

To: Membership of X3T10

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Subject: Addition of REPORT DENSITY SUPPORT command for sequential access devices.

I am requesting that a new command, REPORT DENSITY SUPPORT, be added to the command set for sequential access devices. This command reports the densities supported by a given LUN. This same command may be applied to other models as well.

1.1.1.1 REPORT DENSITY SUPPORT Command

The REPORT DENSITY SUPPORT command (see Table 1) requests that information regarding the supported densities for the logical unit be sent to the application client. Most of the information reported by the REPORT DENSITY SUPPORT command is static. Support of this command is mandatory for sequential access devices. All supported densities shall be supported for reading.

Table 1 - REPORT DENSITY SUPPORT command

Bit Byte	7	6	5	4	3	2	1	0	
0	Operation Code (44h)								
1	Reserved							Media	
2	Reserved								
3	Reserved								
4	Reserved								
5	Reserved								
6	Reserved								
7	(MSB)	Allocation							
8		Length						(LSB)	
9	Control								

A Media bit of zero indicates that the [device server](#) shall return density support data blocks for densities supported by the Logical Unit for any supported media. [The data returned by the device server shall be static if the Media bit is zero.](#) A Media bit of one indicates that the [device server](#) shall return density support data blocks for densities supported by the [mounted](#) medium. If the Media bit is one and the Logical Unit is not in the ready state, CHECK CONDITION status shall be returned. The sense key shall be set to NOT READY.

The Allocation Length field specifies the maximum number of bytes that the [device server](#) may return.

The REPORT DENSITY SUPPORT command returns the REPORT DENSITY SUPPORT header (see Table 2) followed by one or more DENSITY SUPPORT data blocks (see Table 3). The Density support data blocks shall follow the REPORT DENSITY SUPPORT header. The Density Support data blocks shall be in numerical ascending order of the primary density code value for each block.

Table 2 - REPORT DENSITY SUPPORT header

Bit Byte	7	6	5	4	3	2	1	0
<u>0</u>	(MSB) Available <u>density</u>							
<u>1</u>	<u>support length</u>							(LSB)
<u>2</u>	<u>Reserved</u>							
<u>3</u>	<u>Reserved</u>							
4 n	Density support data blocks for supported densities							

The Available density support length field specifies the number of bytes in the following data that is available to be transferred. The Available density support length does not include itself. This field shall be equal to 2 more than an integer multiple of 52 (52 is the size of a Density support data block).

Table 3 - DENSITY SUPPORT data block for each density

Bit Byte	7	6	5	4	3	2	1	0
0	Primary Density Code							
1	Secondary Density Code							
2	WrtOK	Dup	Deflt	Reserved				
3	Reserved							
4	Reserved							
5 : 7	(MSB) Bits per mm							(LSB)
8 9	(MSB) Media Width							(LSB)
10 11	(MSB) Tracks							(LSB)
12 : 15	(MSB) Capacity							(LSB)
16 : 23	<u>Assigning</u> organization							
24 : 31	<u>Density</u> Name							
32 : 51	Description							

Density support data blocks shall be returned by ascending primary density code [values](#). Multiple entries may exist for a given primary density code [value](#). For all entries with equal primary density code [values](#), all other fields except for the [Assigning](#) organization, [density name](#), and description shall be [identical](#). [Density support data blocks with the same primary density code value should be ordered from most to least preferred Assigning organization, Density Name, and Description.](#)

The density support data block may represent a particular format [in addition to giving](#) physical density information. [The information in a density support data block provides an application client with a detailed review of the recording technologies supported by a logical unit. By supplying the a density code value returned in a density support block in a MODE SELECT command, an initiator can select recording technology \(density, format, etc.\).](#)

The Primary Density Code field contains the value returned by a Mode Sense [command](#) for [the density described in the remainder of the density support block](#). [The device server shall accept a Mode Select command containing this value, for appropriate media. The value 07Fh shall be reserved. All other values are available for use. The value of 00h shall only be used for the default density of the logical unit.](#) [All density codes values returned by](#) the Report Density Support command shall support read operations

based on the setting of the Media bit in the CDB. When density information matches one of the entries in Table X-nn (Annex X), the Primary Density Code value should match the density code assigned in the table.

NOTE: By allowing multiple entries for a given primary and secondary density code set, multiple standard names may identify the same density code. This facilitates the remapping of density codes, if required.

When multiple density code values are assigned to the same recording technology (density, format, etc.), the Secondary Density Code field shall contain the equivalent density code value. The Mode Select command shall accept this value as equivalent to the Primary Density Code value. If no secondary density code exists, the device server shall return the Primary Density Code value in this field.

