To: T10 Technical Committee
From: Gary Lestage, Kyle Walczak and Kevin Marks - Dell, Inc.
Date: August 4, 2005
Subject: T10/05-213r1 - SSC-3: Device Statistics log page for SSC-3 and Tape Diagnostic Data log page

Revision History

Revision 0 (06/19/05) – Initial proposal
Revision 1 (08/04/05) – Changes based on July '05 SSC-3 WG Comments
- Migrated the Device statistics log page from ADC to SSC-3 and added the additional counters from original proposal.
- Removed clean status parameter code – will be covered by a proposal from Kevin Butt@IBM.
- Change MMH to POR for last emergency/reset eject counter
- Changed Nth sense to parameter code based and made it the only parameter format on the Tape diagnostics log page
- Added OP code/service action, media id number and vendor specific space to the tape diagnostics data log page
- Change MEDIUM-TYPE CODE to MEDIUM TYPE in SSC-3 mode page section 8.3.1

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 log pages that will allow for the collection of information required during field analysis and troubleshooting of tape devices. This requirement is 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 brings the Device statistics log page from ADC in to SSC-3 and expands the parameter code contents and defines a new Tape Diagnostics log page that contains a collection of sense and diagnostics data.

Suggested Changes to SSC-3:

[New text notated in blue]

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

Table 51 — Log page codes

Page Code	Description	Reference
….	….	….
14h	Device Statistics log page	8.2.X
….	….	….
XXh	Tape Diagnostic Data log page	8.2.Y
….	….	….

where XXh is the assigned log page.

8.2.X Device Statistics log page

8.2.X.1 Device Statistics log page overview

The Device Statistics log page (see table x) defines data counters associated with utilization of the tape device. A device server that implements the Device Statistics log page shall implement one or more of the defined parameters. Support for the individual parameters in the Device Statistics log page is optional. All supported parameters shall be persistent across I_T nexus losses, logical unit resets, and power cycles. The parameters shall not be set to zero or changed via a LOG SELECT command.

Table x – Device Statistics log page

Byte\Bit	7	6	5	4	3	2	1	0
0	Reserved		PAGE CODE (14h)					
1	Reserved							
2	(MSB)		PAGE LENGTH (n-3)					
3								(LSB)
	Device statistics log parameters							
4	First device statistics log parameter							
	: :							
N	Last device statistics log parameter							

See SPC-4 for a description of the PAGE CODE field and PAGE LENGTH field.

Table x+1 defines the Device Statistics log page parameter codes.

Table x+1 – Device Statistics log parameter codes

Parameter Code	Description	Reference
0000h	Lifetime media loads	8.2.X.2
0001h	Lifetime cleaning operations	8.2.X.2
0002h	Lifetime power on hours	8.2.X.2
0003h	Lifetime media motion (head) hours	8.2.X.2
0004h	Lifetime meters of tape processed	8.2.X.2
0005h	Media motion (head) hours when incompatible media was last loaded	8.2.X.2
0006h	Lifetime Power on hours when the last over temperature condition occurred	8.2.X.2
0007h	Lifetime Power on hours when the last power consumption condition occurred (TapeAlert code 1Ch)	8.2.X.2
0008h	Media motion (head) hours since last cleaning	8.2.X.2
0009h	Lifetime Power on hours of last emergency/reset eject	8.2.X.2
00010h – 0FFFh	Reserved	
1000h	Media motion (head) hours for each medium type	8.2.X.3
1001h-7FFFh	Reserved	
8000h - FFFFh	Vendor specific	

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

8.2.X.2 Device statistics data counter log parameter

The device statistics data counter log parameter format is shown in table x+2.

Table x+2 – Device statistics data counter log parameter 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		TMC	LBIN (0)	LP (0)
3	PARAMETER LENGTH (n-3)							
4	(MSB)			DEVICE STATISTICS DATA COUNTER				
n								(LSB)

The PARAMETER CODE field is defined in table x+1.

See SPC-4 for descriptions of the DU bit, DS bit, TSD bit, ETC bit, TMC field, LBIN bit, and LP bit. The DU bit, DS bit, TSD bit, LBIN bit, and LP bit shall be set to the values shown in table x+2.

The PARAMETER LENGTH field indicates the number of bytes in the DEVICE STATISTICS DATA COUNTER field that follows.

The DEVICE STATISTICS DATA COUNTER field is the value of the requested data counter.

8.2.X.3 Medium type log parameter

The medium type log parameter format is shown in table x+3.

Table x+3 – Medium type log parameter format

Byte\Bit	7	6	5	4	3	2	1	0
0	(MSB)			PARAMETER CODE (1000h)				
1								(LSB)
2	DU (0)	DS (1)	TSD (0)	ETC (0)	TMC (00b)		LBIN (1)	LP (1)
3	PARAMETER LENGTH (n-3)							
	Medium type parameters							
4	First medium type parameter (see table x+4)							
	: :							
N	Last medium type parameter (see table x+4)							

The PARAMETER CODE field shall be set to 1000h to indicate the Medium type log parameter.

