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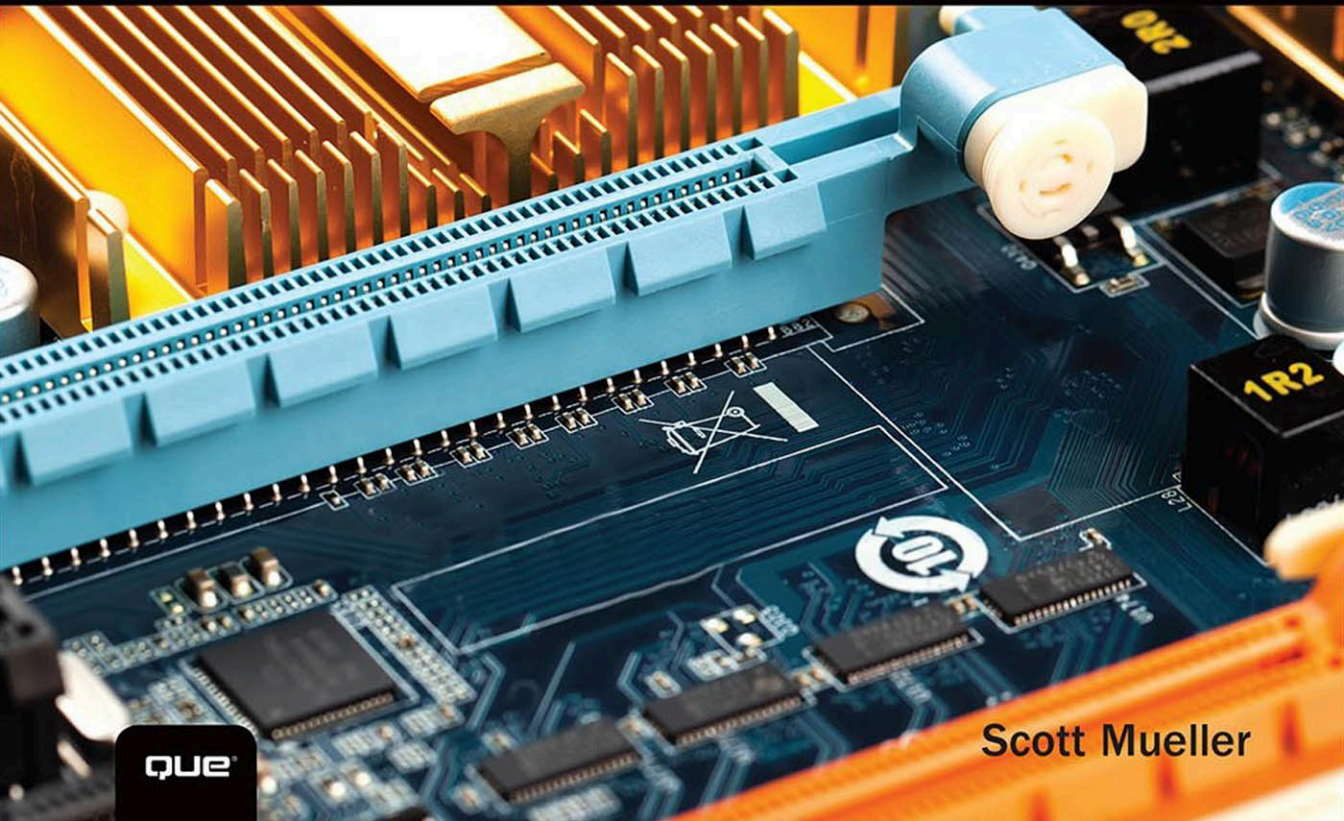