A WrtOK bit of zero shall indicate that logical unit support for this density does not include writing to the media. A WrtOK bit of one shall indicate that the logical unit is capable of writing this density to either the currently mounted medium (Media bit in CDB set to one) or for some media (Media bit in CDB set to zero).

A Dup bit of zero shall indicate that this primary density code has exactly one density support data block. A Dup bit of one shall indicate that this primary density code is specified in more than one density support data block.

A Deflt bit of zero shall indicate that this density is not the default density of the drive. A Deflt bit of one shall indicate that this density is the default density of the drive. If either the Primary or Secondary density code is zero, the Deflt bit shall be one. If neither the Primary or Secondary density code is zero and the Deflt bit is one, the logical unit shall accept a Mode Select density code of 00h as equivalent to the Primary and Secondary density codes.

The Bits per mm field indicates the number of bits per millimeter per track as recorded on the medium. The value in this field shall be rounded up if the fractional value of the actual value is greater than or equal to 0,5. A value of 00h indicates that the number of bits per millimeter does not apply to this logical unit. Direct comparison of this value between different vendors (possibly products) is discouraged since the definition of bits may vary.

The Media Width field indicates the width of the medium supported by this density. This field has units of tenths of millimeters. The value in this field shall be rounded up if the fractional value of the actual value is greater than or equal to 0,5. The Media Width field may vary for a given density depending on the mounted medium. A value of 00h indicates that the width of the medium does not apply to this logical unit.

The Tracks field indicates the number of data tracks supported on the medium by this density. The Tracks may vary for a given density depending on the mounted medium. Direct comparison of this value between different vendors (possibly products) is discouraged since the definition of the number of tracks may vary. For recording formats which are neither parallel nor serpentine, the tracks field indicates the maximum number of data tracks that can be read or recorded simultaneously.

If the Media bit of the CDB is set to 0, the Capacity field shall indicate the approximate capacity of the longest supported medium assuming recording in this density with one partition. If the Media bit of the CDB is set to 1, the Capacity field should indicate the approximate capacity of the current medium, assuming recording in this density with one partition. If the approximate capacity of the current medium cannot be determined for the mounted medium, the longest supported medium capacity shall be used. The capacity assumes that compression is disable, if possible. If this density does not support an uncompressed format, the capacity assumes that compression is enabled using "average" data. The

capacity also assumes that the media is in “good” condition, and that “normal” data and block sizes are used. This value is in units of megabytes (10^6 bytes). The logical unit does not guarantee that this space is actually available in all cases. Direct comparison of this value between different vendors (possibly products) is discouraged since the length of media and the method used to measure maximum capacity may vary. The capacity field is intended to be used by the application client to determine that the correct density is being used, particularly when a lower-density format is required for interchange.

The Assigning organization field contains eight bytes of ASCII data identifying organization responsible for the specifications defining the values in this density support data block. The data shall be left aligned within this field. The ASCII value for a space (20h) shall be used if padding is required.

The Assigning organization field should contain a value listed in the Vendor Identification list in the SPC. The use of a specific vendor identification, other than the one associated with the device is allowed. Thus, if vendor ABC defines a density and format, another vendor may use ABC in the Assigning organization field. If exactly the same density and format construction later becomes known by another name, both ABC and the new assigning organization may be used for the density code. This is one condition that may result in multiple density support data blocks for a single density code value.

NOTE: It is intended that the Assigning organization field contain a unique identification of the organization responsible for the information in a density support data block. In the absence of any formal registration procedure, X3T10 maintains a list of vendors and assigning organizations identification codes in use. Vendors are requested to voluntarily submit their identification codes to X3T10 to prevent duplication of codes.

The Density Name field contains eight bytes of ASCII data identifying the document (or other identifying name) that is associated with this density support data block. The data shall be left aligned within this field.

The ASCII value for a space (20h) shall be used if padding is required. Two physical densities (and possibly formats) shall not have identical Assigning organization and name fields. Assigning organizations shall be responsible for preventing duplicate usage one density name for multiple different densities and/or formats.

NOTE: It is suggested that any document which specifies a format and density for the media contain the values to be used by a Logical Unit when reporting the density support. The values for the bits per mm, media width, and tracks should also be included in such a document to help maintain consistency.

The Description field contains twenty bytes of ASCII data describing the density. The data shall be left aligned within this field. The ASCII value for a space (20h) shall be used if padding is required.