WHITE PAPER

June 2001

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Documentation

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Compaq BIOS for Deskpro, Workstation, iPAQ Desktop, and Evo Desktop/Workstation Products

Frequently Asked Questions

Abstract: This paper answers frequently asked questions regarding the Compaq BIOS for commercial desktop and workstation products. These products include the Deskpro EN, Deskpro EX/EXS, iPAQ, Deskpro Workstation, Professional Workstation, Evo Desktop, and Evo Workstation. Questions are divided into the following categories: BIOS Introduction, Upgrading Your BIOS, Computer Setup and Configuration, Power Management, Security, Management and Asset Tracking, and Solving Problems. Links to other relevant resources are included.

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COMPAQ
14MY-0501A-WWEN

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Frequently Asked Questions

First Edition (June 2001)

BIOS INTRODUCTION

Q. What is BIOS?

A. The BIOS (Basic Input/Output System) is the instructions stored in the ROM (Read-Only Memory) that allow the computer to perform various functions. Among these, are:

- POST (Power-On Self Test) which provides startup services, runtime services for the operating system and certain drivers or applications.
- ACPI (Advanced Configuration and Power Interface) tables for operating system use to control power management and plug-n-play device configuration.
- Setup, which allows for nonvolatile custom configuration of various computer functions such as the power-on password.

Q. Is Compaq BIOS industry-standard?

A. The Compaq BIOS is fully compatible with all industry standards. In some cases, the Compaq BIOS provides value-added functionality in areas where standards do not yet exist. In those cases, Compaq works with industry partners to standardize functionality. For more details and supported specifications, see white paper 13SE-1200A-WWEN, "Industry Standards in Compaq Deskpro and iPAQ Desktops and Deskpro and Professional Workstations" at http://www.compaq.com/support/techpubs/whitepapers/1se-1200a-wwen.html.

Q. What is an option ROM?

A. An option ROM is code that a plug-in or embedded adapter loads and runs during POST in order to initialize the device. For example, a Video ROM provides video services during startup until the driver loads. A Network Controller option ROM may provide network boot services. The system ROM, or BIOS, detects, loads, and runs these option ROMs as necessary.

Q. How can I see option ROM messages that may be hidden?

A. Option ROMs may display messages that are hidden behind the startup screen. Press any key during POST to switch the view to the text-based screen where these messages are displayed.

UPGRADING YOUR BIOS

Q. When should I upgrade my BIOS?

A. BIOS upgrades are optional when a new version is available. Newer BIOS versions may provide bug fixes or enhancements, or may just provide support for newer products and/or components. To check availability, visit the support software page at http://www.compaq.com/support/files/index.shtml. Select the product and "ROMPaqs and System Software" under the operating system menu. To determine the contents of a BIOS revision, click on the selected deliverable. To determine the version of your current BIOS, run Setup and look under System Information. For information, see FAQs "What is Setup and how do I access it?" and "How can I obtain system information from the Bios?"

Q. How can I upgrade my BIOS?

A. There are four methods for upgrading, or flashing, most BIOS's.

- The primary option is to boot to a diskette known as a ROMPaq. This is ideal if a small number of local systems are to be upgraded and the systems contain legacy diskette or LS-120 drives.
- The second method is remote ROM flash. This is useful for flashing a large number of systems over the network. This may be accomplished with either System Software Manager (SSM) (http://www.compaq.com/im/ssmwp.html), designed for administering large networks, or Compaq Insight Manager LC (http://www.compaq.com/im/lc/index.html), designed for managing workgroups of PCs. Compatible BIOS images are made available on the web with the following icon:  . Note that a setup password must be set in order to flash remotely. This is settable using either SSM or Compaq Insight Manager LC.
- A third method uses Wired-for-Management PXE (Preboot eXecution Environment) remote boot technology. This is mostly useful for initial deployment of a large number of systems. A remote boot server can be configured to flash the ROM image using tools and images made available as "Remote ROM flash utilities". These tools may also be used locally in any DOS environment. More information on Compaq's recommended PXE management solution, Altiris eXpress, can be obtained at http://www.compaq.com/im/swdeploy/express.html. For information on remote booting, see FAQ, "How can I boot remotely over the network?" Also, see http://developer.intel.com/ial/wfm/wfmover.htm for additional details on Intel's Wired-for-Management initiative.
- The fourth method is an error recovery procedure. For information on this procedure, see FAQ, "What if my BIOS image becomes corrupted?"

