices**.

F10 Setup Differences

The F10 Setup screens relating to the Management Devices and modes differ slightly between the HP Compaq dc5850 and 7900 Business PCs.

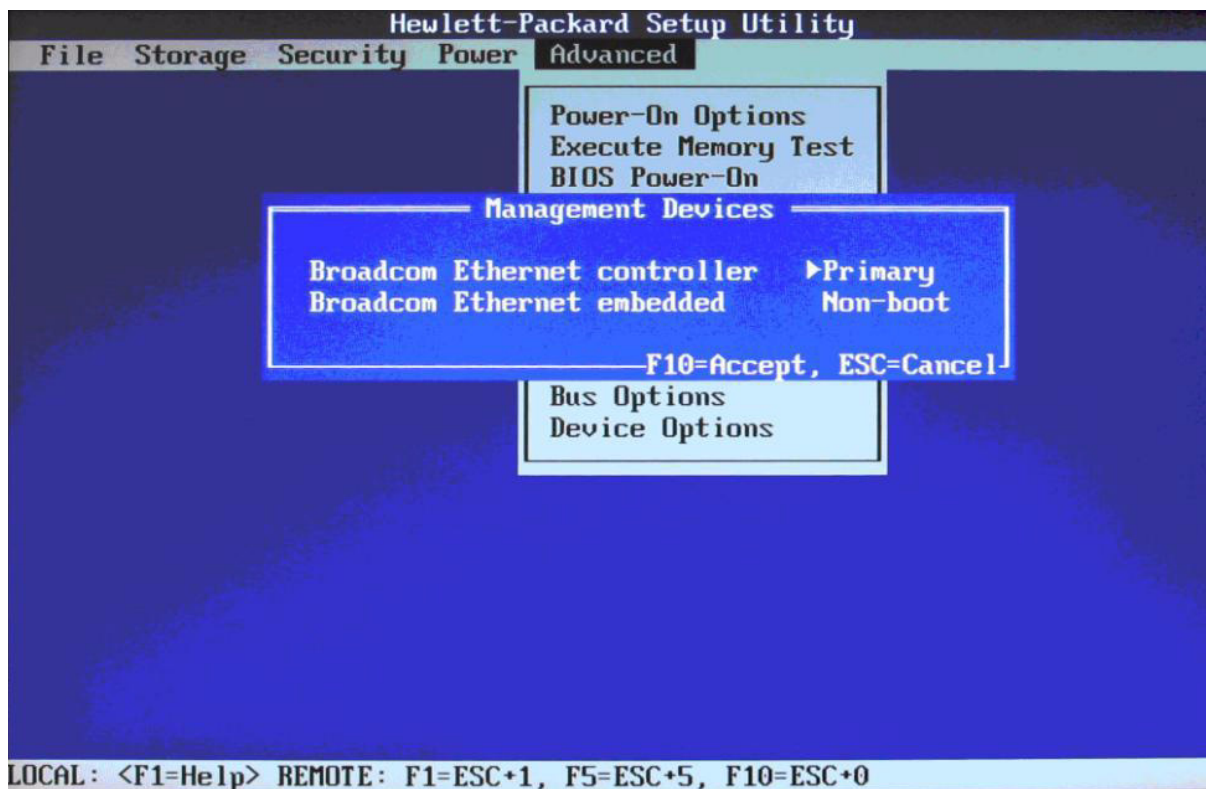
F10 Setup - HP Compaq dc5850 Business PC

The current Management Controller: **F10 Setup > Advanced > Manageability Devices**.

By default, the embedded Broadcom Ethernet controller is primary management controller.

The Broadcom NetXtreme Gigabit Ethernet Plus needs to be changed to primary management controller for DASH to be enabled.

