

PERSONAL COMPUTING DIVISION

ACPI BIOS

- ◆ Cross Platform Solutions for Notebook, Desktop and Server PCs
- ◆ Enables PC'97 Logo Certification
- ◆ Easily Ported

Logo Plus™ Features:

- ◆ Support for a power-management timer
- ◆ Support for a power or sleep button
- ◆ Real time clock wakeup alarm
- ◆ Implementation of at least one system sleep state, S1-S3
- ◆ Interrupt events generate SCI's and the GP_STS (General Purpose Register Block_Status) registers are implemented
- ◆ Description Tables provided in the BIOS
- ◆ Fail-safe mechanism to either unconditionally reset or power off the machine

Advanced ACPI Features:

- ◆ Aggressive Power Management
 - S3 and S4 System Power states supported
 - Device level Power Management
- ◆ Phoenix Services for SMI Handling
- ◆ Plug and Play functionality
 - Support for Docking, PC cards, and swappable device bays
- ◆ Embedded Controller Support
- ◆ Thermal Zone management
- ◆ Multiple CPUs and PCI buses
- ◆ Wake on Event support
 - USB device activity
 - LAN or modem activity

Phoenix ACPI BIOS: Firmware Solutions for PC'97 Compliant Personal Computers

Phoenix Technologies combines extensive firmware knowledge with a leading position in the PC market to offer the most competitive and feature-rich products available today. Phoenix had the first ACPI compliant BIOS, demonstrated by Microsoft in August of 1996. This BIOS was compliant with Rev 0.7 of the ACPI Specification. Since then, Phoenix has continued in its development and now has a 1.0 compliant BIOS available. **Logo Plus™** and **Advanced ACPI** offer support for new features that enhance the basic support required for logo certification and to allow for greater product differentiation for our customers.

The Advanced Configuration and Power Interface (ACPI) specification combines Power Management and Plug and Play functionality in one specification for all types of systems; notebook, desktop and server. ACPI is the keystone in Microsoft's Operating System Directed Power Management (OSPM). Under the OSPM model the operating system determines **when** to do power management and the BIOS determines **how** to do power management. The two pieces work in concert to provide maximum power savings.

Logo Plus™ ACPI Enables PC'97 Logo Certification

The Logo Plus™ ACPI solution includes support for the base ACPI requirements plus incremental standard features that enable differentiation of a personal computer. The features include firmware support for the power management timer, a power or sleep button, a power override button, an RTC alarm, system standby power management mode, a CPU low power state, and system suspend and resume power management modes. Additionally, thermal zone support will be available with Logo Plus™ ACPI for Servers.

Advanced ACPI Offers Premium Feature Set

The Advanced ACPI solution for Notebook PCs includes support for the base ACPI requirements plus extended features that enable differentiation in a high end portable system. The features include firmware support for a power management timer, a power or sleep button, a power override button, an RTC alarm, multiple system power management modes, multiple CPU power management states, and thermal controls. Additional support for device power management, embedded controller support and AC adapters are included with the Advanced ACPI BIOS solution. For further differentiation, device insertion and removal functionality is included as well as support for docking, wake on event (i.e., USB device activity, LAN or modem activity) and support for multiple CPUs and PCI buses are available. Legacy o/s support is available for designers that choose to offer a dual hot load during the transition to OSPM/ACPI.

Integrated BIOS

In an ACPI implementation, the integrated Phoenix BIOS behaves as both a complete PnP BIOS and an ACPI BIOS. The system determines at boot time if it will run in PnP or ACPI mode. The ACPI BIOS contains the system description tables necessary to communicate the hardware specific configurations and features to the Operating system.

Basic support for ACPI includes:

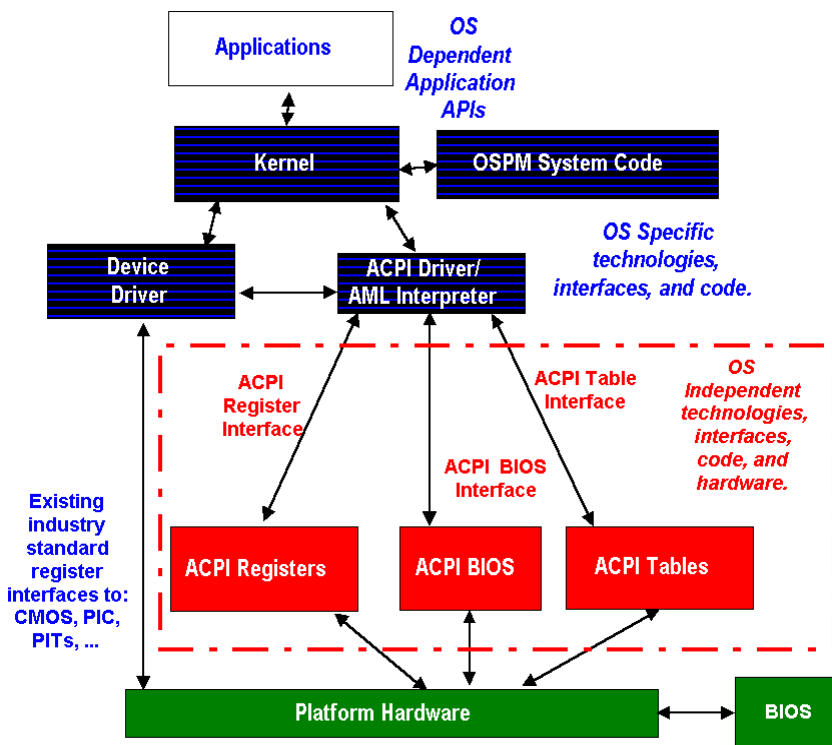
- POST - ACPI table relocation/modification during the Power on Self Test
- MCD - Integration during POST of Motherboard Configurable Devices
- Chipset - Additional services specific to ACPI
- SMM - OS Services, Global Lock, Phoenix Services, Save-to-Disk
- Build - Change process to support ACPI tables, new rules, installable options

Legacy support for older Power Management and Plug and Play is necessary for systems to properly run Windows 95 and other non-ACPI operating systems. All of the Phoenix ACPI BIOS solutions are built using an existing core. The Desktop solutions use the Phoenix BIOS and desktop Miser core. The Notebook solutions are built with a NOTEBIOS core and the Server solution are built on the current server BIOS core.

ACPI - A New Architecture

The architecture of Phoenix's ACPI BIOS solutions are designed to reduce the burden of bringing ACPI support to a new platform. By providing a simple interface to the most common porting issues, a strong set of core support routines and tight integration with Motherboard Configurable Devices (MCD), Phoenix's ACPI BIOS products offer ease of integration and faster time to market for new designs.

The following diagram is taken directly from the ACPI Specification, and shows the various system components: (ACPI 1.0 Specification Figure 1-1, Copyright © Intel/Microsoft/Toshiba, 1996)



Note: The areas outlined by the dotted line are described in the ACPI 1.0 specification.

APM and ACPI

Phoenix pioneered the development of BIOS based power management to provide power savings for early notebook computers. This early power management relied on the BIOS to determine when a particular device had been "idle" long enough to reduce or remove power. With ACPI, power management is moved from the BIOS to the hardware and operating system.

ACPI specifies four base power levels, with three substates for the sleeping state. The four APM states are: enabled, standby, suspend and off. The ACPI states are: S0=On, S1-3=Sleeping, S4=Soft Off and S5=Off. The ACPI BIOS tables define what these states mean for individual devices, and the Operating System determines when to move a device, or indeed the entire system, from one state to another.