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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 (4Ch)							
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 Logical Unit shall return density support data blocks for densities supported by the Logical Unit for any supported media. A Media bit of one indicates that the Logical Unit shall return density support data blocks for densities supported by the loaded 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 Logical Unit 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
0	Number of Densities							
1	Reserved							
2	(MSB)	Available bytes							
3		that follow header							(LSB)
4	Density support data blocks							
n	for supported densities							

The Number of Densities field contains the number of Density Support data blocks that follow this header. This value shall not be 00h.

The Available bytes that follow field contains the number of bytes in the density support data for all supported densities. This value shall be equal to the Number of Densities field multiplied by 52 (52 is the number of bytes in each 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 of longest available tape (LSB)							
16 : 23	Standards organization							
24 : 31	Standard Name							
32 : 51	Description							

Density support data blocks shall be returned by ascending primary density codes. Multiple entries may exist for a given primary density code. For all entries with equal primary density codes, all other fields except for the Standard organization, standard name, and description shall be equal. The density support data block may represent a particular format of a given physical density.

NOTE: By allowing a format to be represented by a density code, an initiator may be allowed to choose, depending on Logical Unit implementation, different formats by use of the 8 bit density code.

The Primary Density Code field contains the value returned by Mode Sense data for this density. Mode Select shall accept this value as well. Only the value 07Fh is reserved. All density codes contained in the data phase of the Report Density Support command shall support read operations.

NOTE: It is suggested that the Primary Density Code be a value from the Sequential-access density codes table (Table 23) if the density has been approved for inclusion.

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 identification of a density which is later standardized.

The Secondary Density Code field contains the secondary density code. Mode Select shall accept this value as equivalent to the Primary Density Code. If no secondary density code exists for this density, the logical unit shall return the Primary Density Code value for this field.

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

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

A Deflt bit of zero indicates that this density is not the default density of the drive. A Deflt bit of one indicates 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.

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. 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 tracks supported on the medium by this density. Direct comparison of this value between different vendors (possibly products) is discouraged since the definition of the number of tracks may vary.

The Capacity of the longest available tape indicates the approximate capacity of the longest media, assuming one partition. 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.

NOTE: The capacity field is intended to be used by the initiator to determine the correct density to be used, particularly when a lower-density format is required for interchange.

The Standards organization field contains eight bytes of ASCII data identifying the owner of the standard 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.

NOTE: It is suggested that the standards organization field be set to a value from the Vendor Identification list in SPC. See SPC for registration procedures associated with this list. The intent is to prevent duplication of the standards organization and standard name fields for non-compatible densities and/or formats.

NOTE: Use of a specific vendor name, other than that associated with the device, is allowed. Thus, if entity ABC develops a standard for a density and format, another entity may use ABC in the standards organization field. If the same density and format becomes a standard, both ABC and the standards organization (such as ANSI) may be used for identification, assuming equivalence.

The Standard name field contains eight bytes of ASCII data identifying which standard of the standards organization 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.

NOTE: Each standards organization must determine the mechanism required to prevent duplication of names for different densities and/or formats. 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 as defined by the vendor. The data shall be left aligned within this field. The ASCII value for a space (20h) shall be used if padding is required.