3 BIOS Setup Utilities

The BIOS Setup utility is a text-based utility that allows the user to configure the system and view current settings and environment information for the platform devices. The Setup utility controls the platform's built-in devices, the boot manager, and error manager.

The BIOS Setup interface consists of a number of pages or screens. Each page contains information or links to other pages. The advanced tab in Setup displays a list of general categories as links. These links lead to pages containing a specific category's configuration.

The following sections describe the look and behavior for the platform setup.

BIOS Setup Operation

The BIOS Setup Utility has the following features:

Localization – The Intel® Server Board BIOS is only available in English. However, BIOS Setup uses the Unicode standard and is capable of displaying data and input in Setup fields in all languages currently included in the Unicode standard.

Console Redirection – BIOS Setup is functional via Console Redirection over various terminal emulation standards. When Console Redirection is enabled, the POST display out is in purely Text Mode due to Redirection data transfer in a serial port data terminal emulation mode. This may limit some functionality for compatibility, for example, usage of colors or some keys or key sequences or support of pointing devices.

Setup screens are designed to be displayable in an 80-character x 24-line format in order to work with Console Redirection, although that screen layout should display correctly on any format with longer lines or more lines on the screen.

Password protection – BIOS Setup may be protected from unauthorized changes by setting an Administrative Password in the Security screen When an Administrative Password has been set, all selection and data entry fields in Setup (except System Time and Date) are grayed out and cannot be changed unless the Administrative Password has been entered.

⁄ NOTE

Note: if an Administrative Password has not been set, anyone who boots the system to Setup has access to all selection and data entry fields in Setup and can change any of them.

Setup Page Layout

The Setup page layout is sectioned into functional areas. Each occupies a specific area of the screen and has dedicated functionality. The following table lists and describes each functional area.

The Setup page is designed to a format of 80 x 24 (24 lines of 80 characters each). The typical display screen in a Legacy mode or in a terminal emulator mode is actually 80 characters by 25 lines, but with "line wrap" enabled (which it usually is) the 25th line cannot be used with the Setup page.

Table 7. BIOS Setup Page Layout

Functional Area	Description
Title (Tab) Bar	The Title Bar is located at the top of the screen and displays "Tabs" with the titles of the top-level pages, or screens that can be selected. Using the left and right arrow keys moves from page to page through the Tabs.
	When there are more Tabs than can be displayed on the Title (Tab) Bar, they will scroll off to the left or right of the screen and temporarily disappear from the visible Title Bar. Using the arrow keys will scroll them back onto the visible Title Bar. When the arrow keys reach either end of the Title Bar, they will "wrap around" to the other end of the Title Bar.
	For multi-level hierarchies, this shows only the top-level page above the page which the user is currently viewing. The Page Title gives further information.
Page Title	In a multi-level hierarchy of pages beneath one of the top-level Tabs, the Page Title identifying the specific page which the user is viewing is located in the upper left corner of the page. Using the <ESC> (Escape) key will return the user to the higher level in the hierarchy, until the top-level Tab page is reached.
Setup Item List	The Setup Item List is a set of control entries and informational items. The list is displayed in two columns. For each item in the list:
	▪ The left column of the list contains Prompt String (or Label String), a character string which identifies the item. The Prompt String may be up to **34 characters** long in the 80 x 24 page format.
	▪ The right column contains a data field which may be an informational data display, a data input field, or a multiple choice field. Data input or multiple-choice fields are demarcated by square brackets "[....]". This field may be up to **90 characters** long, but only the first **22 characters** can be displayed on the 80 x 24 page (**24 characters** for an informational display-only field).
	The operator navigates up and down the right hand column through the available input or choice fields.
	A Setup Item may also represent a selection to open a new screen with a further group of options for specific functionality. In this case, the operator navigates to the desired selection and presses <Enter> to go to the new screen.
Item-Specific Help Area	The Item-specific Help Area is located on the right side of the screen and contains Help Text specific to the highlighted Setup Item. Help information may include the meaning and usage of the item, allowable values, effects of the options, etc.
	The Help Area is a **29 character by 11 line** section of the 80 x 24 page. The Help Text may have explicit line-breaks within it. When the text is longer than 29 characters, it is also broken to a new line, dividing the text at the last space (blank) character before the 29th character. An unbroken string of more than 29 characters will be arbitrarily wrapped to a new line after the 29th character. Text that extends beyond the end of the 11th line will not be displayed.
Keyboard Command Area	The Keyboard Command Area is located at the bottom right of the screen and continuously displays help for keyboard special keys and navigation keys.

Entering BIOS Setup

To enter the BIOS Setup using a keyboard (or emulated keyboard), press the <F2> function key during boot time when the OEM or Intel Logo Screen or the POST Diagnostic Screen is displayed.

The following instructional message is displayed on the Diagnostic Screen or under the Quiet Boot Logo Screen:

Press <F2> to enter setup, <F6> Boot Menu, <F12> Network Boot

Note: With a USB keyboard, it is important to wait until the BIOS "discovers" the keyboard and beeps – until the USB Controller has been initialized and the USB keyboard activated, key presses will not be read by the system. If

When the Setup Utility is entered, the Main screen is displayed initially. However, serious errors cause the system to display the Error Manager screen instead of the Main screen.

It is also possible to cause a boot directly to Setup using an IPMI 2.0 command "Get/Set System Boot Options". For details on that capability, see the explanation in the IPMI description.

Setup Navigation Keyboard Commands

The bottom right portion of the Setup screen provides a list of commands that are used to navigate through the Setup utility. These commands are displayed at all times.

Each Setup menu page contains a number of features. Each feature is associated with a value field, except those used for informative purposes. Each value field contains configurable parameters. Depending on the security option chosen and in effect by the password, a menu feature's value may or may not be changed. If a value cannot be changed, its field is made inaccessible and appears grayed out.

Table 8. BIOS Setup: Keyboard Command Bar

Key	Option	Description
<Enter>	Execute Command	The <Enter> key is used to activate submenus when the selected feature is a submenu, or to display a pick list if a selected option has a value field, or to select a subfield for multi-valued features like time and date. If a pick list is displayed, the <Enter> key selects the currently highlighted item, undoes the pick list, and returns the focus to the parent menu.
<Esc>	Exit	The <Esc> key provides a mechanism for backing out of any field. When the <Esc> key is pressed while editing any field or selecting features of a menu, the parent menu is re-entered.
		When the <Esc> key is pressed in any submenu, the parent menu is re-entered. When the <Esc> key is pressed in any major menu, the exit confirmation window is displayed and the user is asked whether changes can be discarded. If "No" is selected and the <Enter> key is pressed, or if the <Esc> key is pressed, the user is returned to where they were before <Esc> was pressed, without affecting any existing settings. If "Yes" is selected and the <Enter> key is pressed, the setup is exited and the BIOS returns to the main System Options Menu screen.
↑	Select Item	The up arrow is used to select the previous value in a pick list, or the previous option in a menu item's option list. The selected item must then be activated by pressing the <Enter> key.
⬚	Select Item	The down arrow is used to select the next value in a menu item's option list, or a value field's pick list. The selected item must then be activated by pressing the <Enter> key.
⬚	Select Menu	The left and right arrow keys are used to move between the major menu pages. The keys have no effect if a sub-menu or pick list is displayed.
<Tab>	Select Field	The <Tab> key is used to move between fields. For example, <Tab> can be used to move from hours to minutes in the time item in the main menu.
-	Change Value	The minus key on the keypad is used to change the value of the current item to the previous value. This key scrolls through the values in the associated pick list without displaying the full list.

Key	Option	Description
+	Change Value	The plus key on the keypad is used to change the value of the current menu item to the next value. This key scrolls through the values in the associated pick list without displaying the full list. On 106-key Japanese keyboards, the plus key has a different scan code than the plus key on the other keyboards, but will have the same effect.
<F9>	Setup Defaults	Pressing the <F9> key causes the following to display: Load Optimized Defaults? Yes No If "Yes" is highlighted and <Enter> is pressed, all Setup fields are set to their default values. If "No" is highlighted and <Enter> is pressed, or if the <Esc> key is pressed, the user is returned to where they were before <F9> was pressed without affecting any existing field values.
<F10>	Save and Exit	Pressing the <F10> key causes the following message to display: Save configuration and reset? Yes No If "Yes" is highlighted and <Enter> is pressed, all changes are saved and the Setup is exited. If "No" is highlighted and <Enter> is pressed, or the <Esc> key is pressed, the user is returned to where they were before <F10> was pressed without affecting any existing values.

Setup Screen Menu Selection Bar

The Setup Screen Menu selection bar is located at the top of the BIOS Setup Utility screen. It displays tabs showing the major screen selections available to the user. By using the left and right arrow keys, the user can select the listed screens. Some screen selections are out of the visible menu space, and become available by scrolling to the left or right of the current selections displayed.

BIOS Setup Utility Screens

The following sections describe the screens available in the BIOS Setup utility for the configuration of the server platform.

For each of these screens, there is an image of the screen with a list of Field Descriptions which describe the contents of each item on the screen. Each item on the screen is hyperlinked to the relevant Field Description. Each Field Description is hyperlinked back to the screen image.

These lists follow the following guidelines:

- The text heading for each Field Description is the actual text as displayed on the BIOS Setup screen. This screen text is a hyperlink to it's corresponding Field Description.
- The text shown in the Option Values and Help Text entries in each Field Description are the actual text and values are displayed on the BIOS Setup screens.
- In the Option Values entries, the text for default values is shown with an underline. These values do not appear underline on the BIOS Setup screen. The underlined text in this document is to serve as a reference to which value is the default value.

- The Help Text entry is the actual text which appears on the screen to accompany the item when the item is the one in focus (active on the screen).
- The Comments entry provides additional information where it may be helpful. This information does not appear on the BIOS Setup screens.
- Information enclosed in angular brackets (< >) in the screen shots identifies text that can vary, depending on the option(s) installed. For example, <Amount of memory installed> is replaced by the actual value for "Total Memory".
- Information enclosed in square brackets ([ ]) in the tables identifies areas where the user must type in text instead of selecting from a provided option.
- Whenever information is changed (except Date and Time), the systems requires a save and reboot to take place in order for the changes to take effect. Alternatively, pressing <ESC> discards the changes and resumes POST to continue to boot the system according to the boot order set from the last boot.

Map of Screens and Functionality

There are a number of screens in the entire Setup collection. They are organized into major categories. Each category has a hierarchy beginning with a top-level screen from which lower-level screens may be selected. Each top-level screen appears as a tab, arranged across the top of the Setup screen image of all top-level screens.

There are more categories than will fit across the top of the screen, so at any given time there will be some categories which will not appear until the user has scrolled across the tabs which are present.

The categories and the screens included in each category are listed below, with links to each of the screens named.

Table 9. Screen Map

Categories (Top Tabs)	2nd Level Screens	3rd Level Screens
Main Screen (Tab)		
Advanced Screen (Tab)		
⮡	Processor Configuration	
⮡	Power & Performance	
⮡	Memory Configuration	
	⮡	Memory RAS and Performance Configuration
⮡	Mass Storage Controller Configuration	
⮡	PCI Configuration	
	⮡	NIC Configuration

Categories (Top Tabs)	2nd Level Screens	3rd Level Screens
↳	Serial Port Configuration	
↳	USB Configuration	
↳	System Acoustic and Performance Configuration	
Security Screen (Tab)		
Server Management Screen (Tab)		
↳	Console Redirection	
↳	System Information	
↳	BMC LAN Configuration	
Boot Options Screen (Tab)		
↳	CDROM Order	
↳	Hard Disk Order	
↳	Floppy Order	
↳	Network Device Order	
↳	BEV Device Order	
↳	Add EFI Boot Option	
↳	Delete EFI Boot Option	
Boot Manager Screen (Tab)		
Error Manager Screen (Tab)		
Save & Exit Screen (Tab)		

Main Screen (Tab)

The Main Screen is the first screen that appears when the BIOS Setup configuration utility is entered, unless an error has occurred. If an error has occurred, the Error Manager Screen appears.

Main	Advanced	Security	Server Management	Boot Options	Boot Manager

Logged in as: **Administrator**/User

Platform ID   <Platform Identification String>

System BIOS

BIOS Version   <Platform.86B.xx.yy.zzzz>

Build Date   <MM/DD/YYYY>

Memory

Total Memory   <Amount of memory installed>

Quiet Boot   **Enabled**/Disabled

POST Error Pause   Enabled/**Disabled**

System Date   [Day MM/DD/YYYY]

System Time   [HH:MM:SS]
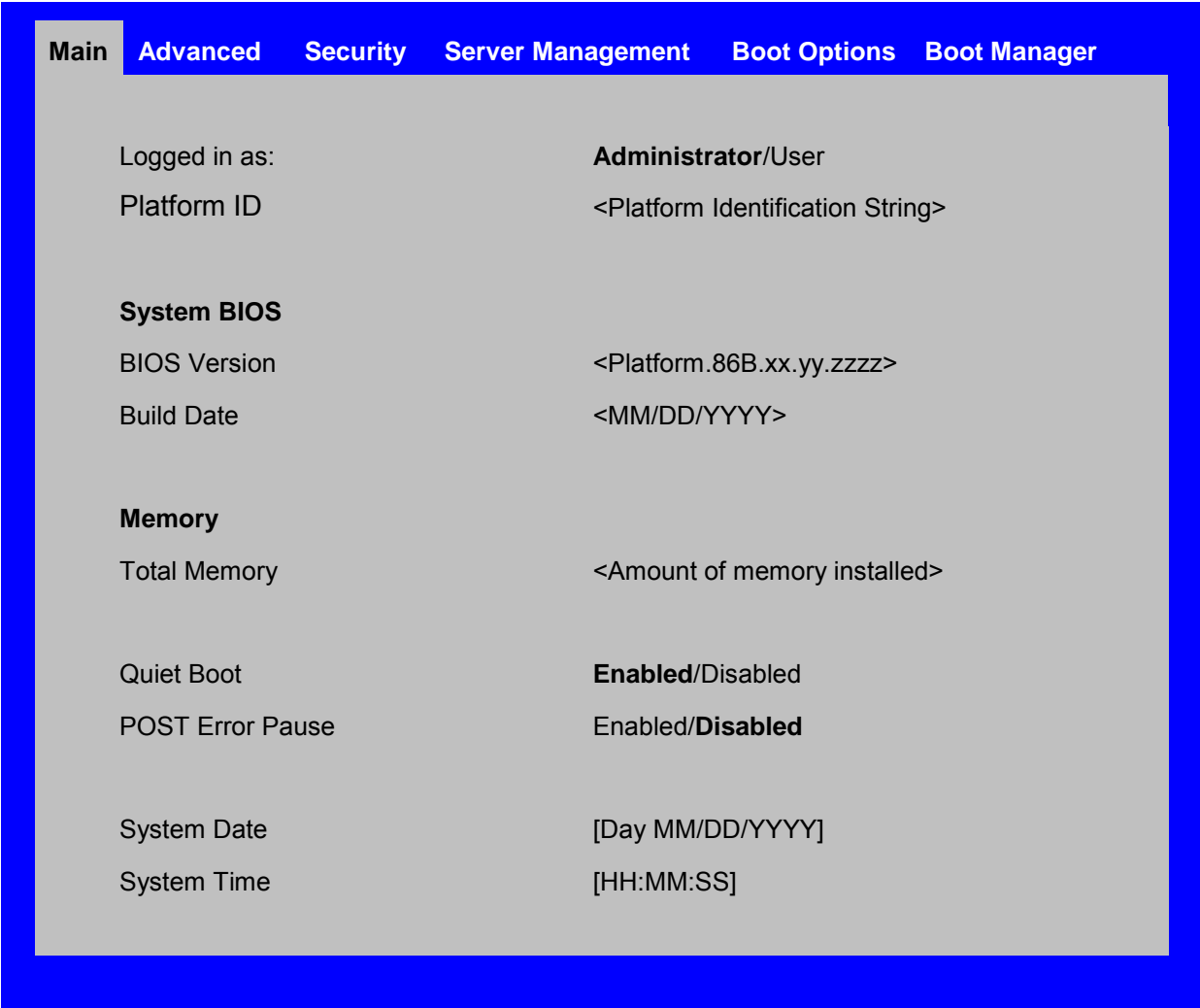
Figure 123. Main Screen

<u>**Screen Field Descriptions:**</u>

1. Logged in as:

   Option Values: *<Administrator / User>*

   Help Text: *<None>*

   Comments: *Information only*. Displays password level that setup is running in: Administrator or User. With no passwords set, Administrator is the default mode.

2. Platform ID

Option Values: *< Platform ID>*

Help Text: *<None>*

Comments: *Information only.* Displays the Platform ID (Board ID) for the board
on which the BIOS is executing POST.

The Platform ID is limited to 8 characters, because it is also used in the ACPI Tables
which have that limitation. In some cases, this means that the Platform ID is abbreviated
from the marketing designation (for example, MFS2600KI is abbreviated to S2600KI).

3. BIOS Version

Option Values: *<Current BIOS version ID>*

Help Text: *<None>*

Comments: *Information only.* The BIOS version displayed uniquely identifies
the BIOS that is currently installed and operational on the board. The version information
displayed is taken from the BIOS ID String, with the timestamp segment dropped off.
The segments displayed are:

Platform:	Identifies that this is the correct platform BIOS
86B:	Identifies this BIOS as being an EPSD Server BIOS
xx:	Major Revision level of the BIOS
yy:	Release Revision level for this BIOS
zzzz:	Release Number for this BIOS

4. Build Date

Option Values: *<Date and time when the currently installed BIOS was
created (built)>*

Help Text: *<None>*

Comments: *Information only.* The time and date displayed are taken from the
timestamp segment of the BIOS ID String.

5. Total Memory

Option Values: *<Amount of memory installed in the system>*

Help Text: *<None>*

Comments: *Information only.* Displays the total physical memory installed in
the system, in MB or GB. The term physical memory indicates the total memory
discovered in the form of installed DDR3 DIMMs.

6. Quiet Boot

Option Values: **<u>Enabled</u>**
Disabled

Help Text:

[Enabled] – Display the logo screen during POST.

[Disabled] – Display the diagnostic screen during POST.

Comments: This field controls whether the full diagnostic information is displayed on the screen during POST. When Console Redirection is enabled, the Quiet Boot setting is disregarded and the text mode Diagnostic Screen is displayed unconditionally.

7. POST Error Pause

Option Values: Enabled
<u>Disabled</u>

Help Text:

[Enabled] – Go to the Error Manager for critical POST errors.

[Disabled] – Attempt to boot and do not go to the Error Manager for critical POST errors.

Comments: If enabled, the POST Error Pause option takes the system to the error manager to review the errors when major errors occur. Minor and fatal error displays are not affected by this setting.

8. System Date

Option Values: *<System Date initially displays the current system calendar date, including the day of the week>*

Help Text:

System Date has configurable fields for the current Month, Day, and Year.

The year must be between 2005 and 2099.

Use [Enter] or [Tab] key to select the next field.

Use [+] or [-] key to modify the selected field.

Comments: This field will initially display the current system day of week and date. It may be edited to change the system date. When the System Date is reset by the "BIOS Defaults" jumper, BIOS Recovery Flash Update, or other method, the date will be the earliest date in the allowed range – ***Saturday 01/01/2005***.

9. System Time

Option Values: *<System Time initially displays the current system time of day, in 24-hour format>*

Help Text:

> *System Time has configurable fields for Hours, Minutes, and Seconds.*
>
> *Hours are in 24-hour format.*
>
> *Use the [Enter] or [Tab] key to select the next field.*
>
> *Use the [+] or [-] key to modify the selected field.*

Comments: This field will initially display the current system time (24 hour time). It may be edited to change the system time. When the System Time is reset by the "BIOS Defaults" jumper, BIOS Recovery Flash Update, or other method, the time will be the earliest time of day in the allowed range – ***00:00:00*** (although the time will be updated beginning from when it is reset early in POST).

Advanced Screen (Tab)

The Advanced screen provides an access point to configure several groups of options. On this screen, the user can select the option group to be configured. Configuration actions are performed on the selected screen, and not directly on the Advanced screen.

This screen is the same for all board series, selecting between the same groups of options, although the options for different boards are not necessarily identical.

To access this screen from the *Main* screen or other top-level "Tab" screen, press the right or left arrow keys to traverse the tabs at the top of the Setup screen until the *Advanced* screen is selected.

Advanced	**Security**	**Server Management**	**Boot Options**	**Boot Manager**

► **Processor Configuration**

► **Power & Performance**

► **Memory Configuration**

► **Mass Storage Controller Configuration**

► **PCI Configuration**

► **Serial Port Configuration**

► **USB Configuration**

► **System Acoustic and Performance Configuration**
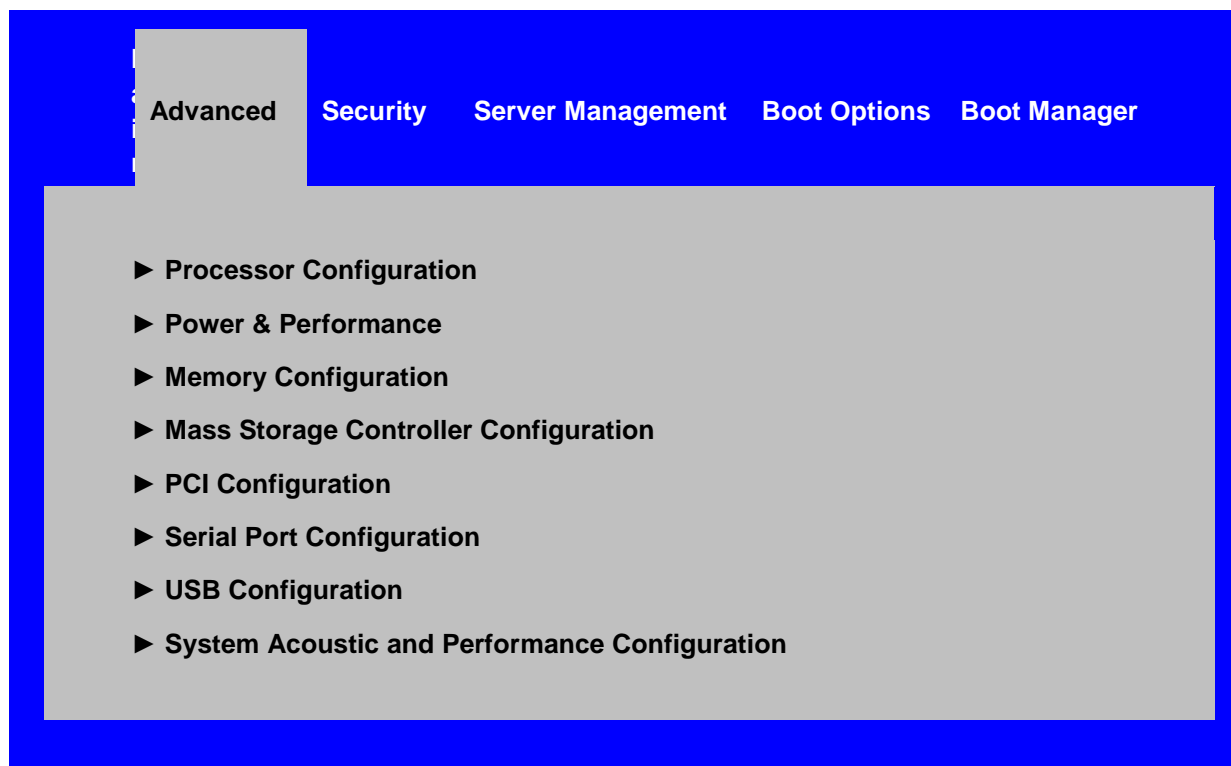
Figure 124. Advanced Screen

Screen Field Descriptions:

1. Processor Configuration

   Option Values: *<None>*

   Help Text: *View/Configure processor information and settings.*

   Comments: *Selection only*. Position to this line and press the <Enter> key to go to the **Processor Configuration** group of configuration settings.

2. Power & Performance

   Option Values: *<None>*

   Help Text: *View/Configure processor information and settings.*

   Comments: *Selection only*. Position to this line and press the <Enter> key to go to the **Power & Performance** group of configuration settings.

3. Memory Configuration

Option Values: *<None>*

Help Text:

    View/Configure memory information and settings.

Comments: *Selection only*. Position to this line and press the <Enter> key to go to the **Memory Configuration** group of configuration settings.

4. Mass Storage Controller Configuration

Option Values: *<None>*

Help Text:

    View/Configure mass storage controller information and settings.

Comments: *Selection only*. Position to this line and press the <Enter> key to go to the **Mass Storage Controller Configuration** group of configuration settings.

5. PCI Configuration

Option Values: *<None>*

Help Text:

    View/Configure PCI information and settings.

Comments: *Selection only*. Position to this line and press the <Enter> key to go to the **PCI Configuration** group of configuration settings.

6. Serial Port Configuration

Option Values: *<None>*

Help Text:

    View/Configure serial port information and settings.

Comments: *Selection only*. Position to this line and press the <Enter> key to go to the *Serial Port Configuration* group of configuration settings.

7. USB Configuration

Option Values: *<None>*

Help Text:

    View/Configure USB information and settings.

Comments: *Selection only*. Position to this line and press the <Enter> key to go to the **USB Configuration** group of configuration settings.

8. System Acoustic and Performance Configuration

Option Values: *<None>*

Help Text:

View/Configure system acoustic and performance information and settings.

Comments: <u>*Selection only*</u>. Position to this line and press the <Enter> key to go to the **System Acoustic and Performance Configuration** group of configuration settings.

Processor Configuration

The Processor Configuration screen displays the processor identification and microcode level, core frequency, cache sizes, Intel® QuickPath Interconnect (QPI) information for all processors currently installed. It also allows the user to enable or disable a number of processor options.

To access this screen from the **Main** screen, select **Advanced > Processor Configuration**. To move to another screen, press the <Esc> key to return to the **Advanced** screen, then select the desired screen.

Advanced		

Processor Configuration

Processor Socket	CPU 1	CPU 2
Processor ID	\<CPUID>* |	\<CPUID>
Processor Frequency	\<Proc Freq> |	\<Proc Freq>
Microcode Revision	\<Rev data> |	\<Rev data>
L1 Cache RAM	\<L1 Cache Size> |	\<L1 Cache Size>
L2 Cache RAM	\<L2 Cache Size> |	\<L2 Cache Size>
L3 Cache RAM	\<L3 Cache Size> |	\<L3 Cache Size>
Processor 1 Version	\<ID string from Processor 1>	
Processor 2 Version	\<ID string from Processor 2>	

Current Intel® QPI Link Speed	Slow/Fast
Intel® QPI Link Frequency	N/A / 6.4 GT/s / 7.2 GT/s / 8.0 GT/s / Unknown GT/s
Intel® QPI Frequency Select	**Auto Max** / 6.4 GT/s / 7.2 GT/s / 8.0 GT/s
Intel® Turbo Boost Technology	**Enabled**/Disabled
Enhanced Intel SpeedStep® Tech	**Enabled/**Disabled
Processor C3	Enabled/**Disabled**
Processor C6	**Enabled**/Disabled
Intel® Hyper-Threading Tech	**Enabled**/Disabled
Active Processor Cores	**All/**1/2/3/4/5/6/7
Execute Disable Bit	**Enabled**/Disabled
Intel® Virtualization Technology	Enabled/**Disabled**
Intel® VT for Directed I/O	Enabled/**Disabled**
Interrupt Remapping	**Enabled**/Disabled

Coherency Support	Enabled/**Disabled**
ATS Support	**Enabled**/Disabled
Pass-through DMA Support	**Enabled**/Disabled
Intel(R) TXT	Enabled/**Disabled**
Enhanced Error Containment Mode	Enabled/**Disabled**
MLC Streamer	**Enabled/**Disabled
MLC Spatial Prefetcher	**Enabled**/Disabled
DCU Data Prefetcher	**Enabled**/Disabled
DCU Instruction Prefetcher	**Enabled**/Disabled
Direct Cache Access (DCA)	**Enabled**/Disabled
SMM Wait Timeout	[20 – 3000ms, **20** is default]

Figure 125. Processor Configuration Screen

<u>**Screen Field Descriptions:**</u>

1. Processor ID

   Option Values: *<CPUID>*

   Help Text: *<None>*

   Comments: *Information only*. Displays the Processor Signature value (from the CPUID instruction) identifying the type of processor and the stepping.

   For multi-socket boards, the processor selected as the Bootstrap Processor (BSP) has an asterisk ("*") displayed beside the Processor ID. "N/A" will be displayed for a processor if not installed.

   Board has 2 Processor ID displays, regardless of whether the second CPU socket has a processor installed. If the socket does not have a processor installed, "N/A" will displayed for the processor data.

