TO: T10 Membership, SMC-3 Working Group
FROM: Rod Wideman, Quantum; rod.wideman@quantum.com
DATE: October 31st, 2006
SUBJECT: SMC-3 New Additional Sense Codes for Media Changers (document T10/06-110r0)

1 Revision History

Rev0 – Initial draft.

2 Related Documents

SMC-3 Revision 4

3 Introduction

This document proposes several new additional sense code and additional sense code qualifiers defined for use within SMC-3. Both the sense code description and usage within SMC-3 are presented. Once agreement is reached within the SMC-3 working group for this proposal, a corresponding proposal for the ASC/ASCQs alone will be compiled for inclusion in SPC-4.

4 Discussion

Various proposals for SMC-3 (e.g., T10/05-243) have necessitated creation of ASC/ASCQs that do not currently exist within SPC-4. Other ASC/ASCQs are proposed as a result of reviewing current vendor specific ASC/ASCQs in use within the industry (see T10/06-109). This proposal attempts to consolidate new ASC/ASCQs created for SMC-3 and ensure that a description of their usage is also provided. New ASC/ASCQs that already have usage descriptions in their originating proposals will only be referenced in this proposal for convenience.

5 Consolidated Reference

Table 1 contains all proposed new ASC/ASCQs for use within SMC-3.

Table 1 Proposed ASC/ASCQs

ASC	ASCQ	Description	Reference
28h	03h	IMPORT/EXPORT ELEMENT ACCESSED, MEDIUM CHANGED	T10/05-315r3, item 3.2.6
3Bh	18h	ELEMENT DISABLED	T10/05-243r4
3Bh	19h	ELEMENT ENABLED	<this proposal>
3Bh	1Ah	DATA TRANSFER DEVICE REMOVED	T10/05-315r3, item 3.2.7
3Bh	1Bh	DATA TRANSFER DEVICE INSERTED	T10/05-315r3, item 3.2.7
55h	09h	DATA CURRENTLY UNAVAILABLE	T10/05-243r4

Notes
The proposed ASC/ASCQ values were based on similarities to existing ASC/ASCQs where possible (the ASCQ values may change to the next available if other ASCQs appear in SPC-4 before this is submitted).

In considering T10/05-315 item 3.2.6, it should be noted that there already is 28h/01h IMPORT OR EXPORT ELEMENT ACCESSED. Since the request was for an application client to detect when opening and closing an I/E element door has resulted in a change in the medium inventory, presumably the existing 28h/01h was deemed inadequate to cover this case (i.e., the request appears to be for an explicit indication that accessing an I/E element has changed the inventory). Do we want to consider a more generic ASC/ASCQ that only indicates medium inventory changed? (I opted not to).

ELEMENT ENABLED ASC/ASCQ was created to balance the ELEMENT DISABLED ASC/ASCQ, even though the referenced proposal did not include it originally.

6 Proposed Changes to SMC-3

These are proposed changes to SMC-3 for new ASC/ASCQs whose usage (i.e., under what conditions the ASC/ASCQ is to be returned) is not already defined in other proposals. Proposed changes are in blue text.

6.1 Changes to 5.2.4 Import/export element

Add the following paragraph as the last paragraph to this sub-clause:

If the device server detects that a volume has been inserted into or withdrawn from an import/export element by an operator, then the device server shall establish a unit attention condition for the initiator port associated with every I_T nexus and the additional sense code shall be set to IMPORT/EXPORT ELEMENT ACCESSED, MEDIUM CHANGED. The device server may establish a single unit attention condition for the initiator port associated with every I_T nexus when more than one volume has been inserted or withdrawn at the same time (e.g., upon closure of a structure containing multiple import/export elements).

[Note: Do we want to specify that the element address of the import/export element be included in the INFORMATION *field of the sense data? We could specify a starting address and number of elements within the four available bytes.]*

6.2 New sub-clause 5.2.7 Disabling/enabling elements

Add the following new sub-clause:

5.2.7   Disabling/enabling elements

Elements within a media changer may be disabled at various times (e.g., when a magazine has been removed or when an element has been logically disabled for servicing) and later enabled (e.g., when a magazine has been inserted or servicing of an element completes). The element disabled (ED) bit indicates that an element is either disabled or enabled (see 6.10.4).

When an element has been disabled, the device server shall establish a unit attention condition for the initiator port associated with every I_T nexus and the additional sense code shall be set to ELEMENT DISABLED. When an element has been enabled, the device server shall establish a unit attention condition for the initiator port associated with every I_T nexus and the additional sense code shall be set to ELEMENT ENABLED.

The device server may establish a single unit attention condition for the initiator port associated with every I_T nexus when more than one element has been disabled or enabled at the same time.

[Note: Do we want to specify that the element address of the element be included in the INFORMATION *field of the sense data? We could specify a starting address and number of elements within the four available bytes.]*

6.3 Changes to 5.2.5 Data transfer element

Add the following paragraphs at the end of this sub-clause:

Data transfer devices may be removed from, replaced within, or added to the media changer at various times (e.g., when servicing a drive). These actions may affect the status of the data transfer element that interfaces with the data transfer device. Various unit attention conditions are established by the device server to notify application clients of these actions.

If replacement of a data transfer device does not change the values returned in the Element Address Assignment mode page (see 7.3.4), the device server should:

1) Disable the data transfer element (see 5.2.7) that interfaces with the data transfer device prior to removal of the data transfer device;
2) Establish a unit attention condition for the initiator port associated with every I_T nexus with the additional sense code set to DATA TRANSFER DEVICE REMOVED upon removal of the data transfer device;
3) Establish a unit attention condition for the initiator port associated with every I_T nexus with the additional sense code set to DATA TRANSFER DEVICE INSERTED upon insertion of the replacement data transfer device; and
4) Enable the data transfer element (see 5.2.7) that interfaces with the data transfer device when the data transfer device is able to be returned to operation.

If removal of a data transfer device changes the values returned in the Element Address Assignment mode page (e.g., reduces the total number of data transfer elements), the device server should:

1) Disable the data transfer element that interfaces with the data transfer device prior to removal of the data transfer device;
2) Establish a unit attention condition for the initiator port associated with every I_T nexus with the additional sense code set to DATA TRANSFER DEVICE REMOVED upon removal of the data transfer device; and
3) Establish a unit attention condition for the initiator port associated with every I_T nexus with the additional sense code set to MODE PARAMETERS CHANGED after updating the Element Address Assignment mode page.

If insertion of a data transfer device changes the values returned in the Element Address Assignment mode page (e.g., increases the total number of data transfer elements), the device server should:

1) Establish a unit attention condition for the initiator port associated with every I_T nexus with the additional sense code set to DATA TRANSFER DEVICE INSERTED upon insertion of the data transfer device; and
2) Establish a unit attention condition for the initiator port associated with every I_T nexus with the additional sense code set to MODE PARAMETERS CHANGED after updating the Element Address Assignment mode page.

[Note: For each instance of DATA TRANSFER DEVICE REMOVED/INSERTED, do we want to specify that the element address of the element be included in the INFORMATION *field of the sense data?]*