

# **Exhibit I**

**Compaq Computer Corporation  
Phoenix Technologies Ltd.  
Intel Corporation**

**Plug and Play BIOS Specification**

**Version 1.0A**

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## References

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Plug and Play ISA Specification Version 1.0A May 5, 1994  
Send email to [plugplay@microsoft.com](mailto:plugplay@microsoft.com) to obtain a copy.

EISA Specification Version 3.12  
Contact BCPR Services Inc to obtain a copy.

Extended System Configuration Data Specification Version 1.02a  
Contact Intel Corporation to obtain a copy.

Device Identifier Reference Table & Device Type Code Table  
Browse the PlugPlay forum on CompuServe to obtain a copy.

## 1.0 Overview

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This Plug and Play BIOS Specification defines new functionality to be provided in a PC compatible system BIOS to fulfill the goals of Plug and Play. To achieve these goals, several new components have been added to the System BIOS. Two key areas that are addressed by the System BIOS are resource management and runtime configuration.

Resource management provides the ability to manage the fundamental system resources which include DMA, Interrupt Request Lines (IRQs), I/O and Memory addresses. These resources, termed *system resources*, are in high demand and commonly are over-allocated or allocated in a conflicting manner in ISA systems, leading to bootstrap and system configuration failures. A plug and play system BIOS will play a vital role in helping to manage these resources and ensure a successful launch of the operating system.

In its role as resource manager, a Plug and Play BIOS takes on the responsibility for configuring Plug and Play cards, as well as systemboard devices during the power-up phase. After the POST process is complete, control of the Plug and Play device configuration passes from the system BIOS to the system software. The BIOS does, however, provide configuration services for systemboard devices even after the POST process is complete. These services are known as Runtime Services.

Runtime configuration is a concept that has not previously existed in a System BIOS before. The system BIOS has not previously provided the ability to dynamically change the resources allocated to systemboard devices after the operating system has been loaded. The Plug and Play BIOS Specification provides a mechanism whereby a Plug and Play operating system may perform this resource allocation dynamically at runtime. The operating system may directly manipulate the configuration of devices which have traditionally been considered static via a System BIOS device node structure.

In addition, a Plug and Play System BIOS may also support event management. By means of the interfaces outlined in this document, the System BIOS may communicate the insertion and removal of newly installed devices which have been added to the system at runtime. The event management support defined by this specification are specific to devices controlled by the system BIOS, such as docking a notebook system to, or undocking it from, an expansion base. This event management does not encompass the insertion and removal of devices on the various expansion busses.

This document describes the BIOS support necessary for both systemboards and add-in boards with Option ROMs.

### 1.1 Goals of a Plug and Play System BIOS

Considering the scope of Plug and Play, the following are the goals of the Plug and Play BIOS Specification.

**Maximize ISA compatibility**

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This is the key consideration in a system BIOS. It is considered unacceptable to change the architecture of a System BIOS to prevent the thousands of ISA cards and software programs that rely on the system BIOS for services.

**Eliminate resource conflicts during the POST procedure**

A common problem that plagues many ISA systems today is the fact that there are a lot more devices available than there are system resources. In this environment, devices are bound to have conflicting resources. The system BIOS will now play a key role to help prevent these resource conflicts by not enabling devices which conflict with the primary boot devices, and relocating boot devices, if necessary, to allow a successful load of the operating system. It is the role of the operating system to provide support for communicating irreconcilable resource conflicts to the user.

**Support Plug and Play ISA cards**

A Plug and Play system BIOS is responsible for the isolation, enumeration, and optional configuration of Plug and Play ISA cards. These cards, which provide information on their resource requirements and permit software to configure those resources, will allow the system BIOS to arrive at a conflict free configuration necessary to load the operating system.

**Allow dynamic configuration of systemboard devices**

Systemboard devices have traditionally been treated as having somewhat static configurations. It is a goal of the Plug and Play BIOS specification to provide a standard mechanism whereby systemboard devices may be configured dynamically by system software. This will grant configuration management software a great deal of flexibility when system resources are in demand and alternate configurations are necessary.

*Note: Dynamic device configuration requires explicit device driver support.*

**Provide system event notification**

The system BIOS is capable of detecting certain hardware events that could affect the system configuration. By providing an event notification mechanism, an operating system can recognize the event and process any necessary configuration changes.

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