2. Processor Frequency

Option Values: *<Current Processor Operating Frequency>*

Help Text: *<None>*

Comments: *Information only*. Displays current operating frequency of the processor.

2 sockets boards have a display column for each socket, showing "N/A" for empty sockets where processors are not installed.

3. Microcode Revision

Option Values: *<Microcode Revision Number>*

Help Text: *<None>*

Comments: *Information only*. Displays Revision Level of the currently loaded processor microcode.

2 sockets boards have a display column for each socket, showing "N/A" for empty sockets where processors are not installed.

4. L1 Cache RAM

Option Values: *<L1 cache size>*

Help Text: *<None>*

Comments: *Information only*. Displays size in KB of the processor L1 Cache. Since L1 cache is not shared between cores, this is shown as the amount of L1 cache <u>per core</u>. There are two types of L1 cache, so this amount is the total of <u>L1 Instruction Cache</u> plus <u>L1 Data Cache</u> for each core.

2 sockets boards have a display column for each socket, showing "N/A" for empty sockets where processors are not installed.

5. L2 Cache RAM

Option Values: *<L2 cache size>*

Help Text: *<None>*

Comments: *Information only*. Displays size in KB of the processor L2 Cache. Since L2 cache is not shared between cores, this is shown as the amount of L2 cache <u>per core</u>.

2 sockets boards have a display column for each socket, showing "N/A" for empty sockets where processors are not installed.

6. L3 Cache RAM

Option Values: *<L3 cache size>*

Help Text: *<None>*

Comments: *Information only.* Displays size in MB of the processor L3 Cache. Since L3 cache is shared between all cores in a processor package, this is shown as the total amount of L3 cache <u>per processor package</u>.

2 sockets boards have a display column for each socket, showing "N/A" for empty sockets where processors are not installed.

7. Processor Version

See following…

8. Processor 1 Version

See following…

9. Processor 2 Version

Option Values: *<ID string from processor>*

Help Text: *<None>*

Comments: *Information only.* Displays Brand ID string read from processor with CPUID instruction.

2 sockets boards have a display line for each socket, showing "N/A" for empty sockets where processors are not installed.

10. Current Intel® QPI Link Speed

Option Values: *Slow*
Fast

Help Text: *<None>*

Comments: *Information only.* Displays current Link Speed setting for the QPI Links. *Appears only on multi-socket boards.*

QPI Link Speed should display as "Slow" only when running at the "Boot Speed" of 50 MT/s, or when a multi-socket board has only one processor installed, so QPI is not functional. It should always be "Fast" when the QPI Link Frequency is in the normal functional range of 6.4 GT/s or above.

11. Intel® QPI Link Frequency

Option Values: *N/A*
6.4 GT/s
7.2 GT/s
8.0 GT/s
Unknown GT/s

Help Text: *<None>*

Comments: *Information only*. Displays current frequency at which the QPI Links are operating. *Appears only on multi-socket boards*.

When a multi-socket board has only one processor installed, QPI Link Frequency will be shown as "N/A".

12. Intel® QPI Frequency Select

Option Values: **Auto Max**
6.4 GT/s
7.2 GT/s
8.0 GT/s

Help Text:

Allows for selecting the Intel® QuickPath Interconnect Frequency. Recommended to leave in [Auto Max] so that BIOS can select the highest common Intel® QuickPath Interconnect frequency.

Comments: Lowering the QPI frequency may improve performance per watt for some processing loads and on certain benchmarks. [Auto Max] will give the maximum QPI performance available. *Appears only on multi-socket boards*.

When a multi-socket board has only one processor installed, this will be grayed out, with the previous value remaining displayed.

Changes in QPI Link Frequency will not take effect until the system reboots, so this will not immediately change the QPI Link Frequency display. Changing QPI Link Frequency does not affect the QPI Link Speed.

13. Intel® Turbo Boost Technology

Option Values: **Enabled**
Disabled

Help Text:

Intel® Turbo Boost Technology allows the processor to automatically increase its frequency if it is running below power, temperature, and current specifications.

Comments: This option is only visible if all processors installed in the system support Intel® Turbo Boost Technology. In order for this option to be available, Enhanced Intel® SpeedStep® Technology must be **Enabled**.

14. Enhanced Intel SpeedStep® Tech

Option Values: **Enabled**
                        Disabled

Help Text:

Enhanced Intel SpeedStep® Technology allows the system to dynamically adjust processor voltage and core frequency, which can result in decreased average power consumption and decreased average heat production.

Contact your OS vendor regarding OS support of this feature.

Comments: When Disabled, the processor setting reverts to running at Max TDP Core Frequency (rated frequency).

This option is only visible if all processors installed in the system support Enhanced Intel® SpeedStep® Technology. In order for the Intel® Turbo Boost option to be available, Enhanced Intel® SpeedStep® Technology must be **Enabled**.

15. Processor C3

Option Values: Enabled
                        Disabled

Help Text:

Enable/Disable Processor C3 (ACPI C2/C3) report to OS

Comments: This is normally **Disabled,** but can be **Enabled** for improved performance on certain benchmarks and in certain situations.

16. Processor C6

Option Values: **Enabled**
                        Disabled

Help Text:

Enable/Disable Processor C6 (ACPI C3) report to OS

Comments: This is normally **Enabled** but can be **Disabled** for improved performance on certain benchmarks and in certain situations.

17. Intel® Hyper-Threading Tech

Option Values: **<u>Enabled</u>**
                           Disabled

Help Text:

Intel® Hyper-Threading Technology allows multithreaded software applications to execute threads in parallel within each processor.

Contact your OS vendor regarding OS support of this feature.

Comments: This option is only visible if all processors installed in the system support Intel® Hyper-Threading Technology.

18. Active Processor Cores

Option Values: **<u>All</u>**
                           1
                           2
                           3
                           4
                           5
                           6
                           7

Help Text:

Number of cores to enable in each processor package.

Comments: The numbers of cores that appear as selections depends on the number of cores available in the processors installed. Boards may have as many as 8 cores in each of 1, 2, or 4 processors. The same number of cores must be active in each processor package.

This Setup screen should begin with the number of currently-active cores as the number displayed. See note below – this may be different from the number previously set by the user.

Note: The ME can control the number of active cores independently of the BIOS Setup setting. If the ME disables or enables processor cores, that will override the BIOS setting, and the number selected by BIOS will be disregarded.

19. Execute Disable Bit

Option Values: **Enabled**
Disabled

Help Text:

Execute Disable Bit can help prevent certain classes of malicious buffer overflow attacks.

Contact your OS vendor regarding OS support of this feature.

Comments: This option is only visible if all processors installed in the system support the Execute Disable Bit. The OS and applications installed must support this feature in order for it to be enabled.

20. Intel® Virtualization Technology

Option Values: Enabled
Disabled

Help Text:

Intel® Virtualization Technology allows a platform to run multiple operating systems and applications in independent partitions.

Note: A change to this option requires the system to be powered off and then back on before the setting takes effect.

Comments: This option is only visible if all processors installed in the system support Intel® VT. The software configuration installed on the system must support this feature in order for it to be enabled.

21. Intel® VT for Directed I/O

Option Values: Enabled
Disabled

Help Text:

Enable/Disable Intel ® Virtualization Technology for Directed I/O (Intel ® VT-d).

Report the I/O device assignment to VMM through DMAR ACPI Tables.

Comments: This option is only visible if all processors installed in the system support Intel® VT-d. The software configuration installed on the system must support this feature in order for it to be enabled.

22. Interrupt Remapping

Option Values: **Enabled**
                   Disabled

Help Text:

> *Enable/Disable Intel® VT-d Interrupt Remapping support. For some processors, this option may be "always enabled".*

Comments: This option only appears when Intel® Virtualization Technology for Directed I/O is ***Enabled.*** For some processors this will be enabled unconditionally whenever Intel® VT-d is enabled. In that case, this option will be shown as "Enabled", and grayed out and not changeable.

23. Coherency Support

Option Values: Enabled
                   Disabled

Help Text:

> *Enable/Disable Intel® VT-d Coherency support.*

Comments: This option only appears when Intel® Virtualization Technology for Directed I/O is ***Enabled***.

24. ATS Support

Option Values: **Enabled**
                   Disabled

Help Text:

> *Enable/Disable Intel® VT-d Address Translation Services (ATS) support.*

Comments: This option only appears when Intel® Virtualization Technology for Directed I/O is ***Enabled***.

25. Pass-through DMA Support

Option Values: **Enabled**
                   Disabled

Help Text:

> *Enable/Disable Intel ® VT-d Pass-through DMA support. For some processors, this option may be "always enabled".*

Comments: This option only appears when Intel® Virtualization Technology for Directed I/O is ***Enabled***. For some processors this will be enabled unconditionally whenever Intel® VT-d is enabled. In that case, this option will be shown as "Enabled", and grayed out and not changeable.

26. Enhanced Error Containment Mode

Option Values: Enabled
                   <u>Disabled</u>

Help Text:

> *Enable Enhanced Error Containment Mode (Data Poisoning) - Erroneous data coming from memory will be poisoned. If disabled (default), will be in Legacy Mode - No data poisoning support available.*

Comments: Enhanced Error Containment (Data Poisoning) is not supported by all models of processors, and this option will not appear unless all installed processors support Enhanced Error Containment. This option globally enables or disables both Core and Uncore Data Poisoning, for processors which support them.

27. MLC Streamer

Option Values: **<u>Enabled</u>**
                   Disabled

Help Text:

> *MLC Streamer is a speculative prefetch unit within the processor(s).*
>
> *Note: Modifying this setting may affect performance.*

Comments: MLC Streamer is normally **Enabled**, for best efficiency in L2 Cache and Memory Channel use, but disabling it may improve performance for some processing loads and on certain benchmarks.

28. MLC Spatial Prefetcher

Option Values: **<u>Enabled</u>**
                   Disabled

Help Text:

> *[Enabled] – Fetches adjacent cache line (128 bytes) when required data is not currently in cache.*
>
> *[Disabled] – Only fetches cache line with data required by the processor (64 bytes).*

Comments: MLC Spatial Prefetcher is normally **Enabled**, for best efficiency in L2 Cache and Memory Channel use, but disabling it may improve performance for some processing loads and on certain benchmarks.

29. DCU Data Prefetcher

Option Values: **Enabled**
                        Disabled

Help Text:

The next cache line will be prefetched into L1 data cache from L2 or system memory during unused cycles if it sees that the processor core has accessed several bytes sequentially in a cache line as data.

[Disabled] – Only fetches cache line with data required by the processor (64 bytes).

Comments: DCU Data Prefetcher is normally **Enabled**, for best efficiency in L1 Data Cache and Memory Channel use, but disabling it may improve performance for some processing loads and on certain benchmarks.

30. DCU Instruction Prefetcher

Option Values: **Enabled**
                        Disabled

Help Text:

The next cache line will be prefetched into L1 instruction cache from L2 or system memory during unused cycles if it sees that the processor core has accessed several bytes sequentially in a cache line as data.

Comments: DCU Data Prefetcher is normally **Enabled**, for best efficiency in L1 I Cache and Memory Channel use, but disabling it may improve performance for some processing loads and on certain benchmarks..

31. Direct Cache Access (DCA)

Option Values: **Enabled**
                        Disabled

Help Text:

Allows processors to increase the I/O performance by placing data from I/O devices directly into the processor cache.

Comments: System performance is usually best with Direct Cache Access Enabled. In certain unusual cases, disabling this may give improved results.

32. SMM Wait Timeout

Option Values: *[Entry Field 20 – 3000ms, **20** is default]*

Help Text:

> *Millisecond timeout waiting for BSP and APs to enter SMM. Range is 20ms to 3000ms.*

Comments: Amount of time to allow for the SMI Handler to respond to an SMI. If exceeded, BMC generates an SMI Timeout and resets the system.

Note: this field is temporary, and will be removed when no longer required.

Power & Performance

The Power & Performance screen allows the user to specify a profile which is optimized in the direction of either reduced power consumption or increased performance.

To access this screen from the *Main* screen, select *Advanced > Power and Performance*. To move to another screen, press the <Esc> key to return to the *Advanced* screen, then select the desired screen.

There are four possible profiles from which to choose. When a Power and Performance Profile is chosen, that in turn will cause the system to implement a defined list of Setup option settings and internal (non-visible) settings.

There is an explanation displayed on the screen, because of the fact that other settings may be adjusted without specifically notifying the user.

Advanced

Power & Performance

CPU Power and Performance Policy   Performance / **Balanced Performance** / Balanced Power / Power

[Performance] Optimization is strongly toward performance, even at the expense of energy efficiency.

[Balanced Performance] Weights optimization toward performance, while conserving energy.

[Balanced Power] Weights optimization toward energy conservation, with good performance.

[Power] Optimization is strongly toward energy efficiency, even at the expense of performance.

Figure 126. Power & Performance Screen

Screen Field Descriptions:

1. CPU Power and Performance Policy

   Option Values: *Performance*
                          <u>Balanced Performance</u>
                          Balanced Power
                          Power

   Help Text:

   Allows the user to set an overall power and performance policy for the system, and when changed will modify a selected list of options to achieve the policy. These options are still changeable outside of the policy, but do reflect the changes that the policy makes when a new policy is selected.

   Comments: Choosing one of these four Power and Performance Profiles implements a number of changes in BIOS settings, both visible settings in the Setup screens and non-visible internal settings.

Memory Configuration

The Memory Configuration screen allows the user to view details about the DDR3 DIMMs that are installed as system memory, and alter BIOS Memory Configuration settings where appropriate.

This screen shows memory system information, has options to select, and allows the user to select the "Configure Memory RAS and Performance" screen for further system memory information and configuration.

This screen differs somewhat between different boards which have different memory configurations. Some boards have one processor socket and fewer DIMMs, while other boards have two sockets or four sockets, more DIMMs, and the boards may have RAS and Performance options if configured for them

To access this screen from the *Main* screen, select **Advanced > Memory Configuration**. To move to another screen, press the <Esc> key to return to the **Advanced** screen, then select the desired screen.

Advanced

Memory Configuration

Total Memory	\<Total Physical Memory Installed in System\>
Effective Memory	\<Total Effective Memory\>
Current Configuration	\<Independent/Mirror/Rank Sparing/Lockstep\>
Current Memory Speed	\<Operational Memory Speed in MT/s\>
Memory Operating Speed Selection	**Auto**/800/1066/1333/1600
Patrol Scrub	**Enabled**/Disabled
Demand Scrub	**Enabled**/Disabled
Correctable Error Threshold	20/**10**/5/All/None
Memory Power Optimization	Power Optimized/**Performance Optimized**

► **Memory RAS and Performance Configuration**

DIMM Information

DIMM_A1	\<DIMM Size\> \<DIMM Status\>
DIMM_A2	\<DIMM Size\> \<DIMM Status\>
DIMM_A3	\<DIMM Size\> \<DIMM Status\>
DIMM_B1	\<DIMM Size\> \<DIMM Status\>
~~ (repeated for B2-H2, omitted) ~~	
DIMM_H3	\<DIMM Size\> \<DIMM Status\>
~~ (repeated for I1-P2, omitted) ~~	
DIMM_P3	\<DIMM Size\> \<DIMM Status\>
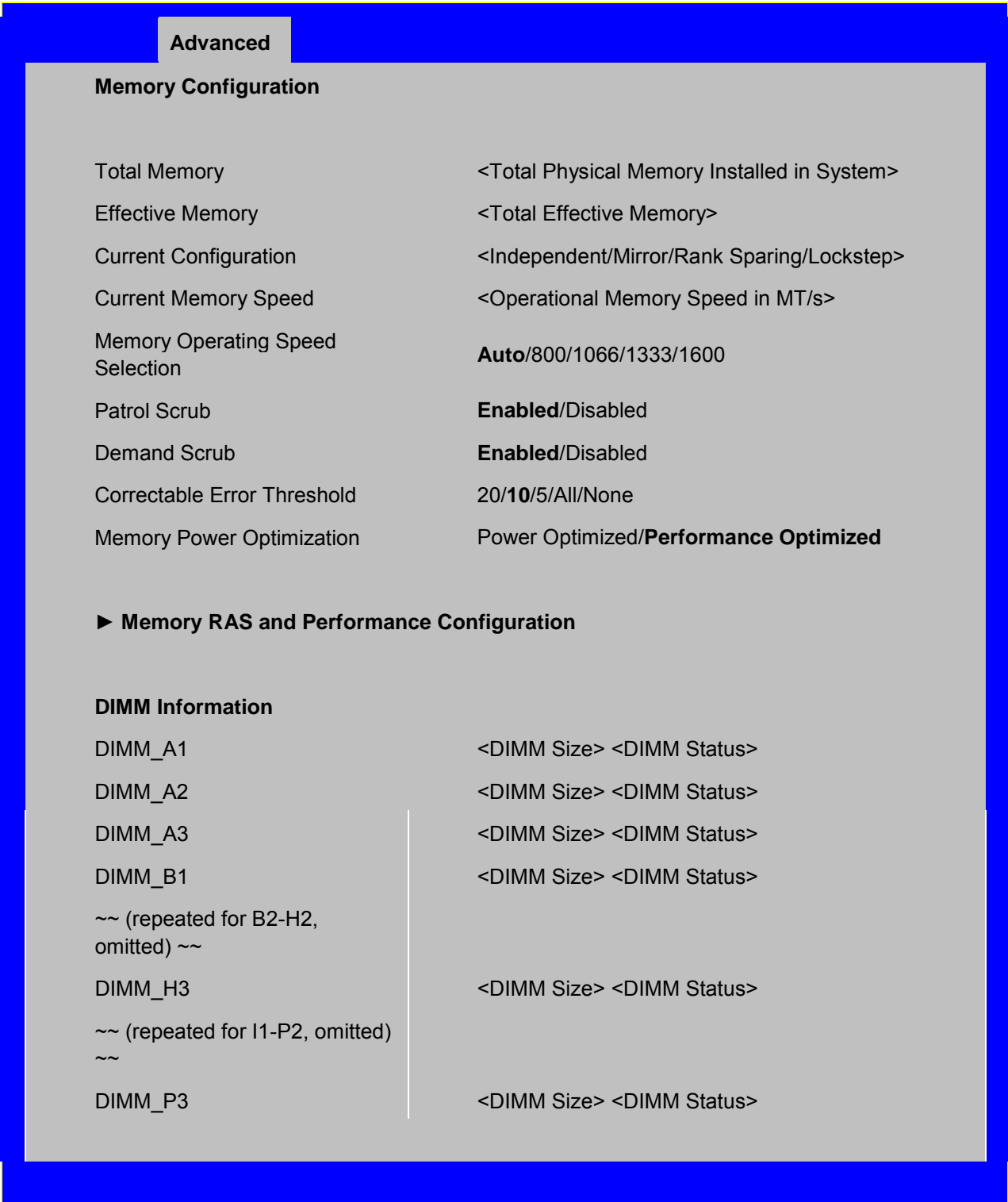
Figure 127. Memory Configuration Screen

<u>**Screen Field Descriptions:**</u>

1. Total Memory

Option Values: *<Total Physical Memory Installed in System>*

Help Text: *<None>*

Comments: *Information only.* Displays the amount of memory available in the system in the form of installed DDR3 DIMMs, in units of GB.

2. Effective Memory

Option Values: *<Total Effective Memory>*

Help Text: *<None>*

Comments: *Information only.* Displays the amount of memory available to the OS in MB or GB.

The Effective Memory is the Total Physical Memory minus the sum of all memory reserved for internal usage, RAS redundancy and SMRAM.

Note: some server operating systems do not display the total physical memory installed.

3. Current Configuration

Option Values: *Independent Channel*
Mirror
Rank Sparing
Lockstep

Help Text: *<None>*

Comments: *Information only:* Displays one of the following:

- **Independent Channel** – DIMMs are operating in Independent Channel Mode, the default configuration when there is no RAS Mode configured.
- **Mirror** – Mirroring RAS Mode has been configured and is operational.
- **Rank Sparing** – Rank Sparing RAS Mode has been configured and is operational
- **Lockstep** – Lockstep RAS Mode has been configured and is operational

4. Current Memory Speed

Option Values: *<Operational Memory Speed in MT/s>*

Help Text: *<None>*

Comments: *Information only.* Displays the speed in MT/s at which the memory is currently running.

The supported memory speeds are 800 MT/s, 1066 MT/s, 1333 MT/s, and 1600 MT/s. The actual memory speed capability depends on the memory configuration.

5. Memory Operating Speed Selection

Option Values: ***Auto***
                                800
                                1066
                                1333
                                1600

Help Text: *Force specific Memory Operating Speed or use Auto setting.*

Comments: Allows the user to select a specific speed at which memory will operate. Only speeds that are legitimate are available, that is, the user can only specify speeds less that or equal to the auto-selected Memory Operating Speed. The default **Auto** setting will select the highest achievable Memory Operating Speed consistent with the DIMMs and processors installed.

1600 MT/s memory speed is available only on certain models.

6. Patrol Scrub

Option Values: **Enabled**
                                Disabled

Help Text:

> *When enabled, performs periodic checks on memory cells and proactively walks through populated memory space, to seek and correct soft ECC errors.*

Comments: When enabled, Patrol Scrub is initialized to read through all of memory in a 24-hour period, correcting any Correctable ECC Errors it encounters by writing back the corrected data to memory.

7. Demand Scrub

Option Values: **Enabled**
                                Disabled

Help Text:

> *When enabled, executes when an ECC error is encountered during a normal read/write of data and corrects that data.*

Comments: When enabled, Demand Scrub automatically corrects a Correctable ECC Error encountered during a fetch from memory by writing back the corrected data to memory.

8. Correctable Error Threshold

Option Values: *20*
                       _10_
                       5
                       All
                       None

Help Text:

> *Threshold value for logging Correctable Errors (CE) – Threshold of 10 (default) logs 10th CE, "All" logs every CE and "None"' means no CE logging. All and None are not valid with Rank Sparing.*

Comments: Specifies how many Correctable Errors must occur before triggering the logging of a SEL Correctable Error Event. Only the first threshold crossing is logged, unless "All" is selected. "All" causes every CE that occurs to be logged. "None" suppresses CE logging completely.

When Rank Sparing RAS Mode is configured, "All" and "None" are not valid, so they will not be presented as choices.

This threshold is applied on a per-rank basis. The Correctable Error occurrences are counted for each memory rank. When any one rank accumulates a CE count equal to the CE Threshold, then a single CE SEL Event is logged, and all further CE logging is suppressed.

Note that the CE counts are subject to a "leaky bucket" mechanism that reduces the count as a function of time, to keep from accumulating counts unnecessarily over the term of a long operational run.

This is also the Correctable Error threshold used when Rank Sparing RAS Mode is configured. When a CE threshold crossing occurs in Rank Sparing Mode on a channel which is in Redundant state, it causes a Sparing Fail Over (SFO) event to occur. That threshold crossing will also be logged as a Correctable Error event if it is the first to occur on the system.

An SFO event causes the rank with the error to be replaced by the spare rank for that channel., and the channel goes to a non-redundant state (with a "Redundancy Degraded" SEL Event logged). There may be an SFO for each channel in the system, although only the first one can be logged as a CE event.

9. Memory Power Optimization

Option Values: Power Optimized
                                   Performance Optimized

Help Text:

> *Power Optimized enables memory power limiting, Performance Optimized disables it for maximum performance.*

Comments: When enabled, the system is configured to allow memory power management by the Node Manager (NM) and Management Engine (ME).

10. Memory RAS and Performance Configuration

Option Values: *<None>*

Help Text:

> *Configure memory RAS (Reliability, Availability, and Serviceability) and view current memory performance information and settings.*

Comments: *Selection only.* Position to this line and press the <Enter> key to go to the **Memory RAS and Performance Configuration** group of configuration settings.

11. DIMM_A1

12. DIMM_A2

13. DIMM_A3

14. DIMM_B1

(DIMM_B2 through DIMM_H2 omitted)

15. DIMM_H3

(DIMM_I1 through DIMM_P2 omitted)

16. DIMM_P3

Option Values: <DIMM Size> <DIMM Status>
                                    Where DIMM Size is:
                                          Size of DIMM in GB
                                    Where DIMM Status is:
                                          Installed&Operational
                                          Not Installed
                                          Failed/Disabled

Help Text: *<None>*

Comments: *Information only:* Displays the status of each DIMM socket present on the board. There is one line for each DIMM socket present on the board.

For each DIMM socket, the DIMM Status reflects one of the following three possible states:

- ***Installed&Operational*** – There is a DDR3 DIMM installed and operational in this slot.

- ***Not Installed*** – There is no DDR3 DIMM installed in this slot.

- ***Failed/Disabled*** – The DIMM installed in this slot has failed during initialization and/or was disabled during initialization.

For each DIMM that is in the ***Installed&Operational*** state, the DIMM Size in GB of that DIMM is displayed. This is the physical size of the DIMM, regardless of how it is counted in the Effective Memory size.

/ **NOTE**

*In "**DIMM_XY**", **X** denotes the Channel Identifier A - P, and **Y** denotes the DIMM Slot identifier 1 - 3 within the Channel. DIMM_A2 is the DIMM socket on Channel A, Slot 2. Not all boards have the same number of channels and slots – this is dependent on the board features.*

S2600 boards can have DIMMs A1, A2, A3 to H1, H2, H3 (max 2 CPU/4 chan/3 DPC)

Memory RAS and Performance Configuration

The Memory RAS and Performance Configuration screen allows the user to customize several memory configuration options, such as whether to use Memory Mirroring or Memory Sparing.

To access this screen from the *Main* screen, select *Advanced > Memory Configuration > Memory RAS and Performance Configuration*. To move to another screen, press the <Esc> key to return to the *Memory Configuration* screen, if necessary press the <Esc> key again to return to the *Advanced* screen, then select the desired screen.
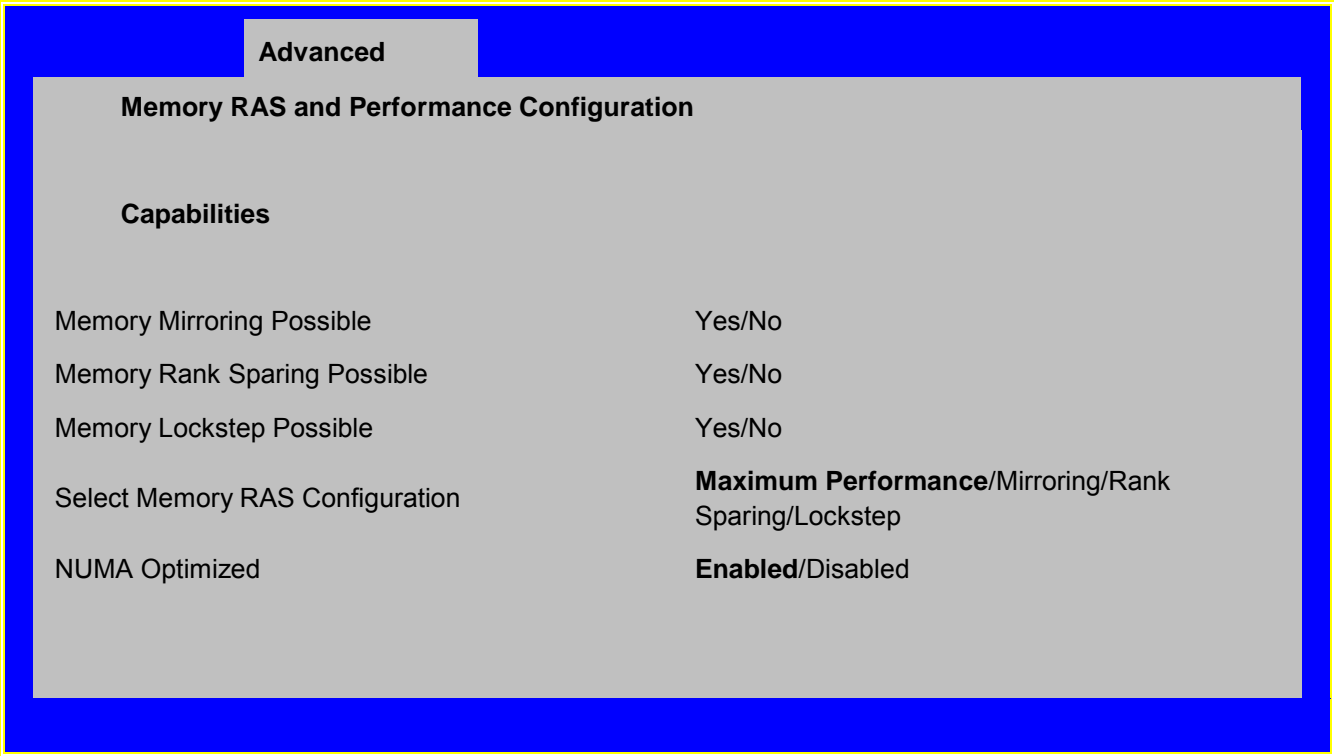
```
┌──────────────────────────────────────────────────────────────────────┐
│      ┌─────────────────┐                                               │
│      │   Advanced      │                                               │
│  ┌───┴─────────────────┴──────────────────────────────────────────┐   │
│  │  Memory RAS and Performance Configuration                       │   │
│  │                                                                 │   │
│  │                                                                 │   │
│  │    Capabilities                                                 │   │
│  │                                                                 │   │
│  │                                                                 │   │
│  │  Memory Mirroring Possible              Yes/No                  │   │
│  │                                                                 │   │
│  │  Memory Rank Sparing Possible           Yes/No                  │   │
│  │                                                                 │   │
│  │  Memory Lockstep Possible               Yes/No                  │   │
│  │                                                                 │   │
│  │  Select Memory RAS Configuration        Maximum Performance/    │   │
│  │                                         Mirroring/Rank          │   │
│  │                                         Sparing/Lockstep        │   │
│  │                                                                 │   │
│  │  NUMA Optimized                         Enabled/Disabled        │   │
│  │                                                                 │   │
│  │                                                                 │   │
│  └─────────────────────────────────────────────────────────────────┘   │
└──────────────────────────────────────────────────────────────────────┘
```

Figure 128. Memory RAS and Performance Configuration Screen

<u>**Screen Field Descriptions:**</u>

1. Memory Mirroring Possible

    Option Values: *Yes*
                            No

    Help Text: *<None>*

    Comments: *Information only.* Displays whether the current DIMM configuration
    is capable of Memory Mirroring. For Memory Mirroring to be possible, DIMM
    configurations on all paired channels must be identical between the channel pair
    (Mirroring Domain). For details about Mirroring configurations.

