

To: T10 Technical Committee  
 From: Rob Elliott, HP (elliott@hp.com)  
 Date: 11 May 2006  
 Subject: 05-011r2 SES-2 Display element enhancements

**Revision history**

Revision 0 (7 December 2004) First revision

Revision 1 (27 March 2006) Incorporated comments from January 2005 CAP WG. Removed Language element updates already incorporated into SES-2. Kept the approach of just supporting one character per Display element rather than tackle modifications to the Subenclosure String In/Out diagnostic pages to send longer strings to selected elements (which is more complicated than anyone is currently requiring).

Revision 2 (11 May 2006) Incorporated comments from May 2006 CAP WG - made the order of the Display elements a "shall" rule.

**Related documents**

ses2r14 - SCSI Enclosure Services - 2 (SES-2) revision 14

**Overview**

SES-2 defines a Display element that may be used to represent any kind of display (LCD, seven-segment LEDs, etc.), but what is displayed is vendor-specific - there are no standard fields specifying what to display in the element or elsewhere. The String Out command may be used to request that a string be displayed, but the interpretation is completely vendor-specific.

This proposal lets the Display element manage the content of what is being displayed. The proposed mechanism requires there be one Display element for each displayable character (e.g., a two character LED must be represented with two Display elements; a 32-character LCD must be represented with 32 Display elements). It is thus more usable for smaller displays like LEDs than for larger displays like LCDs. (A new mechanism optimized for LCDs could be defined in the future)

**Suggested changes**

**7.3.14 Display element**

The Display element ~~manages a visible display (e.g., seven-segment LED)~~ represents a part of a display device or a whole display device in the enclosure (e.g., an LCD panel or a seven-segment LED). For Display elements that support the DISPLAY CHARACTER field, if more than one Display elements share the same type descriptor header in the Configuration diagnostic page (see 6.1.2), the order of the Display elements shall match the order for displaying a string of characters in the appropriate language (e.g., to display "45" on two LEDs each represented by a Display element, the first Display element displays '4' and the second Display element displays '5').

The format of the control field for a Display element is define in table 1.

**Table 1 — Display element for control-type diagnostic pages**

Byte\Bit	7	6	5	4	3	2	1	0
0	COMMON CONTROL							
1	RQST IDENT	Reserved					DISPLAY MODE	
2	Reserved							
3	DISPLAY CHARACTER							

The COMMON CONTROL field is specified in 7.2.2.

The RQST IDENT (request identify) bit is set to request that the element be identified by a visual indication. When the RQST IDENT bit is set to zero, the visual indication is not present.

The DISPLAY MODE field is defined in table 2.

**Table 2 — DISPLAY MODE field**

Code	Description
<a href="#">00b</a>	<a href="#">No change to the display.</a>
<a href="#">01b</a>	<a href="#">Allow the enclosure services process to control the display and ignore the DISPLAY CHARACTER field.</a>
<a href="#">10b</a>	<a href="#">Display the character specified in the DISPLAY CHARACTER field.</a>
<a href="#">11b</a>	<a href="#">Reserved</a>

The DISPLAY CHARACTER field specifies the character to display. If a Language element is available, the DISPLAY CHARACTER field shall contain a character using the language and character set indicated by the Language element. If a Language element is not available, the first byte of the DISPLAY CHARACTER field (i.e., byte 2 of the Display element) contains a US-ASCII character encoded in 8 bits per ISO/IEC 8859-1 and the device server shall ignore the second byte (i.e., byte 3 of the Display element).

The format of the status field for a Display element is defined in table 3.

**Table 3 — Display element for status-type diagnostic pages**

Byte\Bit	7	6	5	4	3	2	1	0
0	COMMON STATUS							
1	IDENT	Reserved					<a href="#">DISPLAY MODE STATUS</a>	
2	<b>Reserved</b>							
3	<a href="#">DISPLAY CHARACTER STATUS</a>							

The COMMON STATUS field is specified in 7.2.3.

The IDENT (identify) bit is set to one to indicate that the RQST IDENT control bit has been set and that the element is providing a visual indication of its location. The IDENT bit is set to zero when the RQST IDENT control bit is set to zero or not implemented.

The DISPLAY MODE STATUS field is defined in table 4.

**Table 4 — DISPLAY MODE STATUS field**

Code	Description
<a href="#">00b</a>	<a href="#">The enclosure services process is controlling the display; Display element control is not supported.</a>
<a href="#">01b</a>	<a href="#">The enclosure services process is controlling the display; Display element control is supported.</a>
<a href="#">10b</a>	<a href="#">The display is being controlled based on the Display element.</a>
<a href="#">11b</a>	<a href="#">Reserved</a>

If the DISPLAY MODE STATUS field is set to 01b or 10b and a Language element is available, the DISPLAY CHARACTER STATUS field indicates the character currently being displayed in the language and character set indicated by the Language element. If the DISPLAY MODE STATUS field is set to 01b or 10b and a Language element is not available, the first byte of the DISPLAY CHARACTER STATUS field (i.e., byte 2 of the Display element) indicates the US-ASCII character encoded in 8 bits per ISO/IEC 8859-1 and the second byte (i.e.,

byte 3 of the Display element) is reserved. If the DISPLAY MODE STATUS field is set to 00b or 11b, the DISPLAY CHARACTER STATUS field is reserved.