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The last word in  
small disk storage

April 20, 1987

TO: SCSI-2 Working Group and Accredited Standards Committee X3T9.2  
From: Skip Jones, MAXTOR  
SUBJECT: PROPOSAL FOR A READ UPDATED BLOCKS COMMAND

Attached for your review is a proposal for a READ UPDATED BLOCKS Command, intended primarily for use with optical devices (WORM in particular) which allow the updating of logical blocks, or more specifically, devices which relocate the physical location of a logical block.

As an example, say a device has six versions (or "GENERATIONS") of LBA 7F. A normal READ command to 7F results in the most current generation being transferred.

What if the host wants one of the other generations of LBA 7F?

This command allows the host to specify which generation and the number of subsequent generations of a particular LBA to be transferred, while avoiding device-specific implementations.

Another feature of this command allows the host to request the transfer of data from multiple contiguous Logical Block Addresses of a particular Generation Address. As an example, consider the case when the host is recovering a previous generation of an entire file of data.

Additionally, this command allows the host to determine the TOTAL number of generations that exists for a particular LBA.

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WORM and Optical Devices

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READ UPDATED BLOCKS; Twelve-Byte version

Peripheral Device Type: WORM, Optical Devices  
Operation Code Type: Optional

READ UPDATED BLOCKS Command

Bit:	7	6	5	4	3	2	1	0
Byte:								
0	Operation Code (ADh)							
1	Logical Unit Number		DPO	FUA	XfrLBA	MaxGen	RelAdr	
2	(MSB)							
3	Logical Block Address							
4								
5	(LSB)							
6	Latest		(MSB)		Generation Address		(LSB)	
7								
8	(MSB)							
9	Transfer Length							
10	Reserved							
11	Vendor Unique		Reserved		Flag		Link	

The READ UPDATED BLOCKS Command (Table \_\_\_) provides a means for reading data from blocks where the Logical Block Address has been physically relocated.

A MaxGen bit of zero and a XfrLBA bit of zero requests the target to transfer the data from each generation of the single logical block specified. The transfer begins at the Generation Address of the Logical Block Address specified and continues transferring each generation of the Logical Block Address specified. The transfer ends when the Transfer Length is exhausted.

A MaxGen bit of zero and a XfrLBA bit of one requests the target to transfer the data from each logical block of the single generation specified. The transfer begins at the Logical Block Address of the Generation Address specified and continues transferring each logical block of the Generation Address specified. The transfer ends when the Transfer Length is exhausted.

If the Transfer Length and Generation Address specified results in

A MaxGen bit of one requests the target transfer the four bytes of Maximum generation data shown in Table 6.2.4 during the DATA IN phase of the command. The MAXIMUM GENERATION ADDRESS field specifies the generation address of the first current generation of the Logical Block Address specified in the CDB. The XfrLBA bit, Generation Address and the Transfer Length fields of the CDB are not implemented.

See section 6.2.4 for a description of the cache control bits (DPO and FUA). See section 6.2.5 for a description of the relative address bit (RelAdr).

The Generation Address specifies the generation of the Logical Block Address that data transfer begins.

A Latest bit of zero specifies that Generation Address zero defines the first original location of the Logical Block Address. Generation Address one defines the second generation of the Logical Block Address, etc.. Requests for multiple generations of a single LBA (MaxGen = 0 and XfrLBA = 0) result in data being transferred from earlier generations toward later generations.

A Latest bit of one specifies that Generation Address zero defines the current location of the Logical Block Address. Generation Address one defines the most recent previous generation of the Logical Block Address, etc.. Requests for multiple generations of a single LBA (MaxGen = 0 and XfrLBA = 0) result in data being transferred from later (most recent) generations toward earlier (oldest) generations.

The Transfer Length specifies the number of contiguous generation blocks (MaxGen = 0 and XfrLBA = 0) or logical blocks (MaxGen = 0 and XfrLBA = 1) of data that shall be transferred. A transfer length of zero indicates that no blocks shall be transferred. This condition shall not be considered an error.

Table 6.2.4: MAXIMUM GENERATION Data

Bit	Description
0 (MSB)	Maximum Generation Address (LSB)
1	Reserved
2	Reserved
3	Reserved

5  
0

READ UPDATED BLOCKS

Peripheral Device Type: WORM, Optical Devices  
Operation Code Type: Optional

READ UPDATED BLOCKS Command

Bit	7	6	5	4	3	2	1	0
Byte								
0	Operation Code (2Dh)							
1	Logical Unit Number		DPO	FUA	XfrLBA	MaxGen	RelAdr	
2	(MSB)							
3	Logical Block Address							
4								
5	(LSB)							
6	Latest (MSB)		Generation Address				(LSB)	
7	Transfer Length							
8								
9	Vendor Unique	Reserved				Flag	Link	

The READ UPDATED BLOCKS Command (Table 6.2.4) provides a means for reading data from blocks where the Logical Block Address has been physically relocated.

A MaxGen bit of zero and a XfrLBA bit of zero requests the target to transfer the data from each generation of the single logical block specified. The transfer begins at the Generation Address of the Logical Block Address specified and continues transferring each generation of the Logical Block Address specified. The transfer ends when the Transfer Length is exhausted.

A MaxGen bit of zero and a XfrLBA bit of one requests the target to transfer the data from each logical block of the single generation specified. The transfer begins at the Logical Block Address of the Generation Address specified and continues transferring each logical block of the Generation Address specified. The transfer ends when the Transfer Length is exhausted.

If the Transfer Length and Generation Address specified results in exceeding the number of existing generations for the Logical Block specified, the command shall be terminated with a CHECK CONDITION status and the ILLEGAL REQUEST sense key.

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A MaxGen bit of one requests the target transfer the four bytes of Maximum Generation data shown in Table \_\_ during the DATA IN phase of the command. The MAXIMUM GENERATION ADDRESS field specifies the generation address of the most current generation of the Logical Block Address specified in the CDB. The XfrLBA bit, Generation Address and the Transfer Length fields of the CDB are not implemented.

See section 6.2.4 for a description of the cache control bits (DPO and FUA). See section 6.2.5 for a description of the relative address bit (RelAdr).

The Generation Address specifies the generation of the Logical Block Address that data transfer begins.

A Latest bit of zero specifies that Generation Address zero defines the first original location of the Logical Block Address. Generation Address one defines the second generation of the Logical Block Address, etc.. Requests for multiple generations of a single LBA (MaxGen = 0 and XfrLBA = 0) result in data being transferred from earlier generations toward later generations.

A Latest bit of one specifies that Generation Address zero defines the current location of the Logical Block Address. Generation Address one defines the most recent previous generation of the Logical Block Address, etc.. Requests for multiple generations of a single LBA (MaxGen = 0 and XfrLBA = 0) result in data being transferred from later (most recent) generations toward earlier (oldest) generations.

The Transfer Length specifies the number of contiguous generation blocks (MaxGen = 0 and XfrLBA = 0) or logical blocks (MaxGen = 0 and XfrLBA = 1) of data that shall be transferred. A transfer length of zero indicates that no blocks shall be transferred. This condition shall not be considered an error.

Table \_\_: MAXIMUM GENERATION Data

Byte	Description
0 (MSB)	Maximum Generation Address
1 (LSB)	
2	Reserved
3	Reserved