2. Memory Rank Sparing Possible

    Option Values: *Yes*
                            No

    Help Text: *<None>*

Comments: *Information only*. Displays whether the current DIMM configuration is capable of Rank Sparing. For Rank Sparing to be possible, DIMM configurations on all channels must be capable of supporting Rank Sparing.

> ### NOTE
>
> *The Correctable Error Threshold value is also the Sparing Fail Over threshold value. Threshold values of "All" or "None" are not valid for Rank Sparing. If the Correctable Error Threshold is set to either of those values, Rank Spring will <u>not</u> be possible.*

3. Memory Lockstep Possible

    Option Values: *Yes*
                                       No

    Help Text: *<None>*

    Comments: *Information only*. Displays whether the current DIMM configuration is capable of Memory Lockstep. For Memory Lockstep to be possible, DIMM configurations on all paired channels must be identical between the channel pair.

4. Select Memory RAS Configuration

    Option Values: ***<u>Maximum Performance</u>***
                                       Mirroring
                                       Rank Sparing
                                       Lockstep

    Help Text:

    Allows the user to select the memory RAS Configuration to be applied for the next boot.

Comments: Available modes depend on the current memory population. Modes which are not listed as "possible" should not be available as choices. If the only valid choice is "Maximum Performance", then this option should be grayed out and unavailable.

Maximum Performance – (default) no RAS, but best memory utilization since full amount of memory is available, operating in Independent Channel Mode.

Mirroring - most reliability by using half of memory as a mirror image, can survive an Uncorrectable ECC Error.

Rank Sparing – offers reliability by reserving spare ranks to replace failing ranks which are generating excessive Correctable ECC Errors.

Lockstep – allows SDDC capability with x8 DIMMs installed. No memory size impact, but does have a performance and power penalty.

⁄ NOTE

Since only RAS Modes which are listed as "possible" are available for selection, it is not possible to select a RAS Mode without first installing an appropriate DIMM configuration.

5. NUMA Optimized

Option Values: **_Enabled_**
                      Disabled

Help Text:

If enabled, BIOS includes ACPI tables that are required for NUMA-aware Operating Systems.

Comments: This option is only present for boards which have two or more processor sockets. When a multi-socket board has only a single processor installed, this option is grayed out and set as Disabled.

When enabled, the SRAT and SLIT ACPI tables are provided that show the locality of systems resources, especially memory, which allows a "NUMA Aware" OS to optimize which processor threads are used by processes which can benefit by having the best access to those resources.

Mass Storage Controller Configuration

The Mass Storage Configuration screen allows the user to configure the Mass Storage controllers that are integrated into the server board on which the BIOS is executing. This includes only onboard Mass Storage controllers. Mass Storage controllers on add-in cards are not included in this screen, nor are other storage mechanisms such as USB-attached storage devices or Network Attached Storage.

There are two types of onboard controller configured in this screen, the AHCI SATA controller and the Storage Control Unit (SCU) with SATA or SAS drive support and RAID support. There are also informational displays of AHCI and SCU controller configuration, and SATA Drive

Information when applicable. If the presence of an Intel® Storage Module is detected, the type of Storage Module is displayed as information-only.

To access this screen from the *Main* screen, select *Advanced > Mass Storage Controller Configuration*. To move to another screen, press the <Esc> key to return to the *Advanced* screen, then select the desired screen.
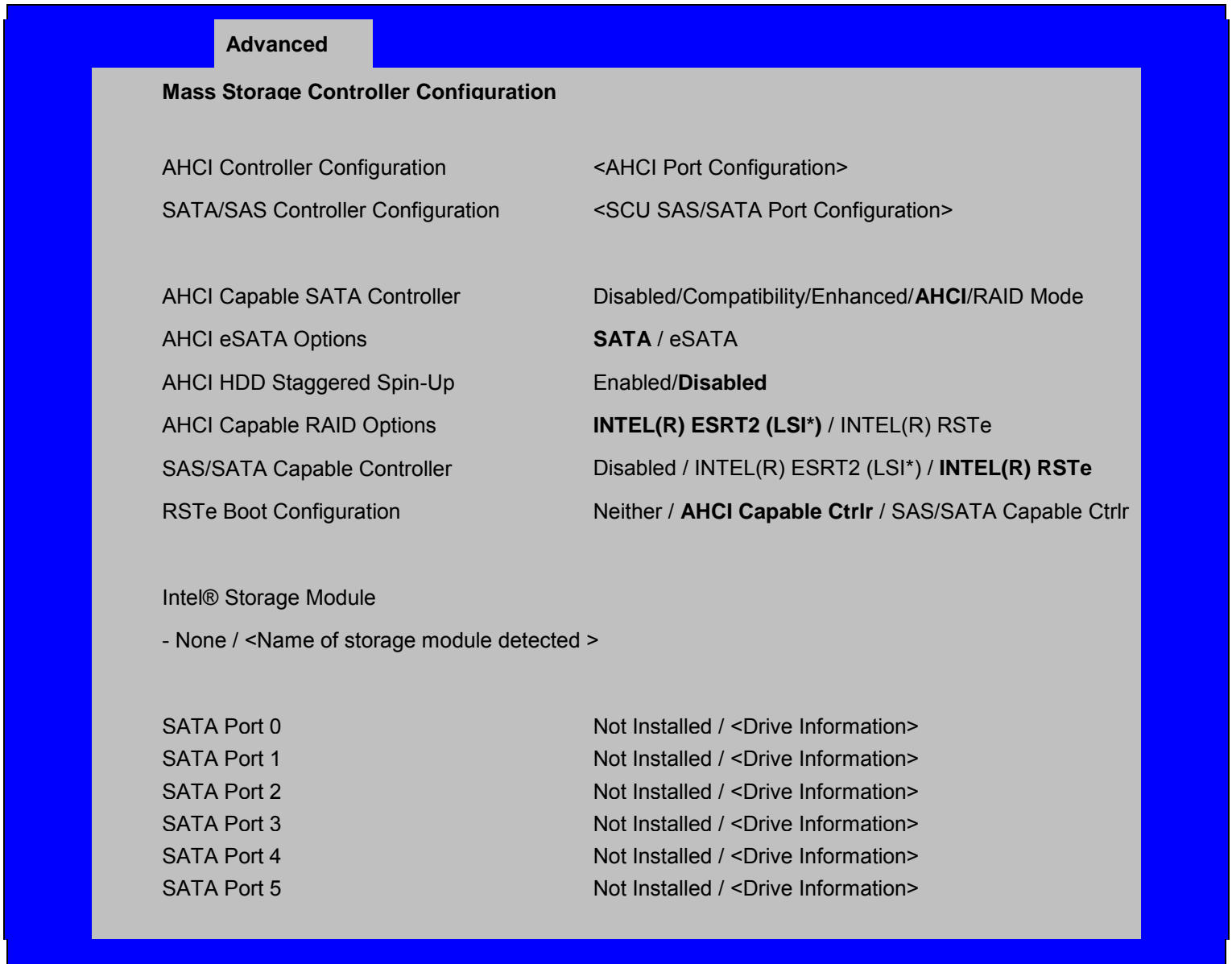
Advanced	
Mass Storage Controller Configuration	
AHCI Controller Configuration	<AHCI Port Configuration>
SATA/SAS Controller Configuration	<SCU SAS/SATA Port Configuration>
AHCI Capable SATA Controller	Disabled/Compatibility/Enhanced/**AHCI**/RAID Mode
AHCI eSATA Options	**SATA** / eSATA
AHCI HDD Staggered Spin-Up	Enabled/**Disabled**
AHCI Capable RAID Options	**INTEL(R) ESRT2 (LSI*)** / INTEL(R) RSTe
SAS/SATA Capable Controller	Disabled / INTEL(R) ESRT2 (LSI*) / **INTEL(R) RSTe**
RSTe Boot Configuration	Neither / **AHCI Capable Ctrlr** / SAS/SATA Capable Ctrlr
Intel® Storage Module	
- None / <Name of storage module detected >	
SATA Port 0	Not Installed / <Drive Information>
SATA Port 1	Not Installed / <Drive Information>
SATA Port 2	Not Installed / <Drive Information>
SATA Port 3	Not Installed / <Drive Information>
SATA Port 4	Not Installed / <Drive Information>
SATA Port 5	Not Installed / <Drive Information>

Figure 129. Mass Storage Controller Configuration Screen

Screen Field Descriptions:

1. AHCI Controller Configuration

Option Values: *<AHCI Port Configuration>*

One of these strings:

> *Controller is disabled*
> *2 ports of 6Gb/s SATA*
> *2 ports of 6Gb/s SATA & 4 ports of 3Gb/s SATA*

Help Text: *<None>*

Comments: *Information only*. This is a display showing which ports are available through the onboard AHCI capable SATA controller, if the controller is enabled.

This information is also displayed during POST in the POST Diagnostic Screen

The number of SATA ports available from the integrated AHCI-capable SATA Controller is dependent on the specific server board installed in the system. Different server board designs expose different SATA port configurations. The Platform ID (Board ID) is displayed in the Main Screen

2. SATA/SAS Controller Configuration

Option Values: *<SCU SAS/SATA Port Configuration>*

One of these strings:

> *Controller is disabled*
> *4 ports in SATA mode*
> *4 ports in SAS mode*
> *8 ports in SATA mode*
> *8 ports in SAS mode*

Help Text: *<None>*

Comments: *Information only*. This is a display showing the number of ports which are available through the SCU controller, and whether they are configured for SATA or SAS.

This information is also displayed during POST in the POST Diagnostic Screen

Various SATA/SAS Capable Controller configurations require the installation of Intel®
RAID C600 Upgrade Keys:

> 4 port SATA requires <u>no key</u> or AXXRKSATA4R5 key
>
> 4 port SAS requires AXXRKSAS4 or AXXRKSAS4R5 key
>
> 8 port SATA requires AXXRKSATA8 or AXXRKSATA8R5 key
>
> 8 port SAS requires AXXRKSAS8 or AXXRKSAS8R5 key

3. AHCI Capable SATA Controller

Option Values: Disabled
        Compatibility
        Enhanced
        AHCI
        RAID Mode

Help Text:

> *- Compatibility provides PATA emulation on the SATA device*
> *- Enhanced provides Native SATA support*
> *- AHCI enables the Advanced Host Controller Interface, which provides Enhanced SATA functionality*
> *- RAID Mode provides host based RAID support on the onboard SATA ports*

Comments: This option configures the onboard AHCI-capable SATA controller, which is distinct from the SCU. The number and type of ports it controls differs between board series

If the SATA Controller is *Disabled*, the SATA Ports will not operate. and any installed SATA devices will be unavailable.

Compatibility provides PATA emulation on the SATA device, allowing the use of legacy IDE/PATA drivers. *Enhanced* provides Native SATA support., using native SATA drivers included with the vast majority of current OSes. *AHCI* enables the Advanced Host Controller Interface, which provides Enhanced SATA functionality. plus possible additional functionality (Native Command Queuing, Hot Plug, Staggered Spin Up). It uses AHCI drivers available for the majority of current OSes.

RAID Mode provides host based RAID support on the onboard SATA ports. RAID levels supported and required drivers depend on the RAID stack selected

4. AHCI eSATA Options

Option Values: **<u>SATA</u>**
        eSATA

Help Text:

> *- SATA mode enables the switchable internal AHCI SATA (port 1)*
> *- eSATA mode enables the switchable external AHCI eSATA (port 1)*
> *- These modes are mutually exclusive, so SATA port 1 will only be active on one connector, not both*

Comments: In order to use the external eSATA connection, this option must be set to *eSATA*. When the external eSATA connector is selected, it disables the corresponding internal SATA port 1 connector. When set to *SATA*, the internal connector for SATA port 1 is active, and the external eSATA connector is disabled.

This option setting only appears when the SATA Controller is enabled, and only for platforms which support eSATA.

5. AHCI HDD Staggered Spin-Up

Option Values: Enabled
                        <u>Disabled</u>

Help Text:

If enabled for the AHCI Capable SATA controller, Staggered Spin-Up will be performed on drives attached to it. Otherwise these drives will all spin up at boot.

Comments: This option enables or disables Staggered Spin-up <u>only for disk drives attached to ports on the AHCI Capable SATA Controller</u>. Disk drives attached to SATA/SAS ports on the Storage Control Unit are controlled by a different method for Staggered Spin-Up and this option does not affect them.

This option is only visible when the SATA Controller is enabled and <u>*AHCI*</u> or <u>*RAID*</u> has been selected as the operational SATA Mode.

Staggered Spin-Up is needed when there are enough HDDs attached to the system to cause a marked startup power demand surge when all drives start spin-up together. Since the power demand is greatest just as the drive spinning is started, the overall startup power demand can be leveled off by starting up each drive at a slightly different time, so the power demand surges for multiple drives do not coincide and cause too great a power draw.

When Staggered Spin-Up is enabled, it does have a possibility of increasing boot time if there are many HDDs attached, because of the interval between starting drives spinning. However, that is exactly the scenario in which Staggered Spin-Up is most needed, because the more disk drives attached, the greater the startup demand surge.

Setting the external eSATA connector <u>*Enabled*</u> (when available) does not invalidate the Staggered Spin-Up option, although there may be less need for Staggered Spin-Up in a system configured for eSATA use.

6. AHCI Capable RAID Options

Option Values: **Intel® ESRT2 (LSI*)**
Intel® RSTe

Help Text:

- *Intel® ESRT2 (Powered By LSI*): Supports RAID 0/1/10 and optional RAID 5 with Intel® RAID C600 Upgrade Keys. Uses Intel ESRT2 drivers (based on LSI* MegaSR).*
- *Intel® RSTe: Provides pass-through drive support. Also provides host based RAID 0/1/10/5 support. Uses Intel® RSTe iastor drivers.*

Comments: This option only appears when the SATA Controller is enabled, and *RAID Mode* has been selected as the operational SATA Mode. This setting selects the RAID stack to be used for SATA RAID with the onboard AHCI SATA controller.

If a RAID Volume has not previously been created that is compatible with the RAID stack selected, it will be necessary to Save and Exit and reboot in order to create a RAID Volume.

7. SAS/SATA Capable Controller

Option Values: Disabled
Intel® ESRT2 (LSI*)
Intel® RSTe

Help Text:

- *Intel® ESRT2: Provides host based RAID 0/1/10 and optional RAID 5. Uses Intel® ESRT2 drivers (based on LSI* MegaSR).*
- *Intel® RSTe: Provides pass-through drive support. Also provides host based RAID 0/1/10 support, and RAID 5 (in SATA mode only). Uses Intel® RSTe iastor drivers.*

Comments: This option selects the RAID stack to be used with the SCU. If *Disabled* is selected, any drives connected to the SCU will not be usable.

Intel® ESRT2 provides host based RAID 0/1/10 and optional RAID 5. For a RAID 5 configuration, this requires one of the Intel® RAID C600 Upgrade Keys AXXRKSATA4R5, AXXRKSATA8R5, AXXRKSAS4R5, or AXXRKSAS8R5. Uses Intel® ESRT2 drivers (based on LSI* MegaSR), and is also supported by Linux MDRAID.

Intel® RSTe provides pass-through drive support and provides host based RAID 0/1/10 support, and RAID 5 (in SATA mode only). Uses Intel RSTe drivers in Windows, and MDRAID stack in Linux. The Intel® RSTe RAID stack is required if it is necessary to provide pass-through support for non-RAID drives, or if support is needed for more than 8 drives.

8. RSTe Boot Configuration

Option Values: Neither
                             <u>AHCI Capable Ctrlr</u>
                             SAS/SATA Capable Ctrlr

Help Text:

> *This selects the device that will support Bootable Drives, whether they are in RAID arrays or individual pass-through SAS/SATA drives. Once selected and set up (if necessary), individual bootable devices will be listed in the Bootable Devices menu display.*

Comments: This option appears only when Intel® RSTe has been selected as the operational mode on <u>both</u> the AHCI and SCU controllers. In that case there is a conflict and only one controller can be selected as having bootable drives attached.

Once selected and set up (if necessary), individual bootable logical or physical drives available on the selected controller will be listed in the Bootable Devices menu display.

If only one device selects RSTe, it will be available as a boot device along with any other devices – this option is only necessary to distinguish between which RSTe device runs the Option ROM instance.

BIOS is required to designate the OPROM for the boot device selected here. Two iterations of the OPROM cannot fully load simultaneously, and the version fully loaded will only show devices connected to the given controller, so the OPROM load order is based on BIOS selecting the correct device.

Note: If RSTe is selected, then only one CONTROLLER can be bootable, so there will be situations where the boot drive *OR* an optical device will be bootable, but not both.

Please also see the product System Guide for restrictions on expander boot support.

9. Intel® Storage Module

Option Values: ***<u>None</u>***
                             <Name of Storage Module detected>

> <u>Names of Storage Modules supported at this time are:</u>
>
> *Intel® Integrated RAID Module*
> *Intel® Integrated RAID Module RMS25PB040*
> *Intel® Integrated RAID Module RMT3PB080*
> *Intel® Integrated RAID Module RMS25CB080*
> *Intel® Integrated RAID Module RMS25CB040*
> *Intel® Integrated RAID Module RMT3CB080*
> *Intel® Integrated RAID Module RMS25JB080*
> *Intel® Integrated RAID Module RMS25JB040*
> *Intel® Integrated RAID Module RMS25KB080*
> *Intel® Integrated RAID Module RMS25KB040*

Help Text: *<None>*

Comments: *Information only*. If no Intel® Storage Module is detected, then **None** is displayed. This shows the customer the product name of the module installed, which helps in identifying drivers, support, documentation, etc.

10. SATA Port

(For Port numbers 0-6)

Option Values: **Not Installed**
                      <Drive Information>

Help Text: *<None>*

Comments: *Information only*. The Drive Information, when present, will typically consist of the drive model identification and size for the disk drive installed on a particular port.

This Drive Information line is repeated for all 6 SATA Port for the onboard AHCI capable SATA Controller. However, for any given board, only the ports which are physically populated on the board are shown. That is, a board which only implements the two 6 GB/s ports 0 and 1 will only show those two ports in this Drive Information list.

This section for Drive Information does not appear at all when the SCU is set to *Disabled* or the SATA operational mode is *RAID Mode*, nor for any drives attached to the SCU SATA or SAS ports. In these cases the BBS information is not available to display.

PCI Configuration

The PCI Configuration screen allows the user to configure the PCI memory space used for onboard and add-in adapters, configure video options, and configure onboard adapter options.

It also includes a selection option to go to the NIC Configuration screen.

To access this screen from the *Main* screen, select *Advanced > PCI Configuration*. To move to another screen, press the <Esc> key to return to the *Advanced* screen, then select the desired screen.
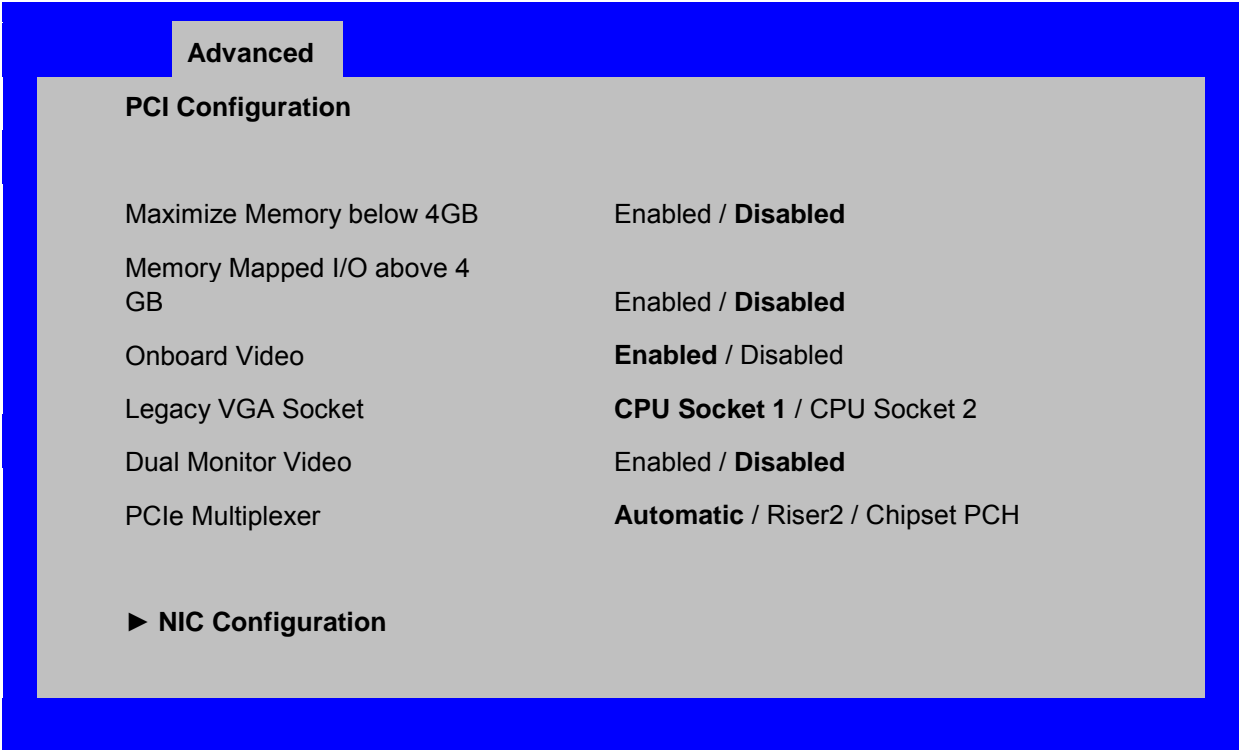
Advanced

PCI Configuration

Maximize Memory below 4GB	Enabled / **Disabled**
Memory Mapped I/O above 4 GB	Enabled / **Disabled**
Onboard Video	**Enabled** / Disabled
Legacy VGA Socket	**CPU Socket 1** / CPU Socket 2
Dual Monitor Video	Enabled / **Disabled**
PCIe Multiplexer	**Automatic** / Riser2 / Chipset PCH

► **NIC Configuration**

Figure 130. PCI Configuration Screen

<u>**Screen Field Descriptions:**</u>

1. Maximize Memory below 4GB

Option Values: Enabled
                            <u>**Disabled**</u>

Help Text:

> *BIOS maximizes memory usage below 4GB for an OS without PAE support, depending on the system configuration. Only enable for an OS without PAE support.*

Comments: When this option is enabled, BIOS makes as much memory available as possible in the 32-bit (4GB) address space, by limiting the amount of PCI/PCIe Memory Address Space and PCIe Extended Configuration Space. This option should only be enabled for a 32-bit OS without PAE capability or without PAE enabled.

2. Memory Mapped I/O above 4 GB

Option Values: Enabled
                        Disabled

Help Text:

> *Enable or disable memory mapped I/O of 64-bit PCI devices to 4 GB or greater address space.*

Comments: When enabled, PCI/PCIe Memory Mapped I/O for devices capable of 64-bit addressing is allocated to address space above 4GB, in order to allow larger allocations and avoid impacting address space below 4G.

3. Onboard Video

Option Values: **Enabled**
                        Disabled

Help Text:

> *On-board video controller.*
>
> *Warning: System video is completely disabled if this option is disabled and an add-in video adapter is not installed.*

Comments: When disabled, the system requires an add-in video card for the video to be seen. When there is no add-in video card installed, Onboard Video is set to *Enabled* and grayed out so it cannot be changed.

If there is an add-in video card installed in a PCIe slot connected to CPU Socket 1, and the Legacy VGA Socket option is set to *CPU Socket 1*, then this Onboard Video option is available to be set.

If there is an add-in video card installed on a PCIe slot connected to CPU Socket 2, and the Legacy VGA Socket option is set to *CPU Socket 2*, this option is grayed out and unavailable, with a value set to *Disabled*. This is because the Onboard Video is connected to CPU Socket 1, and is not functional when CPU Socket 2 is the active path for video. When Legacy VGA Socket is set back to *CPU Socket 1*, this option becomes available again, set to its default value of *Enabled*.

Note: This option does not appear on some models.

4. Legacy VGA Socket

Option Values: **CPU Socket 1**
                        CPU Socket 2

Help Text:

> *Determines whether Legacy VGA video output is enabled for PCIe slots attached to Processor Socket 1 or 2. Socket 1 is the default.*

Comments: This option is necessary when using an add-in video card on a PCIe slot attached to CPU Socket 2, due to a limitation of the processor IIO. The Legacy video device can be connected through either socket, but there is a setting that must be set on only one of the two. This option allows the switch to using a video card in a slot connected to CPU Socket 2.

This option does not appear unless the BIOS is running on a board which have one processor installed on CPU Socket 2 and can potentially a video card installed in a PCIe slot connected to CPU Socket 2.

This option is grayed out as unavailable and set to *CPU Socket 1* unless there is a processor installed on CPU Socket 2 and a video card installed in a PCIe slot connected to CPU Socket 2. When this option is active and is set to *CPU Socket 2*, then both Onboard Video and Dual Monitor Video are set to *Disabled* and grayed out as unavailable. This is because the Onboard Video is a PCIe device connected to CPU Socket 1, and is unavailable when the Legacy VGA Socket is set to Socket 2.

5. Dual Monitor Video

    Option Values: Enabled
                            Disabled

    Help Text:

> *If enabled, both the on-board video controller and an add-in video adapter are enabled for system video. The on-board video controller becomes the primary video device.*

Comments: This option must be enabled to use an add-in card as a secondary POST Legacy Video device while also displaying on the Onboard Video device.

If there is no add-in video card in any PCIe slot connected to CPU Socket 1, this options is set to *Disabled* and grayed out and unavailable.

If the Legacy VGA Socket option is set to *CPU Socket 2*, this option is grayed out and unavailable, with a value set to *Disabled*. When Legacy VGA Socket is set back to *CPU Socket 1*, this option is set to its default value of *Disabled*, and may become available depending on add-in video card configuration,

Note: This option does not appear on some models.

6. NIC Configuration

Option Values: *<None>*

Help Text:

       View/Configure NIC information and settings.

Comments: *Selection only.* Position to this line and press the <Enter> key to go to the **NIC Configuration** group of configuration settings.

NIC Configuration

The NIC Configuration screen allows the user to configure the NIC controller options for BIOS POST. It also displays the NIC MAC Addresses currently in use. This NIC Configuration screen handles network controllers built in on the baseboard ("onboard") or installed as an IO Module (IOM). It does not configure or report anything having to do with add-in network adapter cards.

To access this screen from the **Main** screen, select **Advanced > PCI Configuration > NIC Configuration**. To move to another screen, press the <Esc> key to return to the **PCI Configuration** screen, if necessary press the <Esc> key again to return to the **Advanced** screen, then select the desired screen.

There is usually one Onboard NIC built into the baseboard, although in some cases there are two Onboard NICs. There are several possible types of NICs which are incorporated into different boards. When an InfiniBand controller is on the baseboard, it appears as an Onboard NIC.

Most boards in this family also can have an IO Module that installs on the board in a specialized connector. There are boards which can have two IO Modules installed.