Scott Mueller

que

UPGRADING AND REPAIRING PCs

22nd Edition

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Contents at a Glance

BIOS Setting	Options	Description/Purpose
Intel Rapid Start Technology	Enable Disable	If enabled, the system will wake up faster. Requires a correctly configured SSD
Intel Smart Connect Technology	Enable Disable	When enabled, Intel Smart Connect technology can be configured to periodically wake up the system briefly to retrieve data from the network (email and so on).
Native ACPI OS PCIe Support	Enable Disable	Enable for power savings and performance improvements. **Note:** Not all PCIe devices are compatible with this feature.
OS ACPI C2 Report	Enable Disable	Enable or disable OS ACPI C2 Report. If enabled, BIOS will report ACPI C2 State (mapped to processor C3 state).
OS ACPI C3 Report	Enable Disable	Enable or disable OS ACPI C3 Report. If enabled, BIOS will report ACPI C3 State (mapped to processor C6 state).
Native ACPI OS PCIe Support	Enable Disable	Enable for power savings and performance improvements. **Note:** Not all PCIe devices are compatible with this feature.
OS ACPI C2 Report	Enable Disable	Enable or disable OS ACPI C2 Report. If enabled, BIOS will report ACPI C2 State (mapped to processor C3 state).
OS ACPI C3 Report	Enable Disable	Enable or disable OS ACPI C3 Report. If enabled, BIOS will report ACPI C3 State (mapped to processor C6 state).
PCIe ASPM L0s	Enable Disable	PCIe Active State Power Management: L0 places a single direction of the PCI Express Link into a low power state.
PCIe ASPM L1	Enable Disable	PCIe Active State Power Management: L1 places both directions of the PCI Express Link into a low power state.
PCIe ASPM Support	Disable Enable PEG Only	**Disable:** ASPM support is disabled for all PCIe devices. **Enable:** ASPM support is enabled for all PCIe devices. **PEG Only:** ASPM is only enabled for devices installed in PCI Express Graphics (PEG) slots.
Power Supervisor Shutdown	Enable Disable	If power supply voltages are outside safe ranges while Shutdown is enabled, the system will immediately power down to help protect the system from damage. The system will always light an LED and update the BISO Event Log if power supply voltages are outside safe ranges. This can be triggered by problems with the system power supply or the power grid. If Shutdown is enabled, the system will immediately power down to help protect the system from damage, and the BIOS will pause to display a notification during the next boot.
Processor C States	Enable Disable	**Enable:** Will maximize system energy savings. **Disable:** Can increase system performance and will increase system energy usage. Takes effect only after reboot. C States is required for full function of Processor Turbo Boost.

Table 5.21 Continued

BIOS Setting	Options	Description/Purpose
Processor Power Efficiency Policy	High Performance Balanced Low Power	Configures processor bias for power efficiency versus performance. **High Performance:** Set MSR 1B0h Bits 3:0 to 0h **Balanced:** Set MSR 1B0h Bits 3:0 to 5h **Low Power:** Set MSR 1B0h Bits 3:0 to 7h
QPI Power Management	Enable Disable	Enables power management for the QPI bus. *For more information, refer to http://en.wikipedia.org/wiki/Intel_QuickPath_Interconnect.*
S1 State Indicator	Off Blink On Alternate Color	Determines front panel LED behavior during S1 system power state.
S3 State Indicator	Off Blink On Alternate Color	Determines front panel power LED behavior during S3 system power state.
Wake on LAN from S4/S5	Stay off Power On – Normal Boot Power On – PXE Boot	Configures behavior when a Wake on LAN packet is received during S4/S5. **Stay off:** The system will not wake from S4/S5 power state when a Wake on LAN packet is received. **Power On-Normal Boot:** the system will wake from S4/S5 power state when a Wake on LAN packet is received and will follow normal boot order. **Power On-PXE Boot:** The system will wake from S4/S5 power state when a Wake on LAN packet is received and will attempt boot to PXE. Wake on LAN must also be enabled in the operating system LAN driver and is disabled if Deep S4/S5 is enabled.
Wake System from S5	Enable Disable	Enable or disable system wake on alarm event. When enabled, system will wake on the day/hour/minute/second specified.
Wakeup Date	Numeric range 0 - 31	Select day of each month to wake the system. Select 0 for daily wakeup.
Wakeup Hour	Numeric range 0 - 23	Select wakeup hour in 24-hour format. For example, 15 means 3 p.m.
Wakeup Minute	Numeric range 0 - 59	Select wakeup minute.
Wakeup Second	Numeric range 0 - 59	Select wakeup second.

Boot

The Boot menu is used for setting the boot features and the boot sequence (through menus). If you are installing an OS from an optical drive or USB flash drive, you should ensure that the optical or USB drive comes before the hard drive in the boot sequence. Table 5.22 shows the functions and settings available on a typical motherboard.

