To: T10 Technical Committee
From: Rob Elliott, HP (elliott@hp.com)
Date: 18 February 2005
Subject: 05-074r0 SPC-3 SPC-4 SES-2 SMC-3 Command requirements

Revision history
Revision 0 (18 February 2005) First revision

Related documents
04-313r1 Mandatory REPORT LUNS support (Dave Peterson, CNT)
ses2r10 - SCSI Enclosure Services - 2 revision 10
smc2r07 - SCSI Media Changer Commands - 2 revision 7
spc3r21d - SCSI Primary Commands - 3 revision 21d

Overview
SCSI Controller (SCC) commands (VOLUME SET, SPARE, REDUNDANCY GROUP, MAINTENANCE) make
no sense for standalone enclosure services (SES) devices or independent medium changers (SMC), so the
SCCS bit in standard INQUIRY data should be required to be set to zero in SES-2 and SMC-3.

SCSI Media Changer (SMC) commands make no sense for standalone enclosure services devices since SES
has no commands dealing with media, so the MCHNGR bit in standard INQUIRY data should be required to be
set to zero in SES-2.

REPORT LUNS should be marked as mandatory in SES-2 and SMC-3 as requested by 04-313r1 (already
incorporated in ses2r10). Update the opcode table in SPC-3 to match SES-2 and SPC-4 to match SMC-3.

The new REPORT/SET PRIORITY and REPORT/SET TIMESTAMP commands should be optional for both
SES-2 and SMC-3.

Suggested changes to SPC-3
D.3.1 Operation codes
Remove the "O" optional entry in the E - ENCLOSURE SERVICES DEVICE (SES-2) column and the M -
MEDIA CHANGER DEVICE (SMC-2) column for these opcodes:
   a) A3h and A4h (MAINTENANCE IN/OUT). This column only means the SCC-2 specific service actions,
       so removing it does not imply non-support for commands like REPORT/SET DEVICE IDENTIFIER
       which use also those opcodes but have SPC-3 defined service actions.
   b) BAh and BBh (REDUNDANCY GROUP IN/OUT)
   c) BCh and BDh (SPARE IN/OUT)
   d) BEh and BFh (VOLUME SET IN/OUT).

Mark A0h REPORT LUNS as mandatory in the E - ENCLOSURE SERVICES DEVICE (SES-2) column and
the M - MEDIA CHANGER DEVICE (SMC-2) column.

D.3.2 Additional operation codes for devices with the MCHNGR bit set to one
Remove the "M" mandatory entry in the E - ENCLOSURE SERVICES DEVICE (SES-2) column for:
   a) A7h (MOVE MEDIUM ATTACHED)
   b) B4h (READ ELEMENT STATUS ATTACHED).

D.3.3 Additional operation codes for devices with the EncServ bit set to one

No change.

Suggested changes to SPC-4
D.3.1 Operation codes
Mark A0h REPORT LUNS as mandatory in the M - MEDIA CHANGER DEVICE (SMC-3) column.

Suggested changes to SES-2

5 Commands for enclosure services peripheral devices

The commands for logical units with the peripheral device type of enclosure services (i.e., 0Dh) (see 4.1.2) are

shown in table 4.

Table 4 — Commands for enclosure services peripheral devices (part 1 of 2)

Command name	Operation code [a]	Type [b]	Reference
ACCESS CONTROL IN	86h	O	SPC-3
ACCESS CONTROL OUT	87h	O	SPC-3
CHANGE ALIASES	A4h/0Bh	O	SPC-3
INQUIRY [g]	12h	M	SPC-3
LOG SELECT	4Ch	O	SPC-3
LOG SENSE	4Dh	O	SPC-3
~~MAINTENANCE IN~~	~~A3h/00h - 04h~~ ~~A3h/06h - 09h~~	~~X [e]~~	~~SCC-2~~
~~MAINTENANCE OUT~~	~~A4h/00h - 05h~~ ~~A4h/07h - 09h~~	~~X [e]~~	~~SCC-2~~
MODE SELECT (10)	55h	O	SPC-3
MODE SELECT (6)	15h	O	SPC-3
MODE SENSE (10)	5Ah	O	SPC-3
MODE SENSE (6)	1Ah	O	SPC-3
~~MOVE MEDIUM ATTACHED~~	~~A7h~~	~~X [f]~~	~~SMC-2~~
PERSISTENT RESERVE IN	5Eh	O	SPC-3
PERSISTENT RESERVE OUT	5Fh	O	SPC-3
READ BUFFER	3Ch	O	SPC-3
RECEIVE DIAGNOSTIC RESULTS [c]	1Ch	M	SPC-3
~~REDUNDANCY GROUP IN~~	~~BAh~~	~~X [e]~~	~~SCC-2~~
~~REDUNDANCY GROUP OUT~~	~~BBh~~	~~X [e]~~	~~SCC-2~~
REPORT ALIASES	A3h/0Bh	O	SPC-3
REPORT DEVICE IDENTIFIER	A3h/05h	O	SPC-3
REPORT LUNS	A0h	M	SPC-3
REPORT PRIORITY	A3h/0Eh	O	SPC-3
REPORT SUPPORTED OPERATION CODES	A3h/0Ch	O	SPC-3
REPORT SUPPORTED TASK MANAGEMENT FUNCTIONS	A3h/0Dh	O	SPC-3
REPORT TARGET PORT GROUPS	A3h/0Ah	O	SPC-3
REPORT TIMESTAMP	A3h/0Fh	O	SPC-3
REQUEST SENSE	03h	M	SPC-3
SEND DIAGNOSTIC [d]	1Dh	M	SPC-3
SET DEVICE IDENTIFIER	A4h/06h	O	SPC-3
SET PRIORITY	A4h/0Eh	O	SPC-3
SET TARGET PORT GROUPS	A4h/0Ah	O	SPC-3
SET TIMESTAMP	A4h/0Fh	O	SPC-3
~~SPARE IN~~	~~BCh~~	~~X [e]~~	~~SCC-2~~
~~SPARE OUT~~	~~BDh~~	~~X [e]~~	~~SCC-2~~