To determine what type of NIC is installed on a specific board, or what kinds of IO Modules can be supported on which boards, refer to the Technical Product Specification (TPS) for the board in question.

The descriptive names of the Onboard NIC types are:

- Intel® 82574 Single-Port Gigabit Ethernet Controller
- Intel® I350 Dual-Port Gigabit Ethernet Controller
- Intel® I350 Quad-Port Gigabit Ethernet Controller
- Intel® I540 Dual-Port X540 10 Gigabit RJ-45 Controller
- Mellanox* ConnectX-3* Single-Port InfiniBand FD14 Controller

For boards with only one Onboard NIC, the "Onboard NIC2" entries are not present on the screen. The number of "Port" options which are displayed for each NIC will match the number of ports the Onboard NIC presents.

The IO Modules currently available are:

- Intel® I350 Quad-Port Gigabit Ethernet Module
- Intel® I540 Dual-Port X540 10 Gigabit RJ-45 Module
- Intel® 82599 Dual-Port 10 Gigabit SFP+ Module
- Mellanox* ConnectX-3* Single-Port InfiniBand FD14 Module

For the IO Module entries on the NIC Configuration screen, only entries for modules which are currently installed will appear and only ports which exist on those IO Modules will appear.

If an IO Module which had been installed is no longer installed when the system is booted, all NIC Configuration entries which are specific to that IO Module will be reset to their default values and hidden. If a different IO Module is installed than had been previously installed, the module-specific settings will still be returned to defaults, but not hidden. This will not necessarily affect the Option ROM settings, which depend on the aggregate capabilities of all installed Onboard and IO Module NICs.

For each NIC port which is present on an Onboard NIC or IO Module other than InfiniBand controllers, there will be a port-specific PXE Boot enabling option and a MAC Address display. Onboard NICs and NIC ports also have enable/disable options. IO Modules and the ports on them cannot be disabled by BIOS.

InfiniBand controllers which appear as Onboard NICs or as IO Modules have a slightly different format. They do not have enable/disable options, but they do have a choice of whether to enable loading and executing the embedded Option ROM for the controller, which will cause it to become bootable. For InfiniBand, both a GUID and a MAC Address are displayed. The GUID is used for InfiniBand Fabric operations, and the MAC Address is used when the controller is attached as an Ethernet device.

For non-InfiniBand NICs, there are different OPROMs for different protocols, which are also differentiated by speed, 1 Gb or 10 Gb. For a given protocol/speed, all Ethernet controllers of the same speed use the same Option ROM.

- PXE – there are two separate PXE Option ROMs, one for 1 Gb NICs and another for 10 Gb NICs. The two are independent of each other, but each must be the only Option ROM enabled in its speed class. If 1 GbE PXE is enabled, then the discs OPROM cannot be enabled. If 10 GbE PXE is enabled, then neither discs nor 10 GbE FCoE may be enabled.

- discs – there is only one discs Option ROM for both 1 GbE and 10 GbE NICs. If discs is enabled, then neither PXE nor FCoE OPROMs may be enabled for the 1 GbE or 10 GbE NICs.

- FCoE – there is a 10 GbE FCoE Option ROM that supports the Intel® 82599 NIC. When it is enabled, the discs OPROM and the 10 GbE PXE OPROM must be disabled

NOTE

> These Option ROMs are only in support of onboard NICs and installed IO Modules. They do not support NICs on add-in network cards, even if the NIC on an add-in card is the same type of device as an onboard NIC or IO Module controller.

Only the Option ROMs for which controller capabilities are present are shown in the screen for selection. For example, if there are no 10 GbE NICs installed, then the 10 GbE OPROMs will not appear for selection. If controller capabilities are present, but all controllers with those capabilities are disabled, then the relevant OPROM options will appear, but will be disabled and grayed out and not changeable.

Similarly, when the PXE OPROM of a given speed is disabled, all PXE port enable/disable options using that OPROM will be disabled and grayed out. Conversely, if all ports are disabled for PXE, the PXE OPROM will be disabled and grayed out.

When a NIC Port is disabled, the PXE enable/disable option for it will be disabled and grayed out, and the MAC Address will be blank. When a NIC controller is disabled, all Ports and PXE options for that controller will become disabled and grayed out and all MAC Addresses for those ports will be blank. Conversely, if all ports for a given controller are disabled, the controller itself will appear as disabled.

Advanced

NIC Configuration

Wake on LAN (PME)	**Enabled** / Disabled
PXE 1GbE Option ROM	**Enabled** / Disabled
PXE 10GbE Option ROM	**Enabled** / Disabled
FCoE 10GbE Option ROM	Enabled / **Disabled**
discs 1GbE/10GbE Option ROM	Enabled / **Disabled**
Onboard NIC1 Type	<Onboard NIC Description – Non-InfiniBand>
NIC1 Controller	**Enabled /** Disabled
NIC1 Port1	**Enabled /** Disabled
NIC1 Port2	**Enabled /** Disabled
NIC1 Port3	**Enabled /** Disabled
NIC1 Port4	**Enabled /** Disabled
NIC1 Port1 PXE	**Enabled /** Disabled
NIC1 Port2 PXE	**Enabled /** Disabled
NIC1 Port3 PXE	**Enabled /** Disabled
NIC1 Port4 PXE	**Enabled /** Disabled
NIC1 Port1 MAC Address	<MAC Address display>
NIC1 Port2 MAC Address	<MAC Address display >
NIC1 Port3 MAC Address	<MAC Address display >
NIC1 Port4 MAC Address	<MAC Address display >
Onboard NIC2 Type	<Onboard NIC Description – InfiniBand Only>
NIC2 InfiniBand Option ROM	Enabled / **Disabled**
NIC2 Port1 GUID	<GUID Display>
NIC2 Port1 MAC Address	<MAC Address display >
Onboard NIC2 Type	<Onboard NIC Description – Non-InfiniBand>
NIC2 Controller	**Enabled** / Disabled

NIC2 Port1	**Enabled /** Disabled
NIC2 Port2	**Enabled /** Disabled
NIC2 Port3	**Enabled /** Disabled
NIC2 Port4	**Enabled /** Disabled
NIC2 Port1 PXE	**Enabled /** Disabled
NIC2 Port2 PXE	**Enabled /** Disabled
NIC2 Port3 PXE	**Enabled /** Disabled
NIC2 Port4 PXE	**Enabled /** Disabled
NIC2 Port1 MAC Address	<MAC Address display >
NIC2 Port2 MAC Address	<MAC Address display >
NIC2 Port3 MAC Address	<MAC Address display >
NIC2 Port4 MAC Address	<MAC Address display >
IO Module 1 Type	<IO Module Description – Non-InfiniBand>
IOM1 Port1 PXE	**Enabled /** Disabled
IOM1 Port2 PXE	**Enabled /** Disabled
IOM1 Port3 PXE	**Enabled /** Disabled
IOM1 Port4 PXE	**Enabled /** Disabled
IOM1 Port1 MAC Address	<MAC Address display >
IOM1 Port2 MAC Address	<MAC Address display >
IOM1 Port3 MAC Address	<MAC Address display >
IOM1 Port4 MAC Address	<MAC Address display >
IO Module 1 Type	<IO Module Description – InfiniBand Only>
IOM1 InfiniBand Option ROM	Enabled / **Disabled**
IOM1 Port1 GUID	<GUID Display>
IOM1 Port1 MAC Address	<MAC Address display >
IO Module 2 Type	<IO Module Description – Non-InfiniBand>
IOM2 Port1 PXE	**Enabled /** Disabled
IOM2 Port2 PXE	**Enabled /** Disabled
IOM2 Port3 PXE	**Enabled /** Disabled

IOM2 Port4 PXE	**Enabled /** Disabled
IOM2 Port1 MAC Address	<MAC Address display >
IOM2 Port2 MAC Address	<MAC Address display >
IOM2 Port3 MAC Address	<MAC Address display >
IOM2 Port4 MAC Address	<MAC Address display >

Figure 131. NIC Configuration Screen

<u>**Screen Field Descriptions:**</u>

1. Wake on LAN (PME)

    Option Values: <u>**Enabled**</u>
    Disabled

    Help Text:

    Enables or disables PCI PME function for Wake on LAN capability from LAN adapters.

    Comments: Enables/disables PCI/PCIe PME# signal to generate Power Management Events (PME) and ACPI Table entries required for Wake on LAN (WOL). However, note that this will enable WOL only with an ACPI-capable Operating System which has the WOL function enabled.

2. PXE 1GbE Option ROM

    Option Values: <u>**Enabled**</u>
    Disabled

    Help Text:

    Enable/Disable Onboard/IOM NIC PXE Option ROM Load.

    Comments: This selection is to enable/disable the 1GbE PXE Option ROM that is used by all Onboard and IO Module 1 GbE controllers.

    This option is grayed out and not accessible if the discs Option ROM is enabled. It can co-exist with the 10 GbE PXE Option ROM, the 10 GbE FCoE Option ROM, or with an InfiniBand controller Option ROM.

    If the 1GbE PXE Option ROM is disabled, and no other Option ROM is enabled, the system cannot perform a Network Boot and cannot respond for Wake-on-LAN.

    This 1GbE PXE option does not appear unless there is a 1 GbE NIC installed in the system as an Onboard or IO Module NIC.

3. PXE 10GbE Option ROM

Option Values: **Enabled**
                              Disabled

Help Text:

  Enable/Disable Onboard/IOM NIC PXE Option ROM Load.

Comments: This selection is to enable/disable the 10GbE PXE Option ROM that is used by all Onboard and IO Module 10 GbE controllers.

This option is grayed out and not accessible if the discs Option ROM is enabled or the 10 GbE FCoE Option ROM is enabled. It can co-exist with the 1 GbE PXE Option ROM or with an InfiniBand controller Option ROM.

If the 10GbE PXE Option ROM is disabled, and no other Option ROM is enabled, the system cannot perform a Network Boot and cannot respond for Wake-on-LAN.

This 10GbE PXE option does not appear unless there is a 10 GbE NIC installed in the system as an Onboard or IO Module NIC.

4. FCoE 10GbE Option ROM

Option Values: Enabled
                              Disabled

Help Text:

  Enable/Disable Onboard/IOM NIC FCoE Option ROM Load.

Comments: This selection is to enable/disable the 10GbE FCoE Option ROM that is used by all Onboard and IO Module 10 GbE controllers capable of FCoE support. At the present time, only the Intel® 82599 10 Gigabit SFP+ NIC supports FCoE for this family of server boards.

This option is grayed out and not accessible if the 10GbE PXE Option ROM is enabled or if the discs Option ROM is enabled. It can co-exist with the 1GbE PXE Option ROM or with an InfiniBand controller Option ROM.

If the FCoE Option ROM is disabled, and no other Option ROM is enabled, the system cannot perform a Network Boot and cannot respond for Wake-on-LAN.

This FCoE option does not appear unless there is a FCoE-capable 10GbE NIC installed in the system as an Onboard or IO Module NIC.

5. discs 1GbE/10GbE Option ROM

Option Values: Enabled
                              Disabled

Help Text:

  Enable/Disable Onboard/IOM NIC discs Option ROM Load.

Comments: This selection is to enable/disable the discs Option ROM that is used by all Onboard and IO Module 1 GbE and 10 GbE controllers.

This option is grayed out and not accessible if the 1 GbE or 10GbE PXE Option ROM is enabled or if the 10 GbE FCoE Option ROM is enabled. It can co-exist with an InfiniBand controller Option ROM.

If the discs Option ROM is disabled, and no other Option ROM is enabled, the system cannot perform a Network Boot and cannot respond for Wake-on-LAN.

This discs option does not appear unless there is an discs-capable NIC installed in the system as an Onboard or IO Module NIC.

6. Onboard NIC1 Type

7. Onboard NIC2 Type

Option Values: *<Onboard NIC Description>*

  One of these strings:

  Intel® 82574 Single-Port Gigabit Ethernet Controller
  Intel® I350 Dual-Port Gigabit Ethernet Controller
  Intel® I350 Quad-Port Gigabit Ethernet Controller
  Intel® I540 Dual-Port X540 10 Gigabit RJ-45 Controller
  Mellanox* ConnectX-3* Single-Port InfiniBand FD14 Controller

Help Text: *<None>*

Comments: *Information only*. This is a display showing which NICs are available as Network Controllers integrated into the baseboard. Each of these Onboard NICs will be followed by a section including a group of options that are specific to the type of NIC, either as an Ethernet controller or an InfiniBand controller.

If a board only has one onboard NIC, the second NIC Type and following options section will not appear. If there is an InfiniBand controller integrated onboard, it will appear as NIC2.

For details about the NIC hardware configuration for a specific board, see the Technical Product Specification for that board.

8. IO Module 1 Type

9. IO Module 2 Type

Option Values: *<IO Module Description>*

  One of these strings:

  Intel® I350 Quad-Port Gigabit Ethernet Module
  Intel® I540 Dual-Port X540 10 Gigabit RJ-45 Module
  Intel® 82599 Dual-Port 10 Gigabit SFP+ Module
  Mellanox* ConnectX-3* Single-Port InfiniBand FD14 Module

Help Text: *<None>*

Comments: *Information only*. This is a display showing which Network Controllers on IO Modules are installed on the baseboard. Each of these IO Module NICs will be followed by a section including a group of options that are specific to the type of NIC, either as an Ethernet controller or an InfiniBand controller.

This descriptive screen image shows an example of an InifiniBand controller as IOM1. In a system with two IO Module connectors, an InfiniBand IO Module might be installed as either IOM1 or IOM2.

Most boards have only one IO Module connector. In any case, an IO Module Type and following options section will only appear when an IO Module is installed, and a second IO Module Type and options section will only appear if there are two IO Modules installed.

For details about the NIC hardware configuration for a specific board, see the Technical Product Specification for that board.

10. NIC1 Controller

11. NIC2 Controller

Option Values: **Enabled**
                          Disabled

Help Text:

> *Enable/Disable Onboard Network Controller.*

Comments: This will completely disable Onboard Network Controller NIC1 or NIC2, along with all included NIC Ports and their associated options. That controller's NIC Ports, Port PXE options, and Port MAC Address displays will not appear.

This option only appears for onboard Ethernet controllers. It does not appear for onboard InfiniBand controllers.

Ethernet controllers on IO Modules do not have a disabling function that can be controlled by BIOS, so there is no corresponding controller enable/disable option for an IOM Ethernet controller.

For details about the NIC hardware configuration for a specific board, see the Technical Product Specification for that board.

12. NIC2 InfiniBand Option ROM

13. IOM1 InfiniBand Option ROM

14. IOM2 InfiniBand Option ROM

Option Values: Enabled
                          Disabled

Help Text:

> *Enable/Disable InfiniBand Controller Option ROM and FlexBoot.*

Comments: This option will control whether the associated InfiniBand Controller Option ROM is executed by BIOS during POST. This will also control whether the InfiniBand controller FlexBoot program appears in the list of bootable devices.

This option only appears for Onboard or IO Module InfiniBand controllers. It does not appear for Ethernet controllers.

15. NIC2 Port1 GUID

16. IOM1 Port1 GUID

17. IOM2 Port1 GUID

Option Values: *<GUID Display>*

Help Text: *<None>*

Comments: *Information only*. 16 hex digits of the Port1 GUID of the InfiniBand controller for NIC2, IOM1, or IOM2.

18. NIC1 Port1

19. NIC1 Port2

20. NIC1 Port3

21. NIC1 Port4

22. NIC2 Port1

23. NIC2 Port2

24. NIC2 Port3

25. NIC2 Port4

Option Values: **Enabled**
                        Disabled

Help Text:

Enable/Disable Onboard NIC<n> Port<x>.

Comments: This will enable or disable Port<*x, x = 1-4*> of Onboard Network Controller<*n, n = 1-2*>, including associated Port PXE options. The NIC<*n*> Port<*x*> PXE option and MAC Address display will not appear when that port is disabled.

The associated port enable/disable options will not appear when NIC<n> is disabled.

Only ports which actually exist for a particular NIC will appear in this section. That is, Port1-Port4 will appear for a quad-port NIC, Port1-Port2 will appear for a dual-port NIC, and only Port1 will appear for a single-port NIC.

Network controllers installed on an IO Module do not have a port disabling function that is controlled by BIOS, so there are no corresponding options for IO Module NICs.

For details about the NIC port configuration for a specific board, see the Technical Product Specification for that board.

26. NIC1 Port1 PXE

27. NIC1 Port2 PXE

28. NIC1 Port3 PXE

29. NIC1 Port4 PXE

30. NIC2 Port1 PXE

31. NIC2 Port2 PXE

32. NIC2 Port3 PXE

33. NIC2 Port4 PXE

34. IOM1 Port1 PXE

35. IOM1 Port2 PXE

36. IOM1 Port3 PXE

37. IOM1 Port4 PXE

38. IOM2 Port1 PXE

39. IOM2 Port2 PXE

40. IOM2 Port3 PXE

41. IOM2 Port4 PXE

Option Values: **Enabled**
                            Disabled

Help Text:

Enable/Disable Onboard/IOM NIC Port PXE Boot

Comments: This will enable or disable PXE Boot capability for Port<*x, x = 1-4*> of Onboard NIC<*n, n = 1-2*> or IO Module<*n, n = 1-2*>.

This option will not appear for ports on a NIC which is disabled, or for individual ports when the corresponding NIC Port is disabled.

Only ports which actually exist for a particular NIC or IOM will appear in this section. That is, Port1-Port4 will appear for a quad-port NIC, Port1-Port2 will appear for a dual-port NIC, and only Port1 will appear for a single-port NIC.

The default state of each Port PXE Boot option is *Enabled*, if the corresponding PXE Boot OPROM of the same speed is *Enabled*. If a PXE Boot OPROM for 1 GbE or 10 GbE changes from *Disabled* to *Enabled*, then the Port PXE Boot option becomes *Enabled* for all ports of that speed

If the PXE Boot OPROM for1 GbE NICs or 10 GbE NICs is disabled, PXE Boot will be disabled and grayed out as unchangeable for all ports on NICs or IO Modules of that same speed.

Conversely, if PXE Boot is disabled for all ports of a given speed, the corresponding PXE Option ROM will be disabled, but not grayed out since it could be selected.

42. NIC1 Port1 MAC Address

43. NIC1 Port2 MAC Address

44. NIC1 Port3 MAC Address

45. NIC1 Port4 MAC Address

46. NIC2 Port1 MAC Address

47. NIC2 Port2 MAC Address

48. NIC2 Port3 MAC Address

49. NIC2 Port4 MAC Address

50. IOM1 Port1 MAC Address

51. IOM1 Port2 MAC Address

52. IOM1 Port3 MAC Address

53. IOM1 Port4 MAC Address

54. IOM2 Port1 MAC Address

55. IOM2 Port2 MAC Address

56. IOM2 Port3 MAC Address

57. IOM2 Port4 MAC Address

Option Values: *<Mac Address Display>*

Help Text: *<None>*

Comments: *Information only*. 12 hex digits of the MAC address of Port1- Port4 of the Network Controller corresponding to NIC1, NIC2, IOM1, or IOM2.

This display will appear only for ports which actually exist on the corresponding Network Controller. If the Network Controller or port is disabled, the port MAC Address will not appear.

Serial Port Configuration

The Serial Port Configuration screen allows the user to configure the Serial A and Serial B ports. In Legacy ISA nomenclature, these are ports COM1 and COM2 respectively.

To access this screen from the *Main* screen, select *Advanced > Serial Port Configuration*. To move to another screen, press the <Esc> key to return to the *Advanced* screen, then select the desired screen.

The primary usage for these serial ports is to enable Serial Console Redirection and Serial Over LAN (SOL) capabilities. Either port can be used for Serial Console Redirection, but SOL is only supported on Serial A.

The exception to this is the W2600CR Workstation, which does not provide a Serial A port. With W2600CR, Serial A will not appear for configuration here, and Serial B will support SOL functionality if required.

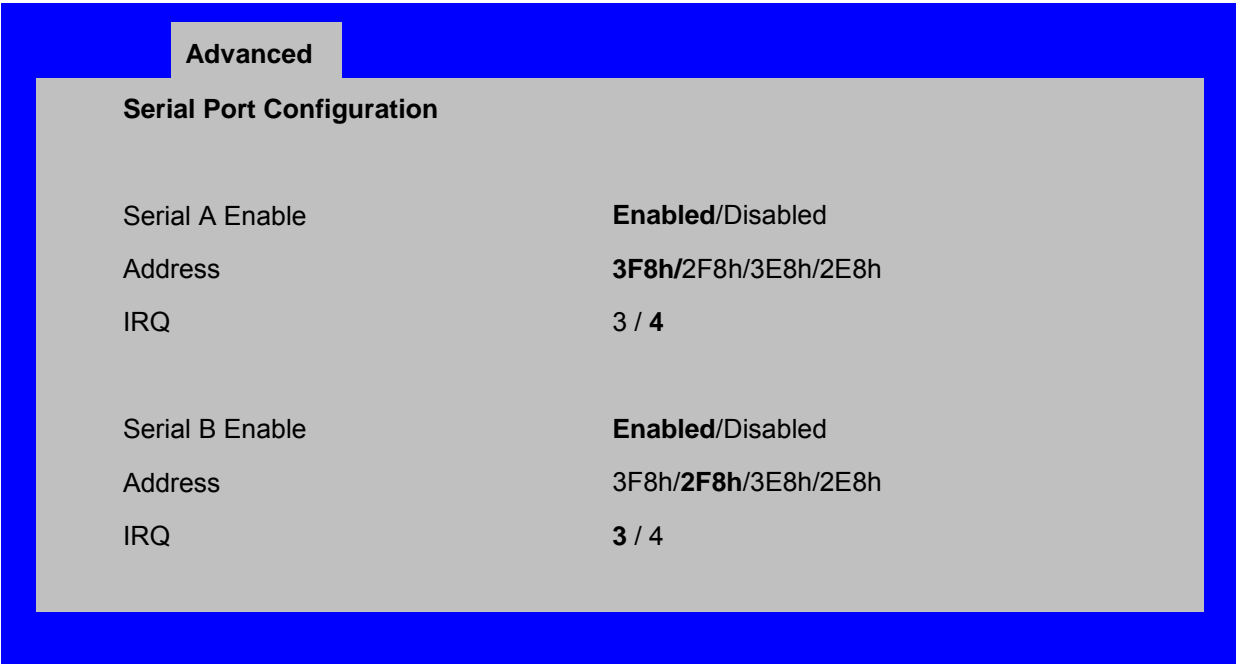| Advanced	
Serial Port Configuration	
Serial A Enable	**Enabled**/Disabled
Address	**3F8h/**2F8h/3E8h/2E8h
IRQ	3 / **4**
Serial B Enable	**Enabled**/Disabled
Address	3F8h/**2F8h**/3E8h/2E8h
IRQ	**3** / 4

Figure 132. Serial Port Configuration Screen

<u>Screen Field Descriptions:</u>

1. Serial A Enable

Option Values: **Enabled**
                                  Disabled

Help Text:

> *Enable or Disable Serial port A.*

Comments: Serial Port A can be used for either Serial Over LAN or Serial Console Redirection.

This Setup option should not appear on W2600CR, which does not provide a Serial A port.

2. Address

Option Values: **3F8h**
                                  2F8h
                                  3E8h
                                  2E8h

Help Text:

> *Select Serial port A base I/O address.*

Comments: Legacy I/O port address. This field should not appear when Serial A port enable/disable does not appear.

3. IRQ

Option Values: 3
                                    4

Help Text:

> *Select Serial port A interrupt request (IRQ) line.*

Comments: Legacy IRQ. This field should not appear when Serial A port enable/disable does not appear.

4. Serial B Enable

Option Values: **Enabled**
                                    Disabled

Help Text:

> *Enable or Disable Serial port B.*

Comments: Serial Port B can be used for Serial Console Redirection. SOL cannot be routed to Serial B except on W2600CR boards, which do not have a Serial A port.

5. Address

Option Values: 3F8h

2F8h
3E8h
2E8h

Help Text:

Select Serial port B base I/O address.

Comments: Legacy I/O port address.

6. IRQ

Option Values: **3**
4

Help Text:

Select Serial port B interrupt request (IRQ) line.

Comments: Legacy IRQ

USB Configuration

The USB Configuration screen allows the user to configure the available USB controller options.

To access this screen from the *Main* screen, select *Advanced > USB Configuration*. To move to another screen, press the <Esc> key to return to the *Advanced* screen, then select the desired screen.

This screen should display all USB Mass Storage devices which have been detected in the system. These include USB-attached Hard Disk Drives (HDDs), Floppy Disk Drives (FDDs), CDROM and DVDROM drives, and USB Flash Memory devices (USB Key, Keyfob, etc).

Each USB Mass Storage device may be set to allow the media emulation for which it is formatted, or an emulation may be specified. For USB Flash Memory devices in particular, there are some restrictions:

- A USB Key formatted as a CDROM drive will be recognized as an HDD.
- A USB Key formatted without a Partition Table will be forced to FDD emulation.
- A USB Key formatted with one Partition Table, and less than 528 MB in size, will be forced to FDD emulation – otherwise if it is 528 MB or greater in size, it will be forced to HDD emulation.

NOTE

USB devices can be "hotplugged" during POST, and will be detected and "beeped". They will be enumerated and displayed on this screen, though they may not be enumerated as bootable devices.
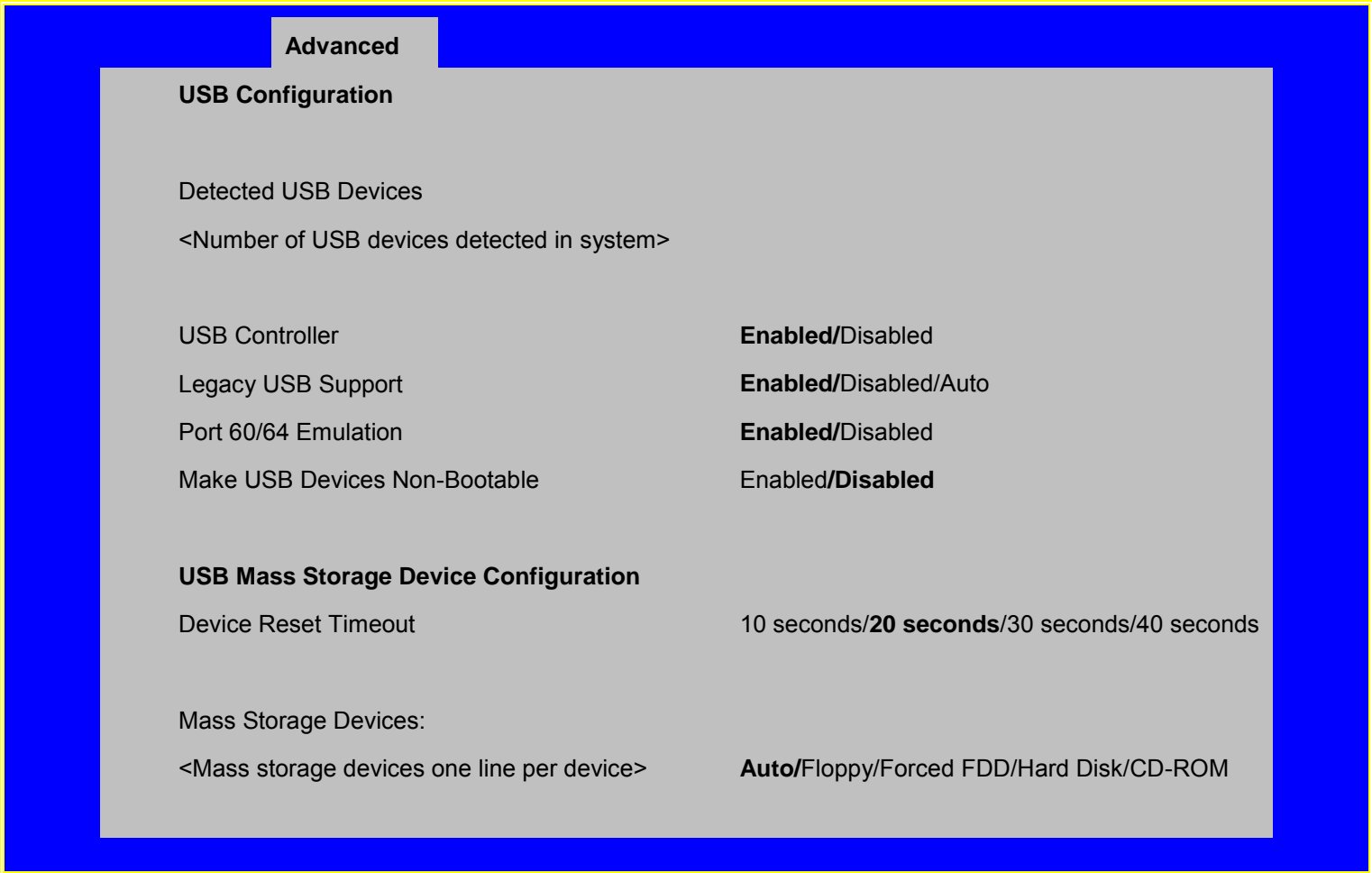
Advanced

USB Configuration

Detected USB Devices

<Number of USB devices detected in system>

USB Controller	**Enabled/**Disabled
Legacy USB Support	**Enabled/**Disabled/Auto
Port 60/64 Emulation	**Enabled/**Disabled
Make USB Devices Non-Bootable	Enabled**/Disabled**

USB Mass Storage Device Configuration

Device Reset Timeout	10 seconds/**20 seconds**/30 seconds/40 seconds

Mass Storage Devices:

<Mass storage devices one line per device>	**Auto/**Floppy/Forced FDD/Hard Disk/CD-ROM

Figure 133. USB Configuration Screen

Screen Field Descriptions:

1. Detected USB Devices

    Option Values: *<Number of USB devices detected in system>*

    Help Text: *<None>*

    Comments: *Information only.* Displays the total number of USB devices of all types which have been detected in POST.