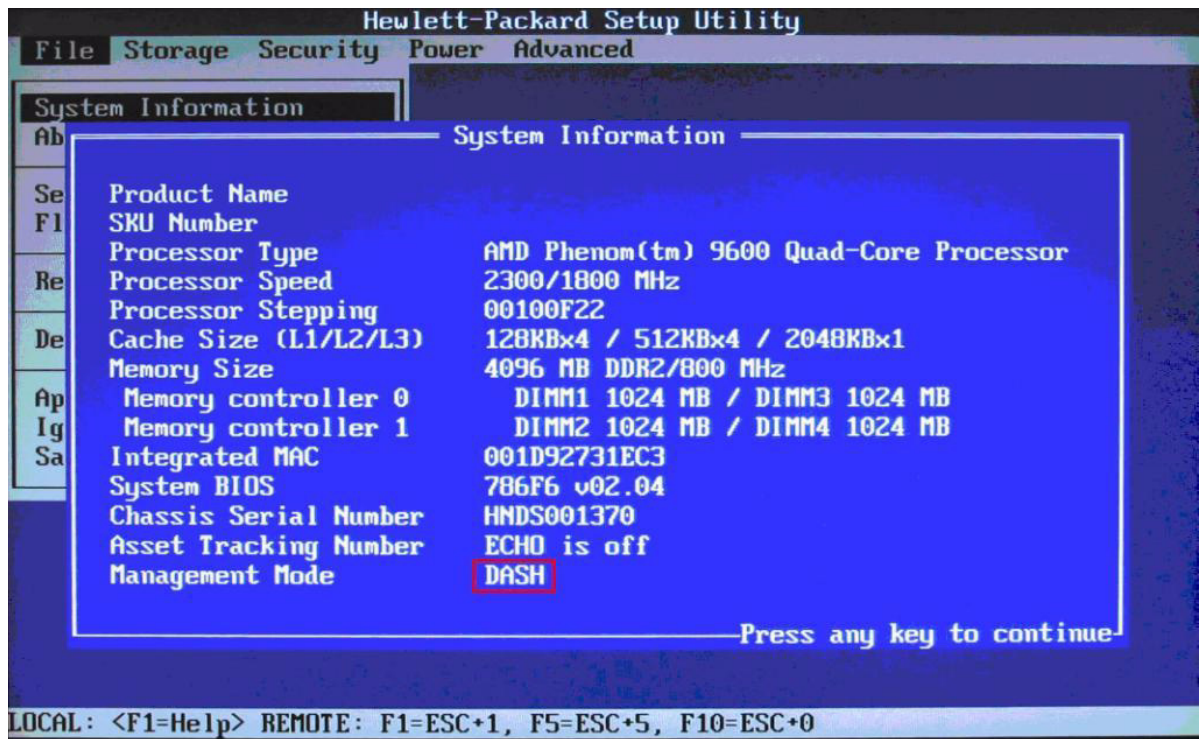
Figure 2 Management Devices in the HP Compaq dc5850 Business PC



The current Management Mode: **F10 Setup > File > System Information.**

Once the Broadcom NetXtreme Gigabit Ethernet Plus is made, the primary management controller and the system is rebooted, the Management Mode will change to DASH.

