

ACS-2 Clarify WRITE UNCORRECTABLE for 4K Physical Sector Size

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Revision 2

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Document Status

Revision History		
Rev	Date	Description
0	Nov. 24, 2009	1) Initial Revision
1	Dec. 15, 2009	1) Minor change to description of how pseudo and flagged uncorrectable sectors are restored to readability.
2	Feb. 3, 2010	1) Incorporate Dec. 2009 Plenary comments about changing 'sector' to 'logical sector' where appropriate 2) Add responses to other review comments from Dec. 2009. 3) Added interaction with Device Statistics

1 Introduction

The description of the WRITE UNCORRECTABLE EXT command in ACS-2 is not clear enough on what behaviour to expect when the device has multiple logical sectors per physical sector (e.g., 512 byte logical / 4K byte physical).

2 Scope

This proposal clarifies the requirements for the WRITE UNCORRECTABLE EXT command.

3 Overview

This proposal clarifies the requirements for the WRITE UNCORRECTABLE EXT command.

3.1 Changes to clause 7

[Editors note: Modify the Description of the WRITE UNCORRECTABLE EXT command (ACS-2 section= 7.78.2) as noted below]

3.2 WRITE UNCORRECTABLE EXT - 45h, Non-Data

3.2.1 Feature Set

This 48-bit command is optional for ATA devices.

3.2.2 Description

[Editors note: This corresponds to ACS-2 section 7.78.2]

3.2.2.1 Overview

The WRITE UNCORRECTABLE EXT command ~~is used to cause~~ causes the device to report an uncorrectable error when the specified logical ~~sector is~~ sectors are subsequently read. ~~If the logical sector is part of a larger physical sector, then all the logical sectors within the physical sector may report uncorrectable errors.~~

When the device processes a read command, it shall set the Uncorrectable Error bit to one and the Error bit to one when a pseudo uncorrectable or flagged uncorrectable logical sector is read. Reading a flagged or pseudo uncorrectable logical sector may affect the Number of Reallocated Logical Sectors device statistic (see A.5.6.6).

If the device completes a write command to a pseudo uncorrectable logical sector or flagged uncorrectable logical sector without error, then the device:

- a) shall write the data to the logical sector;
- b) shall clear the pseudo uncorrectable attribute or flagged uncorrectable attribute of the logical sector; and
- c) should verify that the logical sector may now be read without error.

The pseudo uncorrectable attribute or flagged uncorrectable attribute of a logical sector shall remain set during the processing of all power and reset events. If the device is unable to process a WRITE UNCORRECTABLE EXT command for any reason the device shall return command aborted.

If a logical sector is part of a larger physical sector, then the uncorrectable state of each logical sector shall be independent from any other.

3.2.2.2 Pseudo Uncorrectable Logical Sectors

When the Feature field (7:0) contains a value of 55h the WRITE UNCORRECTABLE EXT command shall cause the device to indicate a failure when reads to any of the logical sectors that are contained in the physical block of the specified logical sector are performed. These logical sectors are referred to as pseudo uncorrectable logical sectors. Whenever a pseudo uncorrectable logical sector is accessed via a read command the device shall perform normal error recovery to the fullest extent until:

- a) the error recovery process is completed, ~~then set~~ the Uncorrectable Error bit is set to one, and the Error bit is set to one; or
- b) a command time-out that applies to error recovery control occurs before error recovery is completed and an error is reported as a result of the command time-out (see 8.3.3).

Logical sectors that have been made pseudo uncorrectable when read back shall be processed ~~handled~~ in the same manner as an Uncorrectable Error, including error logging, device statistics and SMART.

3.2.2.3 Flagged Uncorrectable Logical Sectors

When the Feature field (7:0) contains a value of AAh the WRITE UNCORRECTABLE EXT command shall cause the device to flag the specified logical sectors as flagged uncorrectable. Flagging a logical sector as uncorrectable shall cause the device to indicate a failure when reads to the specified logical sector are ~~performed~~ processed. ~~Whenever a flagged uncorrectable sector is accessed via a read command the device shall set the Uncorrectable Error and Error bits to one to indicate the sector is bad.~~ Reading of flagged uncorrectable logical sectors should not be logged by the device as an error or by SMART. ~~If the logical sector is part of a larger physical sector, then all the logical sectors within the physical sector may report uncorrectable errors.~~

~~When the device processes a read command, it shall set the Uncorrectable Error bit to one and the Error bit to one when a pseudo uncorrectable or flagged uncorrectable sector is read. If the host writes to a pseudo uncorrectable or flagged uncorrectable sector, the device shall attempt to write the data to the sector. The write shall clear the uncorrectable status of the sector and should verify that the sector may now be read without error.~~

~~The pseudo-uncorrectable or flagged-uncorrectable status of a logical sector shall remain set during the processing of all power and reset events. If the device is unable to process a WRITE UNCORRECTABLE EXT command for any reason the device shall return command aborted.~~