Table 5.22 Boot Menu Settings

BIOS Setting	Options	Description/Purpose
BIOS Setup Auto-Entry	Enable Disable	If set to Enable, the BIOS will halt and prompt to boot normally or enter Setup. This must be set to Disable to allow OS boot without user intervention. This feature is not available while Fast Boot USB Optimization is set to Enable.
Boot Device Priority	Removable Devices Optical Drive Hard Disk Drive Ethernet	Specifies the boot sequence from the available devices. The list of options can vary depending on board model and hardware configuration.
Boot Drive Order	Dependent on installed bootable devices	Allows you to specify the boot sequence from the available types of boot devices. All detected bootable devices will be included in the list. The user can change the order of devices. The BIOS will attempt to boot to each device in the order of this list.
Boot Menu Type	Normal Advanced	**Normal:** Allows you to set boot priority based on type of device. **Advanced:** Allows you to set boot priority for each device, regardless of category
Boot Network Devices Last	Enable Disable	**Enable:** Network devices will always be placed after non-network devices in the boot priority. **Disable:** Network devices can be placed at any position. in the boot priority, but will default to last.
Boot to Network	Enable Disable	Enables or disables booting from the network (PXE).
Boot to Optical Devices	Enable Disable	Enables or disables booting from optical devices (CD/DVD).
Boot to Removable Devices	Enable Disable	Enables or disables booting from removable devices.
Boot USB Devices First	Enable Disable	**Enable:** The BIOS will attempt to boot to supported USB devices before any other devices. **Disable:** The normal boot order will be used.
Fast Boot	Enable Disable	Enable or disable Fast Boot features. To disable Fast Boot without entering BIOS Setup, power down the system for 5 seconds, then power it back on while holding the power button for 2 seconds (the system will beep).

Table 5.22 Continued

BIOS Setting	Options	Description/Purpose
General Optimization	Enable Disable	**Enable:** BIOS will boot faster; however, the following features will be disabled: Boot to Network, Boot to Optical Devices, and Boot to Removable Devices. RAID devices will still be bootable, but not configurable. *This BIOS setting is present when Fast Boot is enabled.*
Hard Drive Order	Lists all installed hard drive devices	Allows you to set the boot order of hard drives (used when Boot Menu type is set to normal). All detected hard drives will be included in the list. You can change the order of devices. When attempting to boot to hard drives, the BIOS will attempt to boot to each device in the order of this list.
Internal UEFI Shell	Enable Disable	Enables or disables the internal UEFI shell. This option is grayed out and disabled if Secure Boot is enabled.
Optical Drive Order	Lists all installed optical drive devices (CD/DVD)	Select the boot order for optical drives. All detected optical devices will be included in the list. The user can change the order of devices. When attempting to boot to optical drives, the BIOS will attempt to boot to each device in the order of this list.
Removable Drive Order	Lists all installed removable devices	Allows you to set the boot order of removable devices (floppy drives, USB thumb drives, etc.); it's used when Boot Menu type is set to normal. All detected removable devices will be included in the list. The user can change the order of devices. When attempting to boot to removable drives, the BIOS will attempt to boot to each device in the order of this list.
Startup Sound	Enable Disable	If set to Enable, BIOS will play the Intel sound mark (about 3 seconds long) via onboard audio during each boot. BIOS can extend boot time slightly if necessary to finish playing the sound.
UEFI Boot	Enable Disable	Enables or disables Unified Extended Firmware Interface (UEFI) Boot. UEFI Boot must be enabled in order to boot to a drive larger than 2TB (terabytes). **Enable:** BIOS will attempt to boot via UEFI before using the legacy boot sequence. **Disable**: BIOS will use the legacy boot sequence. *For information on UEFI, refer to http://www.uefi.org/home*
Unlimited Boot to Network Attempts	Enable Disable	**Enable:** Network devices will receive unlimited boot attempts after the normal boot order has been exhausted. **Disable:** Each boot device will only receive a single boot attempt.
USB Boot	Enable Disable	Enables or disables booting from USB boot devices.