2. USB Controller

    Option Values: **Enabled**
                Disabled

    Help Text:

        [Enabled] - All on-board USB controllers are turned on and accessible by the OS.
        [Disabled] - All on-board USB controllers are turned off and inaccessible by the OS.

Comments: When the USB controllers are *Disabled*, there is no USB IO available for either POST or the OS. In that case, all following fields on this screen are grayed out and inactive.

3. Legacy USB Support

Option Values: **<u>Enabled</u>**
Disabled
Auto

Help Text:

Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. Disable option will only keep USB Keyboard devices available for EFI applications.

Comments: When *Legacy USB Support* is *Disabled*, USB devices are available only through OS drivers.

If the *USB controller* setting is *Disabled*, this field is grayed out and inactive.

4. Port 60/64 Emulation

Option Values: **<u>Enabled</u>**
Disabled

Help Text:

Enables I/O port 60h/64h emulation support.
This may be needed for legacy USB keyboard support when using an OS that is USB unaware.

Comments: If the *USB controller* setting is *Disabled*, this field is grayed out and inactive.

5. Make USB Devices Non-Bootable

Option Values: **<u>Enabled</u>**
Disabled

Help Text:

Exclude USB in Boot Table.
[Enabled]- This will remove all USB Mass Storage devices as Boot options.
[Disabled] - This will allow all USB Mass Storage devices as Boot options.

Comments: This is a security option. When *Disabled*, the system cannot be booted directly to a USB device of any kind. USB Mass Storage devices may still be used for data storage.

If the *USB controller* setting is *Disabled*, this field is grayed out and inactive.

6. Device Reset Timeout

Option Values: 10 seconds
20 seconds
30 seconds
40 seconds

Help Text:

USB Mass Storage device Start Unit command timeout.
Setting to a larger value provides more time for a mass storage device to be ready, if needed.

Comments: If the <u>USB controller</u> setting is <u>Disabled</u>, this field is grayed out and inactive.

7. Mass Storage Devices:

Option Values: **Auto**
Floppy
Forced FDD
Hard Disk
CD-ROM

Help Text:

[Auto] - USB devices less than 530 MB are emulated as floppies.
[Forced FDD] - HDD formatted drive is emulated as an FDD (e.g., ZIP drive).

Comments: This field is hidden if no USB Mass Storage devices are detected.

This setup screen can show a maximum of eight USB Mass Storage devices on the screen. If more than eight devices are installed in the system, the 'USB Devices Enabled' displays the correct count, but only the first eight devices discovered are displayed in this list.

If the <u>USB controller</u> setting is <u>Disabled</u>, this field is grayed out and inactive.

System Acoustic and Performance Configuration

The System Acoustic and Performance Configuration screen allows the user to configure the thermal control behavior of the system with respect to what parameters are used in the system's Fan Speed Control algorithms.

To access this screen from the *Main* screen, select *Advanced > System Acoustic and Performance Configuration*. To move to another screen, press the <Esc> key to return to the *Advanced* screen, then select the desired screen.
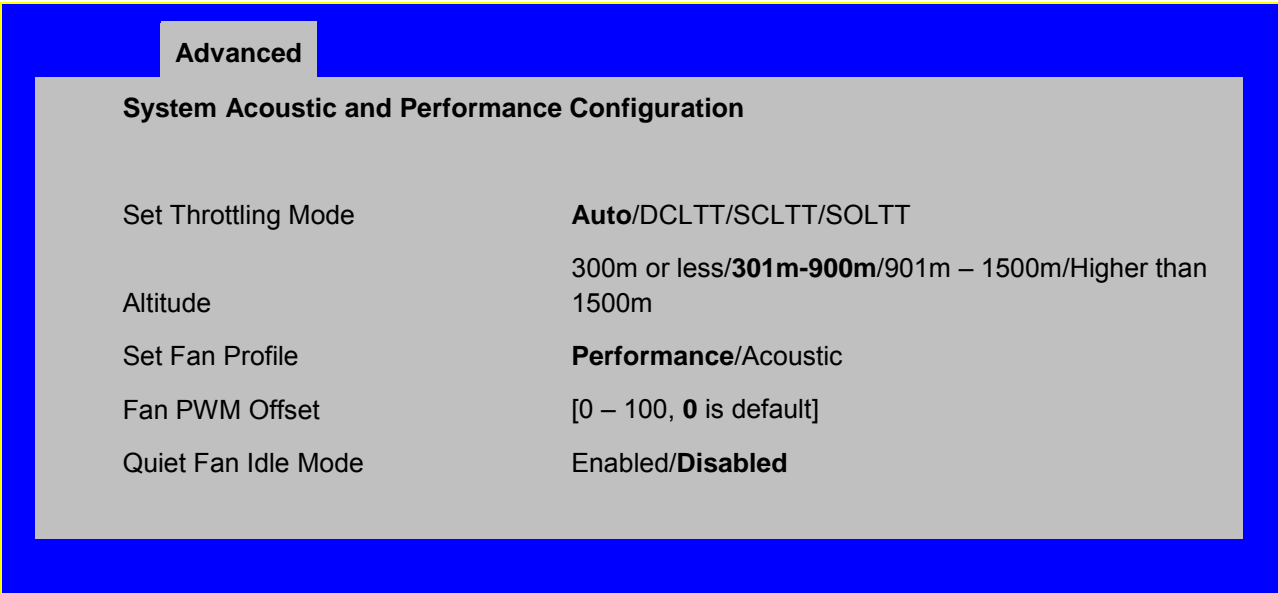
<div style="border:blue">

Advanced

System Acoustic and Performance Configuration

Set Throttling Mode	**Auto**/DCLTT/SCLTT/SOLTT
Altitude	300m or less/**301m-900m**/901m – 1500m/Higher than 1500m
Set Fan Profile	**Performance**/Acoustic
Fan PWM Offset	[0 – 100, **0** is default]
Quiet Fan Idle Mode	Enabled/**Disabled**

</div>

Figure 134. System Acoustic and Performance Configuration

Screen Field Descriptions:

1. Set Throttling Mode

   Option Values: **Auto**
   DCLTT
   SCLTT
   SOLTT

   Help Text:

   Sets Thermal Throttling mode for memory, to control fans and DRAM power as needed to control DIMM temperatures.
   [Auto] – BIOS selects mode.
   [DCLTT] – Dynamic Closed Loop Thermal Throttling.
   [SCLTT] – Static Closed Loop Thermal Throttling.
   [SOLTT] – Static Open Loop Thermal Throttling.

Comments: The Thermal Throttling Mode chosen reflects whether the DIMMs have Temperature Sensors (TSOD), and whether the chassis is an Intel chassis for which thermal data are available. Note that this is for thermal throttling only, independent of any controls imposed for the purpose of power limiting.

> ‣ DCLTT is the expected mode for a board in an Intel chassis with inlet and outlet air temperature sensors and TSOD. The firmware can update the offset registers for closed loop during runtime, as BIOS sends the dynamic CLTT offset temperature data.

> ‣ SCLTT would be used with an OEM chassis and DIMMs with TSOD. The firmware does not change the offset registers for closed loop during runtime, although the Management Engine can do so.

> ‣ SOLTT is intended for a system with UDIMMs which do not have TSOD. The thermal control registers are configured during POST, and the firmware does not change them.

2. Altitude

Option Values: 300m or less
               301m-900m
               901m-1500m
               Higher than 1500m

Help Text:

> *[300m or less](980ft or less) Optimal near sea level.*
> *[301m-900m](980ft-2950ft) Optimal performance setting at moderate elevation.*
> *[901m-1500m](2950ft-4920ft) Optimal performance setting at high elevation.*
> *[Above 1500m](above 4920ft) Optimal performance setting at the highest elevations.*

Comments: This option sets an altitude value in order to choose a Fan Profile that is optimized for the air density at the current altitude at which the system is installed.

3. Set Fan Profile

Option Values: **Performance**
               Acoustic

Help Text:

> *[Performance] - Fan control provides primary system cooling before attempting to throttle memory.*
> *[Acoustic] - The system will favor using throttling of memory over boosting fans to cool the system if thermal thresholds are met.*

Comments: This option allows the user to choose a Fan Profile that is optimized for maximizing performance or for minimizing acoustic noise.

When *Performance* is selected, the thermal conditions in the system are controlled by raising fan speed when necessary to raise cooling performance. This provides cooling without impacting system performance, but may impact system acoustic performance – fans running faster are typically louder.

When *Acoustic* is selected, then rather than increasing fan speed for additional cooling, the system will attempt first to control thermal conditions by throttling memory to reduce heat production. This regulates the system's thermal condition without changing the acoustic performance, but throttling memory may impact system performance.

4. Fan PWM Offset

   Option Values: *[Entry Field 0 – 100, __0__ is default]*

   Help Text:

   > *Valid Offset 0 - 100. This number is added to the calculated PWM value to increase Fan Speed.*

   Comments: This is a percentage by which the calculated fan speed will be increased. The user can apply positive offsets that result in increasing the minimum fan speeds.

5. Quiet Fan Idle Mode

   Option Values: Enabled
                      Disabled

   Help Text:

   > *Enabling this option allows the system fans to operate in Quiet 'Fan off' mode while still maintaining sufficient system cooling. In this mode, fan sensors become unavailable and cannot be monitored. There will be limited fan related event generation.*

   Comments: When enabled, this option allows fans to idle or turn off when sufficient thermal margin is available, decreasing the acoustic noise produced by the system and decreasing system power consumption. Fans will run as needed to maintain thermal control. The actual decrease in fan speed depends on the system thermal loading, which in turn depends on system configuration and workload.

   While Quiet Fan Idle Mode is engaged, fan sensors become unavailable and are not monitored by the BMC.

Quiet Fan Idle Mode does not conflict with Fan PWM Offset (above) – they work in concert, with Fan PWM Offset applied to fans in Quiet Fan Idle Mode just as when the fans are operating in "normal mode". A Fan PWM Offset of zero is necessary for fans to actually stop turning.

Security Screen (Tab)

The Security screen allows the user to enable and set the Administrator and User passwords and to lock out the front panel buttons so they cannot be used. This screen also allows the user to enable and activate the Trusted Platform Module (TPM) security settings on those boards that support TPM.

Note that it is necessary to activate the TPM in order be able to enable Intel® Trusted Execution Technology (TXT) on boards that support it. Changing the TPM state in Setup will require a Hard Reset for the new state to become effective.

This BIOS supports (but does not require) "Strong Passwords" for security. The "Strong Password" criteria for both Administrator and User passwords require that passwords be between 8 and 14 characters in length, and a password must contain at least one case-sensitive alphabetic character, one numeric character, and one special character. A warning is given when a password is set which does not meet the Strong Password criteria, but the password is accepted.

For further security, the BIOS optionally may require a Power on Password to be entered in early POST in order to boot the system. When Power On Password is enabled, POST is halted soon after power on while the BIOS queries for a Power On Password. Either the Administrator or the User password may entered for a Power on Password.

To access this screen from the *Main* screen or other top-level "Tab" screen, press the right or left arrow keys to traverse the tabs at the top of the Setup screen until the *Security* screen is selected.
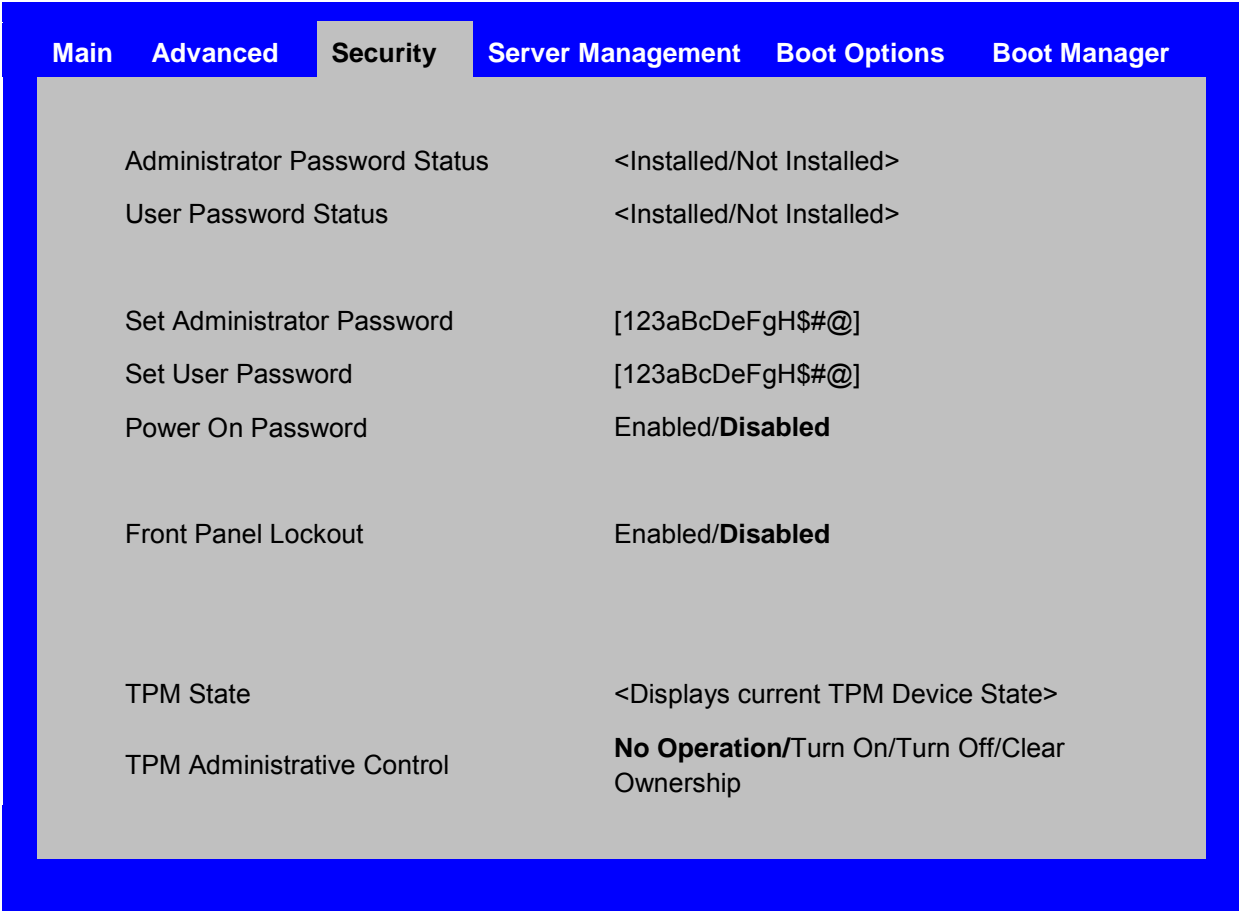
Main	Advanced	Security	Server Management	Boot Options	Boot Manager

Administrator Password Status   <Installed/Not Installed>

User Password Status   <Installed/Not Installed>

Set Administrator Password   [123aBcDeFgH$#@]

Set User Password   [123aBcDeFgH$#@]

Power On Password   Enabled/**Disabled**

Front Panel Lockout   Enabled/**Disabled**

TPM State   <Displays current TPM Device State>

TPM Administrative Control   **No Operation/**Turn On/Turn Off/Clear Ownership

Figure 135. Security Screen

<u>**Screen Field Descriptions:**</u>

1. Administrator Password Status

Option Values: *Installed*

         Not Installed

Help Text: *<None>*

Comments: <u>*Information only*</u>. Indicates the status of the Administrator Password.

2. User Password Status

Option Values: *Installed*

         Not Installed

Help Text: *<None>*

Comments: <u>*Information only*</u>. Indicates the status of the User Password.

3. Set Administrator Password

Option Values: *[Entry Field – 0-14 characters]*

Help Text:

> *Administrator password is used if Power On Password is enabled and to control change access in BIOS Setup. Length is 1-14 characters. Case sensitive alphabetic, numeric and special characters !@#$%^&*()-_+=? are allowed.*
> *Note: Administrator password must be set in order to use the User account.*

Comments: This password controls "change" access to Setup. The Administrator has full access to change settings for any Setup options, including setting the Administrator and User passwords.

When Power On Password protection is enabled, the Administrator password may be used to allow the BIOS to complete POST and boot the system.

Deleting all characters in the password entry field removes a password previously set. Clearing the Administrator Password also clears the User Password.

If invalid characters are present in the password entered, it will not be accepted, and there will be popup error message:

> *Password entered is not valid. Only case sensitive alphabetic, numeric and special characters !@#$%^&*()-_+=? are allowed.*

The Administrator and User passwords must be different. If the password entered is the same as the User password, it will not be accepted, and there will be popup error message:

> *Password entered is not valid. Administrator and User passwords must be different.*

Strong passwords are encouraged, although not mandatory. If a password is entered which does not meet the "Strong Password" criteria, there will be a popup warning message:

> *Warning – a Strong Password should include at least one each case sensitive alphabetic, numeric, and special character. Length should be 8 to 14 characters.*

4. Set User Password

Option Values: *[Entry Field – 0-14 characters]*

Help Text:

> *User password is used if Power On Password is enabled and to allow restricted access to BIOS Setup. Length is 1-14 characters. Case sensitive alphabetic, numeric and special characters !@#$%^&*()-_+=? are allowed.*
> *Note: Removing the administrator password also removes the user password.*

Comments: The User password is available only if the Administrator Password has been installed. This option protects Setup settings as well as boot choices. The User Password only allows limited access to the Setup options, and no choice of boot devices.

When Power On Password protection is enabled, the User password may be used to allow the BIOS to complete POST and boot the system.

The password format and entry rules and popup error and warning message are the same for the User password as for the Administrator password (see above).

5. Power On Password

Option Values: Enabled
                     Disabled

Help Text:

> *Enable Power On Password support. If enabled, password entry is required in order to boot the system.*

Comments: When Power On Password security is enabled, the system will halt soon after power on and the BIOS will ask for a password before continuing POST and booting. Either the Administrator or User password may be used.

If an Administrator password has not been set, this option will be grayed out and unavailable. If this option is enabled and the Administrator password is removed, that will also disable this option.

6. Front Panel Lockout

Option Values: Enabled
                     Disabled

Help Text:

> *If enabled, locks the power button OFF function and the reset and NMI Diagnostic Interrupt buttons on the system's front panel. If [Enabled] is selected, power off and reset must be controlled via a system management interface, and the NMI Diagnostic Interrupt is not available.*

Comments: *Note:* This option does not appear on all boards.

7. TPM State

Option Values: *<Displays current TPM Device State>*
                        May be:
                                Enabled & Activated
                                Enabled & Deactivated
                                Disabled & Activated
                                Disabled & Deactivated

Help Text: *<None>*

Comments: *Information only*. Shows the current TPM device state.

A **Disabled** TPM device does not execute commands that use the TPM functions and TPM security operations are not available.

An **Enabled & Deactivated** TPM is in the same state as a disabled TPM, except that setting of the TPM ownership is allowed if it is not present already.

An **Enabled & Activated** TPM executes all commands that use the TPM functions and TPM security operations are also available.

 NOTE

This option appears only on boards equipped with a TPM.

8. TPM Administrative Control

Option Values: **No Operation**
                        Turn On
                        Turn Off
                        Clear Ownership

Help Text:

[No Operation] - No changes to current state.
[Turn On] - Enables and activates TPM.
[Turn Off] - Disables and deactivates TPM.
[Clear Ownership] - Removes TPM ownership & returns TPM to factory default state.
Note: setting returns to [No Operation] on every boot.

Comments: Any Administrative Control operation selected will require the system to perform a Hard Reset in order to become effective.

 NOTE

This option appears only on boards equipped with a TPM.

Server Management Screen (Tab)

The Server Management screen allows the user to configure several server management features. This screen also provides an access point to the screens for configuring Console Redirection, displaying system information, and controlling the BMC LAN configuration.

To access this screen from the ***Main*** screen or other top-level "Tab" screen, press the right or left arrow keys to traverse the tabs at the top of the Setup screen until the ***Server Management*** screen is selected.

Main	Advanced	Security	**Server Management**	Boot Options	Boot Manager

Assert NMI on SERR   **Enabled** / Disabled

Assert NMI on PERR   **Enabled** / Disabled

Reset on CATERR   **Enabled** / Disabled

Reset on ERR2   **Enabled** / Disabled

Resume on AC Power Loss   **Stay Off** / Last State / Power On

Power Restore Delay   **Disabled** / Auto / Fixed

Power Restore Delay Value   [25 – 300s, **25** is default]

Clear System Event Log   Enabled / **Disabled**

FRB-2 Enable   **Enabled** / Disabled

OS Boot Watchdog Timer   Enabled / **Disabled**

OS Boot Watchdog Timer Policy   **Power off** / Reset

OS Boot Watchdog Timer   5 minutes / **10 minutes** / 15 minutes / 20
Timeout   minutes

Plug & Play BMC Detection   Enabled / **Disabled**

EuP LOT6 Off-Mode   Enabled / **Disabled**

Shutdown Policy   Enabled / **Disabled**

► **Shutdown Policy**

Option Values: Enabled
          Disabled

Help Text: *Enable/Disable Shutdown Policy.*

Comments: This option is designed for multiple-node system and to
control the policy that BMC should shutdown one node if it detected over-current
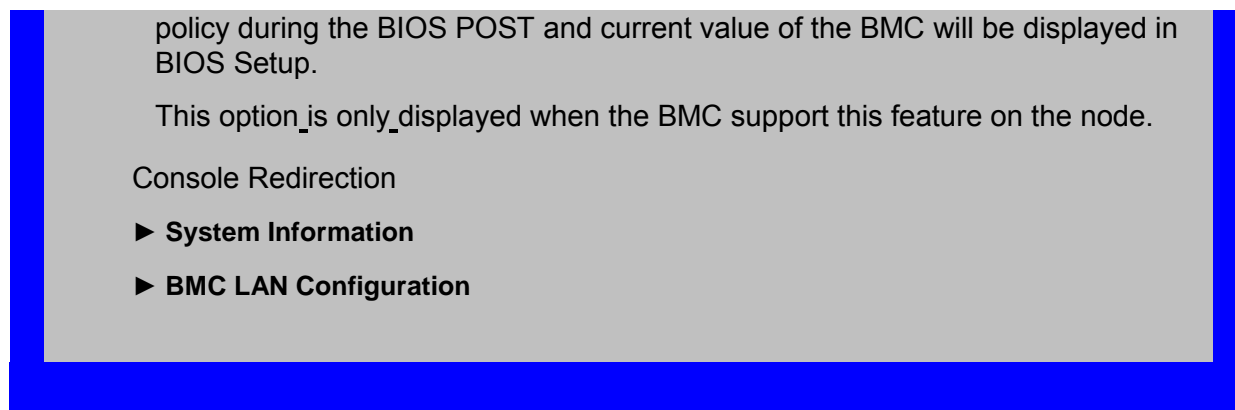or over-temperature condition. The BIOS and the BMC will synchronize the

policy during the BIOS POST and current value of the BMC will be displayed in BIOS Setup.

This option is only displayed when the BMC support this feature on the node.

Console Redirection

► **System Information**

► **BMC LAN Configuration**

Figure 136. Server Management Screen

<u>**Screen Field Descriptions:**</u>

1. Assert NMI on SERR

    Option Values: <u>**Enabled**</u>
    Disabled

    Help Text:

    > *On SERR, generate an NMI and log an error.*
    > *Note: [Enabled] must be selected for the Assert NMI on PERR setup option to be visible.*

    Comments: This option allows the system to generate an NMI when an SERR occurs, which is a method Legacy Operating System error handlers may use instead of processing a Machine Check.

2. Assert NMI on PERR

    Option Values: <u>**Enabled**</u>
    Disabled

    Help Text:

    > *On PERR, generate an NMI and log an error.*
    > *Note: This option is only active if the Assert NMI on SERR option has [Enabled] selected.*

    Comments: This option allows the system to generate an NMI when a PERR occurs, which is a method Legacy Operating System error handlers may use instead of processing a Machine Check.

3. Reset on CATERR

    Option Values: <u>**Enabled**</u>
    Disabled

    Help Text:

    > *When enabled system gets reset upon encountering Catastrophic Error (CATERR); when*
    > *disabled system does not get reset on CATERR.*

Comments: This option controls whether the system will be reset when the "Catastrophic Error" CATERR# signal is held asserted, rather than just pulsed to generate an SMI. This indicates that the processor has encountered a fatal hardware error.

╱ NOTE

> *If "Reset on CATERR" is Disabled, this can result in a system hang for certain error conditions, possibly with the system unable to update the System Status LED or log an error to the SEL before hanging.*

4. Reset on ERR2

Option Values: **Enabled**
Disabled

Help Text:

> *When enabled system gets reset upon encountering ERR2 (Fatal error); when disabled system does not get reset on ERR2*

Comments: This option controls whether the system will be reset if the BMC's ERR2 Monitor times out, that is, the ERR2 signal has been continuously asserted long enough to indicate that the SMI Handler is not able to service the condition

╱ NOTE

> *If "Reset on ERR2" is Disabled, this can result in a system hang for certain error conditions, possibly with the system unable to update the System Status LED or log an error to the SEL before hanging.*

5. Resume on AC Power Loss

Option Values: **Stay Off**
Last State
Power On

Help Text:

> *System action to take on AC power loss recovery.*
> *[Stay Off] - System stays off.*
> *[Last State] - System returns to the same state before the AC power loss.*
> *[Power On] - System powers on.*

Comments: This option controls the policy that the BMC will follow when AC power is restored after an unexpected power outage. The BMC will either hold DC power off or always turn it on to boot the system, depending on this setting – and in the case of **Last State**, depending on whether the power was on and the system was running before the AC power went off.

When this setting is changed in Setup, the new setting will be sent to the BMC. However, the BMC maintains ("owns") this Power Restore Policy setting, and it can be changed independently with an IPMI command to the BMC. BIOS gets this setting from the BMC early in POST, and also for the Setup Server Management screen.

6. Power Restore Delay

Option Values: **<u>Disabled</u>**
Auto
Fixed

Help Text:

Allows a delay in powering up after a power failure, to reduce peak power requirements. The delay can be fixed or automatic between 25-300 seconds.

Comments: When the AC power resume policy (above) is either **Power On** or **Last State**, this option allows a delay to be taken after AC power is restored before the system actually begins to power up. This delay can be either a fixed time or an "automatic" time, where "automatic" means that the BIOS will select a randomized delay time of 25-300 seconds when it sends the Power Restore Delay setting to the BMC.

This option will be grayed out and unavailable when the AC power resume policy is **Stay Off**.

The Power Restore Delay setting is maintained by BIOS. This setting does not take effect until a reboot is done. Early in POST, the Power Restore Policy is read from the BMC, and if the policy is **Power On** or **Last State**, the delay settings are sent to the BMC.

Bear in mind that even if the Power Restore Delay is **Disabled**, there will still be a delay of about 20 seconds while the BMC itself boots up after AC power is restored.

⟋ **NOTE**

This Power Restore Delay option applies only to powering on when AC is applied. It has no effect on powering the system up using the Power Button on the Front Panel. A DC power on using the Power Button is not delayed.

The purpose of this delay is to avoid having all systems draw "startup surge" power at the same time. Different systems or racks of systems can be set to different delay times to spread out the startup power draws. Alternatively, all systems can be set to Automatic, and then each system will wait for a random period before powering up.

7. Power Restore Delay Value

Option Values: *[Entry Field 25 – 300, __25__ is default]*

Help Text:

Fixed time period 25-300 seconds for Power Restore Delay.

Comments: When the power restore policy is *Power On* or *Last State*, and the Power Restore Delay selection is *Fixed*, this field allows for specifying how long in seconds that fixed delay will be.

When the Power Restore Delay is *Disabled* or *Auto*, this field will be grayed out and unavailable.

