



EDD v3.0 rev 0.9b incompatibility with RAID Option-ROM

Version 1.2

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Revision History

Rev 1.0	Initial doc	4-14-00
Rev 1.1	Added Section 6.0: final proposed solution for RAID Interface Type and Device Path.	5-16-00
Rev 1.2	Final solution for RAID Interface Type and Device Path. Some changes in the previously proposed solution. See sec 5.0 and 6.0	9-29-00



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1.0 PURPOSE

To define a new field(s) in EDD v3.0 revision 0.9b Specification, to address RAID concepts.

2.0 OVERVIEW

This document is written for system BIOS engineers, RAID Option-ROM and OS (loader in specific) engineers. It will specifically cover all the known issues related to EDD v3.0 rev0.9b in relation to RAID technology from PCI BIOS Option-ROM perspective.

The topics discussed are as follows:

- 1- Int13 extension function 48h.
 - a- Interface path.
 - b- Device path.



3.0 ASSUMPTIONS

- EDD ver3.0 rev0.9b is susceptible to changes in the context of IA-64 implementations.
- Reader is familiar with EDD ver 3.0 rev 0.9b Specification. This Specification can be found on Phoenix Technology web site (<http://www.phoenix.com/techs/specs.html>) or ANSI T13 committee web site (<ftp://fission.dt.wdc.com/pub/standards/x3t13/project/d1386r4.pdf>). ANSI Specification which is equivalent revision to “Phoenix Technologies EDD ver3.0 rev 0.9b” is “BIOS Enhanced Disk Drive, revision 4, April 6, 2000”.
- Basic knowledge of RAID technology concepts.
- The issues mentioned in this document is not causing a problem today (due to a belief that these returned fields returned are not being used). A major problem will result if these returned fields to the caller (OS loader or others...) are used at one point in the program, knowing that these fields are newly defined and expected to be used at some point.



4.0 CURRENT DEFINITION OF INT 13H EXTENSIONS

FUNCTION 48H

The V3.0 Enhanced Disk Drive (EDD) specifications changed for the INT 13H function 48H to support IA-64 architecture. The important fields that have been added in this function are *Interface Path* and *Device Path*.

Interface Path:

The interface Path allows software external to system BIOS [believed to be OS] to locate mass storage device chips. The format of this field depends on Host bus type such as PCI or ISA..., etc. If it is PCI then the caller has to send PCI Bus No, Slot number and Function number where this mass storage device is present. This information can be propagated to the caller without any problem by our RAID controller Option ROM BIOS

On the other hand, Interface Path requires that Option-ROM BIOS return the channel number where the mass storage devices reside. This is not applicable to RAID technology.

Device Path:

The device path with the interface path allows software external to System BIOS [believed to be OS] to locate a specific mass storage device. The device path field provides a path from an interface to a specific device. The format is dependent on the interface type such as SCSI, ATA or ATAPI etc. Please note that there is no interface type such as "RAID" defined anywhere in the specifications.

4.1 Issues with the Device path

According to specifications the device path in case of SCSI interface type should return Physical Unit Number (PUN) i.e. the physical SCSI ID and Logical Unit Number (LUN).

SCSI Option ROM BIOS:

This is simple straight forward incase of SCSI Option ROM BIOS because every logical device (80H, 81H....) is mapped one-to-one to its physical devices.

For example: if the logical device 80H is created on SCSI ID 0 and LUN 0. So whenever OS makes a request to the BIOS with INT 13H function 48H, the SCSI option ROM BIOS will return Zero (0) in the PUN field and Zero (0) in the LUN field.

RAID Option ROM BIOS:

In the RAID environment this is not applicable. That means every logical device is not mapped one-to-one to its physical devices. Note that in RAID environment, the host software i.e. Option ROM BIOS or Device Drivers will only deal with logical arrays .



For example, if a logical device 80H(array) is mapped to RAID-5 array, then this array can be spanned across SCSI ID 0, SCSI ID 1 and SCSI ID 2, and also can reside on different SCSI (or ATA etc.) Channels. The controller Option-ROM (corresponding Device Driver) has knowledge of how arrays are mapped on to physical devices, but sending this information can not and will not make sense to the caller in the OS environment (or other...).

4.2 Issues with the Interface Path

As mentioned in section 4.1, an array can be across multiple SCSI (ATA or equivalent) channel at the same time, this array will be presented as a one entity logical drive to the caller (assumed to here to be OS loader). Hence, the Interface path structure returned (in specific the byte at offset 51 can't be possibly to represent a RAID array.

5.0 QUESTIONS AND PROPOSED SOLUTIONS

5.1 Questions

- 1- What a RAID controller option-ROM BIOS should return for Interface Type? (offset 40)
- 2- What a RAID controller option-ROM BIOS should return for Device Path? (offset 56)
- 3- What a RAID controller that has multiple channels should return in the Interface path structure (offset 51)?

6.0 Final Proposed Solution

Whenever OS Loader or Software external to the system BIOS issues INT 13H, Function 48H command to get the drive parameters, all the RAID controllers should return the following information in the Interface Type and Device Path Information.

6.1:

Offset 40: Interface Type

Interface type	Description	ASCII Value
RAID	RAID Complaint Device	52H 41H 49H 44H 20H 20H 20H 20H *

* 8bytes ASCII left justified and padded with the value 20H



6.2:

Offset 56: Device Path

Interface Type	Offset	Type	Definition
RAID	56-59	DWORD	RAID Logical Drive Number or Array Number.

6.3:

Offset 48:Interface Path

For PCI Raid controllers the channel number in the offset 51 should always be zero.

Appendix A:

Technical Feedback

None.