Figure 3 Management Mode (DASH highlighted) in the HP Compaq dc5850 Business PC



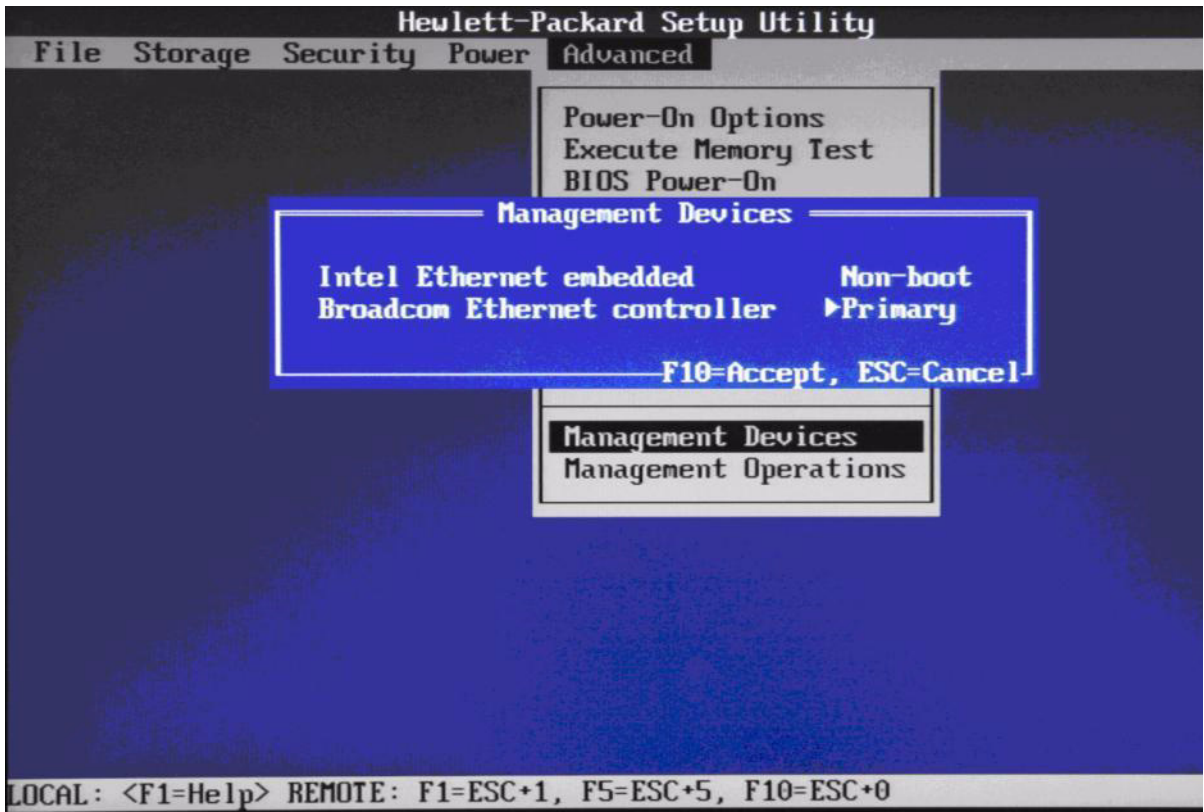
F10 Setup - HP Compaq dc7900 Business PC

The current Management Controller: **F10 Setup > Advanced > Manageability Devices.**

By default, the embedded Intel Ethernet controller is primary management controller.

The Broadcom NetXtreme Gigabit Ethernet Plus needs to be changed to primary management controller for DASH to be enabled.

Figure 4 Management Controller in the HP Compaq dc7900 Business PC



The current Management Mode: **F10 Setup > File > System Information.**

The HP Compaq dc7900 Business PC is an Intel Q45-based system which has an integrated Management Engine (ME) within the GMCH for management control.

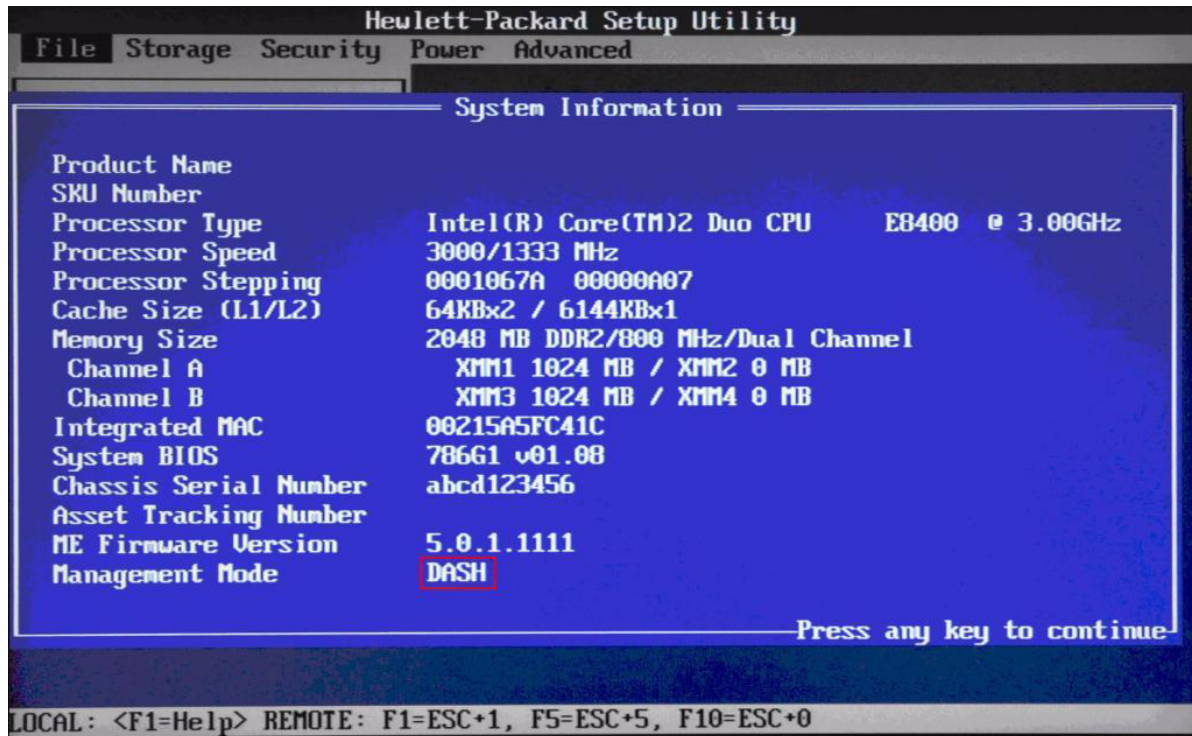
The ME firmware version is displayed in the F10 Setup System Information page right above the Management Mode. The placement of the ME firmware version and the Management Mode is in close proximity, but there is no correlation between the two lines.