The **Power Restore Delay Value** setting is maintained by BIOS. This setting does not take effect until a reboot is done. Early in POST, the Power Restore Policy is read from the BMC, and if the policy is *Power On* or *Last State*, the delay settings are sent to the BMC. When the **Power Restore Delay** setting is *Fixed*, this delay value is used to provide the length of the delay.

8. Clear System Event Log

Option Values: Enabled
                   <u>Disabled</u>

Help Text:

> *If enabled, clears the System Event Log. All current entries will be lost.*
> *Note: This option is reset to [Disabled] after a reboot.*

Comments: This option sends a message to the BMC to request it to clear the System Event Log. The log will be cleared, and then the "Clear" action itself will be logged as an event. This give the user a time/date for when the log was cleared.

9. FRB-2 Enable

Option Values: **<u>Enabled</u>**
                   Disabled

Help Text:

> *Fault Resilient Boot (FRB).*
> *BIOS programs the BMC watchdog timer for approximately 6 minutes. If BIOS does not complete POST before the timer expires, the BMC will reset the system.*

Comments: This option controls whether the system will be reset if the BMC Watchdog Timer detects what appears to be a hang during POST. When the BMC Watchdog Timer is purposed as an FRB-2 timer, it is initially set to allow 6 minutes for POST to complete.

However, the FRB-2 Timer is suspended during times when some lengthy operations are in progress, like executing Option ROMS, during Setup, and when BIOS is waiting for a password. or for input to the F6 BBS Boot Menu. The FRB-2 Timer is also suspended while POST is paused with the <Pause> key.

10. OS Boot Watchdog Timer

Option Values: Enabled
                <u>Disabled</u>

Help Text:

> *BIOS programs the watchdog timer with the timeout value selected. If the OS does not complete booting before the timer expires, the BMC will reset the system and an error will be logged.*
> *Requires OS support or Intel Management Software Support.*

Comments: This option controls whether the system will set the BMC Watchdog to detect an appearent to be a hang during OS booting. BIOS sets the timer before starting the OS bootstrap load procedure. If the OS Load Watchdog Timer times out, then presumably the OS failed to boot properly.

If the OS does boot up successfully, it must be aware of the OS Load Watchdog Timer and immediately turn it off before it expires. The OS may turn off the timer, or more often the timer may be repurposed as an OS Watchdog Timer to protect against runtime OS hangs.

Unless the OS does have timer-aware software to support the OS Load Watchdog Timer, the system will be unable to boot successfully with the OS Load Watchdog Timer enabled. When the timer expires without having been reset or turned off, the system will either reset or power off repeatedly.

11. OS Boot Watchdog Timer Policy

Option Values: **<u>Power off</u>**
                Reset

Help Text:

> *If the OS watchdog timer is enabled, this is the system action taken if the watchdog timer expires.*
> *[Reset] - System performs a reset.*
> *[Power Off] - System powers off.*

Comments: This option is grayed out and unavailable when the O/S Boot Watchdog Timer is disabled.

12. OS Boot Watchdog Timer Timeout

Option Values: 5 minutes
                <u>10 minutes</u>
                15 minutes
                20 minutes

Help Text:

> *If the OS watchdog timer is enabled, this is the timeout value BIOS will use to configure the watchdog timer.*

Comments: This option is grayed out and unavailable when the O/S Boot Watchdog Timer is disabled.

13. Plug & Play BMC Detection

Option Values: Enabled
             Disabled

Help Text:

If enabled, the BMC will be detectable by OSes which support plug and play loading of an IPMI driver. Do not enable this option if your OS does not support this driver.

Comments: This option controls whether the OS Server Management Software will be able to find the BMC and automatically load the correct IPMI support software for it. If your OS does not support Plug & Play for the BMC, you will not have the correct IPMI driver software loaded.

14. EuP LOT6 Off-Mode

Option Values: Enabled
             Disabled

Help Text:

Enable/disable Ecodesign EuP LOT6 "Deep Sleep" Off-Mode for near-zero energy use when powered off.

Comments: This option controls whether the system goes into "Deep Sleep" or more conventional S5 "Soft-Off" when powered off. "Deep Sleep" state uses less energy than S5, but S5 can start up faster and can allow a Wake on LAN action (which cannot be done from a Deep Sleep state).

This option will not appear on platforms which do not support EuP LOT6 Off-Mode. For details on which platform do support it

15. Shutdown Policy

Option Values: Enabled
             Disabled

Help Text: *Enable/Disable Shutdown Policy.*

Comments: This option is designed for multiple-node system and to control the policy that BMC should shutdown one node if it detected over-current or over-temperature condition. The BIOS and the BMC will synchronize the policy during the BIOS POST and current value of the BMC will be displayed in BIOS Setup.

This option is only displayed when the BMC support this feature on the node.

16. Console Redirection

Option Values: *<None>*

Help Text: *View/Configure Console Redirection information and settings.*

Comments: *Selection only*. Position to this line and press the <Enter> key to go to the **Console Redirection** group of configuration settings.

17. System Information

Option Values: *<None>*

Help Text: *View System Information.*

Comments: *Selection only*. Position to this line and press the <Enter> key to go to the **System Information** group of configuration settings.

18. BMC LAN Configuration

Option Values: *<None>*

Help Text: *View/Configure BMC LAN and user settings.*

Comments: *Selection only*. Position to this line and press the <Enter> key to go to the **BMC LAN Configuration** group of configuration settings.

Console Redirection

The Console Redirection screen allows the user to enable or disable Console Redirection for Remote System Management, and to configure the connection options for this feature.

To access this screen from the **Main** screen, select **Server Management > Console Redirection.** To move to another screen, press the <Esc> key to return to the **Server Management** screen, then select the desired screen.

When Console Redirection is active, all POST and Setup displays are in Text Mode. The Quiet Boot setting is disregarded, and the Text Mode POST Diagnostic Screen will be displayed regardless of the Quiet Boot setting. This is due to the limitations of Console Redirection, which is based on data terminal emulation using a serial data interface to transfer character data.

Console Redirection can use either of the two Serial Ports provided by the SuperIO in the BMC. However, if Console Redirection is to be coordinated with Serial Over LAN, the user should be aware that SOL is only supported through Serial Port A (except for W200CR, which only has Serial B and supports SOL on Serial B).
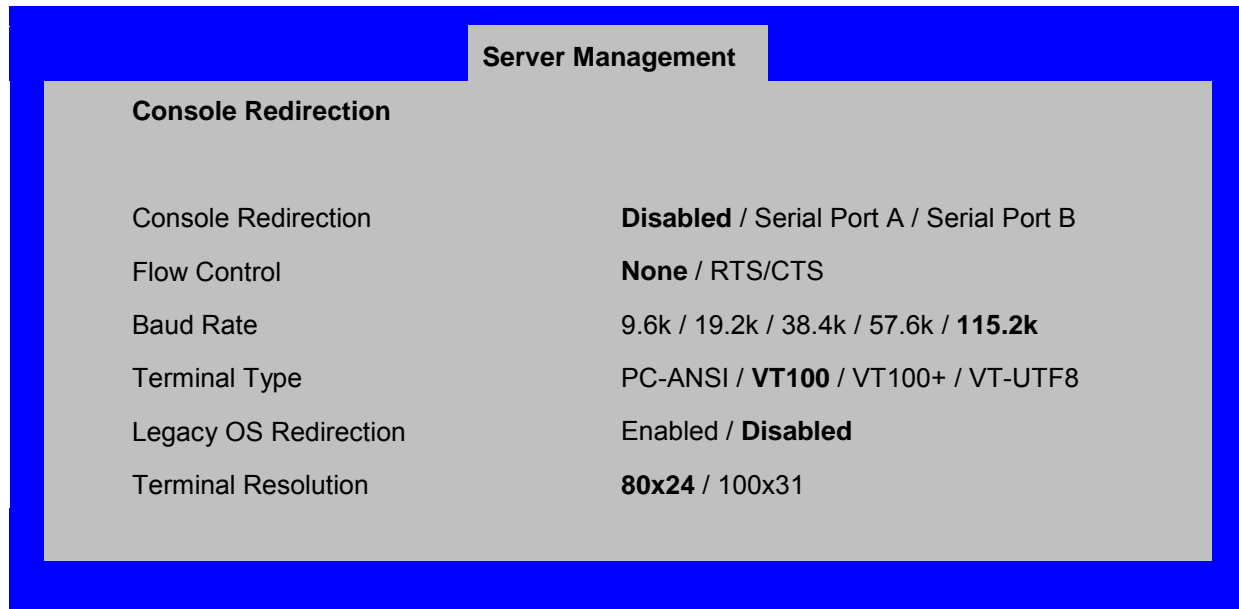
Server Management
Console Redirection

Console Redirection	**Disabled** / Serial Port A / Serial Port B
Flow Control	**None** / RTS/CTS
Baud Rate	9.6k / 19.2k / 38.4k / 57.6k / **115.2k**
Terminal Type	PC-ANSI / **VT100** / VT100+ / VT-UTF8
Legacy OS Redirection	Enabled / **Disabled**
Terminal Resolution	**80x24** / 100x31

Figure 137. Console Redirection Screen

Screen Field Descriptions:

1. Console Redirection

    Option Values: **Disabled**
    Serial Port A
    Serial Port B

    Help Text:

    > *Console redirection allows a serial port to be used for server management tasks.*
    > *[Disabled] - No console redirection.*
    > *[Serial Port A] - Configure serial port A for console redirection.*
    > *Enabling this option will disable display of the Quiet Boot logo screen during POST.*

    Comments: Serial Console Redirection can use either Serial Port A or Serial Port B. If SOL is also going to be configured, note that SOL is only supported through Serial Port A (with the exception of W2600CR, which only has Serial B so supports SOL on Serial B).

    When Console Redirection is set to *Disabled*, all other options on this screen will be grayed out and unavailable.

    Only Serial Ports which are *Enabled* should be available to choose for Console Redirection. If neither Serial A nor Serial B is set to *Enabled*, then Console Redirection will be forced to *Disabled*, and grayed out as inactive. In that case, all other options on this screen will also be grayed

2. Flow Control

Option Values: __None__
RTS/CTS

Help Text:

Flow control is the handshake protocol.
This setting must match the remote terminal application.
[None] - Configure for no flow control.
[RTS/CTS] - Configure for hardware flow control.

Comments: Flow control is necessary only when there is a possibility of data   overrun. In that case the Request To Send/Clear to Send (RTS/CTS) hardware handshake is a relatively conservative protocol which can usually be configured at both ends.

When Console Redirection is set to *Disabled*, this option will be grayed out and unavailable.

3. Baud Rate

Option Values: 9.6k
19.2k
38.4k
57.6k
__115.2k__

Help Text:

Serial port transmission speed. This setting must match the remote terminal application.

Comments: In most modern Server Management applications, serial data transfer is consolidated over an alternative faster medium like LAN, and 115.2k is the speed of choice.

When Console Redirection is set to *Disabled*, this option will be grayed out and unavailable.

4. Terminal Type

Option Values: PC-ANSI
__VT100__
VT100+
VT-UTF8

Help Text:

Character formatting used for console redirection. This setting must match the remote terminal application.

Comments: The VT100 and VT100+ terminal emulations are essentially the same. VT-UTF8 is a UTF8 encoding of VT100+. PC-ANSI is the native character encoding used by PC-compatible applications and emulators.

When Console Redirection is set to *Disabled*, this option will be grayed out and unavailable.

5. Legacy OS Redirection

Option Values: Enabled
>   **Disabled**

Help Text:

> *This option enables legacy OS redirection (i.e., DOS) on serial port. If it is enabled, the associated serial port is hidden from the legacy OS.*

Comments: Operating Systems which are "redirection-aware" implement their own Console Redirection mechanisms. For a Legacy OS which is not "aware", this option allows the BIOS to handle redirection.

When Console Redirection is set to *Disabled*, this option will be grayed out and unavailable.

6. Terminal Resolution

Option Values: **80x24**
>   100x31

Help Text:

> *Remote Terminal Resolution*

Comments: This option allows the use of a larger terminal screen area, although it does not change Setup displays to match.

When Console Redirection is set to *Disabled*, this option will be grayed out and unavailable.

System Information

The System Information screen allows the user to view part numbers, serial numbers, and firmware revisions. This is an *Information Only* screen

To access this screen from the **Main** screen, select **Server Management > System Information.** To move to another screen, press the <Esc> key to return to the **Server Management** screen, then select the desired screen.
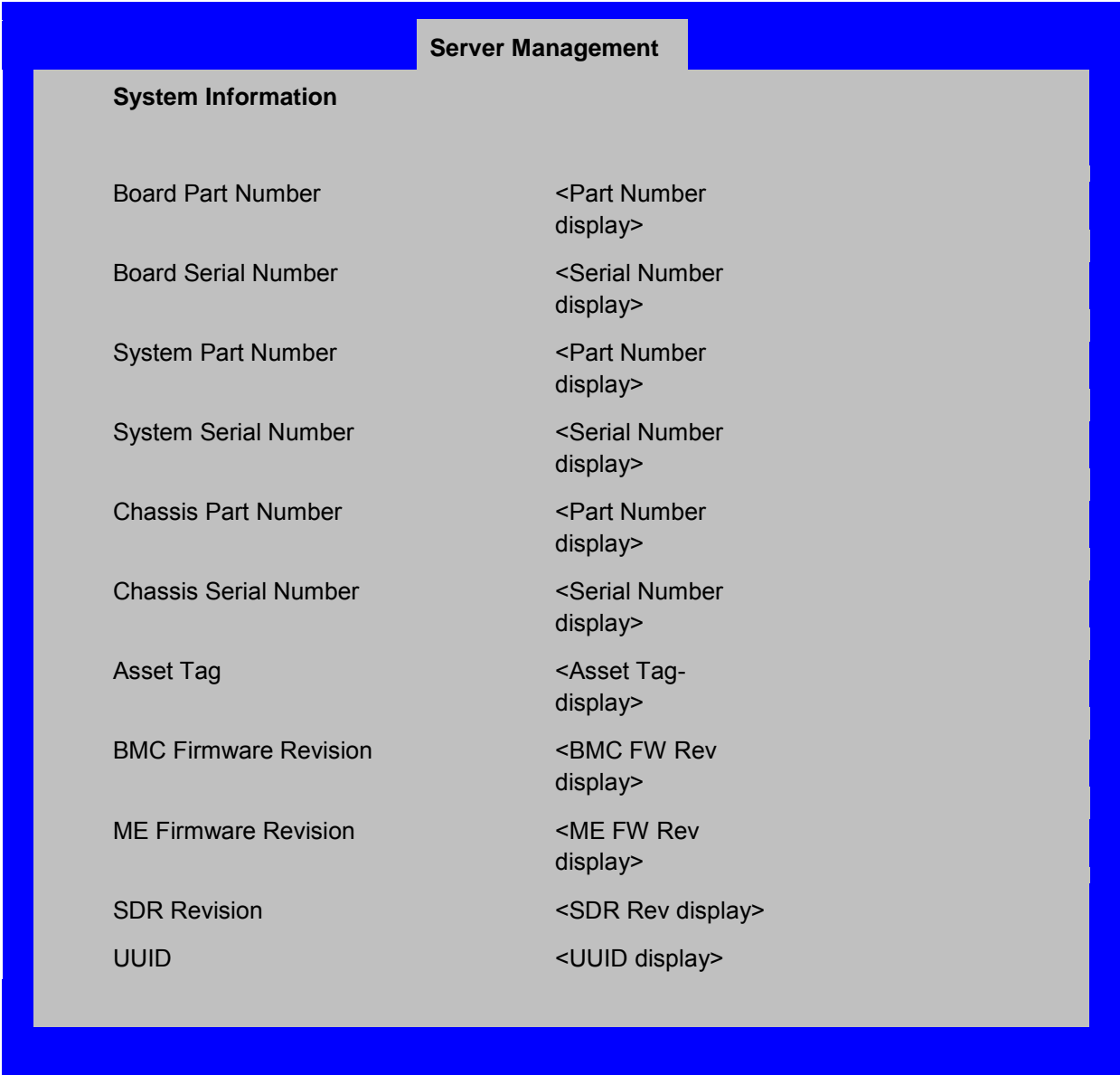
Server Management

System Information

Board Part Number	\<Part Number display>
Board Serial Number	\<Serial Number display>
System Part Number	\<Part Number display>
System Serial Number	\<Serial Number display>
Chassis Part Number	\<Part Number display>
Chassis Serial Number	\<Serial Number display>
Asset Tag	\<Asset Tag-display>
BMC Firmware Revision	\<BMC FW Rev display>
ME Firmware Revision	\<ME FW Rev display>
SDR Revision	\<SDR Rev display>
UUID	\<UUID display>

Figure 138. System Information Screen

<u>**Screen Field Descriptions:**</u>

1. Board Part Number

   Option Values: *\<Part Number display>*

   Help Text: *\<None>*

   Comments: <u>*Information only*</u>.

2. Board Serial Number

Option Values: *<Serial Number display>*

Help Text: *<None>*

Comments: *Information only.*

3. System Part Number

Option Values: *<Part Number display>*

Help Text: *<None>*

Comments: *Information only.*

4. System Serial Number

Option Values: *<Serial Number display>*

Help Text: *<None>*

Comments: *Information only.*

5. Chassis Part Number

Option Values: *<Part Number display>*

Help Text: *<None>*

Comments: *Information only.*

6. Chassis Serial Number

Option Values: *<Serial Number display>*

Help Text: *<None>*

Comments: *Information only.*

7. Asset Tag

Option Values: *<Asset Tag-display>*

Help Text: *<None>*

Comments: *Information only.*

8. BMC Firmware Revision

Option Values: *<BMC FW Rev display>*

Help Text: *<None>*

Comments: *Information only.*

9. ME Firmware Revision

Option Values: *<ME FW Rev display>*

Help Text: *<None>*

Comments: *Information only.*

10. SDR Revision

Option Values: *<SDR Rev display>*

Help Text: *<None>*

Comments: *Information only.*

11. UUID

Option Values: *<UUID display>*

Help Text: *<None>*

Comments: *Information only.*

BMC LAN Configuration

To access this screen from the *Main* screen, select *Server Management > System Information.* To move to another screen, press the <Esc> key to return to the *Server Management* screen, then select the desired screen.

The BMC configuration screen allows the user to configure the BMC Baseboard LAN channel and an Intel® RMM4 LAN channel, and to manage BMC User settings for up to five BMC Users.

An Intel® RMM4 Management Module may be installed in the server system.

If the Management Module is installed, it may also have a Dedicated Server Management NIC Module (DMN) installed with it. In that case, the LAN settings for the Intel®RMM4 with Dedicated Server Management NIC may be configured.

When there is no Management Module installed in the system, or there is an Intel® RMM4-Lite without a DMN installed, the LAN settings specific to the Intel® RMM4 are grayed out and not available.

This screen has a choice of IPv4 or IPv6 addressing. When IPv6 is disabled, only the IPv4 addressing options appear. When IPv6 is enabled, the IPv4 options are grayed out and unavailable, and there is an additional section active for IPv6-addressing. This is true for both the Baseboard LAN configuration and the Intel® RMM4 with Dedicated Server Management NIC Module.

IP addresses for either IPv4 or IPv6 addressing can be assigned by static IP addresses manually typed in, or by dynamic IP addresses supplied by a Dynamic Host Configuration Protocol (DHCP) server. IPv6 addressing can also be provided by "stateless autoconfiguration" which does not require a DHCP server.

The BMC LAN Configuration screen is unusual in that the LAN Configuration parameters are maintained by the BMC itself, so this screen is just a User Interface to the BMC configuration. As

such, the initial values of the LAN options shown on the screen are acquired from the BMC when this screen is initially accessed by a user,. Any values changed by the user are communicated back to the BMC when a "Save Changes" or "Save Changes and Exit" action is performed. If a "Discard Changes" or "Discard Changes and Exit" action is performed instead, any accumulated changes from this screen will be disregarded and lost.

Server Management

BMC LAN Configuration

Baseboard LAN configuration

IP Source	Static/**Dynamic**
IP Address	[0.0.0.0]
Subnet Mask	[0.0.0.0]
Gateway IP	[0.0.0.0]

Baseboard LAN IPv6 configuration

IPv6	Enabled/**Disabled**
IPv6 Source	Static/**Dynamic**/Auto
IPv6 Address	[0000.0000.0000.0000.0000.0000.0000.0000]
Gateway IPv6	[0000.0000.0000.0000.0000.0000.0000.0000]
IPv6 Prefix Length	[0 – 128, **64** is default]

Intel(R) RMM4 LAN configuration

Intel® RMM4	<Not Present/Intel(R) RMM4-Lite/Intel(R) RMM4 + DMN>
IP Source	Static/**Dynamic**
IP Address	[0.0.0.0]
Subnet Mask	[0.0.0.0]
Gateway IP	[0.0.0.0]

Intel(R) RMM4 LAN IPv6 configuration

IPv6 Source	Static/**Dynamic**/Auto
IPv6 Address	[0000.0000.0000.0000.0000.0000.0000.0000]
Gateway IPv6	[0000.0000.0000.0000.0000.0000.0000.0000]
IPv6 Prefix Length	[0 – 128, **64** is default]

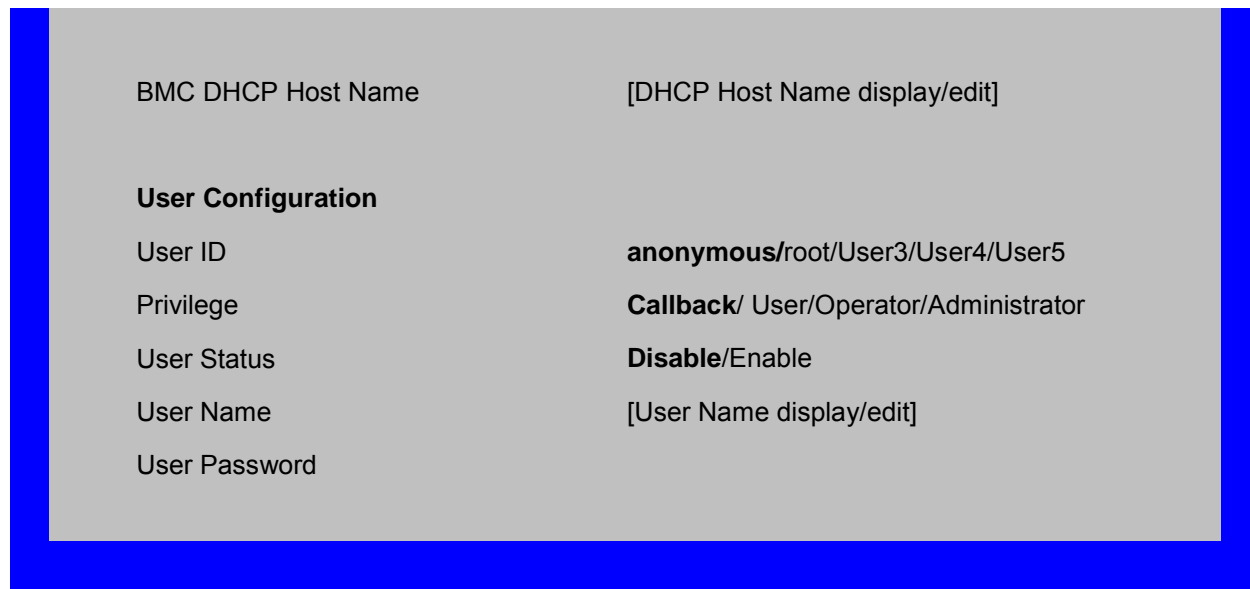|	
BMC DHCP Host Name	[DHCP Host Name display/edit]
User Configuration	
User ID	**anonymous/**root/User3/User4/User5
Privilege	**Callback**/ User/Operator/Administrator
User Status	**Disable**/Enable
User Name	[User Name display/edit]
User Password	

Figure 139. BMC LAN Configuration Screen

Screen Field Descriptions:

1. IP Source

   Option Values: Static
   Dynamic

   Help Text:

   Select BMC IP Source: If [Static], IP parameters may be edited. If [Dynamic], these fields are display-only and IP address is acquired automatically (DHCP).

   Comments: This specifies the IP Source for IPv4 addressing for the Baseboard LAN. There is a separate IP Source field for the Intel® RMM4 LAN configuration.

   When IPv4 addressing is used, the initial value for this field is acquired from the BMC, and its setting determines whether the other Baseboard LAN IPv4 addressing fields are display-only (when **Dynamic**) or can be edited (when **Static**).

   When IPv6 addressing is enabled, this field is grayed out and inactive.

2. IP Address

   Option Values: [Entry Field 0.0.0.0, **0.0.0.0** is default]

   Help Text:

   View/Edit IP Address. Press <Enter> to edit.

   Comments: This specifies the IPv4 Address for the Baseboard LAN. There is a separate IPv4 Address field for the Intel® RMM4 LAN configuration.

When IPv4 addressing is used, the initial value for this field is acquired from the BMC. The setting of *IP Source* determines whether this field is display-only (when *Dynamic*) or can be edited (when *Static*).

When IPv6 addressing is enabled, this field is grayed out and inactive.

3. Subnet Mask

    Option Values: [Entry Field 0.0.0.0, **0.0.0.0** is default]

    Help Text:

    > *View/Edit Subnet Mask. Press <Enter> to edit.*

    Comments: This specifies the IPv4 addressing Subnet Mask for the Baseboard LAN. There is a separate IPv4 Subnet Mask field for the Intel® RMM4 LAN configuration.

    When IPv4 addressing is used, the initial value for this field is acquired from the BMC. The setting of *IP Source* determines whether this field is display-only (when *Dynamic*) or can be edited (when *Static*).

    When IPv6 addressing is enabled, this field is grayed out and inactive.

4. Gateway IP

    Option Values: [Entry Field 0.0.0.0, **0.0.0.0** is default]

    Help Text:

    > *View/Edit Gateway IP. Press <Enter> to edit.*

    Comments: This specifies the IPv4 addressing Gateway IP for the Baseboard LAN. There is a separate IPv4 Gateway IP field for the Intel® RMM4 LAN configuration.

    When IPv4 addressing is used, the initial value for this field is acquired from the BMC. The setting of *IP Source* determines whether this field is display-only (when *Dynamic*) or can be edited (when *Static*).

    When IPv6 addressing is enabled, this field is grayed out and inactive.

5. IPv6

    Option Values: Enabled
                    Disabled

    Help Text:

    > *Option to Enable/Disable IPv6 addressing and any IPv6 network traffic on these channels.*

    Comments: The initial value for this field is acquired from the BMC. It may be changed in order to switch between IPv4 and IPv6 addressing technologies.

When this option is set to ***Disabled***, all other IPv6 fields will not be visible for the Baseboard LAN and Intel® RMM4 DMN (if installed). When IPv6 addressing is ***Enabled***, all IPv6 fields for the Baseboard LAN and Intel® RMM4 DMN will become visible, and all IPv4 fields will be grayed out and inactive.

6. IPv6 Source

   Option Values: Static
                   Dynamic
                   Auto

   Help Text:

   > *Select BMC IPv6 source: If [Static], IPv6 parameters may be edited. If [Dynamic], these fields are display-only and IPv6 address is acquired automatically (DHCP). If [Auto], these fields are display-only and IPv6 address is acquired using ICMPv6 router / neighbor discovery.*

   Comments: This specifies the IP Source for IPv6 addressing for the Baseboard LAN configuration. There is a separate IPv6 Source field for the Intel® RMM4 LAN configuration.

   This option is only visible when the ***IPv6*** option is set to ***Enabled***.

   When IPv6 addressing is ***Enabled***, the initial value for this field is acquired from the BMC, and its setting determines whether the other Baseboard LAN IPv6 addressing fields are display-only (when ***Dynamic*** or ***Auto***) or can be edited (when ***Static***).

7. IPv6 Address

   Option Values: *[Entry Field 0000.0000.0000.0000.0000.0000.0000.0000,*
                   0000.0000.0000.0000.0000.0000.0000.0000 *is default]*

   Help Text:

   > *View/Edit IPv6 address. Press <Enter> to edit. IPv6 addresses consist of 8 hexadecimal 4 digit numbers separated by colons.*

   Comments: This specifies the IPv6 Address for the Baseboard LAN. There is a separate IPv6 Address field for the Intel® RMM4 LAN configuration.

   This option is only visible when the ***IPv6*** option is set to ***Enabled***.

   When IPv6 addressing is used, the initial value for this field is acquired from the BMC. The setting of ***IPv6 Source*** determines whether this field is display-only (when ***Dynamic*** or ***Auto***) or can be edited (when ***Static***).

