To: T10 Technical Committee
From: Rob Elliott, HP (elliott@hp.com)
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Subject: 05-011r0 SES-2 Display element enhancements

Revision history
Revision 0 (7 December 2004) First revision

Related documents
ses2r09 - SCSI Enclosure Services - 2 revision 9

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. There is one Display element for each displayable character (e.g., a two character LED would be represented with two Display elements; a 32-character LCD with 32 Display elements).

Suggested changes

2.2 Approved references

At the time of publication, the following referenced standards were approved.

ISO 639-1:2002, *Codes for the representation of names of languages - Part 1: Alpha-2 code*

ISO/IEC 8859-1:1998, *Information processing—8-bit single-byte coded graphic character sets - Part 1: Latin alphabet No. 1*

ISO/IEC 10646-1:2000, *Universal Multiple-Octet Coded Character Set (UCS) - Part 1: Architecture and Basic Multilingual Plane (BMP)*

IEC 60027-2:2000, *Letter symbols to be used in electrical technology - Part 2: Telecommunications and electronics*

0.0.1 Display element

The Display element 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 is assumed to 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~~						
~~2~~	~~Reserved~~							
~~3~~	~~Reserved~~							
1	RQST IDENT	Reserved					DISPLAY MODE	
2	DISPLAY CHARACTER							
3								

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
0h	No change to the display.
1h	Allow the enclosure services process to control the display.
2h	Display the character specified in the DISPLAY CHARACTER field.
3h	Reserved

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 8859-1and 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~~						
~~2~~	~~Reserved~~							
~~3~~	~~Reserved~~							
1	IDENT	Reserved					DISPLAY MODE STATUS	
2	DISPLAY CHARACTER STATUS							
3								

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
0h	The enclosure services process is controlling the display; Display element control is not supported.
1h	The enclosure services process is controlling the display; Display element control may be requested.
2h	The display is being controlled based on the Display element.
3h	Reserved

If the DISPLAY MODE STATUS field is set to 1h or 2h, the DISPLAY CHARACTER field indicates the character currently being displayed in the language and character set indicated by the Language element. Otherwise, the DISPLAY CHARACTER field is reserved.

0.0.2 Language element

The format of the control field for a Language element is defined in table 5.

Table 5 — Language element for control type diagnostic pages

Byte\Bit	7	6	5	4	3	2	1	0
0	COMMON CONTROL							
1	RQST IDENT	Reserved						
2	(MSB)	LANGUAGE CODE						
3								(LSB)

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 LANGUAGE CODE field requests the language and character encoding to be used in all fields that specify the capability of being modified by the Language element. The enclosure should provide external indications in the requested language. The LANGUAGE CODE field shall contain either 0000h or the two-letter lowercase symbols defined by ISO 639-1 to indicate which language is requested (e.g., “en” for English, “fr” for French, “de” for German, “ja” for Japanese). The two-letter codes shall be expressed as US-ASCII characters as defined by ISO/IEC 8859-1 (i.e., encoded as 8-bit characters with the MSB set to zero). If the LANGUAGE CODE field has a value of 0000h, the language shall be the default of English, using the US-ASCII character set encoded as defined by ISO/IEC 8859-1 (i.e., encoded as 8-bit characters with each MSB set to zero). If the two characters contain the ISO 639-1 two-letter code for a language that is supported by the enclosure services process, the ~~glyphs transmitted by the~~ enclosure services process shall ~~be encoded using the Unicode standard, UCS-2 canonical form~~ use UCS-2 as defined by ISO 10646-1 (i.e., encoded as 16-bit characters). If the LANGUAGE CODE field contains a value other than 0000h or the two-letter code of a language supported by the enclosure services process, the enclosure services process shall use the default language of English with the US-ASCII character set encoded as defined by ISO/IEC 8859-1 (i.e., encoded as 8-bit

characters with each MSB set to zero) ~~shall be used~~ and shall report an invalid field error ~~shall be reported~~ (see 4.5).

The format of the status field for a Language element is defined in table 6.

Table 6 — Language element for status type diagnostic pages

Byte\Bit	7	6	5	4	3	2	1	0
0	COMMON STATUS							
1	IDENT	Reserved						
2	(MSB)	LANGUAGE CODE						
3								(LSB)

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 value in the LANGUAGE CODE field indicates the language and character set ~~encoding~~ that the enclosure services process uses for those fields that have the capability of being modified by the Language element. The LANGUAGE CODE field shall contain either 0000h or the two-letter lowercase symbol defined by ISO 639-1 for the language used by the enclosure services process (e.g., “en” for English, “fr” for French, “de” for German, “ja” for Japanese). The two-letter code shall be expressed as US-ASCII characters as defined by ISO/IEC 8859-1 (i.e., encoded as 8-bit characters with the MSB set to zero). ~~If the LANGUAGE CODE field has a value of 0000h, the enclosure services process indicates that it uses the default of English, using the US-ASCII character set . If the two characters contain an ISO 639-1 two-letter code, the glyphs transmitted by the enclosure services process are encoded using the Unicode standard, UCS-2 canonical form~~ . A LANGUAGE CODE field set to 0000h indicates the enclosure services process is using the default language of English and the US-ASCII character set encoded as defined by ISO/IEC 8859-1 (i.e., encoded as 8-bit characters with each MSB set to zero). A LANGUAGE CODE field set to an ISO 639-1 two-letter code indicates the enclosure services process is using the indicated language and is using UCS-2 as defined by ISO/IEC 10646-1 (i.e., encoded as 16-bit characters).