To: T10 Technical Committee
From: Rob Elliott, Compaq Computer Corporation (Robert.Elliott@compaq.com)
Date: 27 July 2001
Subject: T10/01-246r0 SBC-2 Long LBA PMI support for READ CAPACITY

Revision History
Revision 0 (27 July 2001) first revision

Overview
READ CAPACITY does not support the partial medium indicator (PMI) bit for Long LBAs. This feature is useful and should be supported. To effect this, remove the LONGLBA bit and format from READ CAPACITY (10) and create READ CAPACITY (16) which always uses the long LBA format and has room for a long LBA in its CDB (used with PMI).

Suggested changes
[Obtain an opcode for READ CAPACITY (16)]
[Table 2, 6, 76, 86 - add READ CAPACITY (16) rows and add (10) to existing rows]

1.1.1   READ CAPACITY (10) command

The READ CAPACITY (10) command (see Table 1) provides a means for the application client to request information regarding the capacity of the block device.

Table 1 - READ CAPACITY (10) command

Bit Byte	7	6	5	4	3	2	1	0
0	OPERATION CODE (25h)							
1	Reserved						LONGLBA	RELADR
2	(MSB)							
3				LOGICAL BLOCK ADDRESS				
4								
5								(LSB)
6	Reserved							
7	Reserved							
8	Reserved							PMI
9	CONTROL							

See <> for reservation requirements for this command. See the LOCK UNLOCK CACHE (10) command (<>) for a definition of the RELADR bit and the LOGICAL BLOCK ADDRESS field.

~~A long LBA (LONGLBA) bit of zero indicates A LONGLBA bit of one indicates the target shall return the read capacity data as defined in Table 29. If the LONGLBA bit is one the PMI bit shall be zero.~~

The LOGICAL BLOCK ADDRESS shall be zero if the PMI bit is zero. If the PMI bit is zero and the LOGICAL BLOCK ADDRESS is not zero, the device server shall return a CHECK CONDITION status and the sense key shall be set to ILLEGAL REQUEST with the additional sense code set to ILLEGAL FIELD IN CDB.

A partial medium indicator (PMI) bit of zero indicates that the RETURNED LOGICAL BLOCK ADDRESS and the BLOCK LENGTH IN BYTES are those of the last logical block on the block device.

A PMI bit of one indicates that the RETURNED LOGICAL BLOCK ADDRESS and BLOCK LENGTH IN BYTES are those of the last logical block address before a substantial delay in data transfer may be encountered. This returned LOGICAL BLOCK ADDRESS shall be greater than or equal to the logical block address specified by the RELADR and LOGICAL BLOCK ADDRESS fields in the command descriptor block.

Note 1 - This function is intended to assist storage management software in determining whether there is sufficient space on the current track, cylinder, etc., to contain a frequently accessed data structure, such as a file directory or file index, without incurring an access delay.

If the LONGLBA bit is zero, tThe short read capacity data (see Table 2) shall be sent during the data-in buffer transfer of the command. The maximum value that shall be returned in the returned logical block address field is FFFFFFFEh. If the LONGLBA bit is zero and the number of logical blocks exceeds the maximum value that may be specified in the RETURNED LOGICAL BLOCK ADDRESS field the device server shall transfer FFFFFFFFh in the RETURNED LOGICAL BLOCK ADDRESS field. The initiator should then issue a READ CAPACITY (16) command with a LONGLBA bit of one.

Table 2 - Short read capacity data

Bit Byte	7	6	5	4	3	2	1	0
0	(MSB)							
1				RETURNED LOGICAL BLOCK ADDRESS				
2								
3								(LSB)
4	(MSB)							
5				BLOCK LENGTH IN BYTES				
6								
7								(LSB)

If the LONGLBA bit is one the long read capacity data (see Table 29) shall be sent during the data-in buffer transfer of the command.

Table 29 - Long read capacity data

Bit Byte	7	6	5	4	3	2	1	0
0	(MSB)							
1								
2								
3				RETURNED LOGICAL BLOCK ADDRESS				
4								
5								
6								
7								(LSB)
8	(MSB)							
9				BLOCK LENGTH IN BYTES				
10								
11								(LSB)

1.1.2 READ CAPACITY (16) command

The READ CAPACITY (16) command (see Table 1) provides a means for the application client to request information regarding the capacity of the block device.

Table 4 - READ CAPACITY (16) command

Bit Byte	7	6	5	4	3	2	1	0
0	OPERATION CODE (25h)							
1	Reserved						LONGLBA	RELADR
2	(MSB)							
3								
4								
5				LOGICAL BLOCK ADDRESS				(LSB)
6								
7								
8								
9								(LSB)
106	Reserved							
11	Reserved							
12	Reserved							
137	Reserved							
148	Reserved							PMI
159	CONTROL							

See <> for reservation requirements for this command. See the LOCK UNLOCK CACHE (10) command (<>) for a definition of the RELADR bit and the LOGICAL BLOCK ADDRESS field. See the READ CAPACITY (10) command (1.1.1) for a description of the fields in this command.

The long read capacity data (see Table 5) shall be sent during the data-in buffer transfer of the command. The maximum value that shall be returned in the RETURNED LOGICAL BLOCK ADDRESS field is FFFFFFFF FFFFFFFEh.

Table 5 - Long read capacity data

Bit Byte	7	6	5	4	3	2	1	0
0	(MSB)							
1								
2								
3				RETURNED LOGICAL BLOCK ADDRESS				
4								
5								
6								
7								(LSB)
8	(MSB)							
9								
10				BLOCK LENGTH IN BYTES				
11								(LSB)