8. Gateway IPv6

Option Values: *[Entry Field 0000.0000.0000.0000.0000.0000.0000.0000,*
0000.0000.0000.0000.0000.0000.0000.0000 *is default]*

Help Text:

> *View/Edit Gateway IPv6 address. Press <Enter> to edit. Gateway IPv6 addresses consist of 8 hexadecimal 4 digit numbers separated by colons.*

Comments: This specifies the Gateway IPv6 Address for the Baseboard LAN. There is a separate Gateway IPv6 Address field for the Intel® RMM4 LAN configuration.

This option is only visible when the **IPv6** option is set to **Enabled**.

When IPv6 addressing is used, the initial value for this field is acquired from the BMC. The setting of **IPv6 Source** determines whether this field is display-only (when **Dynamic** or **Auto**) or can be edited (when **Static**).

9. IPv6 Prefix Length

Option Values: *[Entry Field 0 – 128, __64__ is default]*

Help Text:

> *View/Edit IPv6 Prefix Length from zero to 128 (default 64). Press <Enter> to edit.*

Comments: This specifies the IPv6 Prefix Length for the Baseboard LAN. There is a separate IPv6 Prefix Length field for the Intel® RMM4 LAN configuration.

This option is only visible when the **IPv6** option is set to **Enabled**.

When IPv6 addressing is used, the initial value for this field is acquired from the BMC. The setting of **IPv6 Source** determines whether this field is display-only (when **Dynamic** or **Auto**) or can be edited (when **Static**).

10. Intel® RMM4

Option Values: *Not Present*
> *Intel® RMM4-Lite*
> *Intel® RMM4 + DMN*

Help Text: *<None>*

Comments: *Information only*. Displays whether an Intel® RMM4 component is currently installed. This information may come from querying the BMC.

Intel® RMM4-Lite is the Management Module __without__ the Dedicated Server Management NIC Module. When this is present, or if the Management Module is **Not Present** at all, the fields for Intel® RMM4 LAN Configuration will not be visible.

When an **Intel® RMM4 + DMN** is installed, the options for **Intel® RMM4 LAN Configuration** will be visible. When **IPv6** is **Disabled**, the IPv4 configuration fields will be visible and the IPv6 configuration fields will not be visible. When **IPv6** is **Enabled**, the IPv4 fields will be grayed out and inactive, while the IPv6 Configuration fields will be visible.

In either case, the Intel® RMM4 section *IP Source* or *IPv6 Source* will determine whether the IPv4 or IPv6 address fields are display-only or can be edited.

11. IP Source

Option Values: Static
                 Dynamic

Help Text:

> *Select RMM4 IP source: If [Static], IP parameters may be edited. If [Dynamic], these fields are display-only and IP address is acquired automatically (DHCP).*

Comments: This specifies the IP Source for IPv4 addressing for the Intel® RMM4 DMN LAN connection. There is a separate IP Source field for the Baseboard LAN configuration.

When IPv4 addressing is used, the initial value for this field is acquired from the BMC, and its setting determines whether the other Intel® RMM4 DMN LAN IPv4 addressing fields are display-only (when *Dynamic*) or can be edited (when *Static*).

When IPv6 addressing is enabled, this field is grayed out and inactive.

12. IP Address

Option Values: [Entry Field 0.0.0.0, **0.0.0.0** is default]

Help Text:

> *View/Edit IP Address. Press <Enter> to edit.*

Comments: This specifies the IPv4 Address for the Intel® RMM4 DMN LAN. There is a separate IPv4 Address field for the Baseboard LAN configuration.

When IPv4 addressing is used, the initial value for this field is acquired from the BMC. The setting of *IP Source* determines whether this field is display-only (when *Dynamic*) or can be edited (when *Static*).

When IPv6 addressing is enabled, this field is grayed out and inactive.

13. Subnet Mask

Option Values: [Entry Field 0.0.0.0, **0.0.0.0** is default]

Help Text:

> *View/Edit Subnet Mask. Press <Enter> to edit.*

Comments: This specifies the IPv4 addressing Subnet Mask for the Intel® RMM4 DMN LAN. There is a separate IPv4 Subnet Mask field for the Baseboard LAN configuration.

When IPv4 addressing is used, the initial value for this field is acquired from the BMC. The setting of *IP Source* determines whether this field is display-only (when *Dynamic*) or can be edited (when *Static*).

When IPv6 addressing is enabled, this field is grayed out and inactive.

14. Gateway IP

Option Values: [Entry Field 0.0.0.0, **0.0.0.0** is default]

Help Text:

> *View/Edit Gateway IP. Press <Enter> to edit.*

Comments: This specifies the IPv4 addressing Gateway IP for the Intel® RMM4 DMN LAN. There is a separate IPv4 Gateway IP field for the Baseboard LAN configuration.

When IPv4 addressing is used, the initial value for this field is acquired from the BMC. The setting of *IP Source* determines whether this field is display-only (when *Dynamic*) or can be edited (when *Static*).

When IPv6 addressing is enabled, this field is grayed out and inactive.

15. IPv6 Source

Option Values: Static
                Dynamic
                Auto

Help Text:

> *Select Intel® RMM4 IPv6 source: If [Static], IPv6 parameters may be edited. If [Dynamic], these fields are display-only and IPv6 address is acquired automatically (DHCP). If [Auto], these fields are display-only and IPv6 address is acquired using ICMPv6 router / neighbor discovery.*

Comments: This specifies the IP Source for IPv6 addressing for the Intel® RMM4 DMN LAN configuration. There is a separate IPv6 Source field for the Baseboard LAN configuration.

This option is only visible when the *IPv6* option is set to *Enabled*.

When IPv6 addressing is *Enabled*, the initial value for this field is acquired from the BMC, and its setting determines whether the other Intel® RMM4 DMN LAN IPv6 addressing fields are display-only (when *Dynamic* or *Auto*) or can be edited (when *Static*).

16. IPv6 Address

Option Values: *[Entry Field 0000.0000.0000.0000.0000.0000.0000.0000,*
0000.0000.0000.0000.0000.0000.0000.0000 is default]

Help Text:

> *View/Edit IPv6 address. Press <Enter> to edit. IPv6 addresses consist of 8 hexadecimal 4 digit numbers separated by colons.*

Comments: This specifies the IPv6 Address for the Intel® RMM4 DMN LAN. There is a separate IPv6 Address field for the Baseboard LAN configuration.

This option is only visible when the **IPv6** option is set to **Enabled**.

When IPv6 addressing is used, the initial value for this field is acquired from the BMC. The setting of **IPv6 Source** determines whether this field is display-only (when **Dynamic** or **Auto**) or can be edited (when **Static**).

17. Gateway IPv6

Option Values: *[Entry Field 0000.0000.0000.0000.0000.0000.0000.0000,*
0000.0000.0000.0000.0000.0000.0000.0000 is default]

Help Text:

> *View/Edit Gateway IPv6 address. Press <Enter> to edit. Gateway IPv6 addresses consists of 8 hexadecimal 4 digit numbers separated by colons.*

Comments: This specifies the Gateway IPv6 Address for the Intel® RMM4 DMN LAN. There is a separate Gateway IPv6 Address field for the Baseboard LAN configuration.

This option is only visible when the **IPv6** option is set to **Enabled**.

When IPv6 addressing is used, the initial value for this field is acquired from the BMC. The setting of **IPv6 Source** determines whether this field is display-only (when **Dynamic** or **Auto**) or can be edited (when **Static**).

18. IPv6 Prefix Length

Option Values: *[Entry Field 0 – 128, __64__ is default]*

Help Text:

> *View/Edit IPv6 Prefix Length from zero to 128 (default 64). Press <Enter> to edit.*

Comments: This specifies the IPv6 Prefix Length for the Intel® RMM4 DMN LAN. There is a separate IPv6 Prefix Length field for the Baseboard LAN configuration.

This option is only visible when the **IPv6** option is set to **Enabled**.

When IPv6 addressing is used, the initial value for this field is acquired from the BMC. The setting of **IPv6 Source** determines whether this field is display-only (when **Dynamic** or **Auto**) or can be edited (when **Static**).

19. BMC DHCP Host Name

Option Values: *[Entry Field, 2-63 characters]*

Help Text:

> *View/Edit BMC DHCP host name. Press <Enter> to edit. Host name should start with an alphabetic, remaining can be alphanumeric characters. Host name length may be from 2 to 63 characters.*

Comments: This field is active and may be edited whenever at least one of the **IP Source** or **IPv6 Source** options is set to **Dynamic**. This is the name of the DHCP Host from which dynamically assigned IPv4 or IPv6 addressing parameters are acquired.

The initial value for this field is supplied from the BMC, if there is a DHCP Host available. The user can edit the existing Ho or enter a different DHCP Host Name.

If none of the **IP/IPv6 Source** fields is set to **Dynamic**, then this **BMC DHCP Host Name** field will be grayed out and inactive.

20. User ID

Option Values: **<u>anonymous</u>**
                 root
                 User3
                 User4
                 User5

Help Text:

> *Select the User ID to configure: User1 (anonymous), User2 (root), and User3/4/5 are supported.*

Comments: These 5 User IDs are fixed choices and cannot be changed. The BMC supports 15 User IDs natively, but only the first 5 are supported through this interface.

21. Privilege

Option Values: Callback
                 User
                 Operator
                 <u>Administrator</u>

Help Text:

> *View/Select user privilege. User2 (root) privilege is "Administrator" and cannot be changed.*

Comments: The level of privilege that is assigned for a User ID affects which functions that user may perform.

22. User Status

Option Values: Enabled
Disabled

Help Text:

Enable / Disable LAN access for selected user. Also enables/disables SOL, KVM, and media redirection.

Comments: Note that status setting is **Disabled** by default until set to **Enabled**.

23. User Name

Option Values: *[Entry Field, 4 - 15 characters]*

Help Text:

Press <Enter> to edit User Name. User Name is a string of 4 to 15 alphanumeric characters, and must begin with an alphabetic character. User Name cannot be changed for User1 (anonymous) and User2 (root).

Comments: User Name can only be edited for users other than "anonymous" and "root". Those two User Names may not be changed.

24. User Password

Option Values: *[Popup Entry Field, 0 - 15 characters]*

Help Text:

Press <Enter> key to enter password. Maximum length is 15 characters. Any ASCII printable characters can be used: case-sensitive alphabetic, numeric, and special characters.

**Note: Password entered will override any previously set password.

Comments: This field will not indicate whether there is a password set already. There is no display - just press <Enter> for a popup with an entry field to enter a new password. Any new password entered will override the previous password, if there was one.

Boot Options Screen (Tab)

The Boot Options screen displays all bootable media encountered during POST, and allows the user to configure the desired order in which boot devices are to be tried.

To access this screen from the **Main** screen or other top-level "Tab" screen, press the right or left arrow keys to traverse the tabs at the top of the Setup screen until the **Boot Options** screen is selected.

The first boot device in the specified Boot Order which is present and is bootable during POST will be used to boot the system, and will continue to be used to reboot the system until the boot device configuration has changed (that is, which boot devices are present), or until the system has been powered down and booted in a "cold" power-on boot.

/ **NOTE**

> *USB devices can be "hotplugged" during POST, and will be detected and "beeped". They will be enumerated and displayed on the USB Configuration Setup screen. However, they may not be enumerated as bootable devices, depending on when in POST they were hotplugged. If they were recognized before the enumeration of bootable devices, they will appear as Boot Devices if appropriate. If they were recognized after Boot Device enumeration, they will not appear as a bootable device for the Boot Options screen, the Boot Manager screen, or the F6 Boot Menu.*

There are two main types of boot order control, Legacy Boot and EFI Optimized boot. These are mutually exclusive – when EFI Optimized Boot is enabled, Legacy Boot (the default) is disabled. Within Legacy Boot operation, there are two further methods of ordering boot devices, Dynamic Boot Order and Static Boot Order.

The default for Boot Order control is Legacy Boot, with Dynamic Boot Order. If all types of bootable devices are installed in the system, then the default Boot Order is as follows:

- CD/DVD-ROM
- Floppy Disk Drive
- Hard Disk Drive
- PXE Network Device
- BEV (Boot Entry Vector) Device
- EFI Shell and EFI Boot paths

In this default Boot Order, a USB device may appear in any of several Device Classes, due to the flexibility of USB connections and USB emulation of various types of devices.

/ **NOTE**

> *A USB Key (USB Flash Drive) can be formatted to emulate either a Floppy Drive or a Hard Drive. and will appear in that Boot Device Class. However, although it can be formatted as a CDROM Drive, it will not be detected as such. It will be treated as a Hard Disk and will appear in the list of available Hard Drives.*
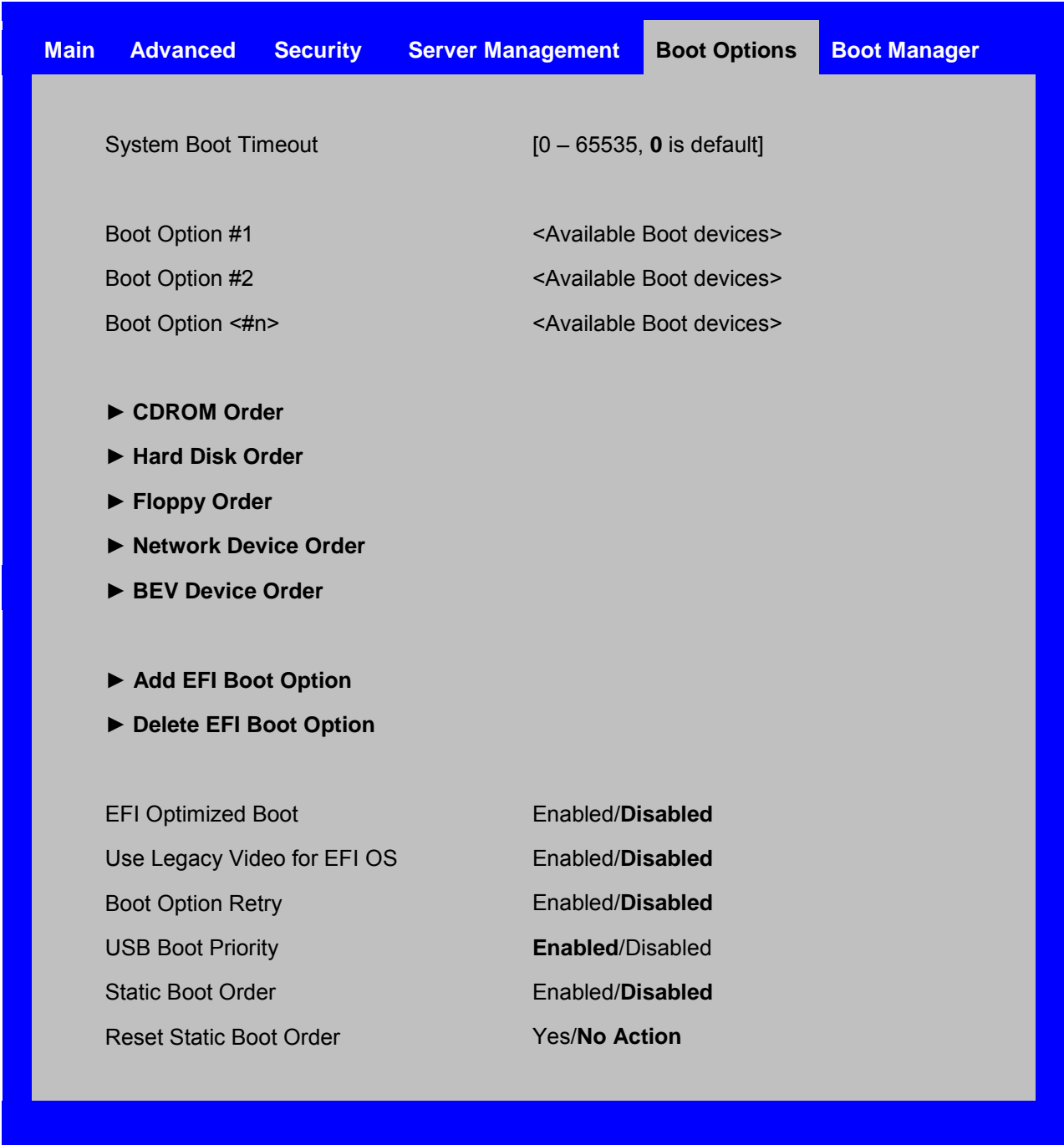
Main	Advanced	Security	Server Management	**Boot Options**	Boot Manager

System Boot Timeout   [0 – 65535, **0** is default]

Boot Option #1   <Available Boot devices>

Boot Option #2   <Available Boot devices>

Boot Option <#n>   <Available Boot devices>

► **CDROM Order**

► **Hard Disk Order**

► **Floppy Order**

► **Network Device Order**

► **BEV Device Order**

► **Add EFI Boot Option**

► **Delete EFI Boot Option**

EFI Optimized Boot   Enabled/**Disabled**

Use Legacy Video for EFI OS   Enabled/**Disabled**

Boot Option Retry   Enabled/**Disabled**

USB Boot Priority   **Enabled**/Disabled

Static Boot Order   Enabled/**Disabled**

Reset Static Boot Order   Yes/**No Action**

Figure 140. Boot Options Screen

Screen Field Descriptions:

1. System Boot Timeout

Option Values: *[Entry Field 0 – 65535, **0** is default]*

Help Text:

> *The number of seconds BIOS will pause at the end of POST to allow the user to press the [F2] key for entering the BIOS Setup utility.*
> *Valid values are 0-65535. Zero is the default. A value of 65535 causes the system to go to the Boot Manager menu and wait for user input for every system boot.*

Comments: After entering the desired timeout, press the <Enter> key to register that timeout value to the system. These settings are in seconds. The timeout value entered will take effect on the next boot.

This timeout value is independent of the FRB2 setting for BIOS boot failure protection. The FBR2 countdown will be suspended during the time that the Boot Timeout countdown is active.

Also, if the <Pause> key is pressed during the time that the Boot Timeout is active, the Boot Timeout countdown will be suspended until the Pause state has been dismissed and normal POST processing has resumed.

2. Boot Option #1

3. Boot Option #2

4. Boot Option <#n>

Option Values: *<Available Boot Device #n>*

Help Text:

> *Set system boot order by selecting the boot option for this position.*

Comments: When the Boot order has been chosen, it will take effect on the next boot. The system will go down the list and boot from the first device on the list which is available and bootable.

This establishes the Boot Order only with respect to the normal boot path. This order has no effect on the Boot Manager selection list or the <F6> BIOS Boot Menu popup, both of which simply list all bootable devices available in the order in which they were detected. Whether or not a potential Boot Device is in this list has no bearing on the presence or order of Boot Devices shown for Boot Manager or the BIOS Boot Menu.

5. CDROM Order

Option Values: *<None>*

Help Text:

> *Set the order of the legacy devices in this group.*

Comments: *Selection only*. Position to this line and press the <Enter> key to go to the **CDROM Order s**creen. This option appears when one or more bootable CDROM drives are available in the system. This includes USB CDROM devices, but not USB Keys formatted for CRDOM emulation, which are seen as Hard Disk drives.

6. Hard Disk Order

Option Values: *<None>*

Help Text:

> *Set the order of the legacy devices in this group.*

Comments: *Selection only*. Position to this line and press the <Enter> key to go to the **Hard Disk Order** screen. This option appears when one or more bootable Hard Disk drives are available in the system. This includes USB Hard Disk devices and USB Keys formatted for Hard Disk or CRDOM emulation.

7. Floppy Order

Option Values: *<None>*

Help Text:

> *Set the order of the legacy devices in this group.*

Comments: *Selection only*. Position to this line and press the <Enter> key to go to the **Floppy Order** screen.

This option appears when one or more bootable Floppy Disk drives are available in the system. This includes USB Floppy Disk devices and USB Keys formatted for Floppy Disk emulation.

8. Network Device Order

Option Values: *<None>*

Help Text:

> *Set the order of the legacy devices in this group.*

Comments: *Selection only*. Position to this line and press the <Enter> key to go to the **Network Device Order** screen.

This option appears when one or more bootable Network Devices are available in the system.

9. BEV Device Order

Option Values: *<None>*

Help Text:

> *Set the order of the legacy devices in this group.*

Comments: *Selection only*. Position to this line and press the <Enter> key to go to the **BEV Device Order** screen.

This option appears when one or more bootable BEV Devices are available in the system.

10. Add EFI Boot Option

Option Values: *<None>*

Help Text:

> *Add a new EFI boot option to the boot order.*

Comments: *Selection only*. Position to this line and press the <Enter> key to go to the **Add EFI Boot Option** screen.

This option is only displayed if an EFI bootable device is available to the system.

11. Delete EFI Boot Option

Option Values: *<None>*

Help Text:

> *Remove an EFI boot option from the boot order.*

Comments: *Selection only*. Position to this line and press the <Enter> key to go to the **Delete EFI Boot Option** screen.

This option is only displayed if an EFI boot path is included in the Boot Order.

12. EFI Optimized Boot

Option Values: Enabled
                     <u>Disabled</u>

Help Text:

> *If enabled, the BIOS only loads modules required for booting EFI-aware Operating Systems.*

Comments: If this option is enabled, the system will not boot successfully to a non-EFI-aware OS.

13. Use Legacy Video for EFI OS

Option Values: Enabled
                        <u>Disabled</u>

Help Text:

> *If enabled, the BIOS uses the legacy video ROM instead of the EFI video ROM.*

Comments: This option appears only when EFI Optimized Boot is enabled.

14. Boot Option Retry

Option Values: Enabled
                        <u>Disabled</u>

Help Text:

> *If enabled, this continually retries non-EFI-based boot options without waiting for user input.*

Comments: This option is intended to keep retrying for cases where the boot devices could possibly be slow to initially respond, for example, if the device were "asleep" and did not wake quickly enough. However, if none of the devices in the Boot Order <u>ever</u> responds, the BIOS will continue to reboot indefinitely.

15. USB Boot Priority

Option Values: Enabled
                        <u>Disabled</u>

Help Text:

> *If enabled, newly discovered USB devices are moved to the top of their boot device category.*
> *If disabled, newly discovered USB devices are moved to the bottom of their boot device category.*

Comments: This option enables or disables the "USB Reorder" functionality. USB Boot Priority, if enabled, is intended for the case where a user wants to be able to plug in a USB device and immediately boot to it, for example in case of a maintenance or System Administration operation. If a User Password is installed, USB Boot Priority action is suspended when a User Password is installed.

16. Static Boot Order

Option Values: Enabled
                Disabled

Help Text:

> *[Disabled] - Devices removed from the system are deleted from Boot Order Tables.*
> *[Enabled] - Devices removed have positions in Boot Order Tables retained for later*
> *reinsertion.*

Comments: When the option changes to "Enabled" from "Disabled", it will enable Static Boot Order (SBO) from the next boot onward, and also the current Boot Order will be stored as the SBO template.

When the option changes from "Enabled" to "Disabled", this will disable SBO and the SBO template will be cleared.

Otherwise it will retain the current Enabled/Disabled state.

17. Reset Static Boot Order

Option Values: Yes
                No Action

Help Text:

> *[Yes] Take snapshot of current boot order to save as Static Boot Order Template.*

Comments: This option will allow you to save the Boot Order list as the Static Boot Order template without disabling and re-enabling the Static Boot Order option.

Select *Yes* to snapshot the current Boot Options list into the Static Boot Options list on the next boot. After saving Static Boot Options list, this option will change back to *NoAction* automatically.

This option is available only when the Static Boot Order option is *Enabled*. Otherwise it will grayed out and unavailable.

CDROM Order

The CDROM Order screen allows the user to control the order in which BIOS attempts to boot from the CDROM drives installed in the system. This screen is only available when there is at least one CDROM device available in the system configuration.

/ **NOTE**

> *A USB attached CDROM device will appear in this section. However, a USB Key formatted as a*
> *CRDOM device will not – it will be detected as a Hard Disk device and will be included in the Hard*
> *Disk Order Screen.*

To access this screen from the *Main* screen, select **Boot Options > CDROM Order**. To move to another screen, press the <Esc> key to return to the **Boot Options** screen, then select the desired screen.
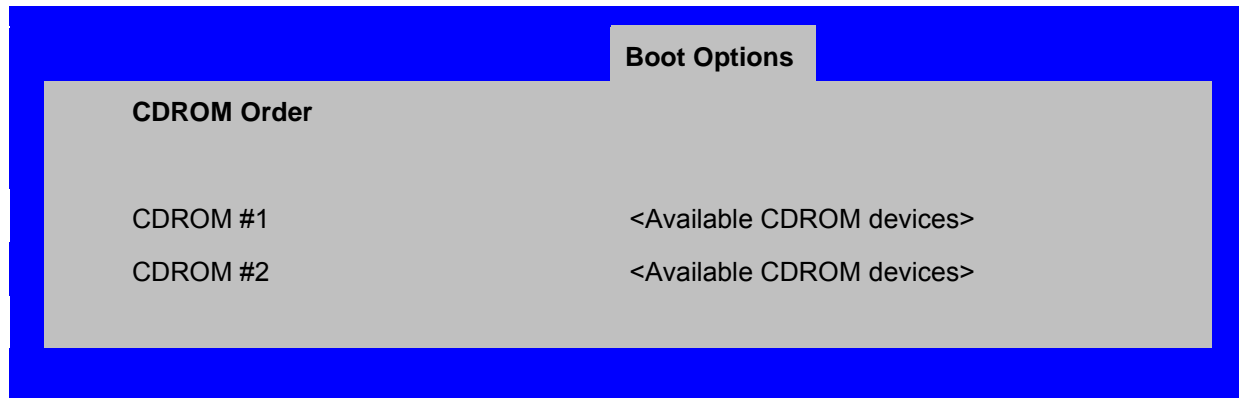
Boot Options

CDROM Order

CDROM #1   <Available CDROM devices>

CDROM #2   <Available CDROM devices>

Figure 141. CDROM Order Screen

<u>**Screen Field Descriptions:**</u>

1. CDROM #1

2. CDROM #2

   Option Values: *<Available CDROM devices>*

   Help Text:

           Set system boot order by selecting the boot option for this position.

   Comments: Choose the order of booting among CDROM devices by choosing which available CDROM device should be in each position in the order.

Hard Disk Order

The Hard Disk Order screen allows the user to control the order in which BIOS attempts to boot from the hard disk drives installed in the system. This screen is only available when there is at least one hard disk device available in the system configuration. Note that a USB attached Hard Disk drive or a USB Key device formatted as a hard disk will appear in this section.

To access this screen from the *Main* screen, select *Boot Options > Hard Disk Order*. To move to another screen, press the <Esc> key to return to the *Boot Options* screen, then select the desired screen.
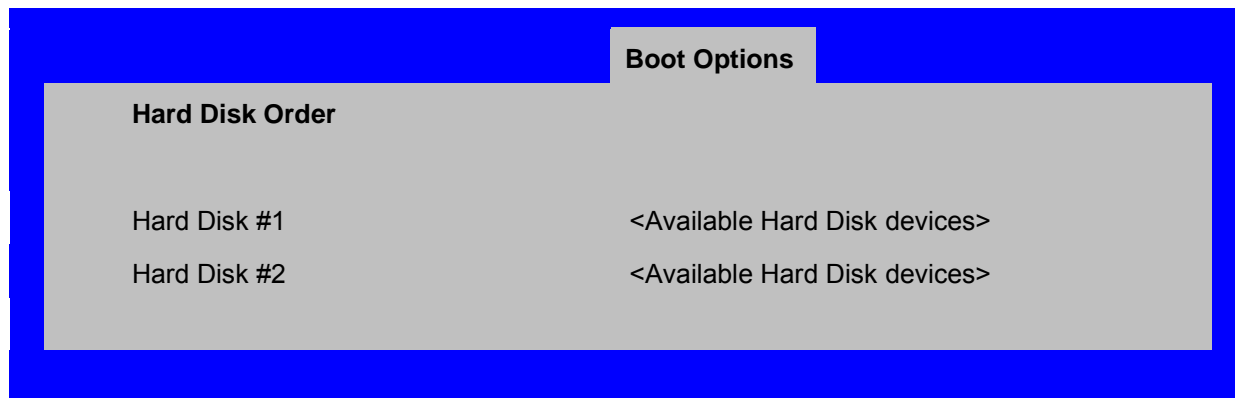
```
                                   Boot Options

   Hard Disk Order


     Hard Disk #1                          <Available Hard Disk devices>

     Hard Disk #2                          <Available Hard Disk devices>
```

Figure 142. Hard Disk Order Screen

<u>**Screen Field Descriptions:**</u>

1. Hard Disk #1

2. Hard Disk #2

    Option Values: *<Available Hard Disk devices>*

    Help Text:

         Set system boot order by selecting the boot option for this position.

    Comments: Choose the order of booting among Hard Disk devices by choosing
    which available Hard Disk device should be in each position in the order.