BIOS Setting	Options	Description/Purpose
USB Optimization	Enable Disable	**Enable:** All USB devices will be unavailable until after the operating system boots, but BIOS will boot faster. **Disable:** USB devices will be available before the operating system boots, but BIOS will boot slower. This feature cannot be enabled while a User password or Hard Drive password is installed. This BIOS setting is present when Fast Boot is enabled.
Video Optimization	Enable Disable	**Enable:** BIOS will display text only but will boot faster. **Disable:** BIOS will display the logo but will boot slower. This feature does not affect video capabilities after the operating system boots. *This BIOS setting is present when Fast Boot is enabled.*

Using this menu, you can configure which devices your system boots from and in which order the devices are sequenced. You also can access Hard Drive and Removable Devices menus, which enable you to configure the ordering of these devices in the boot sequence. For example, you can set hard drives to be the first boot choice, and then in the hard drive menu, decide to boot from the secondary drive first and the primary drive second. Normally, the default with two drives is the other way around.

The Boot Menu lists up to 12 hard disks and four removable devices, enabling you to choose the preferred boot device; older systems usually list only primary and secondary master and slave (four) drives. This BIOS option enables you to install more than one bootable hard disk in your computer and select which one you want to boot from at a BIOS level, rather than by using a boot manager program. If you need to work with multiple OSs, this menu can be useful.

Most recent systems also enable you to boot from external USB drives, including flash or thumb drives.

If you are booting from a hard drive that is 2.2TB or larger in capacity, you must enable UEFI (Unified Extended Firmware Interface) Boot in the BIOS Setup and install an OS that supports UEFI. Also, you must format the drive using the GUID (Globally Unique Identifier) Partition Table (GPT) format.

Boot—Boot Display Options

The options in Table 5.23 configure the prompts displayed during boot.

Table 5.23 Boot Display Options Menu Settings

BIOS Setting	Options	Description/Purpose
Display CTRL-P for Intel MEBX	Enable Disable	If enabled, BIOS will display "CTRL-P to Enter Intel MEBX" prompt. The CTRL-P key will still be accepted if this prompt is disabled.
Display F2 to Enter Setup	Enable Disable	If enabled, BIOS will display "F2 to Enter Setup" prompt. The F2 key input will still be accepted if this prompt is disabled.

Table 5.23 Continued

BIOS Setting	Options	Description/Purpose
Display F7 to Update BIOS	Enable Disable	If enabled, BIOS will display "F7 to Update BIOS" prompt. The F7 key input will still be accepted if this prompt is disabled.
Display F9 for Remote Assistance	Enable Disable	If set to Enable, BIOS will display "F9 for Remote Assistance" prompt. The F9 key input will still be accepted if this prompt is disabled. *This BIOS setting is present only when the board supports Remote Assistance.*
Display F10 to Enter Boot Menu	Enable Disable	If enabled, BIOS will display "F10 to Enter Boot Menu" prompt. The F10 key input will still be accepted if this prompt is disabled.
Display F12 for Network Boot	Enable Disable	If enabled, BIOS will display "F12 for Network Boot" prompt. The F12 key input will still be accepted if this prompt is disabled.
Expansion Card Text	Disable Enable Hide All	**Disable:** BIOS will display text only from mass-storage PCI option ROMs during POST. **Enable:** BIOS will display text from any PCI option ROMs during POST. **Hide All:** BIOS will display no text from PCI option ROMs during POST.
Keyboard Ready Beep	Enable Disable	If enabled, BIOS will beep once during POST when ready for keyboard input. BIOS will beep only if both keyboard and video are detected. Beep is played via onboard audio.
POST Code Routing	Onboard PCI	Routing for Ports 80h, 84-86h, 88h, 8C-8Eh. **Onboard:** Sends BIOS POST codes to the onboard POST code LED display. **PCI:** Sends BIOS POST codes to the PCI bus (POST card in PCI slot).
POST Function Hot-keys Displayed	Enable Disable	If enabled, BIOS will display function key prompts during POST. Function key input will still be accepted even if prompts are disabled.

Boot—Secure Boot

The option in Table 5.24 works along with the options in Table 5.25 to provide secure boot services.

Table 5.24 Secure Boot Menu Setting

BIOS Setting	Options	Description/Purpose
Generate New Platform Key	Enable Disable	Generates a new Secure Boot Platform Key during the next boot. The private half of the Platform Key is discarded.