To: T10 Technical Committee
From: Rob Elliott, HP (elliott@hp.com)
Date: 27 February 2004
Subject: 04-074r0 SPC-3 SES-2 Supported SES Diagnostic Pages

Revision history
Revision 0 (27 February 2004) First revision

Related documents
spc3r17 - SCSI Primary Commands - 3 revision 17
ses2r05 - SCSI Enclosure Services - 2 revision 6
sff-8067 - 40-pin SCA-2 Connector w/Bidirectional ESI revision 3.2 (28 January 2004) (available from http://www.sffcommittee.org)
02-189r1 SPC-3 SES-2 Vendor specific diagnostic pages (Rob Elliott, HP) incorporated into spc3r09. This added sixteen SES-related vendor-specific page codes (10h - 1Fh) to SPC-3 and SES-2, using page codes that were formerly reserved for all device types in SPC-2 and SES-1.
04-010 SPC-3 SES-2 More diagnostic pages (Rob Elliott, HP)

Overview
SCSI targets implementing ESI are required to return every page code in the passthrough range in the Supported Diagnostic Pages diagnostic page (00h). There is no way in ESI for the drive to query that information from the enclosure services process.

This range

a) was 01h through 0Fh in SES-1;
b) is currently 01h through 1Fh in SES-2; and
c) is proposed by 04-010 to grow to 01h through 2Fh.

A new diagnostic page is proposed to let the enclosure services process indicate specifically which pages it implements. The disk drive just forwards this page over ESI like any other SES page. The new page only reports those in the range of 01h through 2Fh. Page 00h continues to report:

a) all supported page codes outside that range (i.e., 00h and pages supported in the range of 30h through FFh), plus
b) all page codes from 01h through 2Fh (whether supported or not).

Suggested changes to SPC-3

7.1 Diagnostic parameters

7.1.2 Supported diagnostic pages

The Supported Diagnostic Pages diagnostic page (see table 172) returns the list of diagnostic pages implemented by the device server. This diagnostic page shall be implemented if the device server implements the diagnostic page format option of the SEND DIAGNOSTIC and RECEIVE DIAGNOSTIC RESULTS commands.

Table 1 — Supported diagnostic pages

Byte\Bit	7	6	5	4	3	2	1	0
0	PAGE CODE (00h)							
1	Reserved							
2	(MSB)			PAGE LENGTH (n - 3)				
3								(LSB)
4				SUPPORTED PAGE LIST				
n								

The definition of this diagnostic page for the SEND DIAGNOSTIC command includes only the first four bytes. If the PAGE LENGTH field is not zero, the device server shall terminate the SEND DIAGNOSTIC command with CHECK CONDITION status. The sense key shall be set to ILLEGAL REQUEST with an additional sense code of INVALID FIELD IN PARAMETER LIST. This diagnostic page instructs the device server to make available the list of all supported diagnostic pages to be returned by a subsequent RECEIVE DIAGNOSTIC RESULTS command.

The definition of this diagnostic page for the RECEIVE DIAGNOSTIC RESULTS command includes the list of diagnostic pages supported by the device server.

The PAGE LENGTH field specifies the length in bytes of the following supported page list.

The SUPPORTED PAGE LIST field shall contain a list of all diagnostic page codes, one per byte, implemented by the device server in ascending order beginning with page code 00h.

Annex C Numeric order codes

Add to the diagnostic page code list (proposed by 04-010).

Table 2 — Diagnostic page codes

Page Code	Diagnostic Page Name	Device types
0Dh	Supported SES Diagnostic Pages	E - Enclosure Services Device

Suggested changes to SES-2

6 Parameters for enclosure services devices

6.1 Diagnostic parameters

6.1.1 Diagnostic parameters overview

This clause describes the diagnostic page structure and the diagnostic pages that are applicable to enclosure services devices and other device types that provide communications access to an enclosure services process. Each diagnostic page provides either control (outbound) or status (inbound) data transmission to or from the enclosure process.

The diagnostic page format is specified in SPC-3. All diagnostic pages have the diagnostic page header defined in SPC-3, including the PAGE CODE and PAGE LENGTH fields.

The PAGE CODE field identifies the diagnostic page being sent or requested. The page codes are defined in table 18.

Table 3 — Diagnostic page codes for enclosure service devices

Page code	Description	Control or status	Reference
00h	Supported Diagnostic Pages	Status	SPC-3
01h	Configuration diagnostic page	Status	6.1.2
02h	Enclosure Control diagnostic page	Control	6.1.3
	Enclosure Status diagnostic page	Status	6.1.4
03h	Help Text diagnostic page	Status	6.1.2
04h	String Out diagnostic page	Control	6.1.3
	String In diagnostic page	Status	6.1.4
05h	Threshold Out diagnostic page	Control	6.1.8
	Threshold In diagnostic page	Status	6.1.9
06h	Obsolete	N/A	
07h	Element Descriptor diagnostic page	Status	6.1.10
08h	Short Enclosure Status diagnostic page	Status	6.1.11
09h	Enclosure Busy diagnostic page	Status	6.1.12
0Ah	Device Element Status diagnostic page	Status	6.1.13
0Bh	Sub-enclosure Help Text diagnostic page	Status	6.1.2
0Ch	Sub-enclosure String Out diagnostic page	Control	6.1.3
	Sub-enclosure String In diagnostic page	Status	6.1.4
0Dh	Supported SES Diagnostic Pages diagnostic page	Status	6.1.x
~~0Dh~~ 0Eh-0Fh	Reserved for this standard	N/A	6.1
10h-1Fh	Vendor-specific SES diagnostic pages	N/A	6.1
20h-2Fh	Reserved for this standard	N/A	6.1
30h-3Fh	Reserved for all device types	N/A	SPC-3
40h-7Fh	See specific device type for definition; reserved for the SES device type	N/A	SPC-3
80h-FFh	Vendor-specific pages	N/A	SPC-3

6.1.xx Supported SES Diagnostic Pages diagnostic page

The Supported SES Diagnostic Pages diagnostic subpage returns the list of diagnostic pages in the range of 01h to 2Fh implemented by the enclosure services process.

The Supported SES Diagnostic Pages diagnostic page is read by the RECEIVE DIAGNOSTIC RESULTS command. If a PAGE CODE field set to 0Dh is transmitted using a SEND DIAGNOSTIC command, the command shall be treated as having an invalid field error (see 4.5).

Table 4 describes the Supported SES Diagnostic Pages diagnostic page.

Table 4 — Supported SES Diagnostic Pages diagnostic page

Byte\Bit	7	6	5	4	3	2	1	0
0	PAGE CODE (0Dh)							
1	Reserved							
2	(MSB)			PAGE LENGTH (n - 3)				
3								(LSB)
4				SUPPORTED SES PAGE LIST				
m								
m + 1				PAD (if needed)				
n								

The PAGE LENGTH field indicates the length in bytes of the rest of the diagnostic page.

The SUPPORTED SES PAGE LIST field contains a list of all diagnostic page codes, one per byte, in the range of 01h to 2Fh that are implemented by the enclosure services process. It shall be sorted in ascending order beginning with page code 01h. The Supported SES Diagnostic Pages page code (i.e., 0Dh) shall be included in the list.

The PAD field contains zero, one, two, or three bytes set to 00h such that the total length of the diagnostic page is a multiple of four.

Editor's Note 1: The 2Fh value assumes that 04-010 is adopted. Without that, the current maximum is 1Fh.
