

**Proposed
Draft****Serial ATA
International Organization****Revision 16
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Title: Zero Power Slimline ODD**

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Revision History

Revision	Date	Comments
1	7/31/09	Initial Proposal
2	8/05/09	Initial comments from review with cabcon working group
3	8/12/09	Additional inputs from cabcon working group
4	8/19/09	Additional inputs from 8/19 cabcon working group meeting
5	9/2/09	Additional inputs from 9/2 joint cabcon/MtFuji meeting
6	10/10/09	Additional inputs from 10/9 Mt Fuji meeting
7	10/15/09	Added MD/DA configuration of the ODD
8	10/21/09	Additional inputs from 10/21/09
9	10/28/09	Additional input from 10/28 meetings
10	11/02/09	Additional input from the 11/02/09 cabcon meeting
11	11/11/09	Additional input from the 11/11/09 cabcon meeting
12	11/19/09	Additional input from Digital I/O review
13	12/03/09	Additional input from Digital I/O team
14	12/07/09	Additional input from the Digital I/O team
15	12/14/09	Final Digital I/O team edits and approval
16	12/16/09	Final Cabcon I/O team edit and approval

Introduction

This proposal modifies the existing SATA slimline connector pin assignment to allow a device to notify the host that it requires attention. It is intended to allow a host to completely power off a slimline connected device such as an optical drive and still preserve the existing usage model to the user by allowing the front panel button on the drive to behave as it does today.

The fundamental approach is to extend the existing manufacturing diagnostic pin (Pin 4 of the slimline connector as defined in Table 13 of the SATA specification) to include Device Attention signaling. Device Attention asserts when the drive requires service from software, and does not require power to be applied to the main 5V rail of the drive. Optical drives assert Device Attention when the front panel button is pressed for tray load drives, and when media is inserted for slot load drives.

This document describes the changes required to the Serial ATA Revision Specification 3.0 June 2 2009 Gold Version.

1 Section 6.3.1 Usage Models

Removable Bay requirements:

- Support for 12.7 mm, 9.5 mm and 7.0 mm slimline devices
- Direct attach support for 1.8" HDD not required
- Direct attach support for 2.5" HDD not required. Attachment in carrier adapter shall conform to cabled usage model for Gen1i, Gen2i and Gen3i.
- Warm plug and blind mate required
- Un-powered device presence detection required
- No floppy support required
- No battery connector support required
- Support 500 insertions and removals. Design is scalable to higher cycle counts.
- ~~Un-powered device attention required~~

2 Section 6.3.2 General Description

- DP – Device Present – Active low signal indicating device connect to the host. The device shall connect the DP pin to ground with a resistance of 1K ohms and a maximum tolerance of $\pm 10\%$ ohms. This signal is not supported in a cabled environment. If a cabled connection is used and the cable is held in a fixed position, the cable shall follow backplane requirements. Host connection to the DP pin is optional. If un-used, no connection is allowed. If the host requires the use of the DP function, the maximum current it shall source is 4 mA and the minimum is 0 mA.
- ~~MD – Manufacturing Diagnostic – Signal pin used by device vendors during device testing. No host connection is allowed, device connection is optional.~~
- ~~MD/DA – Manufacturing Diagnostic/Device Attention.~~

~~In a manufacturing environment this signal pin is used by device vendors during device testing. In a PC application environment (e.g., a shipping system) it is used to signal that the device requires attention from the host.~~

~~Device implementation of Device Attention is optional and if supported, the device shall set bit 4 in word 77 in the IDENTIFY PACKET DEVICE data structure to inform the host it supports this capability. (See section 13.2 for details).~~

~~The maximum voltage applied to the pin from the host shall be 3.63V. The maximum current the host shall source at any time is 4 mA, and the minimum is 0 mA.~~

~~If the feature is unused by the host, then host connection of this pin is optional. If the host connects to MD/DA the host shall apply a voltage bias to the pin within the maximum and minimum values defined in this section. This voltage bias allows the device to detect whether the device is connected to a PC Application environment, or a manufacturing test environment~~

~~If MD/DA is pulled to ground by the host or if no voltage is applied by the host at the time 5 V is applied to the device, the device may assume that the device is in a manufacturing test environment and may apply the appropriate signaling to the pin necessary for the manufacturing test environment. In no case shall the device apply more than 3.3 V (+/-10%) on the pin. If IDENTIFY PACKET DEVICE bit 5 word 77 is cleared to zero, the device may apply manufacturing diagnostic signaling on MD/DA at any time.~~

~~If MD/DA is pulled up to 3.3 V (+/-10%) at the time 5 V is applied to the device, or if 5 V and 3.3 V are applied within 100 ms of each (for example when the device is connected into a powered system) the device is in a PC application environment. In a PC application~~

environment, the device shall not apply signaling intended for manufacturing diagnostic purposes.

In the PC Application environment MD/DA is asserted on a low to high transition and indicates that the device requires attention by host SW or hardware. When the signal is low, the device shall present no more than 1K ohm (+/- 10%) effective resistance to the host. When the signal is high, the device shall present a resistance of no less than 100K ohm (+/- 10%).

If Device Attention function capability is desired by the host, the host shall ensure that MD/DA is pulled up to 3.3 V (+/-10%) before applying 5 V during the power up sequence to properly configure the device.

When in a PC application environment, if the device does not set the Device Attention supported bit in the IDENTIFY PACKET DEVICE, the device may assert MD/DA.

Tray load optical devices shall assert Device Attention when the front panel button is released. Slot load optical devices shall assert device attention for at least 10 ms when the media is inserted. A Slot load optical device may optionally assert device attention as defined above when the media is ejected.

3 Section 6.3.4.2 9.5 mm and 12.7 mm Slimline Device plug connector

In the definition of Pin 4 on Table 13

Change MD to MD/DA

Change “Manufacturing Diagnostic” to “Manufacturing Diagnostic/Device Attention”

Note 4:

The DP and MD/DA signals shall be referenced to the power portion ground pins, P5 and P6.

4 Section 13.2.2 IDENTIFY PACKET DEVICE

Word	O/M	F/V	
77	O	R	Serial ATA Additional Capabilities
		F	15-6 Reserved
		F	5 Supports host environment detect
		F	4 Supports Device Attention on slimline connected device
		V	3-1 Coded value indicating current negotiated Serial ATA signal speed
		F	0 Shall be cleared to 0

13.2.2.14 Word 77: Serial ATA Additional capabilities

Support for this word is optional and if not supported, the word shall be zero indicating the device has no support for additional Serial ATA capabilities.

Bit 0 shall be cleared to zero

Bit 1-3 are a coded value to indicate the current Serial ATA Phy speed that device is communicating at. Table 76 defines these values.

Note: In the case of system configurations that have more than one Phy link in the data path (eg. port multiplier), the indicated speed is only relevant for the link between the device Phy and its immediate host Phy. It is possible for each link in the data path to negotiate a different Serial ATA signaling speed.

Bit 4 when set to one indicates that the device supports Device Attention capability in the slimline connector. Devices that do not use the slimline connector shall set this bit to zero.

Bit 5 when set to one indicates that the device supports the ability to detect whether or not the device is in a manufacturing test or PC application environment.

Bit 6-15 are reserved and shall be cleared to zero.