To: T10 Technical Committee
From: Rob Elliott, HP (elliott@hp.com)
Date: 20 January 2003
Subject: T10/03-028r2 SPC-3 SBC-2 Block Limits VPD page

Revision History
Revision 0 (17 December 2002) first revision
Revision 1 (14 January 2003) changed to INQUIRY VPD implementation based on request from George Penokie (IBM).
Revision 2 (20 January 2003) incorporated comments from January CAP WG.

Related Documents
sbc2r08 - SCSI Block Commands - 2 revision 8
spc3r10 – SCSI Primary Commands – 3 revision 10

Overview
Some block targets have maximum transfer lengths on their simple read and write commands; e.g. they might refuse a command requesting more than 16 MB by returning CHECK CONDITION/ILLEGAL REQUEST/INVALID FIELD IN CDB.

Some block targets, particularly RAID controllers, have noticeable performance degradation when transfer lengths exceed a certain threshold and/or are not multiples of a certain granularity.

A (read-only) INQUIRY VPD page to return these transfer length limitations is proposed.

Related
There is a maximum size reported for XOR write commands in the XOR Control mode page.

SSC-2 has a READ BLOCK LIMITS command for tape drives. It returns: granularity, maximum block length limit, and minimum block length limit. The opcode (05h) is marked vendor-specific for block devices.

Suggested Changes to SPC-3
8.6 Vital product data parameters
8.6.1 Vital product data parameters overview and page codes
This subclause describes the vital product data (VPD) page structure and the VPD pages (see table 265) that are applicable to all SCSI devices. These VPD pages are optionally returned by the INQUIRY command (see 7.4) and contain vendor specific product information about a target or logical unit. The vital product data may include vendor identification, product identification, unit serial numbers, device operating definitions, manufacturing data, field replaceable unit information, and other vendor specific information. This standard defines the structure of the vital product data, but not the contents.

Table 265 — Vital product data page codes

Page code	VPD page name	Reference	Support requirements
82h	ASCII	8.6.2	Optional
01h – 7Fh	ASCII	8.6.3	Optional
83h	Device identification	8.6.4	Mandatory
81h	Obsolete	3.3.7	
84h	Software interface identification	8.6.5	Optional
00h	Supported VPD pages	8.6.6	Mandatory
80h	Unit Serial Number	8.6.7	Optional
85h – ~~BFh~~AFh	Reserved		
B0h - BFh	See specific device type for definition		
C0h – FFh	Vendor-specific		

Suggested Changes to SBC-2

5.2.xx XYZ command [each command with a TRANSFER LENGTH field]

...

The TRANSFER LENGTH field specifies .... The transfer length field is constrained by the MAXIMUM TRANSFER LENGTH field in the Block Limits VPD page (see 6.1.3.10).

5.2.27 VERIFY (10) command
5.2.28 VERIFY (12) command
5.2.29 VERIFY (16) command
[Change VERIFICATION LENGTH to TRANSFER LENGTH since data is transferred.]

5.3.2 ERASE (10) command
5.3.3 ERASE (12) command
[Change TRANSFER LENGTH to ERASE LENGTH since no data is transferred. The new block limits parameters will not apply to ERASE.]

6.1.3.10 XOR Control mode page

...

The MAXIMUM TRANSFER LENGTH field specifies the maximum transfer length in blocks that the target accepts for a single XDWRITE, XDWRITE EXTENDED, ~~XDWRITE,~~ or XPWRITE command.

The MAXIMUM REBUILD ~~READ~~ TRANSFER SIZE field specifies the maximum transfer length in blocks that the target shall use for commands issued as a temporary initiator (e.g., READ and XPWRITE commands) during a rebuild operation. This field does not limit the rebuild size.

6 Parameters for block devices
6.1 Parameters for direct-access block devices
6.1.n Vital product data parameters
6.1.n.1 Overview
The VPD page codes specific to direct-access block devices are defined in table 265.

Table 265 —VPD page codes specific to direct-access block devices

Page code	VPD page name	Reference	Support requirements
B0h	Block Limits VPD page	6.1.n.2	Optional
B1h – BFh	Reserved for this device type		

6.1.n.2 Block Limits VPD page [new]

The Block Limits VPD page (see Table xx) provides the application client with the means to obtain certain operating parameters of the logical unit.

Table xx. Block Limits VPD page

	7	6	5	4	3	2	1	0
0	PERIPHERAL QUALIFIER			PERIPHERAL DEVICE TYPE				
1	PAGE CODE (B0h)							
2	Reserved							
3	PAGE LENGTH (0Ch)							
4	Reserved							
5	Reserved							
6	(MSB)	OPTIMAL TRANSFER LENGTH GRANULARITY						
7								(LSB)
8	(MSB)	MAXIMUM TRANSFER LENGTH						
9								
10								
11								(LSB)
12	(MSB)	OPTIMAL MAXIMUM TRANSFER LENGTH						
13								
14								
15								(LSB)

The PERIPHERAL QUALIFIER field and the PERIPHERAL DEVICE TYPE field are defined in SPC-3.

The PAGE CODE field shall be set to B0h.

The PAGE LENGTH field is defined in SPC-3.

The OPTIMAL TRANSFER LENGTH GRANULARITY field specifies the optimal transfer length granularity in blocks for a single PRE-FETCH, READ, READ LONG, VERIFY, WRITE, WRITE AND VERIFY, WRITE LONG, XDREAD, XDWRITE, XDWRITEREAD, XDWRITE EXTENDED, or XPWRITE command. Transfers with transfer lengths not equal to a multiple of this value may incur significant delays in processing.

The MAXIMUM TRANSFER LENGTH field specifies the maximum transfer length in blocks that the target accepts for a single PRE-FETCH, READ, READ LONG, VERIFY, WRITE, WRITE AND VERIFY, WRITE LONG, XDREAD, XDWRITE, XDWRITEREAD, XDWRITE EXTENDED, or XPWRITE command. Requests for transfer lengths exceeding this limit result in CHECK CONDITION status with a sense key of ILLEGAL REQUEST and an additional sense code of INVALID FIELD IN CDB. A value of zero means there is no reported limit on the transfer length.

The OPTIMAL MAXIMUM TRANSFER LENGTH field specifies the recommended maximum transfer length in blocks for a single PRE-FETCH, READ, READ LONG, VERIFY, WRITE, WRITE AND VERIFY, WRITE LONG, XDREAD, XDWRITE, XDWRITEREAD, XDWRITE EXTENDED, or XPWRITE command. Transfers with transfer lengths exceeding this value may incur significant delays in processing.

6.1 Parameters for optical block devices

6.1.n Vital product data parameters

Refer to the VPD parameters for direct access block devices (see 6.1.n).

6.3 Parameters for write-once block devices

Refer to the parameters for optical memory block devices (see 6.2).