Proposed Draft

Serial ATA International Organization

Version 2

May 21, 2013

ECN072v2_SATA31_Endianness_of_LBA_Range_List

Title: Endianness of LBA Range List

Proposed correction to ratified document TP_042v14_SATA31_Hybrid_Information

This is an internal working document of the Serial ATA International Organization. As such, this is not a completed standard and has not been approved. The Serial ATA International Organization may modify the contents at any time. This document is made available for review and comment only.

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Document History

Version	Date	Comments
0	05/13/2013	Initial draft
1	05/20/2013	Change ‘N’ to ‘63’ in the table
2	05/21/2013	Member review

1 Introduction

The description of “LBA Range” in “TP_042v14_SATA31_Hybrid Information” for the HYBRID EVICT command doesn’t match the description in ACS-3 (for the DATASET MANAGEMENT command).

2 Summary of the problem

In ACS-3 (rev 4f):

7.5.6 Output From the Host to the Device Data Structure
DATA SET MANAGEMENT Request Data is a list of one or more LBA Range Entries. If the Trim bit is set to one, then LBA Range Entries may overlap and are not required to be sorted. See table 40.

Table 40 — LBA Range Entries

Offset	Type	Description
0..7	QWord	Entry #0 63:48 Range Length 47:0 LBA Value
8..15	QWord	Entry #1 63:48 Range Length 47:0 LBA Value
...		...
496..511	QWord	Entry #63 63:48 Range Length 47:0 LBA Value

An individual LBA range is called an LBA Range Entry and is represented by eight bytes. The LBA is expressed by the LBA Range Entry's first six bytes and the Range Length is a zero based number (e.g., 0=0 and 1=1) represented by the remaining two bytes. If the two byte range length is zero, then the LBA Range Entry shall be discarded as padding.

The following are two examples:
1) logical blocks 11 through 18 make one LBA Range Entry that has LBA 11 as its first 48 bits and the value of 8 as its next 16 bits (i.e., 0008_0000_0000_000Bh).
2) if only LBA 20 was represented in an LBA Range Entry, then the range value is one (i.e., 0001_0000_0000_0014h).

The largest range that may be specified in a LBA Range Entry is 65 535. Multiple LBA Range Entries shall be used to specify larger range values.

For above example 1), it shows the value in order of byte7, byte 6, byte 5, byte 4, byte 3, byte 2, byte 1 and byte 0. (e.g. 00 08 00 00 00 00 00 0B)

Looking it in Table 40, the value of LBA Range entry, from byte 0 to byte 7: 0B 00 00 00 00 00 08 00

In Hybrid proposal (TP_042v14_SATA31_Hybrid_Information – section 13.6.5.4.5)

Byte	7	6	5	4	3	2	1	0
0	(MSB)							
				Starting LBA				
5								(LSB)
6	(MSB)			Range Length				
7								(LSB)

Figure 250+3 - LBA Range

For above example 1), Figure 250+3 will have value in bytes for the LBA Range: from byte 0 to byte 7: 00 00 00 00 00 0B 00 08

These do not match (e.g., we have two LBA Range formats).

The intention of original Hybrid proposal was to use the same LBA Range format defined in ACS spec.

3 Proposed corrections

[editors note: modify the following tables and text in the HYBRID EVICT command. The references are to TP_042v14]

3.1.1.1.1 [Editor's note 13.6.8.6.4]Output from the Host to the Device Data Structure

[Editor's note Figure 250+2] describes the format for all 512-byte data blocks transferred from the host to the device for the HYBRID EVICT command, containing up to 64 LBA Range entries each ~~(see [Editor's note Figure 250+3]~~). There may be more than one 512-byte data block transferred. The LBA Range entries shall be sorted in order of increasing Starting LBA. If the value of the Range Length field of an LBA Range entry is cleared to zero, then the device shall ignore the LBA Range entry and all following LBA Range entries.

For any LBA range, if the Starting LBA plus the Range Length is greater than the maximum LBA, then the device:

a) shall return command aborted; and

b) may evict LBA ranges that are valid.

Byte	7	6	5	4	3	2	1	0
0	(MSB)							
				LBA Range 0 (see [Editor's note Figure 250+3]Figure)				
7								(LSB)
8	(MSB)							
				LBA Range 1				
15								(LSB)
				. . .				
504	(MSB)							
				LBA Range 63				
511								(LSB)

Figure 250+2 - Output data from the host for the HYBRID EVICT command

Byte	7	6	5	4	3	2	1	0
0	(MSB)							
				Starting LBA				
5								(LSB)
6	(MSB)			Range Length				
7								(LSB)

Figure 250+3 - LBA Range

Byte	Type	Description
0..7	QWord	LBA Range entry 0 Bits 63:48 Range Length Bits 47:0 Starting LBA
8..15	QWord	LBA Range entry 1 Bits 63:48 Range Length Bits 47:0 Starting LBA
...		. . .
504..511	QWord	LBA Range entry 63 Bits 63:48 Range Length Bits 47:0 Starting LBA

Figure 250+2 - Output data from the host for the HYBRID EVICT command

