To: T10 Technical Committee
From: Gary Lestage, Kyle Walczak and Kevin Marks - Dell, Inc.
Date: June 19, 2005
Subject: T10/05-213r0 - SSC-3: Tape Diagnostic Data Log Page for Sequential Access Devices

Revision History

Revision 0 (06/19/05) – Initial proposal

Related Documents

SCSI Stream Commands - 3 (T10/1611-D - SSC-3r01c)
SCSI Primary Commands - 4 (T10/1729-D - SPC-4r00)

Overview

Dell sees a need to standardize on a single log page that will allow for the collection of information required during field analysis and troubleshooting of tape devices. This requirement will be beneficial to those applications that report diagnostic information back via diagnostic software. Special code will no longer need to be written specific to the tape drive being used. This proposal outlines the parameters that will be gathered for collection and reporting via the log page defined in this proposal.

Suggested Changes:

Add new row to **Table 51 - Log page codes**

Table 51 — Log page codes

Page Code	Description	Reference
….	….	….
XXh	Tape Diagnostic Data log page	8.2.4
….	….	….

where XXh is the assigned log page.

[All new below]

Editor's note: Cleaning Required in the Sequential-Access Device log page is redundant, if this proposal is accepted.

8.2.4 Tape Diagnostic Data log page

The Tape Diagnostic Data log page defines data counters associated with various events, sense data, and media types with associated media motion hours that aid in field analysis and troubleshooting.

Support of the Tape Diagnostic Data log page is optional. Support of the individual parameters in the Tape Diagnostic Data log page are optional. All supported parameters shall be persistent across I_T nexus losses, logical unit resets, and power cycles, unless otherwise noted. The parameters shall not be set to zero or changed via a LOG SELECT command.

The Tape Diagnostic Data log page format is shown in table 1.

Table 1 - Tape Diagnostic Data log page

Byte\Bit	7	6	5	4	3	2	1	0
0	Reserved		PAGE CODE (XXh)					
1	Reserved							
2	MSB		PAGE LENGTH (n-3)					
3								LSB
	tape diagnostic data log parameters							
4	First tape diagnostic data log parameter							
	:							
n	Last tape diagnostic data log parameter							

See SPC-3 for a description of the PAGE CODE field and PAGE LENGTH field.

Table 2 defines the parameter codes and parameter format for each respective parameter code of the Tape Diagnostic Data log page.

Table 2 - Parameter codes and parameter format for Tape Diagnostic Data log page

Parameter Code	Description	Parameter Format
0000h	Lifetime media loads	General format
0001h	Lifetime cleaning operations	General format
0002h	Lifetime power on hours	General format
0003h	Lifetime media motion (head) hours	General format
0004h	Media motion (head) hours when incompatible media was last loaded	General format
0005h	Power on hours when the last over temperature condition occurred	General format
0006h	Power on hours when the last power consumption condition occurred (TapeAlert code 1Ch)	General format
0007	Media motion (head) hours since last cleaning	General format
0008	Media motion (head) hours of last emergency/reset eject	General format
0009h – 00FFh	Reserved	
0100h	Cleaning Status	Cleaning format
0101h-01FFh	Reserved	
0200h	Media motion (head) hours for each media type	Media type format
0201h-02FFh	Reserved	
0300h	Last N sense data, media motion (head) hours, firmware revision, media type, last cleaning	Nth sense format
0301h-7FFFh	Reserved	

8000h - FFFFh	Vendor specific	

Parameters codes corresponding to time values shall be reported in hours and rounded up to the next whole hour.

The tape diagnostic data log parameter - general format is shown in table 3.

Table 3 - Tape Diagnostic data log parameter – general format

Byte\Bit	7	6	5	4	3	2	1	0
0	MSB			PARAMETER CODE				
1								LSB
2	DU (0)	DS (1)	TSD (0)	ETC (0)	TMC (00b)		LBIN (0)	LP (0)
3	PARAMETER LENGTH (n-3)							LSB
4	Reserved							
5	TAPE DIAGNOSTIC DATA COUNTER							
n								

Editor's Note: Should the DU, DS, TSD, ETC, and TMC bits/fields be specified as above and as in the Device Statistics log page in ADC?

See SPC-3 for descriptions of the DU bit, DS bit, TSD bit, ETC bit, TMC field, LBIN bit, and LP bit. These bits and fields shall be set to the values shown in table 3.

The PARAMETER LENGTH field indicates the number of bytes in the TAPE DIAGNOSTIC DATA COUNTER field that follows.

The TAPE DIAGNOSTIC DATA COUNTER field is the value of the requested data counter.

The tape diagnostic data log parameter - cleaning format is shown in table 4.

Table 4 - Diagnostic data log parameter – cleaning format

Byte\Bit	7	6	5	4	3	2	1	0
0	MSB			PARAMETER CODE (0100h)				
1								LSB
2	DU (0)	DS (1)	TSD (0)	ETC (0)	TMC (00b)		LBIN (1)	LP (1)
3	PARAMETER LENGTH (4)							LSB
4						CLEAN NOW	CLEAN PERIODIC	EXPIRED CLEANING MEDIA
5	Reserved							
7								

See SPC-3 for descriptions of the DU bit, DS bit, TSD bit, ETC bit, TMC field, LBIN bit, and LP bit. These bits and fields shall be set to the values shown in table 4.

