T10/06-046r6

To	**From**	**Subject**	**Date**
INCITS T10 Committee	Curtis Ballard, HP Michael Banther, HP	Report Supported Volume Types	31 July, 2006

Revision History

Revision 0 – Initial document.

Revision 1 – Changes from Jan 06 T10
   Changed to identifier form for return data

Revision 2 – Changed return data form to more generic descriptor
   Removed "ELEM" bit option since "Report Element Information" command will be used to report individual elements
   Removed support for data transfer device inquiry in favor of "Report DTD Inquiry" proposal 05-243r3
   Added model clause section
   Reduced detail level of returned information to only static details about the medium type

Revision 3 – Incorporated changes from March 27, 06 conference call
   Changed primary medium type to volume type in command name and all other references
   Changed secondary medium type to volume qualifier
   Split defined media types table into two for volume type and qualifier then moved from model clause to command
   Added a definition for "form factor"
   Removed the "SUPPORTED" bit from the CDB and the corresponding UPG bit from the descriptor
   Corrected byte numbering on tape y+1
   Removed "MEDIUM TYPE" and "MAM" from the descriptor.
   Changed ASCII text in descriptor to text based on a "CODE SET"
   Reserved 80h-FFh in Volume Type and Volume Qualifier tables
   Reserved 00h in Volume Type table

Revision 4 – Incorporated changes discussed at May 06 T10
      Changed "providing storage" to "accepting" in overview
      Added reference to section 3.1.13 in overview
      Added paragraph to overview for how to query device server for supported volume types and qualifiers
      Removed extra reserved bits from bytes 4/5 of Volume Type Descriptor
      Corrected byte numbering of Volume Type Descriptor
      Added "field" to label for tables y+3 and y+4
      Added "code" to first row heading for tables y+3 and y+4
      Moved requirement for support of all qualifiers if reporting universal to normative text
      Cleaned up table y+5 and added note referencing table same as similar in SPC-3
      Added definitions for type and qualifier description length fields in table y+2
      Revised definitions for content of volume type/qualifier description fields.
      Moved assignment for types/qualifiers recommendation to normative text
      Revised description of VOLUME TYPE and VOLUME QUALIFIER in 3.5.2
      Revised statement regarding use of command to report supported types in 3.5.2
      Moved tables defining valid values of the type and qualifier into 3.5.2
      Changed to an 8 byte header for the descriptor
      Merged separate descriptions for type and qualifier into a single description for that combination
      Added requirement of universal descriptor for the generic family name.
      Added requirement of null-terminated, null-padded 4 byte multiple for description

Revision 5 – Editorial changes
      Clarified requirement for universal volume qualifier for all supported volume types
      Added should clause for returning all supported qualifiers
      Descriptor name changed back to name used in version 3, Volume Type Descriptor
      Moved length field in table y+4 and corrected byte numbering in same table

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Revision 6 – Incorporated changes from July T10
    New wording requiring definition of volume type and changing "shall" be unique to "should"
    Reviewed all occurrences of volume type and volume qualifier for correct small caps usage
    Moved location of requirement for a single volume type for a form factor
    Corrected "Code" header for table y+1
    Changed return data table format to parameter data modeled off of REPORT LUNS
    Changed remaining "medium" references to "volume"
    Changed soft definition of return data to a requirement for shall return
    Renamed "Universal" qualifier to "All Qualifiers" and updated all references to it.
    Added specific examples of names for all qualifiers
    Updated CODE SET field to match SPC4 instead of SPC3 no content changes just description

Related Documents

smc3r01 – SCSI Media Changer Commands - 3 revision 01

spc3r23 – SCSI Primary Commands -3 revision 23

Background

The Read Element Status command is used by applications to describe the contents of all elements within a media changer device. Information about the element compatibility and type of medium in the elements is not currently captured and media changer vendors have implemented several vendor unique methods for reporting those attributes. Most media changer vendors report media type information using two vendor unique values for medium domain which is the physical shape and medium type which is the particular media generation or variant within that domain.

A new command is proposed that provides a way for media changers to report what values will be used to describe the medium supported by the media changer and report which data transfer devices support that medium type.

In the proposed changes that follow, new text appears in blue or purple, deleted text appears in red strikeout, and editorial comments appear in green.

Proposed Changes to SMC-3

New sub-clause 3.1.13 (others shift down)

3.1.13 form factor: The external physical characteristics of a volume that affect the fit of the volume in any element.

New sub-clause 5.3.2 (others shift down)

5.3.2 Volume types overview

Each element in a media changer is capable of accepting one or more types of volumes. A volume type and volume qualifier combination describes a volume supported by an element.

If the REPORT SUPPORTED VOLUME TYPES command is supported, the device server shall define volume types and volume qualifiers. The volume types should be the same for all volumes that have the same form factor (see 3.1.13). The volume types should not be the same for volumes that have different form factors. The volume type codes are defined in table y.