Table 4 — Commands for enclosure services peripheral devices (part 2 of 2)

Command name	Operation code [a]	Type [b]	Reference
TEST UNIT READY	00h	M	SPC-3
~~VOLUME SET IN~~	~~BEh~~	~~X [e]~~	~~SCC-2~~
~~VOLUME SET OUT~~	~~BFh~~	~~X [e]~~	~~SCC-2~~
WRITE BUFFER	3Bh	O	SPC-3
The following operation codes are obsolete: 16h (RESERVE (6)), 17h (RELEASE (6)), 56h (RESERVE (10)), 57h (RELEASE (10)) All operation codes for enclosure services type peripheral devices not specified in this table are reserved for future standardization.			

[a] Some commands are defined by a combination of operation code and service action. The operation code value is shown preceding the slash and the service action value is shown after the slash.

[b] M = command implementation is mandatory. O = command implementation is optional. ~~X = Command implementation requirements detailed in the reference.~~

[c] Enclosure services status-type diagnostic pages are transferred by the RECEIVE DIAGNOSTIC RESULTS command using the PF bit set to one.

[d] Enclosure services control-type diagnostic pages are transferred by the SEND DIAGNOSTIC command. Device servers are only required to accept a single diagnostic page in each command.

[e] ~~If the SCCS bit is set to one in the standard INQUIRY data (see SPC-3), these commands shall be supported as required by SCC-2. If the SCCS bit is set to zero, these commands shall not be supported.~~

[f] ~~If the MCHGR bit is set to one in the standard INQUIRY data (see SPC-3), these commands shall be supported as required by SMC-2. If the MCHGR bit is set to zero, these commands shall not be supported.~~

[g] In the standard INQUIRY data (see SPC-3), the SCCS bit shall be set to zero and the MCHNGR bit shall be set to zero.

All the commands are described in the referenced standards. The diagnostic pages accessed by the SEND DIAGNOSTIC command and the RECEIVE DIAGNOSTIC RESULTS command are defined in 6.1. The elements accessed by some of the diagnostic pages are defined in clause 7. The format for the mode parameters and mode page accessed by the MODE SELECT commands and the MODE SENSE commands are defined in 6.3.

Suggested changes to SMC-3

The commands for independent media changers shall be as shown in table 3.

Table 3 — Commands for independent media changers (part 1 of 2)

Command name	Operation code [a]	Type [b]	Reference
[only showing changed rows]			
INQUIRY [d]	12h	M	SPC-3
RECEIVE DIAGNOSTIC RESULTS	1Ch	O/M [c]	SPC-3
REPORT LUNS	A0h	~~O~~ M	SPC-3
REPORT PRIORITY	A3h/0Eh	O	SPC-3

Table 3 — Commands for independent media changers (part 2 of 2)

Command name	Operation code [a]	Type [b]	Reference
REPORT TIMESTAMP	A3h/0Fh	O	SPC-3
SEND DIAGNOSTIC [no change to this row]	1Dh	M	SPC-3
SET PRIORITY	A4h/0Eh	O	SPC-3
SET TIMESTAMP	A4h/0Fh	O	SPC-3
All operation codes for media changer type peripheral devices not specified in this table are reserved for future standardization. ~~Key~~ ~~M = command implementation is mandatory.~~ ~~O = command implementation is optional.~~			
[a] This command is defined by a combination of operation code and service action. The operation code value is shown preceding the slash and the service action value is shown after the slash. [b] M = command implementation is mandatory. O = command implementation is optional. [c] This command shall be supported if the ENCSERV bit is set to one in the standard INQUIRY data (see SPC-3) and may be supported otherwise. [d] In the standard INQUIRY data (see SPC-3), the SCCS bit shall be set to zero.			