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Armada 7800 and 7400 Battery Calibration

Abstract: In 1Q'99, Armada 7800 and 7400 computers will feature a new, higher capacity battery. In addition to providing higher capacity, the new battery features a more accurate method for measuring remaining capacity. Although more accurate, this new method is prone to error when subjected to many short charge/discharge cycles. Correcting this accumulated error requires periodic calibration. To make calibration as easy as possible for users, Compaq has developed a new software battery calibration utility.

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Armada 7800 and 7400 Battery Calibration
White Paper prepared by Portables Software Marketing

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Overview

The new High Capacity SMART Battery started shipping with the new Armada 7800 and 7400 notebook computers. This battery uses a new chemistry that requires a different method to measure remaining battery capacity. This new method begins with a known capacity value for the battery pack. Power consumption is then tracked in real time and subtracted from total battery capacity to derive remaining capacity. The result is greater accuracy when compared to methods used on earlier Armada batteries. Earlier methods made assumptions about the rate of discharge.

This new method of measuring remaining battery capacity is subject to errors. Accuracy is compromised over time through normal use. Generally speaking, the more frequently the battery is subjected to partial charges and discharges, the faster the battery gauge will become inaccurate. To improve accuracy of the gauge periodic calibration of the battery is required.

For 1Q99 models in the Armada 7800 and 7400 families, a new software battery calibration feature is included in the factory pre-install. This utility provides a convenient and automatic method for calibrating batteries. It also provides an interface that clearly identifies batteries that could benefit from calibration. This eliminates guesswork on the user's part and avoids over calibration.

Battery Calibration

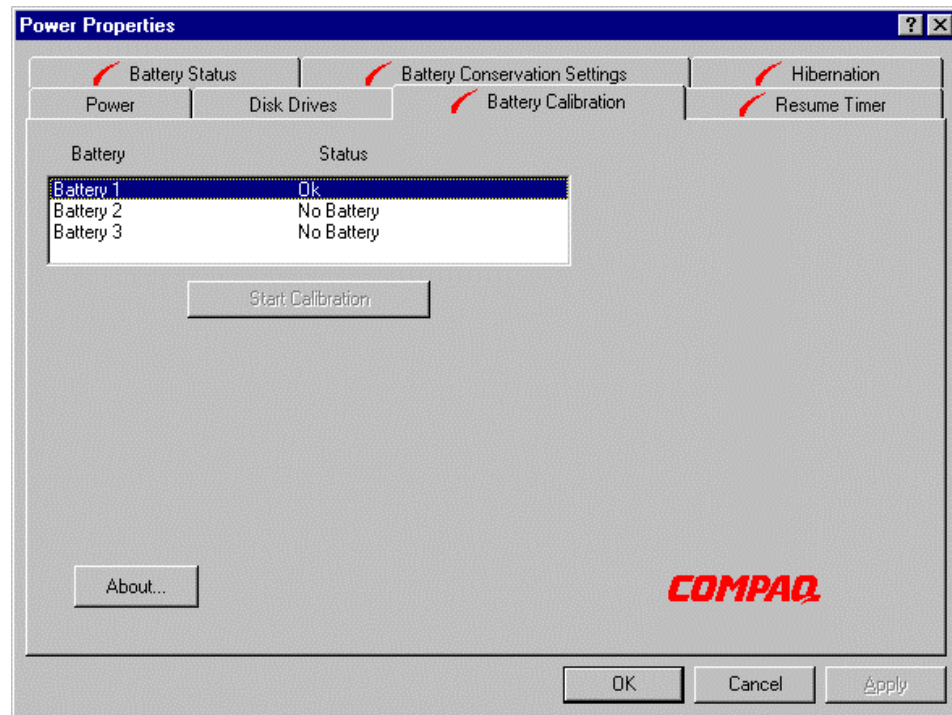
NOTE:

The Battery Calibration tab will only appear on Armada 7800 and 7400 notebooks built after January 31, 1999 that are already equipped with an appropriate revision of system BIOS that supports battery calibration.

