

Date: July 11, 2001

To: T10 Committee (SCSI)

From: George Penokie (Tivoli)

Subject: Reassign Blocks 2 TBytes Support

1 Overview

In the original proposal to add 2 TByte support to SCSI (99-259r4) included a change to the Reassign Blocks parameter list. However the requested change was incorrect and was never placed into SBC-2. This proposal corrects the error in 99-259r4.

2 REASSIGN BLOCKS command

The REASSIGN BLOCKS command (see table 1) requests the device server to reassign the defective logical blocks to another area on the medium set aside for this purpose. The device server should also record the location of the defective logical blocks to the grown defect list if such a list is supported. More than one physical or logical block may be relocated by each defect descriptor sent by the application client. This command does not alter the contents of the PLIST (see 5.1.1, FORMAT UNIT command).

Table 1 - REASSIGN BLOCKS command

Bit Byte	7	6	5	4	3	2	1	0
0	OPERATION CODE (07h)							
1	RESERVED						LONGLBA	LONGLIST
2	RESERVED							
3	RESERVED							
4	RESERVED							
5	CONTROL							

See 4.2.1.9 for reservation requirements for this command.

The application client transfers a defect list that contains the logical block addresses to be reassigned. The device server shall reassign the physical medium used for each LOGICAL BLOCK ADDRESS in the list. The data contained in the logical blocks specified in the defect list may be altered, but the data in all other logical blocks on the medium shall be preserved.

NOTE 1 - The effect of specifying a logical block to be reassigned that previously has been reassigned is to reassign the block again. Although not likely, over the life of the medium, a logical block may be assigned to multiple physical addresses until no more spare locations remain on the medium.

A long LBA (LONGLBA) bit of zero requests four byte defect descriptors be returned in the reassign blocks defect list. A LONGLBA bit of one requests eight byte defect descriptors be returned in the reassign blocks defect list.

The REASSIGN BLOCKS defect list (see table 2) contains a four-byte header followed by one or more defect descriptors. The length of each defect descriptor is four bytes. If `LONGLIST` is set to zero, the header is defined in table 3. If `LONGLIST` is set to one, the header is defined in table 4.

Table 2 - REASSIGN BLOCKS defect list

Bit Byte	7	6	5	4	3	2	1	0
0	DEFECT LIST LENGTH HEADER							
3								
	DEFECT DESCRIPTOR(s)							
4	DEFECT LOGICAL BLOCK ADDRESS 0							
7 or 11								
	⋮							
n - (3 or 7)	DEFECT LOGICAL BLOCK ADDRESS X							
n								

Table 3 - REASSIGN BLOCKS short defect header

Bit Byte	7	6	5	4	3	2	1	0	
0	RESERVED								
1	RESERVED								
2	(MSB)	DEFECT LIST LENGTH						(LSB)	
3									

Table 4 - REASSIGN BLOCKS short defect header

Bit Byte	7	6	5	4	3	2	1	0	
0	(MSB)	DEFECT LIST LENGTH						(LSB)	
3									

The DEFECT LIST LENGTH field specifies the total length in bytes of the defect descriptors that follow. The DEFECT LIST LENGTH is equal to four times (`LONGLBA` is set to zero) or eight times (`LONGLBA` is set to one) the

number of defect descriptors and does not include the defect list header length.

~~The defect descriptor specifies a four-byte defect logical block address that contains the defect.~~

The defect descriptor contains the logical block address of the defect. The logical block address is a four-byte field if the LONGLBA bit is set to zero or an eight-byte field if the LONGLBA bit is set to one.

The defect descriptors shall be in ascending order.

If the block device has insufficient capacity to reassign all of the logical blocks specified in the defect descriptors, the command shall terminate with CHECK CONDITION status and the sense key shall be set to HARDWARE ERROR with the additional sense code set to NO DEFECT SPARE LOCATION AVAILABLE.

If the block device is unable to successfully complete a REASSIGN BLOCKS command, the command shall terminate with CHECK CONDITION status with the appropriate sense information. The logical block address of the first defect descriptor not reassigned shall be returned in the COMMAND-SPECIFIC INFORMATION field of the sense data. If information about the first defect descriptor not reassigned is not available, or if all the defects have been reassigned, this field shall be set to FFFFFFFFh (LONGLBA is set to zero) or FFFFFFFFFFFFFFFFh (LONGLBA is set to one).

If the REASSIGN BLOCKS command failed due to an unexpected unrecoverable read error that would cause the loss of data in a block not specified in the defect list, the logical block address of the unrecoverable block shall be returned in the INFORMATION field of the sense data and the valid bit shall be set to one.

NOTE 2 - If the REASSIGN BLOCKS command returns CHECK CONDITION status and the sense data COMMAND-SPECIFIC INFORMATION field contains a valid logical block address, the application client should remove all defect descriptors from the defect list prior to the one returned in the COMMAND-SPECIFIC INFORMATION field. If the sense key is MEDIUM ERROR and the valid bit is one (the INFORMATION field contains the valid block address) the application client should insert that new defective logical block address into the defect list and reissue the REASSIGN BLOCKS command with the new defect list. Otherwise, the application client should perform any corrective action indicated by the sense data and then reissue the REASSIGN BLOCKS command with the new defect list.