See SPC-4 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 x+3.

The PARAMETER LENGTH field indicates the number of bytes in the medium type parameters that follow.

The medium type parameter format is shown in table x+4.

Table x+4 - Medium type parameter format

Byte\Bit	7	6	5	4	3	2	1	0
0	MEDIUM TYPE							
1	Reserved							
3								
4	(MSB)			MEDIA MOTION HOURS				
7								(LSB)

The MEDIUM TYPE field contains the value returned in the mode parameter header (see SPC-4). The values returned in the MEDIUM TYPE field are vendor specific for sequential-access devices.

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

8.2.Y Tape Diagnostic Data log page

The optional Tape Diagnostic Data log page (see table y) provides for a number of error-event records using the list parameter format of the log page. Each error-event record contains diagnostic information for a single error encountered by the device including data counters associated with the error event, sense data, operation code/service action and medium type with associated media motion hours. The Tape Diagnostic Data log page is used to aid in field analysis and repair.

The Tape Diagnostic Data log page shall only include parameter entries for commands ending with a CHECK CONDITION status and having the sense key set to MEDIUM ERROR or HARDWARE ERROR.

The parameter code associated with error-event record indicates the relative time at which the error occurred. A higher parameter code indicates that the error event occurred later in time (i.e., the parameter code for the error-event that occurred last shall have the highest parameter code value returned.)

The number of supported parameter codes is vendor specific. Once the parameter code values have reached a vendor specific maximum, a new error-event shall be assigned to that vendor specific maximum value and all other parameter code values shall be shifted down by one parameter code value. The error-event associated with the parameter code value of 0000h is removed.

All supported parameter codes 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.

Table y - 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 (see table y+1)							
	⋮							
n	Last tape diagnostic data log parameter (see table y+1)							

See SPC-4 for a description of the PAGE CODE field and PAGE LENGTH field.

The tape diagnostic data log parameter format is shown in table y+1.

Table y+1 – Tape diagnostic data log parameter 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 (1)	LP (1)
3	PARAMETER LENGTH (n-3)							
4	MEDIUM TYPE							
5				Reserved				
7								
8	(MSB)			MEDIA MOTION HOURS				
11								(LSB)
12	Reserved							
13	Reserved				SENSE KEY			
14	ADDITIONAL SENSE CODE							
15	ADDITIONAL SENSE CODE QUALIFIER							
16	(MSB)			VENDOR SPECIFIC CODE QUALIFIER				
19								(LSB)
20	(MSB)			FIRMWARE REVISION				
23								(LSB)
24				HOURS SINCE LAST CLEAN				
27								(LSB)
28	OPERATION CODE							
29	Reserved				SERVICE ACTION			
30				Reserved				
31								
32	(MSB)							
:				MEDIUM ID NUMBER				
:								
63								(LSB)
64				Vendor specific				
n								

See SPC-4 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 y+1.

The PARAMETER LENGTH field indicates the number of bytes in the tape diagnostic data log parameter that follows.

The MEDIUM TYPE field contains the type of media loaded when the CHECK CONDITION status occurred. The MEDIUM TYPE field is the same value as returned in the mode parameter header (see SPC-4). If no media was loaded when the CHECK CONDITION status occurred, the MEDIUM TYPE field shall be set to 00h.

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

See SPC-4 for descriptions of the SENSE KEY field, ADDITIONAL SENSE CODE field, and ADDITIONAL SENSE CODE QUALIFIER field. The SENSE KEY field, ADDITIONAL SENSE CODE field, and ADDITIONAL SENSE CODE QUALIFIER field shall contain the sense key, additional sense code and additional sense code qualifier values when the CHECK CONDITION status occurred.

The VENDOR SPECIFIC CODE QUALIFIER field is vendor specific.

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

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

See SPC-4 for descriptions of the OPERATION CODE field and SERVICE ACTION field. The OPERATION CODE field and SERVICE ACTION field if applicable contain the operation code and service action of the command that received the CHECK CONDITION status.

The content of the MEDIUM ID NUMBER field is vendor specific, but should contain:

1) The BARCODE value contained in the medium auxiliary memory (see SPC-4);
2) The MEDIUM SERIAL NUMBER value contained in the medium auxiliary memory (see SPC-4); or
3) A unique vendor specific value associated with the mounted medium.

If no media is present at the time the CHECK CONDITION status occurred, the MEDIUM ID NUMBER field should be set to 0h.

8.3.1 Mode parameters overview

This subclause defines the descriptors and pages for mode parameters used with sequential-access devices.

The mode parameter list, including the mode parameter header and mode block descriptor, are described in SPC-3.

The MEDIUM-TYPE CODE MEDIUM TYPE field in the mode parameter header is vendor-specific for sequential-access devices.

The value of the BLOCK LENGTH field in the mode parameter block descriptor shall be a multiple of four.

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