T10/05-078r2 SMC-3 Extended device capabilities proposal

To: T10 Technical Committee
From: Noud Snelder, BDT (noud.snelder@bdt.de)
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Subject: T10/05-078r2 SMC-3 Extended device capabilities proposal

Revision History
Revision 0 (22 February 2005): initial revision
Revision 1 (1 May 2005): updated revision (not posted on T10 website)
Revision 2 (20 May 2005): incorporated changes as discussed in May T10 SMC-3 WG

Related Documents
SMC-3 r0 - SCSI Media Changer Commands – 3, revision 0

Overview
Media changer driver developers are currently keying from the media changer Product ID in order to set some of the media changer properties. Until now there is no other method to retrieve certain properties from the media changer itself. This proposal will add the missing static properties into a sub page of the Device Capabilities mode sense page.

Suggested Changes to SMC-3
Change Table 31 - Mode page codes:
- Add Subpage code column
- Add line: 1Fh, 01h, Extended Device Capabilities, 7.3.3

Page code	Subpage code	Mode page codes	Reference
00h	Not applicable	Vendor-specific (does not require page format)	
01h	00h - FEh	Reserved	
02h	00h	Disconnect-Reconnect	SPC-3
03h - 09h	00h – FEh	Reserved	
0Ah	00h	Control	SPC-3
0Ah	01h	Control Extention	SPC-3
0Bh - 17h	00h – FEh	Reserved	
18h	00h	Protocol Specific LUN	SPC-3
19h	00h	Protocol Specific Port	SPC-3
1Ah	00h	Power Condition	SPC-3
1Bh	00h – FEh	Reserved	
1Ch	00h	Informational Exceptions Control	SPC-3
1Dh	00h	Element Address Assignment	7.3.4
1Eh	00h	Transport Geometry Parameters	7.3.5
1Fh	00h	Device Capabilities	7.3.2
1Fh	01h	Extended Device Capabilities	7.3.3
20h – 3Eh	00h – FEh	Vendor-specific (page format required)	
3Fh	00h	Return all pages (valid only for the MODE SENSE command)	SPC-3
3Fh	FFh	Return all pages and subpages (valid only for the MODE SENSE command)	SPC-3
00h – 3Eh	FFh	Return all subpages (valid only for the MODE SENSE command)	SPC-3

All page code and subpage code combinations not shown in this table are reserved.

Add the following chapter:

7.3.3 Extended Device Capabilities mode page

The Extended Device Capabilities mode page (see table XX) defines characteristics of the media changer. Independent media changers shall return this page. Attached media changers shall not return this page. This information may be employed by the application client to determine capabilities performed by the media changer.

Table XX – Extended Device Capabilities mode page

Bit / Byte	7	6	5	4	3	2	1	0
0	PS (0)	SPF (1)	Page Code (1Fh)					
1	Subpage Code (01h)							
2	(MSB)	Page Length (10h)						
3								(LSB)
4	Reserved	MV_RTR	MV_EXT	USR_CL	USR_OP	CL_IEP	OP_IEP	IEP_ST
5	Reserved		DRV_EDA	R_ORG_A	MV_TRY	CMGZ	Reserved	NV_STAT
6	Reserved				CL_HID	CL_RTN	CL_ACC	CL_OPS
7	Reserved				TR_EXC	~~EXC_CP~~	~~INIT_WR~~	~~PTE_CP~~
8	Reserved							
9	Reserved			~~VOL_ID~~	~~VOL_SR~~	~~VOL_AS~~	~~VOL_UN~~	~~VOL_RP~~
10	Reserved							
11	Reserved					LCK_KP	LCK_IE	LCK_D
12	Reserved							
13	Reserved				DIS_RQ	MT_RQ	PPOS_DR	PPOS_SL
14-19	Reserved							

The parameters savable (PS) bit is only used with the MODE SENSE command. This bit is reserved with the MODE SELECT command. A PS bit of one indicates that the device server is capable of saving the page in a nonvolatile vendor specific location. A PS bit set to zero indicates that the device server is not able to save the page.

A SubPage Format (SPF) bit set to one indicates that the subpage mode page format is being used.

An Import/Export Port State (IEP_ST) bit set to one indicates that the media changer is able to detect medium presence in all Import/Export elements. An IEP_ST bit set to zero indicates that the media changer is not able to detect medium presence in all Import/Export elements.

A User Control Import/Export Element Open (USR_OP) bit set to one indicates that the media changer requires the user to manually open a closed Import/Export element. An USR_OP bit set to zero indicates that the media changer requires no user operation to open a closed Import/Export element.

A User Control Import/Export Element Close (USR_CL) bit set to one indicates that the media changer requires the user to manually close an open Import/Export element. An USR_CL bit set to zero indicates that the media changer requires no user operation to close an open Import/Export element.

A Move Extends Import/Export Element (MV_EXT) bit set to one indicates that the media changer will open the Export element for user access whenever a command is issued to move media with an Export element as a destination element address. An MV_EXT bit set to zero indicates that the Export element remains closed whenever a command is issued with an Export element as destination element address.

A Move Retracts Import/Export Element (MV_RTR) bit set to one indicates that the media changer will close the Import element whenever a command is issued to move media from an Import element. An MV_RTR bit set to zero indicates that the media changer is unable to move media from an open Import element.

A Non Volatile Status (NV_STAT) bit set to one indicates that the media changer element status persists through power on events. An NV_STAT bit set to zero indicates that the medium changer element status does not persists during power on events.

A Cartridge Magazine (CMGZ) bit set to one indicates that the media changer uses cartridge magazines for (some) storage slots. A CMGZ bit set to zero indicates that the media changer does not use cartridge magazines.