The following chart shows the correlation between the Management Controller and Management Mode for the HP Compaq dc7900.

Primary Management Controller	Management Module
Intel ME	AMT, ASF, None
Broadcom MC	DASH, ASF

In the case of ASF, both management controllers can be in this mode. However, only one of them will actually be in control.

Figure 5 Management Mode (DASH highlighted) in the HP Compaq dc7900 Business PC



Limitations

The Broadcom NetXtreme Gigabit Ethernet Plus functions very similarly between a dc7900 and a dc5850. However, there is one important difference regarding remote wake and Power-On Password behavior.

A remote shutdown into a sleep state, S3 - S5, and subsequent remote wake of the dc5850 will bypass the Power-On Password as the system resumes from the sleep state. This is the expected behavior.

In the case of the dc7900, there is a hardware limitation that does not report the remote wake and wakes the system as a localized wake. Therefore, the BIOS reacts to the wake event as a localized wake and does not bypass the Power-On Password.

Drivers

The Broadcom NetXtreme Gigabit Ethernet Plus has driver support for Windows XP and Windows Vista.

For Windows XP, use driver version 10.85.0.0 or newer.

For Windows Vista, use driver version 10.100.0.0 or newer.



Manageability Feature Enabling

Manageability features such as DASH and ASF are disabled by default on the Broadcom NetXtreme Gigabit Ethernet Plus network adapter.

DASH Enabling

DASH can be enabled in one of two methods:

- Broadcom Manageability Configuration and Control application (BMCC)
- Broadcom Advanced Control Suite (BACS)

BMCC is not pre-installed in the system image. It requires the Broadcom NetXtreme Gigabit Drivers for Multiple Operating Systems Softpaq to be downloaded. BACS is included in the system image.

The following steps will enable DASH with BMCC:

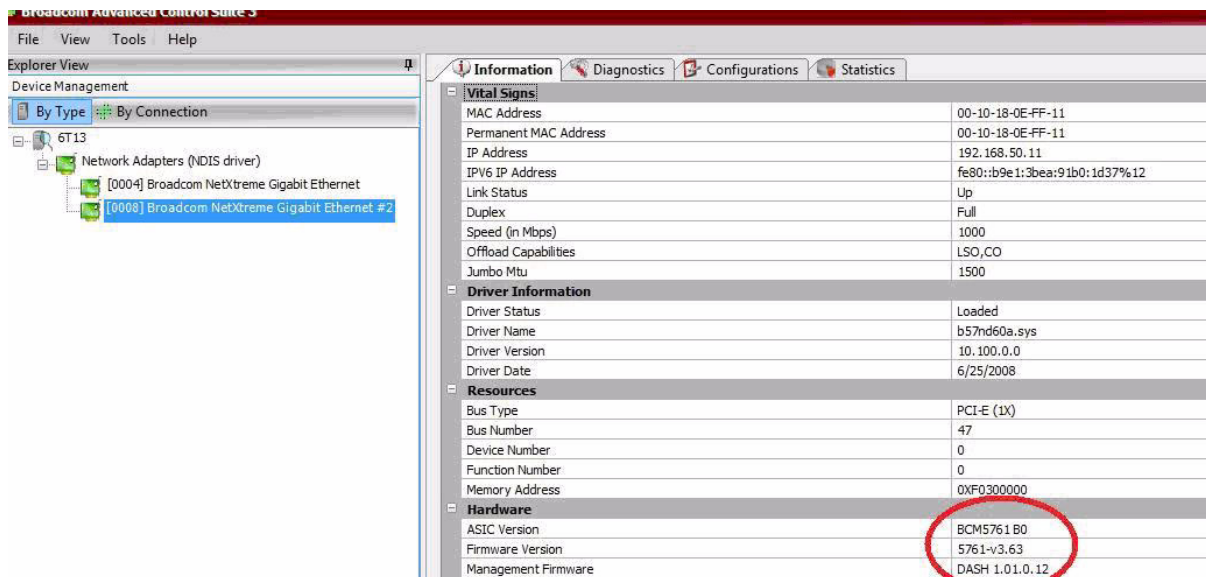
1. Download the Broadcom NetXtreme Gigabit Drivers for Multiple Operating Systems Softpaq from www.hp.com.
2. Install the Softpaq.
3. Open a Command box as Administrator.
4. Go to the directory where the Broadcom application is installed.
5. Run `bmcc enable`.

