

May 15, 1998

T10/98-128 revision 2



To: NCITS Technical Committee T10

From: Bob Snively

Subject: New log page requirements

Two new log page definitions are required to support extensions of SCSI device functionality.

Changes created by decisions at the SCSI meeting held in San Diego on March 17 are marked with change bars.

1 Start-Stop Cycle Counter Log Page:

A log page is required to monitor the number of start-stop cycles that have been performed on a device. This page is most interesting to devices like disk drives, where each start-stop cycle detracts from the long-term reliability of the disk drive. However, I recommend that the page be installed in SPC-2 so that it may be applied to other devices that may also have a reason for monitoring the number of power cycles performed. By requiring the page to have one or more of the parameters specified, each individual parameter is implicitly made optional, so individual parameter requirements need not be specified.

At present, there are a number of identical vendor-specific implementations using the vendor specific page code of 31h. The standard start-stop cycle counter log page should use the appropriate log page code (0Eh) and the specified format.

The following line should be added in the proper row to SPC-2, section 8.2, table 86.

Table 85 - Log page codes

Page Code	Description	Clause
0Eh	Start-stop cycle counter page	8.2.x

The following text should be added in the proper clause, as defined by the alphabetization of Table 85.

8.2.x Start-stop cycle counter page

This clause defines the optional start-stop cycle counter page. A device that implements this page shall implement one or more of the defined parameters. Table nn shows an example of this page with all parameters implemented.

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Table nn - Start-stop cycle counter page

Bit	7	6	5	4	3	2	1	0
Byte								
0	Page code = 0Eh							
1	Reserved							
2	(MSB) Page length (= 34d) (LSB)							
3								
4	Parameter code 0001h (Date of manufacture)							
5								
6	DU	DS	TSD	ETC	TMC	LBIN	LP	
7	Parameter Length (06h)							
8	Date of Manufacture (ASCII) Year (4 characters) (LSB)							
9								
10								
11								
12	(MSB) Week (2 characters) (LSB)							
13								
14	Parameter code 0002h (Accounting Date)							
15								
16	DU	DS	TSD	ETC	TMC	LBIN	LP	
17	Parameter Length (06h)							
18	Accounting Date (ASCII) Year (4 characters) (LSB)							
19								
20								
21								
22	(MSB) Week (2 characters) (LSB)							
23								

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Table nn - Start-stop cycle counter page

Bit	7	6	5	4	3	2	1	0
24	Parameter code 0003h (Specified cycle count over device life-time)							
25								
26	DU	DS	TSD	ETC	TMC	LBIN	LP	
27	Parameter Length (04h)							
28	Specified cycle count over device lifetime (4-byte binary number)							
29								
30								
31								
24	Parameter code 0004h (Accumulated start-stop cycles)							
25								
32	DU	DS	TSD	ETC	TMC	LBIN	LP	
33	Parameter Length (04h)							
34	Accumulated start-stop cycles (4-byte binary number)							
35								
36								
37								

The year and week in the year that the device was manufactured shall be set in the parameter field defined by parameter code 1. This date cannot be modified by the application client. The date is expressed in ASCII numbers in the form YYYYWW, as shown in table nn. The state of the control bits for parameter 1 is specified in table nn+1.

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Table nn+1 Control bits for date of manufacture parameter

Control bit	Value	Description
DU	0	Value provided by device server
DS	1	Device server does not support saving of parameter
TSD	0	Device server manages saving of parameter
ETC	0	No threshold comparison is made on this value
TMC	xx	Not valid when ETC is 0
LBIN	0	The parameter is in ASCII format
LP	1	The parameter is a list parameter

The accounting date specified by parameter code 2 is a parameter that may optionally be savable using a LOG SELECT command to indicate when the device was placed in service. If the parameter is not yet set or is not settable by the device server, the default value placed in the parameter field shall be 6 ASCII blank characters (20h). The field is not checked for validity by the device server. The state of the control bits for parameter 2 is specified in table nn+2.

Table nn+2 Control bits for accounting date parameter

Control bit	Value	Description
DU	0	Value provided by device server
DS	0 or 1	Device server optionally supports saving of parameter
TSD	0	Device server manages saving of parameter
ETC	0	No threshold comparison is made on this value
TMC	xx	Not valid when ETC is 0
LBIN	0	The parameter is in ASCII format
LP	1	The parameter is a list parameter

The specified cycle count over device lifetime specified by parameter code 3 is a parameter provided by the device server that cannot be modified by the application client. The value is a 4-byte binary number. The value indicates how many stop-start cycles may typically be executed over the lifetime of a device without degrading the device's opera-

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tion or reliability outside the limits specified by the manufacturer of the device. The state of the control bits for parameter 3 is specified in table nn+3.

