Sun Microsystems, Inc.
901 San Antonio Road
Palo Alto, CA 94303-4900

March 13, 1998 T10/98-128

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.

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.

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, assumed to be 0Ch in this document, but use the same 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
0Ch	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. If this page is implemented, all parameters shall be provided when the page is tested using the LOG SENSE command. The format of the log page shall be as specified in table nn.

Table nn - Start-stop cycle counter page

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

■

Table nn - Start-stop cycle counter page

Bit / Byte	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	(MSB) Specified cycle count over device life-time (4-byte binary number)							
29								
30								
31	(LSB)							
24	Parameter code 0004h (Accumulated start-stop cycles)							
25								
32	DU	DS	TSD	ETC	TMC		LBIN	LP
33	Parameter Length (04h)							
34	(MSB) Accumulated start-stop cycles (4-byte binary number)							
35								
36								
37	(LSB)							

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.

■

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 life-time 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 be executed over the life-time of a device without degrading the device's operation or reliability outside the limits speci-

■

fied 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 life-time

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 performed since its date of manufacture. The time at which the count is incremented during a stop or start cycle is vendor specific. The count will be incremented by one for each complete start-stop cycle. No comparison 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 is assumed in this document pending the assignment of a dedicated code.

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 / Byte	7	6	5	4	3	2	1	0
0	Page code = 0Dh							
1	Reserved							
2	(MSB) Page length (= 08d or 12d)							
3	(LSB)							
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 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 shall be reported with an accuracy of +/- 3 Celsius degrees. 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.

■

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

Table mm+1 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

■