The following steps will enable DASH with BACS:

1. Execute BACs.
2. Choose the Broadcom NetXtreme Gigabit Ethernet Plus network adapter.

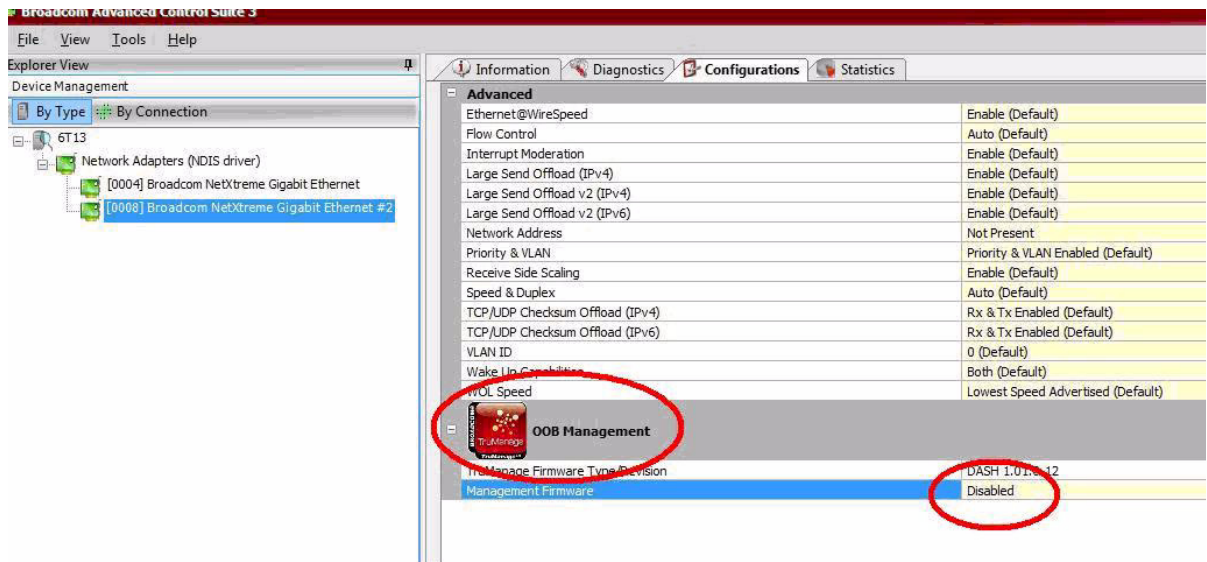
Note that all network adapters will be displayed by BACS. The Broadcom NetXtreme Gigabit Ethernet Plus can be identified through the **Information** tab. Look for the ASIC and Firmware of 5761.