The PARAMETER LENGTH field indicates the number of bytes that follows.

A CLEAN NOW bit set to one indicates that the tape drive requires cleaning. A CLEAN NOW bit set to zero indicates that the tape drive does not require cleaning. The CLEAN NOW bit is equivalent to TapeAlert code 14h (see Table A.1).

A CLEAN PERIODIC bit set to one indicates that the tape drive is due for routine cleaning. A CLEAN PERIODIC bit set to zero indicates that the tape drive is not due for routine cleaning. The CLEAN PERIODIC bit is equivalent to TapeAlert code 15h (see Table A.1).

An EXPIRED CLEAN MEDIA bit set to one indicates that the last cleaning cartridge loaded into the tape drive has expired. An EXPIRED CLEAN MEDIA bit set to zero indicates that the last cleaning cartridge loaded into the tape drive has not expired. The EXPIRED CLEAN MEDIA bit is equivalent to TapeAlert code 16h (see Table A.1).

The CLEAN NOW bit, CLEAN PERIODIC bit and EXPIRED CLEAN MEDIA bit if set to one, shall remain set to one until a successful cleaning of the tape drive. The EXPIRED CLEAN MEDIA bit may be persistent across power cycles

The tape diagnostic data log parameter - media type format is shown in table 5.

Table 5 - Diagnostic data log parameter - media type format

Byte\Bit	7	6	5	4	3	2	1	0
0	MSB	PARAMETER CODE (0200h)						
1								LSB
2	DU (0)	DS (1)	TSD (0)	ETC (0)	TMC (00b)		LBIN (1)	LP (1)
3	PARAMETER LENGTH (n-3)							LSB
	Media type parameters							
4	First media type parameter (see table 6)							
	:							
n	Last media type parameter (see table 6)							

See SPC-3 for descriptions of the DU bit, DS bit, TSD bit, ETC bit, TMC field, LBIN bit, and LP bit. These bits and fields shall be set to the values shown in table 5.

The PARAMETER LENGTH field indicates the number of bytes in the media type parameters that follows.

The media type parameter format is shown in table 6.

Table 6 - Media type parameter format

Byte\Bit	7	6	5	4	3	2	1	0
0	MEDIA TYPE							
1	MEDIA MOTION HOURS							
3								

The MEDIA TYPE field associates a numeric value with the type of media being read and/or written to. The values assigned to the types of media in the MEDIA TYPE field are vendor specific.

The MEDIA MOTION HOURS field contains the number of media motion (head) hours for the type of media specified in the MEDIA TYPE field.

The tape diagnostic data log parameter - Nth sense format is shown in table 7.

Table 7 - Diagnostic data log parameter format – Nth sense format

Byte\Bit	7	6	5	4	3	2	1	0
0	MSB			PARAMETER CODE (0300h)				
1								LSB
2	DU (0)	DS (1)	TSD (0)	ETC (0)	TMC (00b)		LBIN (1)	LP (1)
3	PARAMETER LENGTH (n-3)							LSB
	Nth sense parameters							
4	First Nth sense parameter (see table 8)							
	:							
n	Last Nth sense parameter (see table 8)							

See SPC-3 for descriptions of the DU bit, DS bit, TSD bit, ETC bit, TMC field, LBIN bit, and LP bit. These bits and fields shall be set to the values shown in table 7.

The PARAMETER LENGTH field indicates the number of bytes in the Nth sense parameters that follows.

The Nth sense parameters shall be listed in reverse order of occurrence (i.e., the Nth sense parameter that occurred last shall be the first Nth sense parameter listed)

The Nth sense parameter format is shown in table 8.

Each Nth sense parameter returns specific diagnostic information about the nth CHECK CONDITION status with the sense key set to 03h or 04h that occurred.

Table 8 - Nth sense parameter format

Byte\Bit	7	6	5	4	3	2	1	0
0	MEDIA MOTION HOURS							
2								
3	Reserved							
4	Reserved				SENSE KEY			
5	ADDITIONAL SENSE CODE							
6	ADDITIONAL SENSE CODE QUALIFIER							
7	VENDOR SPECIFIC CODE QUALIFIER							
11								
12	FIRMWARE REVISION							
15								
16	MEDIA TYPE							
17	HOURS SINCE LAST CLEAN							
19								

Editor's Note: As defined, only supports up to 12 entries, should the Nth sense parameters be moved to a separate log page with a separate parameter code per entry? Additionally a request was made to add the media serial number, which would make the number of entries only 4 with a 32 byte serial number..

The MEDIA MOTION HOURS field contains the number of media motion (head) hours when the CHECK CONDITION status occurred.

See SPC-3 for descriptions of the SENSE KEY field, ADDITIONAL SENSE CODE field, and ADDITIONAL SENSE CODE QUALIFIER field.

The VENDOR SPECIFIC CODE QUALIFIER field is vendor specific.

The FIRMWARE REVISION field contains tape drive firmware revision when the CHECK CONDITION status occurred. The format of the FIRMWARE REVISION field is vendor specific.

The MEDIA TYPE field contains the type of media loaded when the CHECK CONDITION status occurred. If no media was loaded when the CHECK CONDITION status occurred, the MEDIA TYPE field shall be set to 00h.

The HOURS SINCE LAST CLEAN field is the time in hours since the last cleaning when the CHECK CONDITION status occurred.