A Move Tray (MV_TRY) bit set to one indicates that the media changer uses removable trays in its slots, which require the media to be placed in a tray and the tray moved to the desired position. An MV_TRY bit set to zero indicates that the media changer does not use trays in its slots.

A Return To Original Address (R_ORG_A) bit set to one indicates that the media changer requires the application client to return the volume in the data transfer element to its original source element address. An R_ORG_A bit set to zero indicates that the application client does not need to return the volume from the data transfer element to its original source element address.

A Drive Empty on Door Access (DRV_EDA) bit set to one indicates that the media changer requires all data transfer elements to be empty (dismounted) before access via the door is possible. A DRV_EDA bit set to zero indicates that the media changer may open the door while the data transfer elements contain media.

A True Exchange Capable (TR_EXC) bit set to one indicates that the media changer is able to process an EXCHANGE command that has the second destination element address equal to the source element address. A TR_EXC bit set to zero indicates that the media changer is not able to process an EXCHANGE command that has the second destination element address equal to the source element address.

A Lock Door (LCK_D) bit set to one indicates that the PREVENT ALLOW MEDIA REMOVAL command, with the PREVENT bit set to one, secures the media changer door(s). An LCK_D bit set to zero indicates that the PREVENT ALLOW MEDIA REMOVAL command, with the PREVENT bit set to one, does not secure the media changer door(s).

A Lock Import/Export Element (LCK_IE) bit set to one indicates that the PREVENT ALLOW MEDIA REMOVAL command, with the PREVENT bit set to one, secures the media changer Import/Export element(s). An LCK_IE bit set to zero indicates that the PREVENT ALLOW MEDIA REMOVAL command, with the PREVENT bit set to one, does not lock the Import/Export element(s).

A Lock Keypad (LCK_KP) bit set to one indicates that the PREVENT ALLOW MEDIA REMOVAL command, with the PREVENT bit set to one, prevents input from the media changer operator panel(s). An LCK_KP bit set to zero indicates that PREVENT ALLOW MEDIA REMOVAL command, with the PREVENT bit set to one, does not prevent input from the media changer operator panel(s).

A Pre-Dismount Align to Slot (PPOS_SL) bit set to one indicates that the media changer requires a POSITION TO ELEMENT command to position the medium transport element to the source element address of a MOVE MEDIUM command. A PPOS_SL bit set to zero indicates that the media changer does not require a POSITION TO ELEMENT command to position the medium transport element to the source element address.

An Pre-Dismount align to Drive (PPOS_DR) bit set to one indicates that the media changer requires a POSITION TO ELEMENT command to position the medium transport element to a data transfer element before an unload. An PPOS_DR bit set to zero indicates that the media changer does not require a POSITION TO ELEMENT command to position the medium transport element to a data transfer element before an unload.

A Pre-Mount Eject Required (MT_RQ) bit set to one indicates that the media changer requires the application client to send an explicit command to the data transfer element to extend the drive mechanism before the media changer is able to move media to the data transfer element. (For example, a CD-ROM changer requires the CD tray to be presented before the MOVE MEDIUM operation starts). An MT_RQ bit set to zero indicates that the application client does not need to send an explicit command to the data transfer element before the media changer is able to move media to the data transfer element.

A Pre-Dismount Eject Required (DIS_RQ) bit set to one indicates that the media changer requires the application client to send an explicit command to the data transfer element to unload the media before the media changer is able to move media from the data transfer element to a storage element. A DIS_RQ bit set to zero indicates that the application client does not need to send an explicit command to the data transfer element to unload the media before the media changer is able to move the media from a data transfer element to a slot.

A Cleaning Operations Supported (CL_OPS) bit set to one indicates that the media changer supports host controlled cleaning by means of MOVE MEDIUM commands. A CL_OPS bit set to zero indicates that the media changer does not support host controlled cleaning by means of MOVE MEDIUM commands.

A Cleaning Access Ready (CL_ACC) bit set to one indicates that the media changer shall clear the ACCESS bit of the data transfer element when cleaning medium is loaded and cleaning is in progress. The ACCESS bit is set to one when cleaning is completed. A CL_ACC bit set to zero indicates that the media changer does not clear the ACCESS bit of the data transfer element when cleaning medium is loaded and cleaning is in progress.

A Cleaning Media Return (CL_RTN) bit set to one indicates that when a cleaning media is loaded in the data transfer device via a MOVE MEDIUM command, the media changer shall return the cleaning media to its source element address after completing the cleaning operation. The MOVE MEDIUM command shall return CHECK CONDITION status. The sense key shall be set to ABORTED COMMAND and the additional sense code shall indicate the result of the cleaning operation. A list of possible additional sense codes are defined in table XX+1.

Table XX+1 – Additional sense codes for Commanded Cleaning

ASC	ASCQ	Description
30h	07h	CLEANING FAILURE
30h	0Ah	CLEANING REQUEST REJECTED
30h	0Bh	CLEANING TAPE EXPIRED (new)
30h	0Dh	CLEANING COMPLETED (new)

A CL_RTN bit set to zero indicates that the media changer shall not return the cleaning media to its source element address when a cleaning media is moved via a MOVE MEDIUM command to a data transfer device.

A Cleaning Media Hidden (CL_HID) bit set to one indicates that the media changer supports hidden storage element(s) for cleaning media. These hidden storage element(s) are not reported in the READ ELEMENT STATUS data. A CL_HID bit set to zero indicates that the media changer does not hide storage element(s) for cleaning media in the READ ELEMENT STATUS data.