Figure 6 Broadcom NetXtreme Gigabit Ethernet Plus network adapter - Information tab



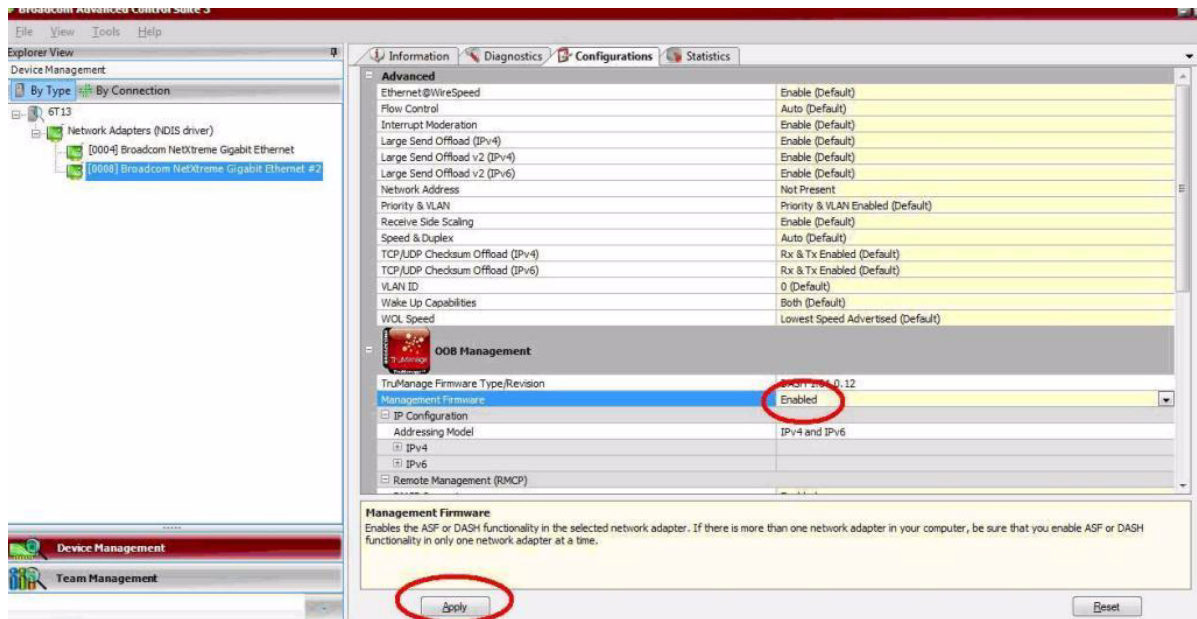
3. Go to the **Configuration** tab.
4. Expand the **OOB Management** list to determine if DASH is enabled or disabled. By default DASH is disabled.

Figure 7 OOB Management list



5. Enable DASH and click the **Apply** button.

Figure 8 Enabling DASH



ASF Enabling

ASF can be enabled with the Broadcom Advanced Control Suite (BACS). Steps 1 - 5 are the same as enabling DASH, but there are a few additional steps.

- 1 - 5) Same as enabling DASH (see above).
- 6) Set **Management Console Address**.
- 7) Set **SNMP Connectivity Name**.

In addition, make sure the Secure RMCP Support for ASF 2.0 is enabled.

Setting Up Initial Administrator Account for DASH

Setting up an Administrator account for DASH requires the use of the Broadcom NetXtreme Gigabit Drivers for Multiple Operating Systems Softpaq. This is available at www.hp.com.

Execute the Softpaq, and then open a Command box as Administrator.

Use the following steps to create an Administrator account:

1. Go to the directory where the Broadcom application is installed.
2. Run `bmc edit`. This will execute the Broadcom Manageability Configuration and Control application and will bring up a list of Management Firmware Configuration options.

Figure 9 Management Firmware Configuration options

```
Administrator: Command Prompt - bmcc edit
MAC Address: 0010180EFED8 IP Address: 0.0.0.0
Service Name: <2FCD7756-24DF-4BEB-9A7C-D91B323F9AA>
Reading configuration records from NURAM
Exporting 1024 bytes of Opaque Management Data...
Verifying configuration records...
Read 101 configuration records <39520 bytes>

Management Firmware Configuration:

[4] IPv4 Settings - Dynamic 192.168.30.20
[6] IPv6 Settings - Dynamic fe80::30e5:c884:7e8:acb3
[U] User Account Management <10>
[W] WS-Management - HTTP:623 HTTPS:664
[E] WS-Event Subscriptions <4>
[O] Opaque Management Data <4> 1024 of 1024 bytes available
[C] Console Redirection - Enabled
[P] ASF Alerting (PETs) - sent to , Heartbeat @ 60 seconds
[R] ASF Remote Query and Control - RMCP:623 (Ping Only) Secure:664
[?] ASF System Description Table
[S] SMBus Interfaces <1>
[A] Advanced Settings
[F] Save to file
[X] Exit

Enter your choice -> _
```