COMPUTER SETUP AND CONFIGURATION

Q. What is Setup and how do I access it?

A. Setup allows the user to configure various computer functions such as passwords, asset tracking tags, power management, and devices. Additionally, it provides valuable system information regarding components, serial numbers, and BIOS revision. Setup is available in 12 languages. To enter Setup, restart the computer and press the F10 key (when prompted) during POST. You will be asked to select a language. Note that Setup may be protected with a password that prevents unauthorized use, in which case you will be prompted. If settings are modified, be sure to Save Changes and Exit for them to take effect.

Q. How can I obtain system information from the BIOS?

A. The primary mechanism for obtaining system information is via Setup under the File tab. This information can be also be saved to a text file on a diskette drive using the Save/Restore to Diskette feature, also under the File tab, or by using the DOS-based utility REPSET, which is included with "Remote ROM flash utilities" support files. For information on the latter, see FAQs, "When should I upgrade my BIOS" and "How can I upgrade my BIOS."

Additional information is available using Compaq Diagnostics which is preinstalled with the software image. Desktop Management agents make this information available remotely using compliant DMI and/or WBEM management tools such as Compaq Insight Manager.

If the customer is capable of developing custom software, Compaq BIOS supports the System Management BIOS Specification, which details a standard programming interface for obtaining system information. This specification is available at http://www.phoenix.com/PlatSS/PDFs/specs-smbios.pdf.

Q. How can I replicate BIOS settings?

A. Using the Save/Restore to Diskette feature in Setup, settings may be saved to a diskette, then used to restore settings on other computers. The REPSET utility may be similarly used, as its file is compatible with that of Setup. The actual file may be edited. For example, a setting may be deleted from the file, causing it to be skipped during the restore process.

The SSM and Compaq Insight Manager LC tools allow for setting some security settings remotely. For information on the latter, see FAQ, "How can I upgrade my BIOS."

Q. How can I change boot order?

A. In Setup, under the Storage tab, select Boot Order and use the right and left arrows to change the priority of the listed boot devices.

In the case of mixed IDE and SCSI hard drives or RAID controller, the C: drive boot priority can be selected in Setup under the Storage tab, Controller order.

NOTE: This option is not displayed unless SCSI drives or RAID controller are attached.

Q. Do I need to manually configure newly installed drives or change resource settings of newly installed expansion cards?

A. No. All devices are automatically configured. Device resource configurations may be changed in Setup under the Advanced tab. Use PCI devices or Onboard devices to view/change configurations. Legacy (ISA) fixed resources are fully selectable. PCI devices only allow for IRQ selection since other resources are dynamic and there is typically no reason to change them. In some rare cases, a PCI card driver may not support sharing interrupts with another device. In this case, use Setup to change IRQ resources.

Detailed drive information and configuration settings for storage devices may be viewed or modified in Setup under the Storage tab.

Q. What is the difference between Quickboot and Fullboot?

A. Quickboot performs minimal self-testing in order to minimize startup time. Full boot performs more testing including the memory test.

POWER MANAGEMENT

Q. How can I change my power management scheme?

A. For older non-ACPI operating systems like Microsoft Windows 95 or Microsoft Windows NT 4.0, use the settings in Setup under the Power tab.

For newer ACPI-aware (Advanced Configuration and Power Interface) operating systems, such as Microsoft Windows 2000 or Microsoft Windows 98, go into Control Panel and run Power Options.

One exception to this rule is hard disk spin down. Microsoft Windows does not override the default BIOS setting for spin down if set to 'never'. To disable this completely, enter Setup and look under the Power tab for Timeouts.

A common source of confusion is that power management settings controlled through Setup are generally not applicable under ACPI-aware operating systems.

NOTE: Windows NT does not support ACPI or the Advanced Power Management specification, so a shutdown will not power down the system, as it will in Windows 95. The BIOS provides limited power management capabilities under Windows NT that are independent of the operating system.