Table y – Volume type codes

Code	Description
00h	Reserved
01h – 7Fh	Vendor-specific
80h – FFh	Reserved

Comment: Some special volume type values such as universal or unknown may be defined in the future and cause the volume qualifier to be ignored.

The volume qualifier describes additional characteristics of the volume. The volume qualifier codes are defined in table y+1.

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Table y+1 – Volume qualifier codes

Code	Description
00h	All Qualifiers
01h – 7Fh	Vendor-specific
80h – FFh	Reserved

The REPORT VOLUME TYPES SUPPORTED command (see 6.X) allows the application client to retrieve the set of valid volume type and volume qualifier combinations.

Changes to 6.1

Table 3, summary of commands for independent media changers, has the following addition (the entire table is not reproduced here).

Comment: Pending proposals may renumber the command sections so no section number is assumed.

Command	Operation Code	Type	Reference
REPORT VOLUME TYPES SUPPORTED	44h	O	6.x

Changes to 6.3:

Table 5 has the following addition (the entire table is not reproduced here):

REPORT VOLUME TYPES SUPPORTED	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed

New sub-clause 6.x:

6.x   REPORT VOLUME TYPES SUPPORTED command

The REPORT VOLUME TYPES SUPPORTED command (see table y+2) requests that information regarding the supported volume types for the device be sent to the application client.

Table y+2 – REPORT VOLUME TYPES SUPPORTED command

Bit Byte	7	6	5	4	3	2	1	0
0	OPERATION CODE (44h)							
1	Reserved							
2	Reserved							
3	Reserved							
4	Reserved							
5	Reserved							
6	Reserved							
7	(MSB)							
8	ALLOCATION LENGTH							(LSB)
9	CONTROL							

See SPC-3 for the definition of the OPERATION CODE, ALLOCATION LENGTH, and CONTROL fields.

The REPORT VOLUME TYPES SUPPORTED command shall return a list of volume type and volume qualifier combinations that describe volumes supported by the device in the format shown in table y+3.

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Table y+3: REPORT VOLUME TYPES SUPPORTED parameter data format

Bit Byte	7	6	5	4	3	2	1	0
0	(MSB)							
1			DESCRIPTORS LENGTH (n-7)					(LSB)
2				Reserved				
5								
6	(MSB)							
7			DESCRIPTORS COUNT					(LSB)
			Volume type descriptors					
8			First volume type descriptor (see table y+4)					
			:					
			:					
n			Last volume type descriptor (see table y+4)					

The DESCRIPTORS LENGTH field contains the total length in bytes of the descriptors to follow. If the descriptors are truncated because of the allocation length, the DESCRIPTORS LENGTH field shall not be affected.

The DESCRIPTORS COUNT field contains a count of the total number of descriptors to follow. If the descriptors field is truncated because of the allocation length, the DESCRIPTORS COUNT field shall not be affected.

6.x.1 Volume Type Descriptor

Table y+4 defines the Volume Type descriptor.

Table y+4: Volume Type descriptor

Bit Byte	7	6	5	4	3	2	1	0
0	VOLUME TYPE							
1	VOLUME QUALIFIER							
2	Reserved							
3	Reserved				CODE SET			
4				Reserved				
5								
6								
7	VOLUME DESCRIPTION LENGTH (y-8)							
8	VOLUME DESCRIPTION							
y								

Volume Type descriptors shall be returned by ascending VOLUME TYPE field values. Multiple entries may exist for a given VOLUME TYPE field value. For entries that have equal VOLUME TYPE field values the volume type descriptors shall be returned by ascending VOLUME QUALIFIER field values.

For each supported volume type, the device server shall return a volume type descriptor with the VOLUME QUALIFIER field set to All Qualifiers (see table y+1). The volume description field shall contain the name for that volume type (e.g. DAT, 8MM, Magneto-Optical).

The VOLUME TYPE field contains a vendor specified value for a volume type that may be used in the device (see 5.3.2).

The VOLUME QUALIFIER field contains a vendor specified qualifier for a volume type that may be used in the device (see 5.3.2). The device server should return all supported VOLUME QUALIFIER field values.

The CODE SET field (see table y+5) specifies the format of the data in the VOLUME DESCRIPTION field.

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Table y+5 – CODE SET field

Code	Description
0h-1h	Reserved
2h	The VOLUME DESCRIPTION field shall contain ASCII printable characters (i.e., code values 20h through 7Eh)
3h	The VOLUME DESCRIPTION field contains ISO/IEC 10646-1 (UTF-8) codes
4h-Fh	Reserved

COMMENT: The definition of the CODE SET field follows that of the CODE SET field in SPC-4 (see SPC-4 7.6.3.1).

The VOLUME DESCRIPTION LENGTH field contains the total length in bytes of the VOLUME DESCRIPTION field. The DESCRIPTION LENGTH shall be a multiple of four.

The VOLUME DESCRIPTION field shall contain a null-terminated, null-padded vendor specific description in the format specified by the CODE SET field (see SPC-4).