Table nn+3 Control bits for specified cycle count over device lifetime

Control bit	Value	Description
DU	0	Value provided by device server
DS	1	Device server does not support saving of parameter
TSD	0	Device server manages saving of parameter
ETC	0	No threshold comparison is made on this value
TMC	xx	Not valid when ETC is 0
LBIN	1	The parameter is in binary format
LP	1	The parameter is a list parameter

The accumulated start-stop cycles specified by parameter code 4 is a parameter provided by the device server that cannot be modified by the application client. The value is a 4-byte binary number. The value indicates how many start-stop cycles the device has detected since its date of manufacture. The time at which the count is incremented during a start-stop cycle is vendor specific. For rotating magnetic storage devices, a single start-stop cycle is defined as an operational cycle that begins with the disk spindle at rest, continues while the disk accelerates to its normal operational rotational rate, continues during the entire period the disk is rotating, continues as the disk decelerates toward a resting state, and ends when the disk is no longer rotating. For devices without a spindle or with multiple spindles, the definition of a single start-stop cycle is device specific. The count is incremented by one for each complete start-stop cycle. No compari-

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son with the value of parameter 3 shall be performed by the device server. The state of the control bits for parameter 4 is specified in table nn+4.

Table nn+4 Control bits for accumulated start-stop cycles

Control bit	Value	Description
DU	0	Value provided by device server
DS	1	Device server does not support saving of parameter
TSD	0	Device server manages saving of parameter
ETC	0	No threshold comparison is made on this value
TMC	xx	Not valid when ETC is 0
LBIN	1	The parameter is in binary format
LP	1	The parameter is a list parameter

2 Temperature log page

Various vendor specific mechanisms for indicating the temperature of a device have been created. While the SCSI-3 Enclosure Management (SES) standard provides a mechanism applicable to enclosures, it is also important to access this information in devices that are directly installed in host systems without SES and in locations not accessible to the SES processor. A device log sense page is proposed to allow a device to present an internal temperature indication and a reference value for comparison with the temperature indication. Only one temperature indicator is proposed for the entire device, so it is expected that the temperature sensor will be placed in the most representative or most temperature critical portion of the device. It is expected that intelligent enclosures may choose to adjust the power of adjacent devices and the intensity of the cooling such that no energy is spent cooling the device significantly below the reference value. If no reference value is provided, a default reference value may be assumed or extracted from information outside the scope of the standard.

A page code of 0Dh has been tentatively assigned for this log page.



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The following line should be added in the proper row to SPC-2, section 8.2, table 86.

Table 85 - Log page codes

Page Code	Description	Clause
0Dh	Temperature page	8.2.y

The following text should be added in the proper clause, as defined by the alphabetization of Table 85.

8.2.y Temperature page

This clause defines the optional temperature log page. In this page, parameter 0 is mandatory and parameter 1 is optional and may be either omitted or set to a value indicating that the parameter is not defined. The format of the log page shall be as specified in table mm.



Table mm- Temperature page

Bit	7	6	5	4	3	2	1	0
Byte								
0	Page code = 0Dh							
1	Reserved							
2	(MSB) Page length (= 08d or 12d) (LSB)							
3								
4	Parameter code 0000h (Temperature)							
5								
6	DU	DS	TSD	ETC	TMC	LBIN	LP	
7	Parameter Length (02h)							
8	Reserved = 0							
9	Temperature (degrees Celsius)							
10	Parameter code 0001h (Reference temperature)							
11								
12	DU	DS	TSD	ETC	TMC	LBIN	LP	
13	Parameter Length (02h)							
14	Reserved = 0							
15	Reference temperature (degrees Celsius)							

The temperature sensed in the device at the time the LOG SENSE command is executed shall be set in the parameter field defined by parameter code 0. The one byte value specifies the hexadecimal value of the temperature of the drive in degrees C. Temperatures equal to or less than 0 degrees C shall be indicated by a value of zero. If a valid temperature cannot be detected because of a sensor failure or other condition, the value returned in this field shall be FFh. The temperature should be reported with an accuracy of +/- 3 Celsius degrees while the device is operating at a steady state within the environmental limits specified for the device. No comparison is performed between the temperature value specified in parameter 0 and the reference temperature specified in parameter 1.

The state of the control bits for parameter 0 is specified in table mm+1.

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Table mm+1 Control bits for temperature parameter

Control bit	Value	Description
DU	0	Value provided by device server
DS	1	Device server does not support saving of parameter
TSD	0	Device server manages saving of parameter
ETC	0	No threshold comparison is made on this value
TMC	xx	Not valid when ETC is 0
LBIN	1	The parameter is in binary format.
LP	1	The parameter is a list parameter

A reference temperature for the device may optionally be provided by the device. If no reference temperature is provided, the parameter may not be provided in the log page or alternatively, the reference temperature value may be provided and set to the value of FFh. The reference temperature should reflect the maximum reported sensor temperature at which the device can operate continuously without degrading the device's operation or reliability outside the limits specified by the manufacturer of the device. The reference temperature may change for vendor specific reasons.

The state of the control bits for parameter 0 is specified in table mm+1.

Table mm+2 Control bits for temperature reference parameter

Control bit	Value	Description
DU	0	Value provided by device server
DS	1	Device server does not support saving of parameter
TSD	0	Device server manages saving of parameter
ETC	0	No threshold comparison is made on this value
TMC	xx	Not valid when ETC is 0
LBIN	1	The parameter is in binary format.
LP	1	The parameter is a list parameter

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