Q. What are the S1, S3, S4, and S5 power states?

A. There are four possible power states.

- S1 is a standby power state supported through ACPI. It offers the least power savings and the fastest resume latency. It is very similar to the standby power management state of non-ACPI systems.
- S3 is a deeper standby power state supported through ACPI. In the S3, or suspend-to-RAM state, the machine is powered off except for memory, which contains the information required to restore the system configuration upon resume. With S3, a user can enjoy significant power savings, drawing less than 5W in the sleep state, while maintaining relatively short resume latencies (around 5 seconds). Use of this feature can boost productivity by avoiding lengthy shutdowns and startups and having to launch applications and open data files. Systems that support the S3 state are sometimes marketed as 'Instantly Available PCs'. Windows 98 and Windows 2000 will support S3 as the default standby power state if it is supported by the BIOS. Otherwise, S1 is the default standby state.
- S4 is a hibernation power state supported through ACPI. It is similar to S3, except that RAM is not powered and device states are stored to the hard drive. The power consumption is equivalent to the OFF state. Resume must go through full POST and takes roughly 20 seconds.
- S5 is the OFF state when AC Power is connected. This is similar to a stereo that is off, but with AC power connected, the remote control can still turn on the system.

  NOTE: ACPI complaint device drivers are required in order to correctly support ACPI power management. If the system supports S3, specific driver support for that state may be required. For more information, see FAQ, "Can S3 be disabled?".

Q. What wake events are supported?

A. In the non-ACPI standby state, the Deskpro Personal Computer supports waking from PS/2 mouse and keyboard, USB devices (typically mouse and keyboard), serial and parallel activity, and PCI devices (typically NICs and modems).

The same wake events are supported in the ACPI S1 and S3 states.

In the ACPI S4 hibernation and S5 states, wake is supported only from PCI devices. In the S5 state, the operating system support (ACPI or non-ACPI) is irrelevant.

Q. What happens if power is lost while the PC is ON?

A. In the default operation, with AC power connected, when power is restored the system will power back up automatically. This may be changed to require a power button press in Setup, under the Advanced Tab, Power-On Options.

Q. Can S3 be disabled?

A. In some cases, problematic device drivers may prevent the S3 feature from functioning properly. For example, the machine may hang upon resume from the sleep state. In this case, if newer drivers are not available, S3 may be disabled in Setup under the Advanced tab, Device Options. The operating system will then timeout into the S1 standby state which consumes more power because fewer devices are powered-down.

CAUTION: If S3 is disabled, the operating system may need to be reinstalled to re-enable the feature.

SECURITY

Q. How can I secure my system?

A. There are multiple ways to help secure access to your computer through Setup. These features are accessible under the Security tab unless otherwise noted:

- Device security: Devices may be secured or hidden from the operating system and its software. For example, the USB bus may be disabled to prevent the hot plugging of insecure keyboards.
- Power-on passwords: A user password may be set to secure boot.
- Setup password: An administrator password may be set which restricts access to F10 Setup and administration including BIOS upgrades. This password may also be used in place of the Power-on password at any time.
- Master Boot Record security: The primary hard drive master boot record can be saved into memory and the user notified if it changes. Optionally, it can be restored. This can be useful in protecting against some viruses. Note that this is potentially destructive if used incorrectly. In some cases there are valid reasons for the master boot record to change.
- Disable removable media boot: The ability to boot from a diskette or CD may be prevented. This is useful in preventing circumvention of NT security to access data on the hard drive. It may also be useful in protection against some viruses. This is available in Setup under the Storage tab, Storage Options.

- Write-protect removable media: Similarly, the ability to write to media may be disabled to prevent unauthorized removal of data. This is available in Setup under the Storage tab, Storage Options. This feature is available for legacy diskette, LS-120, and PD/CD drives.
- Drivelock: Some hard drives support the use of a password to secure the data. When a password is set, the data on the hard drive remains inaccessible until the password is entered. Setup may be used to enable and disable this feature on drives that support it.
- Smart Cover: In some systems, a Smart Cover chassis lock and removal sensor are installed. The lock may be engaged/disengaged and the sensor may be programmed to notify the user if the chassis is opened.

Q. Is my Intel processor serial number secure?

A. Due to privacy issues, the Compaq BIOS disables the processor serial number function of Intel processors by default. Software cannot change this setting at runtime. Newer Intel processors do not support the function.

Q. What is BIS?

A. BIS (Boot Integrity Services) allows for certificate-based authentication of a remote boot server using the Wired-for-Management standard. This can be used to prevent a client from booting to an unauthorized server.

