

# memorandum



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T10/06-046r2

**To** INCITS T10 Committee  
**From** Curtis Ballard, HP  
Michael Banther, HP  
**Subject** Report Supported Medium Types

**Date** 24 March 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

## 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**, deleted text appears in **red strikeout**, and editorial comments appear in **green**.

## Proposed Changes to SMC-3

*New sub-clause 5.3.2 (others shift down)*

### 5.3.2 Volume types overview

Each element in a media changer is capable of providing storage for one or more types of volumes. The different types of volumes that can be supported are referred to as medium types. The medium types supported by an element can be described using a two byte code containing a PRIMARY MEDIUM TYPE CODE field and a SECONDARY MEDIUM TYPE CODE field.

The PRIMARY MEDIUM TYPE CODE and the SECONDARY MEDIUM TYPE CODE fields contain vendor defined values (see table y) for the medium type. An application client may use the REPORT MEDIUM TYPES SUPPORTED command to return descriptors which identify how the medium types are assigned.

The PRIMARY MEDIUM TYPE CODE shall be the same for all media with the same external mechanical specifications.

Each medium type in a PRIMARY MEDIUM TYPE CODES family shall be given a different SECONDARY MEDIUM TYPE CODE if there is a difference that affects compatibility with any element in the device server. Different SECONDARY MEDIUM TYPE CODE values may be assigned for other media differences that are detectable by the device server (e.g. cleaning media may have a different secondary medium type).



**Table y – PRIMARY MEDIUM TYPE CODE AND SECONDARY MEDIUM TYPE CODE values**

PRIMARY MEDIUM TYPE CODE	SECONDARY MEDIUM TYPE CODE	Description
00h	00h	Universal medium type
01h – FEh	00h	Primary medium type vendor-specific Secondary medium type universal
01h – FEh	01h – FEh	Vendor-specific
01h – FEh	FFh	Primary medium type vendor-specific; Secondary medium type unknown
FFh	FFh	Unknown medium type

Changes to 6.1

Table 3, summary of commands for independent media changes, 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 MEDIUM TYPES SUPPORTED	44h	○	6.x

Changes to 6.3:

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

REPORT MEDIUM TYPES SUPPORTED	Allowed	Allowed	Allowed	Allowed	Allowed	Allowed
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New sub-clause 6.x:

**6.x REPORT MEDIUM TYPES SUPPORTED command**

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

**Table y – REPORT MEDIUM TYPES SUPPORTED command**

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

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

A SUPPORTED bit set to one specifies that the device server shall return medium type supported descriptors for all medium types supported by the device even if the current hardware configuration of the device does not support all of these medium types. The device shall support all reported values with field installable hardware changes. A SUPPORTED bit set to zero specifies the device server shall return medium type supported descriptors for medium types supported by the current hardware configuration. If the SUPPORTED bit is set to one and the logical unit is not able to determine the supported medium types (e.g. during power on when the medium changer has not yet determined what data transfer device types are installed), the device server shall return CHECK CONDITION status and shall set the sense key to NOT READY.

The REPORT MEDIUM TYPES SUPPORTED command returns a medium types supported header (see table y+1) followed by one of more medium type descriptors (see table y+2).

**Table y+1: Medium types supported header**

Bit	7	6	5	4	3	2	1	0	
Byte									
(1 Byte)	DESCRIPTORS COUNT								
(1 Byte)	Reserved								
(1 Byte)	(MSB)	DESCRIPTORS LENGTH						(LSB)	
(1 Byte)									
(x Bytes)	DESCRIPTORS								

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.

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.

**6.x.1 Medium Type Descriptor**

Table y+2 defines the medium type descriptor.

**Table y+2: Medium Types Descriptor**

Bit	7	6	5	4	3	2	1	0
Byte								
0	PRIMARY MEDIUM TYPE CODE							
1	SECONDARY MEDIUM TYPE CODE							
2	Reserved			UPG	MAM	MEDIUM TYPE		
3	Reserved							
4	Primary Medium Type Description							
17								
18	Secondary Medium Type Description							
31								

The PRIMARY MEDIUM TYPE CODE and SECONDARY MEDIUM TYPE code fields are defined in section 5.3.2. The REPORT MEDIUM TYPES SUPPORTED command shall not return descriptors for unknown medium types. Universal medium types may be reported (e.g. Ultrium universal cleaning medium will have a universal secondary medium type).

An Upgrade (UPG) bit set to zero specifies that the device server supports this medium type with the current hardware configuration. An UPG bit set to one specifies that a hardware upgrade is required to support the specified medium type. A device server shall implement support for the UPG bit set to one if the device server implements support for the SUPPORTED bit set to one in the CDB.

A MAM bit set to zero specifies that the medium type does not support Medium Auxiliary Memory (MAM, see SPC-3) when used with any supported data transfer devices. A MAM bit set to one specifies that this medium type supports MAM when used with at least one supported data transfer device type.

The MEDIUM TYPE field specifies the type of medium for this combination of PRIMARY MEDIUM TYPE CODE and SECONDARY MEDIUM TYPE CODE values. Table 17 describes the values for the MEDIUM TYPE field.

The Primary Medium Type Description field shall contain 14 characters of ASCII text with a vendor specific primary media description. The text shall be left aligned and space padded. The Primary Medium Type Description field shall be the same for all descriptors with the same PRIMARY MEDIUM TYPE CODE value.

The Secondary Medium Type Description field shall contain 14 characters of ASCII text with a vendor specific secondary media description. The text shall be left aligned and space padded.

Comment: The vendor ID and product ID of the native drive type could also be reported and that would give an application client a fixed string that could identify exactly what type of media is being described but if mixed drive types are installed there could be

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two drives that use this media as the native media type. If the vendor ID and product ID are returned they would probably have to be the ID values for the most preferred currently installed drive for which this is the native media type. Reporting these values would also be difficult for media like the Ultrium universal cleaning cartridge which doesn't have a single native drive type. It would be useful for vendors to agree on these values so that an application client can interpret them however that is beyond the scope of this specification.