The new battery calibration utility has been incorporated into the suite of Compaq power management features for Windows 95, Windows 98 and Windows NT 4.0. Battery calibration controls can be found on the battery calibration tab in the Power applet located in the Windows Control Panel {Start → Settings → Control Panel → Power (called *Compaq Power* under Windows NT) → Battery Calibration tab}.

The process of calibration is defined as a full charge, followed by a full discharge¹. Unless these two steps are followed, a battery will continue to report it needs calibration. The battery calibration utility simplifies the process by allowing both steps to be completed without requiring the user to unplug AC or undock in order to discharge the battery. Furthermore, calibration can be started and run in the background allowing the user to continue to use the computer while calibrating.

¹ While the battery is calibrated at the point of full discharge, obviously the battery must be allowed to recharge before it can be used.

**IMPORTANT!**

While the tab displays all batteries installed in the system including those in the ArmadaStation, only those batteries installed in computer battery bay or MultiBay can be calibrated. To calibrate a battery in the ArmadaStation, with the computer off remove the battery from the docking station and insert into either the computer battery bay or MultiBay.

To use the calibration utility first identify whether or not the battery requires calibration. On the battery calibration tab, all installed batteries will be displayed in the primary list box. Next to each will be an indication of whether or not calibration is required. If required, the phrase “Needs calibration” will appear. Select the battery to be calibrated and press the “Start Calibration” button.

While calibrating, the utility will display an icon in the Windows System Tray to indicate that calibration is in progress and what phase of calibration the system is in (i.e. charging or discharging). Calibration is complete when the icon no longer appears in the System Tray.

Once calibration is started, the following actions or events will terminate the process:

1. Unplug AC from the computer
2. Unplug calibrating battery (may result in data loss if a second battery is not installed)
3. Undock the computer
4. Press power or standby button
5. Power down or suspend machine by using Windows menus
6. Pressing the “Stop Calibration” button in the Battery Calibration tab

Terminating calibration will not damage the computer or battery; however, depending on the level of charge remaining in the battery, there may not be enough power to keep the computer turned on. Without enough power to keep the computer on, the computer will obviously shut off creating the potential for data loss. If it is necessary to terminate calibration, Compaq recommends using the Stop Calibrating button in the Battery Calibration tab.

Calibrating Without the Utility

The Battery Calibration tab will not appear on Armada 7000 family computers produced prior to 1Q99. The new High Capacity SMART Battery is still backward compatible with these computers though. To calibrate the new battery on these systems using the following steps:

- (1) Remove any second battery from the notebook, leaving only the battery to be calibrated.
- (2) Dock the computer or connect to AC.
- (3) If the remaining battery capacity is between 90 and 100%, undock or disconnect AC and let the battery drain to less than 90%.
- (4) Dock the computer again or reconnect AC.
- (5) Allow the computer to charge to 100%.
- (6) Restart the computer in MS-DOS mode (Start → Shut Down → Restart the Computer in MS-DOS Mode → OK).
- (7) Set the system to “drain” mode on the battery conservation settings through Fn+F7.
- (8) Allow the computer to discharge until it shuts off.
- (9) Dock the computer or reconnect AC.
- (10) Allow the computer to fully charge.

NOTE:

While the computer is recharging it can be turned on and used.

Frequently Asked Questions

Why do the new Armada 7800 and 7400 notebook computers require calibration when earlier models did not?

Previously used methods for measuring remaining battery capacity are no longer effective on the new, higher capacity batteries. While the accuracy of the remaining power gauge has been improved, periodic calibration is required to keep the gauge as accurate as possible. Improved gauge accuracy translates into the obvious user benefit of being able to better estimate the remaining run time given the current charge level. However, other benefits such as longer runtime can also be achieved since many of the power management triggers such as low battery hibernation are triggered based on remaining battery capacity reported by the gauge. A more accurate gauge means that these triggers are more likely to occur at the correct point.

Are the new batteries backward compatible with earlier Armada 7000 notebooks?

Yes, the new High Capacity SMART Battery is backward compatible with earlier Armada 7800 and 7400 models as well as the 7700 and 7300; however, the battery calibration utility will only work with the newer computers. When using a new battery in an older computer the battery can still be calibrated without the utility using the steps outlined in the section titled *Calibrating Without the Utility*.