Q. What is Network Server Mode and how do I use it?

A. Network server mode allows for either keyboard or keyboard-less operation. This mode is useful for applications where the computer might be used as a network server or demonstration unit in a public location. A Power-on password is required. If the keyboard is disconnected, the password prompt and keyboard errors are bypassed during POST. If the keyboard is connected, the password prompt is skipped during POST and the keyboard will be disabled until the Power-on password is entered. If the user attempts to boot to a diskette, the system will prompt for a password during POST.

NOTE: The Network server mode applies only to PS/2 keyboards. USB keyboards are controlled by the operating system.

MANAGEMENT AND ASSET TRACKING

Q. How can I boot remotely over the network?

A. If the Network Controller supports remote boot, press the F12 key during POST to attempt to boot from the server. If this does not work, make sure the Network Controller supports Wired-for-Management and the network server is configured properly. The system may be permanently configured to boot from the network by adjusting the boot order in Setup. For more information, See FAQ, "How can I change boot order?".

Q. What is the difference between the ownership tag, asset tag, and UUID?

A. An ownership tag is a string displayed at startup on the splash screen during POST. For example, a user may set it to "Property of ABC, Inc." or "Have a Nice day." The asset tag is meant for tracking, using a customer's own alphanumerical inventory scheme. Both of these features can be viewed or modified in Setup. The UUID, or Universally Unique ID, is a computer-generated number that is standardized for all PCs and mathematically

guaranteed to be unique across all platforms and vendors. It is intended for administering non-homogenous networks of computers. It can be viewed in Setup, but not modified.

Q. How can I enable remote tracking of monitor serial numbers?

A. In Setup, under the Advanced tab, select Device Options and enable Monitor Tracking. This allows the system to provide the monitor serial number to management software. Monitor Tracking is disabled by default because it increases startup time.

SOLVING PROBLEMS

Q. What if my BIOS image becomes corrupted?

A. If power is lost during a BIOS flash, or the procedure is otherwise not successfully completed, the BIOS image may become corrupted. In this case, the computer may fail to startup properly, sometimes appearing to be completely dead as video may or may not be present depending on the computer. However, all is not lost, because the ROM chip contains a failsafe mechanism known as boot block recovery. In order to recover the BIOS image, place the correct ROMPaq in the diskette drive and turn on the power. A series of beeps are heard and the keyboard LEDs flash. Leave the computer on until the diskette is read and a series of beeps are heard and all three keyboard LEDs are lighted. The beeps and LEDs indicate the recovery is complete. Remove the ROMPaq.

If only the Numlock LED is lighted, insert the ROMPaq and cycle power (try again). If only the CapsLock LED is lighted, enter the setup password and press the Enter key to continue.

If the system does not automatically recover from the diskette, press and hold the Escape key during power-on forcing boot block recovery mode from the ROMPaq. This override is only available with PS/2 keyboard. If the system is not recoverable by either method, the system board may need to be replaced. (Call Compaq Technical Support at 1-800-OK-COMPAQ.)

Q. I forgot my password. What do I do next?

A. Call Compaq Technical Support (1-800-OK-COMPAQ).

Q. My computer beeps, flashes the keyboard LEDs, and hangs during POST. What does that mean?

A. These indicate errors that cannot be described on the screen because the computer is not functional enough to display video. For example,

- If the beeps are SHORT LONG LONG and the Num Lock LED flashes, system memory is not present or incompatible. If you recently added or removed memory, make sure it is properly installed. If this still does not work, try replacing or removing any added memory.
- If the beeps are LONG SHORT SHORT and the Caps Lock LED is flashing, the video controller is not present or incorrectly initialized. If you recently added a video controller, try replacing it.

- If the beeps are LONG LONG SHORT and the Scroll Lock LED is flashing, you have a system board failure. Call Compaq Technical Support (1-800-OK-COMPAQ).

  NOTE: LEDs do not blink on USB keyboards but the audible beeps are still provided.

Q. My system is hung up and I cannot power-down the computer. What do I do?

A. Always make sure that you shutdown Windows before powering down; however, in some cases that may not be possible. If this is the case, and the power button does not respond, push and hold it for up to 8 seconds until power is turned off.