

Write Uncorrectable EXT / Read Raw DMA EXT Proposal

To: T13 Technical committee
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1 Introduction

This proposal defines two new commands titled 'Write Uncorrectable EXT' and 'Read Raw DMA EXT'.

Write Uncorrectable EXT is a 48-bit non-data command which will create a hard error at the target location. The primary usage would be for testing of h/w and s/w.

Read Raw EXT is a 48-bit DMA command that will cause the drive to transfer the raw contents of given sectors to the host without applying ECC correction. The primary usage would be for diagnostic purposes.

2 Write Uncorrectable EXT - ??h, Non-Data

2.1.1 Description

The Write Uncorrectable EXT command is used to cause the device to report an uncorrectable error when the target sector is subsequently read.

When the Features register contains a value of 5xh the Write Uncorrectable EXT command shall cause the device to write data that is uncorrectable by the ECC capabilities of the drive to all sectors contained in the physical block that has shared ECC with the specified sector which will cause the device to indicate a failure when reads to any of the sectors that are contained in physical block of the specified sector are performed. These sectors are referred to as 'pseudo uncorrectable' sectors. In this case whenever a pseudo uncorrectable sector is accessed via a read command the drive shall perform normal error recovery to the fullest extent and then set the UNC and ERR bits to indicate the sector is bad.

When the Features register contains a value of Axh the Write Uncorrectable EXT command shall cause the device to flag the specified sector as 'flagged uncorrectable' which will cause the device to indicate a failure when reads to the specified sector are performed. These sectors are referred to as 'flagged uncorrectable' sectors. In this case whenever a 'flagged uncorrectable' sector is accessed via a read command the drive shall set the UNC and ERR bits to indicate the sector is bad

Commands that return UNC and ERR when a pseudo uncorrectable or flagged uncorrectable sector is read include: READ DMA, READ DMA EXT, READ DMA QUEUED, READ DMA QUEUED EXT, READ MULTIPLE, READ MULTIPLE EXT, READ SECTOR(S), READ SECTOR(S) EXT, READ VERIFY SECTOR(S), READ VERIFY SECTOR(S) EXT. If the host writes to a 'pseudo uncorrectable' or 'flagged uncorrectable' sector, the drive shall attempt to write the data to the sector. The write shall clear the uncorrectable status of the sector and make the sector good if possible and the device shall verify that the sector can now be read without error. It is possible that an 'uncorrectable' sector location has actual physical errors. In this case read commands and/or write commands shall return ERR status information that is consistent with the error.

If the LOG feature is set to x5h sectors that have been made pseudo uncorrectable when read back shall be listed as failed in the standard error logs and shall cause SMART utilities to indicate failure if too many sectors are uncorrectable. The LOG feature set to xAh shall indicate that reading of pseudo uncorrectable sectors shall not be logged as an error in any standardized error logs.

The pseudo uncorrectable or flagged uncorrectable status of a sector shall remain through a power cycle. If the drive is unable to process a Write Uncorrectable EXT command for any reason the device shall abort the command.

2.1.2 Inputs

Word	Name	Description
00h	Feature	Large Physical Sector / Log
01h	Count	The number of sectors to be transferred. A value of 0000h indicates that 65,536 sectors are to be transferred.
02h	LBA	MSB
03h		Address of first sector to be transferred.
04h		
05h	Command	??h

Features register –

Large Physical Sector - when set to 5xh the drive shall create a pseudo uncorrectable error on the target sector and when set to Axh the drive shall create a flagged uncorrectable error on the target sector.

LOG - set to x5h shall indicate that reading of pseudo uncorrectable sectors shall be logged as errors in standard error logs. LOG set to xAh shall indicate that reading of pseudo uncorrectable sectors shall not be logged as an error in any standardized error logs.

Device register -

DEV shall indicate the selected device.

Status register -

BSY shall be cleared to zero indicating command completion.

DRDY shall be set to one.

DF (Device Fault) shall be cleared to zero.

DRQ shall be cleared to zero.

ERR shall be cleared to zero.

2.1.3 Normal outputs

See Normal and Error Output Tables in ATA8-ACS.

2.1.4 Error outputs

See Normal and Error Output Tables in ATA8-ACS.

3 Read Raw DMA EXT - ??h, DMA

3.1.1 Description

The Read Raw EXT command shall cause the device to transfer the specified sectors of data to the host without applying any ECC correction. Other forms of error recovery such as off track recovery would be allowed. Note: ECC bytes shall not be transferred to the host.

3.1.2 Inputs

Word	Name	Description
00h	Feature	Reserved
01h	Count	The number of sectors to be transferred. A value of 0000h indicates that 65536 sectors are to be transferred.
02h	LBA	MSB
03h		Address of first sector to be transferred.
04h		
05h	Command	C8h

3.1.3 Normal outputs

See Normal and Error Output Tables in ATA8-ACS.

3.1.4 Error outputs

See Normal and Error Output Tables in ATA8-ACS.

Changes to DCO

Need to add a WRITE UNCORRECTABLE / READ RAW bit to the Device Configuration Identify data structure.

WRITE UNCORRECTABLE / READ RAW – If set to one indicates that the device is capable of supporting the WRITE UNCORRECTABLE / READ RAW commands.

Changes to Identify Device information

Need to add a bit in Identify Device information to indicate WRITE UNCORRECTABLE EXT / READ RAW EXT commands are supported.