Floppy Order

The Floppy Order screen allows the user to control the order in which BIOS attempts to boot from
the Floppy Disk drives installed in the system. This screen is only available when there is at least
one Floppy Disk (diskette) device available in the system configuration. Note that a USB attached
diskette drive or a USB Key device formatted as a diskette drive will appear in this section.

To access this screen from the *Main* screen, select **Boot Options > Floppy Order**. To move to
another screen, press the <Esc> key to return to the **Boot Options** screen, then select the desired
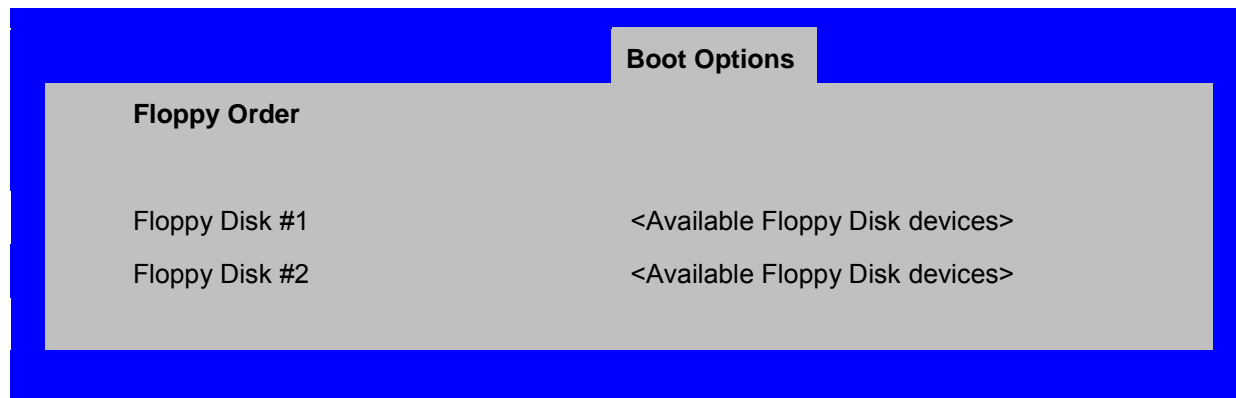screen.

Boot Options

Floppy Order

Floppy Disk #1   <Available Floppy Disk devices>

Floppy Disk #2   <Available Floppy Disk devices>

Figure 143. Floppy Order Screen

Screen Field Descriptions:

1. Floppy Disk #1

2. Floppy Disk #2

Option Values: *<Available Floppy Disk devices>*

Help Text:

Set system boot order by selecting the boot option for this position.

Comments: Choose the order of booting among Floppy Disk devices by choosing which available Floppy Disk device should be in each position in the order.

Network Device Order

The Network Device Order screen allows the user to control the order in which BIOS attempts to boot from the network bootable devices installed in the system. This screen is only available when there is at least one network bootable device available in the system configuration.

To access this screen from the *Main* screen, select *Boot Options > Network Device Order*. To move to another screen, press the <Esc> key to return to the *Boot Options* screen, then select the desired screen.
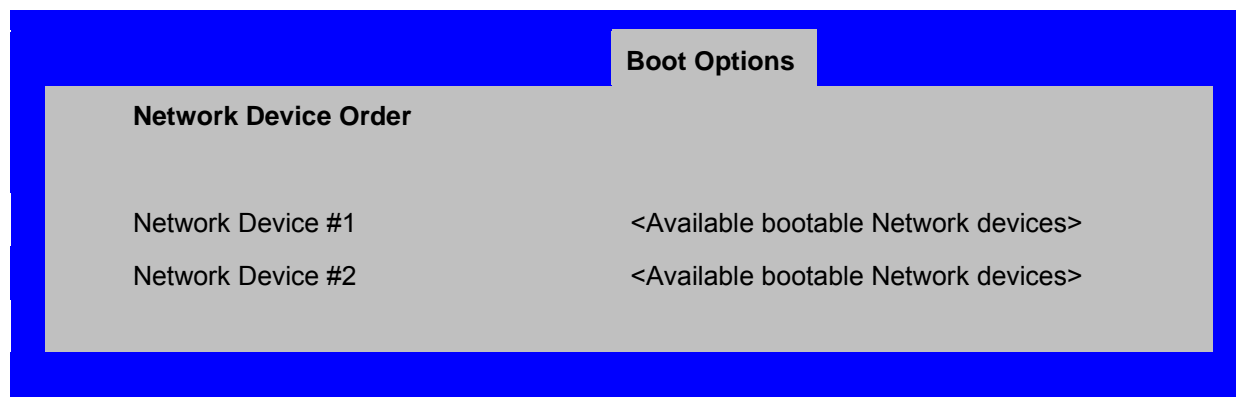
Boot Options

Network Device Order

Network Device #1   <Available bootable Network devices>

Network Device #2   <Available bootable Network devices>

Figure 144. Network Device Order Screen

<u>**Screen Field Descriptions:**</u>

1. Network Device #1

2. Network Device #2

Option Values: *<Available Network Devices>*

Help Text:

Set system boot order by selecting the boot option for this position.

Comments: Choose the order of booting among Network Devices by choosing which available Network Device should be in each position in the order.

BEV Device Order

The BEV Device Order screen allows the user to control the order in which BIOS attempts to boot from the BEV Devices installed in the system. This screen is only available when there is at least one BEV device available in the system configuration.

To access this screen from the *Main* screen, select *Boot Options > BEV Device Order*. To move to another screen, press the <Esc> key to return to the *Boot Options* screen, then select the desired screen.
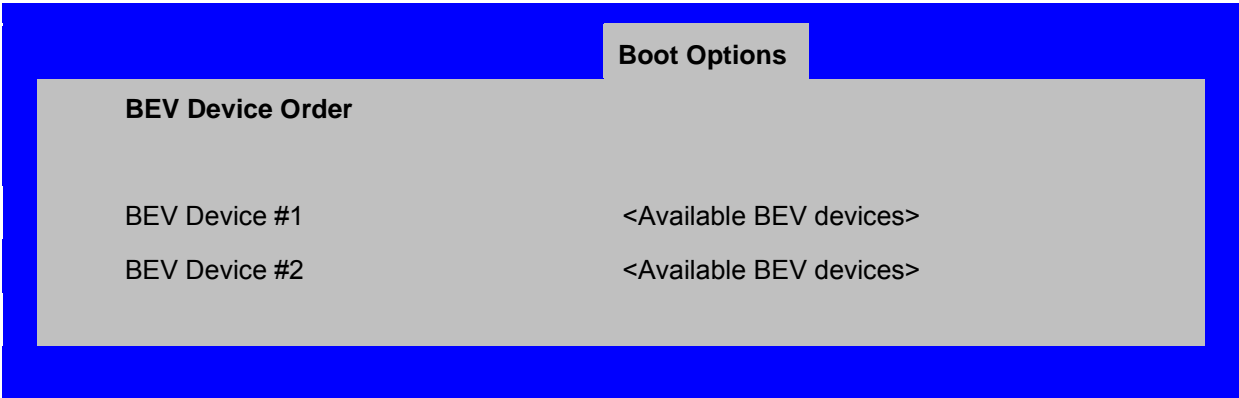
Boot Options	
BEV Device Order	
BEV Device #1	<Available BEV devices>
BEV Device #2	<Available BEV devices>

Figure 145. BEV Device Order Screen

<u>**Screen Field Descriptions:**</u>

1. BEV Device #1

2. BEV Device #2

Option Values: *<Available BEV Devices>*

Help Text:

> *Set system boot order by selecting the boot option for this position.*

Comments: Choose the order of booting among BEV Devices by choosing which available BEV Device should be in each position in the order.

Add EFI Boot Option

The Add EFI Boot Option screen allows the user to add an EFI boot option to the boot order. This screen is only available when there is at least one EFI bootable device present in the system configuration. The "Internal EFI Shell" Boot Option is permanent and cannot be added or deleted.

To access this screen from the *Main* screen, select *Boot Options > Add EFI Boot Option*. To move to another screen, press the <Esc> key to return to the *Boot Options* screen, then select the desired screen.
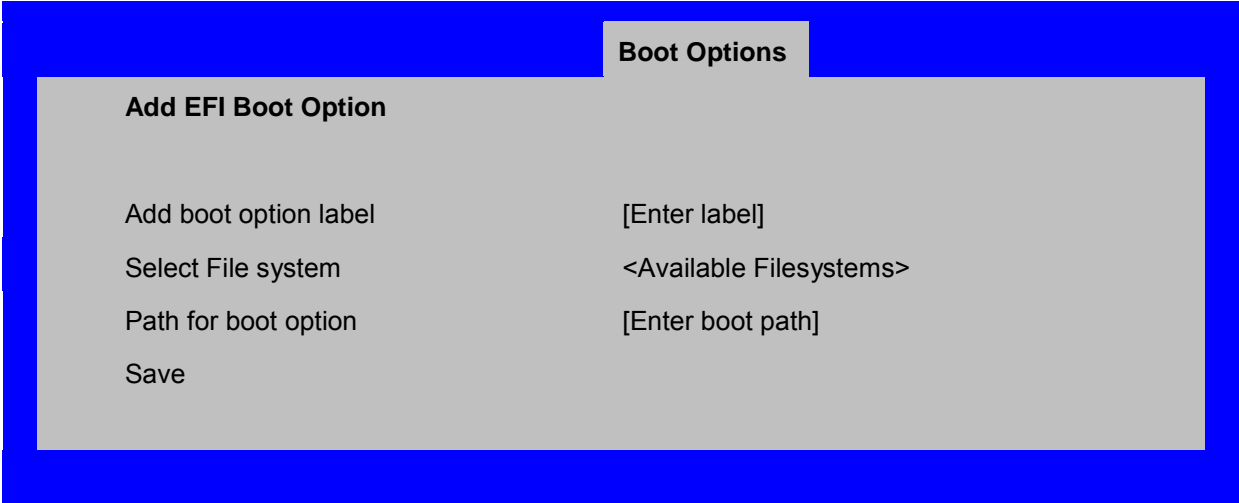
Boot Options	
Add EFI Boot Option	
Add boot option label	[Enter label]
Select File system	<Available Filesystems>
Path for boot option	[Enter boot path]
Save	

Figure 146. Add EFI Boot Option Screen

<u>**Screen Field Descriptions:**</u>

1. Add boot option label

   Option Values: *[Enter label]*

   Help Text:

   > *Create the label for the new boot option.*

   Comments: This label becomes an abbreviation for this Boot Path.

2. Select File system

Option Values: *<Available Filesystems>*

Help Text:

       Select one filesystem from this list.

Comments: Choose the filesystem on which this boot path resides.

3. Path for boot option

Option Values: *[Enter Boot Path]*

Help Text:

       Enter the path to the boot option in the format \path\filename.efi.

Comments: This will be the Boot Path, residing on the filesystem chosen, which will entered into the Boot Order with the Label entered above.

4. Save

Option Values: *<None>*

Help Text:

       Save the boot option..

Comments: <u>*Selection only.*</u> This will save the new Boot Option into the Boot Order.

Delete EFI Boot Option

The Delete EFI Boot Option screen allows the user to remove an EFI boot option from the boot order. The "Internal EFI Shell" Boot Option will not be listed, since it is permanent and cannot be added or deleted.

To access this screen from the ***Main*** screen, select ***Boot Options > Delete EFI Boot Option***. To move to another screen, press the <Esc> key to return to the ***Boot Options*** screen, then select the desired screen.
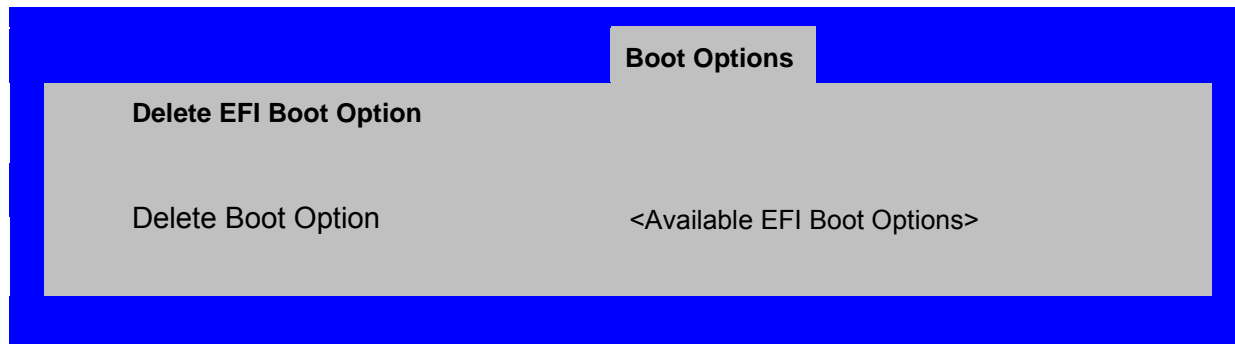

Figure 147. Delete EFI Boot Option Screen

<u>**Screen Field Descriptions:**</u>

1. Delete Boot Option

    Option Values: *<Available EFI Boot Options>*

    Help Text:

        Select one to delete.

    Comments: This will not allow a user to delete the EFI Shell.

Boot Manager Screen (Tab)

The Boot Manager screen allows the user to view a list of devices available for booting, and to select a boot device for immediately booting the system. There is no predetermined order for listing bootable devices. They are simply listed in order of discovery.

Regardless of whether any other bootable devices are available, the "Internal EFI Shell" will always be available,

Note that this list is <u>*not*</u> in order according to the system Boot Option order. Reordering Boot Devices or even removing them from the Boot Order completely has no effect on the Boot Manager.

To access this screen from the *Main* screen or other top-level "Tab" screen, press the right or left arrow keys to traverse the tabs at the top of the Setup screen until the ***Boot Manager*** screen is selected.
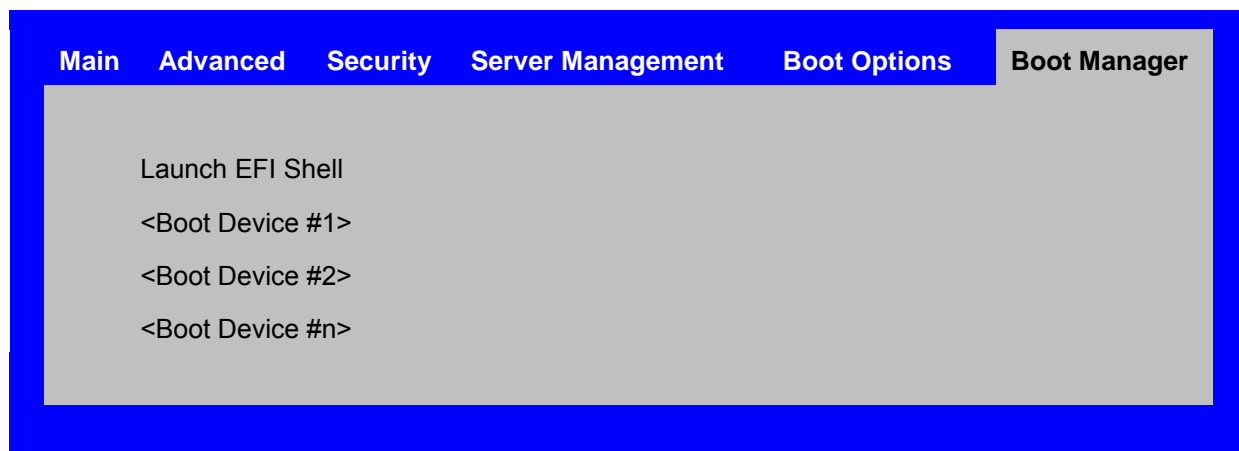
Main	Advanced	Security	Server Management	Boot Options	Boot Manager

Launch EFI Shell

<Boot Device #1>

<Boot Device #2>

<Boot Device #n>

Figure 148. Boot Manager Screen

Screen Field Descriptions:

1. Launch EFI Shell

Option Values: *<None>*

Help Text:

> *Select this option to boot now.*
> *Note: This list is not the system boot option order. Use the Boot Options menu to view and configure the system boot option order.*

Comments: The EFI Shell will always be present in the list of bootable devices.

2. <Boot Device #1>

3. <Boot Device #2>

4. <Boot Device #n>

Option Values: *<None>*

Help Text:

> *Select this option to boot now.*
> *Note: This list is not the system boot option order. Use the Boot Options menu to view and configure the system boot option order.*

Comments: These are names of bootable devices discovered in the system. The system user can choose any of them from which to initiate a one-time boot – that is, booting from any device in this list will not permanently affect the defined system Boot Order.

These bootable devices are not displayed in any specified order, particularly not in the system Boot Order established by the Boot Options screen. This is just a list of bootable devices in the order in which they were enumerated.

Error Manager Screen (Tab)

The Error Manager screen displays any POST Error Codes encountered during BIOS POST, along with an explanation of the meaning of the Error Code in the form of a Help Text. This is an *Information Only* screen.

To access this screen from the ***Main*** screen or other top-level "Tab" screen, press the right or left arrow keys to traverse the tabs at the top of the Setup screen until the ***Error Manager*** screen is selected.
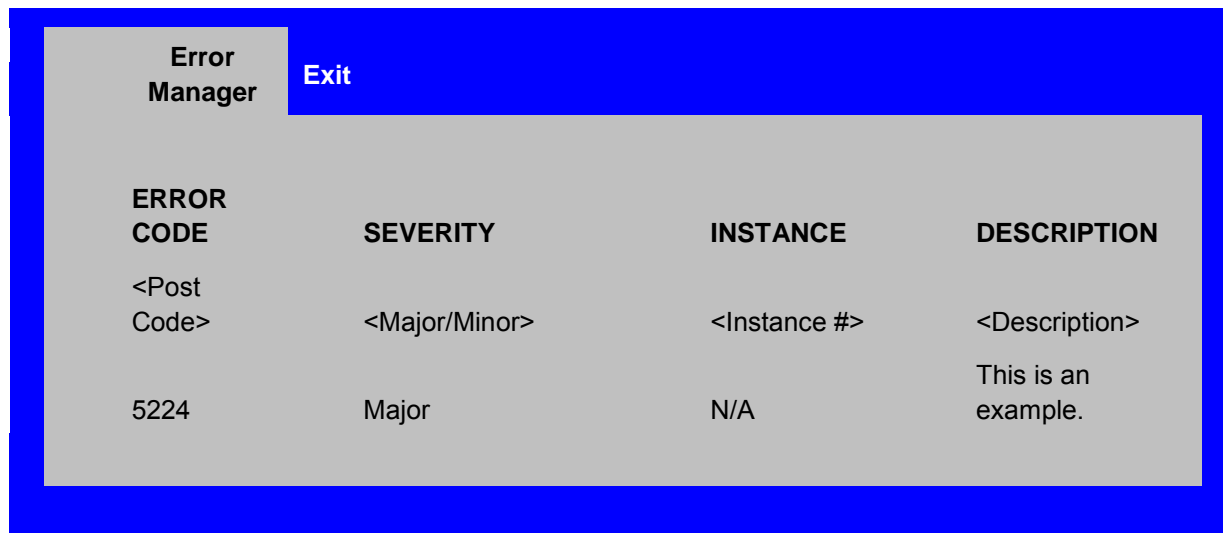
ERROR CODE	SEVERITY	INSTANCE	DESCRIPTION
<Post Code>	<Major/Minor>	<Instance #>	<Description>
5224	Major	N/A	This is an example.

Error Manager   Exit

Figure 149. Error Manager Screen

<u>**Screen Field Descriptions:**</u>

1. ERROR CODE

Option Values: *<POST Error Code>*

Help Text: *<N/A>*

Comments: This is a POST Error Code – a BIOS-originated error that occurred during POST initialization.

2. SEVERITY

Option Values: Minor
                        Major
                        Fatal

Help Text: *<N/A>*

Comments: Each POST Error Code has a Severity associated with it. Refer to the list of POST Error Codes to determine the Severity – Fatal, Major, Minor

3. INSTANCE

Option Values: *<Depends on error code>*

Help Text: *<N/A>*

Comments: Where applicable, this field shows a value indicating which one of a group of components was responsible for generating the POST Error Code that is being reported.

4. DESCRIPTION

Option Values: *<N/A>*

Help Text: *<Description of POST Error Code>*

Comments: This is a description of the meaning of the POST Error Code that is being reported. This text actually appears in the screen space that is usually reserved for "Help" messages.

Save & Exit Screen (Tab)

The Save &Exit screen allows the user to choose whether to save or discard the configuration changes made on other Setup screens. It also allows the user to restore the BIOS settings to the factory defaults or to save or restore them to a set of user-defined default values. If Load Default Values is selected, the factory default settings (noted in bold in the Setup screen images) are applied. If Load User Default Values is selected, the system is restored to previously saved User Default Values. To access this screen from the *Main* screen or other top-level "Tab" screen, press the right or left arrow keys to traverse the tabs at the top of the Setup screen until the *Exit* screen is selected.

Note that there is a Legal Disclaimer footnote at the bottom of the Save & Exit screen:

*Certain brands and names may be claimed as the property of others.

This is reference to any instance in the Setup screens where names belonging to other companies may appear. For example "LSI*" appears in Setup in the context of Mass Storage RAID options.
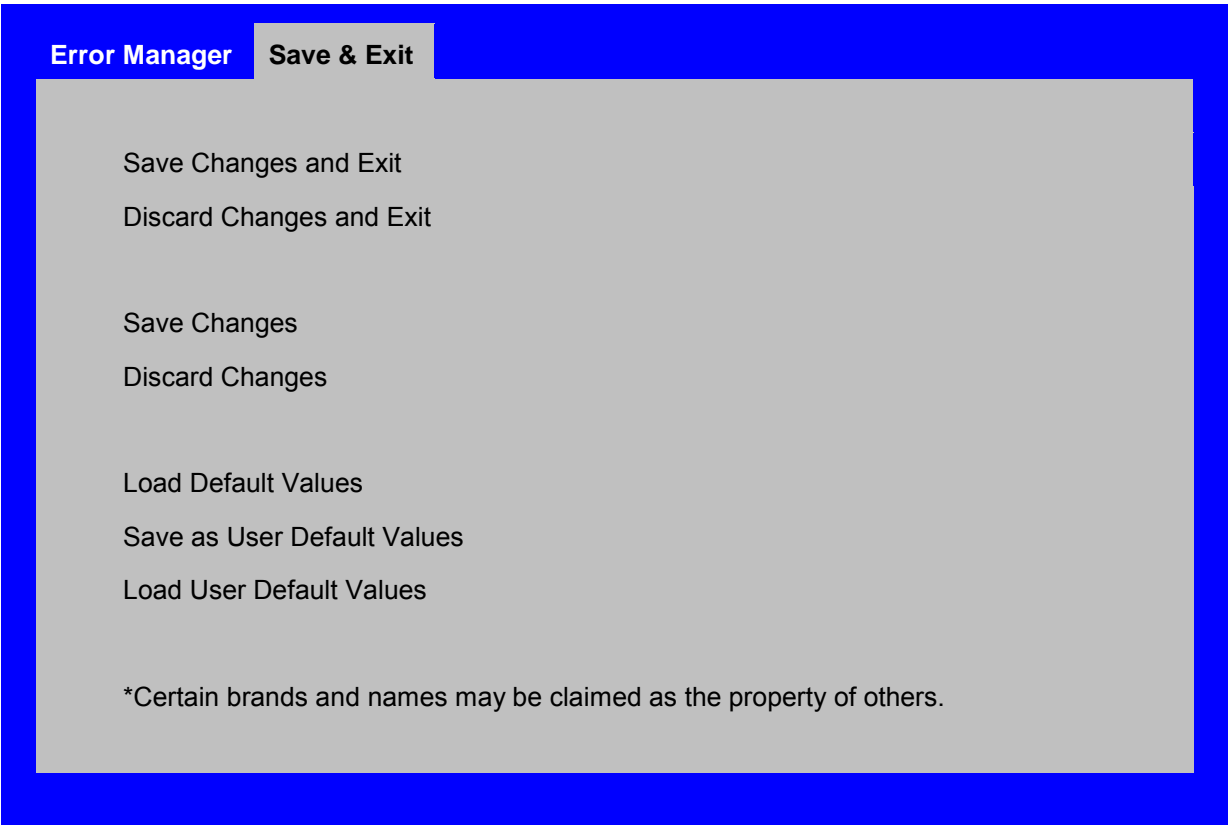

Figure 150. Save & Exit Screen

Screen Field Descriptions:

1. Save Changes and Exit

   Option Values: *<None>*

   Help Text:

   > *Exit BIOS Setup Utility after saving changes. The system will reboot if required.*
   > *The [F10] key can also be used.*

   Comments: *Selection only.* Position to this line and press the <Enter> key to exit
   Setup with any changes in BIOS settings saved. If there have been no changes made in the
   settings, the BIOS will resume executing POST.

   If changes have been made in BIOS settings, a confirmation pop-up will appear. If the "Save
   Changes & Exit" action is positively confirmed,, any persistent changes will applied and saved to
   the BIOS settings in NVRAM storage, then the system will reboot if necessary (which is
   normally the case). If the "Save Changes & Exit" action is not confirmed, BIOS will resume
   executing Setup.

   The <F10 > function key may also be used from anyplace in Setup to initiate a "Save Changes &
   Exit" action.

2. Discard Changes and Exit

   Option Values: *<None>*

   Help Text:

   > *Exit BIOS Setup Utility without saving changes.*
   > *The [Esc] key can also be used.*

   Comments: *Selection only.* Position to this line and press the <Enter> key to exit
   Setup without saving any changes in BIOS settings. If there have been no changes made in the
   settings, the BIOS will resume executing POST.

   If changes have been made in BIOS settings, a confirmation pop-up will appear. If the "Discard
   Changes & Exit" action is positively confirmed,, all pending changes will be discarded and BIOS
   will resume executing POST. If the "Discard Changes & Exit" action is not confirmed, BIOS will
   resume executing Setup without discarding any changes.

   The <Esc > key may also be used in Setup to initiate a "Discard Changes & Exit" action.

3. Save Changes

   Option Values: *<None>*

   Help Text:

   > *Save Changes made so far to any of the setup options.*

   Comments: *Selection only.* Position to this line and press the <Enter> key to save any
   pending changes in BIOS settings. If there have been no changes made in the settings,

Also, the user should be aware that most changes require a reboot to become active. If changes have been made and saved, without exiting Setup, the system should be rebooted later even if no additional changes are made.

4. Discard Changes

    Option Values: *<None>*

    Help Text:

    > *Discard Changes made so far to any of the setup options.*

    Comments: *Selection only*. Position to this line and press the <Enter> key to discard any pending unsaved changes in BIOS settings. If there have been no changes made in the settings, the BIOS will resume executing POST.

    If changes have been made in BIOS settings and not yet saved, a confirmation pop-up will appear. If the "Discard Changes" action is positively confirmed, all pending changes will be discarded and BIOS will resume executing POST. If the "Discard Changes" action is not confirmed, BIOS will resume executing Setup without discarding pending changes.

5. Load Default Values

    Option Values: *<None>*

    Help Text:

    > *Load Defaults Values for all the setup options.*

    Comments: *Selection only*. Position to this line and press the <Enter> key to load default values for all BIOS settings. These are the initial factory settings ("failsafe" settings) for all BIOS parameters.

    There will be a confirmation popup to verify that the user really meant to take this action.

    After initializing all BIOS settings to default values, the BIOS will resume executing Setup, so the user may made additional changes in the BIOS settings if necessary (for example, Boot Order) before doing a "Save Changes and Exit" with a reboot to make the default settings take effect, including any changes made after loading the defaults.

    The <F9> function key may also be used from anyplace in Setup to initiate a "Load Default Values" action.

6. Save as User Default Values

    Option Values: *<None>*

    Help Text:

    > *Save the changes made so far as User Default Values.*

Comments: *Selection only*. Position to this line and press the <Enter> key to save the current state of the settings for all BIOS parameters as a customized set of "User Default Values".

These are a user-determined set of BIOS default settings that can be used as an alternative instead of the initial factory settings ("failsafe" settings) for all BIOS parameters.

By changing the BIOS settings to values that the user prefers to have for defaults, and then using this operation to save them as "User Default Values", that version of BIOS settings can be restored at any time by using the following "Load User Default Values" operation.

There will be a confirmation popup to verify that the user really intended to take this action.

Loading the "factory default" values with F9 or the "Load Default Values" – or by any other means – does not affect the User Default Values. They remain set to whatever values they were saved as.

7. Load User Default Values

Option Values: *<None>*

Help Text:

   Load the User Default Values to all the setup options.

Comments: *Selection only*. Position to this line and press the <Enter> key to load User Default Values for all BIOS settings. These are user-customized BIOS default settings for all BIOS parameters, previously established by doing a "Save User Defaults" action (see above).

There will be a confirmation popup to verify that the user really intended to take this action.