3. Enter **U** for User Account Management.
4. Enter **2** for User Accounts.
5. Enter **1** for Administrator Account.

Figure 10 Management options

```
Administrator: Command Prompt - bmcc edit

Enter your choice -> u

User Account Management:

0. Return to previous menu [Enter]
1. User Roles...
2. User Accounts...

Enter your choice -> 2

WS-Management User Accounts:

0. Return to previous menu [Enter]
1. Account #1 - Administrator
2. Account #2 - Operator
3. Account #3 -
4. Account #4 -
5. Account #5 -
6. Account #6 -
7. Account #7 -
8. Account #8 -
9. Account #9 -
10. Account #10 -
A. Add a User Account
D. Delete a User Account

Enter your choice -> 1
```

6. Enter **2** to change Offline from True to False.

- Enter **4=xxx** where xxx is the password to set a password. The password by default is blank.

Figure 11 Management options

```

Administrator: Command Prompt - bmcc edit
6. Roles.....: 0x00000001
Enter your choice <item=value> -> 2
WS-Management User Account #1 Settings:
0. Return to previous menu [Enter]
1. Created.....: True
2. Offline.....: False
3. User ID.....: "Administrator"
4. Password.....: ""
5. Organization.....: "My Company"
6. Roles.....: 0x00000001
Enter your choice <item=value> -> 4=Password
WS-Management User Account #1 Settings:
0. Return to previous menu [Enter]
1. Created.....: True
2. Offline.....: False
3. User ID.....: "Administrator"
4. Password.....: "Password"
5. Organization.....: "My Company"
6. Roles.....: 0x00000001
Enter your choice <item=value> ->

```

- Enter **0** twice to get back to the main page.
- Enter **Q** to Save and Exit.

Figure 12 Save and exit

```

Administrator: Command Prompt - bmcc edit
User Account Management:
0. Return to previous menu [Enter]
1. User Roles...
2. User Accounts...
Enter your choice -> 0
Management Firmware Configuration <changed>:
[4] IPv4 Settings - Dynamic 192.168.30.20
[6] IPv6 Settings - Dynamic fe80::30e5:c884:7e8:acb3
[U] User Account Management <10>
[W] WS-Management - HTTP:623 HTTPS:664
[E] WS-Event Subscriptions <4>
[O] Opaque Management Data <4> 1024 of 1024 bytes available
[C] Console Redirection - Enabled
[P] ASF Alerting (PETs) - sent to , Heartbeat @ 60 seconds
[R] ASF Remote Query and Control - RMCP:623 <Ping Only> Secure:664
[?] ASF System Description Table
[S] SMBus Interfaces <1>
[A] Advanced Settings
[F] Save to file
[Q] Save to NVRAM and Exit
[X] Exit without saving changes
Enter your choice ->

```

After saving to NVRAM and exiting, the Administrator account along with the password has been created.

WebGUI

The WebGUI is a web browser based interface for limited remote system management.

The WebGUI will only function once the Administrator account has been enabled and a password is set with `bmcc.exe`.

The WebGUI is accessible from the following web browsers:

- Microsoft Internet Explorer 6 SP1 or newer
- Netscape Navigator 7.1 or newer
- Mozilla Firefox 1.0 or newer
- Mozilla 1.7 or newer

Limited remote system management includes:

- Hardware inventory for processor and memory
- Remote system power on, power off, or reset
- Determining network settings
- Setting up users accounts

Connecting with the WebGUI:

1. Execute a web browser from a separate system - a management system that is also on the same subnet as the DASH system.
2. Connect to the IP address and port of the DASH system.
By default the port is 623.
Example A: <http://172.16.2.17:623>
3. The management system makes a TCP connection to the DASH system and accesses the top level embedded web page.

Figure 13 Logon screen



4. Enter user name and password. The default user name is "Administrator" or "Operator" depending which account was set with bmcc. The password is blank by default, but can be changed during DASH account setup with bmcc.

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