

# Device Statistics – Solid State

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T13 Technical Proposal – [e06184r10](#)~~e06184r9~~

By

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[This document is a proposal for the T13 to describe the Device Statistics for the device to report. The solid state statistics is the information specific for the solid state storage such as SSD. The statistics supported are optional, and only applicable to the applicable devices.]

**A.5 Device Statistics (Log Address ~~TBD~~TBDh)**

**A.5.1 Overview**

The optional Device Statistics log contains selected statistics about the device. This log shall be read-only, and shall only be accessed via the GPL feature set. This log is supported if there is a non-zero length for log address TBDh in the General Purpose Log Directory. The format of the data is defined in table TBD. If the Device Statistics log is supported, only the Structure Version field is required. Each statistic is composed of a 1-byte flag field and a value field. If the bit 7 of the flag field is set to one then the value field of that statistic is valid. Each statistic shall be a multiple of 8 bytes long. The number of log pages may be greater than one.

**A.5.2 A.5.1 Solid State Device Statistics (Page TBD)**

**A.5.2.1 A.5.1.1 Overview**

Device Statistics log page TBD contains solid state device information about the device as described in table TBD. The summary of this solid state statistics is as followed:

- a) Structure Version;
- b) Number of Defective Logical Sectors in the Solid State Media;
- c) Number of Solid State Media Erase Operations;
- d) Percentage of the Rated Lifetime Used;
- e) Percentage of Spare Blocks Remaining in Solid State Media;
- f) Number of Error Events on Erase; and

Number of Error Events on Program.The summary of this solid state statistics is as followed:

- a) ~~Structure Version~~
- b) ~~Number of Defective Logical Blocks in the Solid State Media (Lifetime)~~
- c) ~~Number of Solid State Media Erase Operations (Lifetime)~~
- d) ~~Percentage of the Rated Lifetime Used~~
- e) ~~Percentage of Spare Blocks Remaining in Solid State Media~~
- f) ~~Number of Error Events on Erase (Lifetime)~~
- g) ~~Number of Error Events on Program (Lifetime)~~

**Table TBD – Solid State Statistics**

Offset	Type	Content										
0-7	QWord	Structure Version										
		<table border="0"> <tr> <td><b>Bit</b></td> <td><b>Meaning</b></td> </tr> <tr> <td>63:56</td> <td>Device Statistics Flags, (See Table TBD) Reserved</td> </tr> <tr> <td>23:16</td> <td>TBD, Page Device Statistics Version Number = 0001h</td> </tr> <tr> <td>15:0</td> <td>Device Statistics Version Number = 0001h Reserved</td> </tr> <tr> <td>45:0</td> <td>0003h</td> </tr> </table>	<b>Bit</b>	<b>Meaning</b>	63:56	Device Statistics Flags, (See Table TBD) Reserved	23:16	TBD, Page Device Statistics Version Number = 0001h	15:0	Device Statistics Version Number = 0001h Reserved	45:0	0003h
<b>Bit</b>	<b>Meaning</b>											
63:56	Device Statistics Flags, (See Table TBD) Reserved											
23:16	TBD, Page Device Statistics Version Number = 0001h											
15:0	Device Statistics Version Number = 0001h Reserved											
45:0	0003h											
8-15	QWord	Number of Defective Logical <del>Sectors</del> Blocks in the Solid State Media <del>(Lifetime)</del>										
		<table border="0"> <tr> <td><b>Bit</b></td> <td><b>Meaning</b></td> </tr> <tr> <td>63:56</td> <td>Device Statistics Flags, (See Table TBD)</td> </tr> <tr> <td>55:32</td> <td>Reserved</td> </tr> <tr> <td>31:0</td> <td>Number of Defective Logical <del>Sectors</del>Blocks in the Solid State Media <del>(DWord)</del>(Lifetime)</td> </tr> </table>	<b>Bit</b>	<b>Meaning</b>	63:56	Device Statistics Flags, (See Table TBD)	55:32	Reserved	31:0	Number of Defective Logical <del>Sectors</del> Blocks in the Solid State Media <del>(DWord)</del> (Lifetime)		
<b>Bit</b>	<b>Meaning</b>											
63:56	Device Statistics Flags, (See Table TBD)											
55:32	Reserved											
31:0	Number of Defective Logical <del>Sectors</del> Blocks in the Solid State Media <del>(DWord)</del> (Lifetime)											
16-23	QWord	Number of Solid State Media Erase Operations <del>(Lifetime)</del>										

Offset	Type	Content
		<b>Bit Meaning</b> 63:56 Device Statistics Flags, (See Table TBD) 55:32 Reserved 31:0 Number of Solid State Media Erase Operations (DWord)(Lifetime)
24-31	QWord	Percentage of the Rated Lifetime Used
		<b>Bit Meaning</b> 63:56 Device Statistics Flags, (See Table TBD) 55:16 Reserved 15:0 Percentage of the Rated Lifetime Used (Word)
32-39	QWord	Percentage of Spare Blocks Remaining in Solid State Media
		<b>Bit Meaning</b> 63:56 Device Statistics Flags, (See Table TBD) 55:8 Reserved 7:0 Percentage of Spare Blocks Remaining in Solid State Media (Byte)
40-47	QWord	Number of Error Events on Erase (Lifetime)
		<b>Bit Meaning</b> 63:56 Device Statistics Flags, (See Table TBD) 55:32 Reserved 31:0 Number of Error Events on Erase (DWord)(Lifetime)
48-55	QWord	Number of Error Events on Program (Lifetime)
		<b>Bit Meaning</b> 63:56 Device Statistics Flags, (See Table TBD) 55:32 Reserved 31:0 Number of Error Events on Program (DWord)(Lifetime)
-511	Byte	Reserved

#### ~~A.5.2.2.A.5.1.2~~ **Structure Version**

##### ~~A.5.2.2.1~~A.5.1.2.1 **Description**

Structure Version defines the version of the data structure arrangement for this [page\\_statistics](#). ~~The structure is defined by the T13 committee. When a new structure is defined the version number will be assigned.~~

Bit ~~23:16~~56:48 is ~~the page number of the Log Page. Bit 15:0 is used for~~ the revision number of the statistics structure. ~~Bit 15:0 is used for the page number of the Log Page for this statistics.~~

##### ~~A.5.2.2.2~~A.5.1.2.2 **Update Interval**

~~NA~~Update interval is not applicable to the Structure Version field.

##### ~~A.5.2.2.3~~A.5.1.2.3 **Measurement Unit**

~~NA~~Measurement unit is not applicable to the Structure Version field.

**A.5.2.2.4A.5.1.2.4 Initialization**

Structure Version shall be [set initialized](#) to [0001h](#). ~~the corresponding number at the time of manufacture.~~

**A.5.2.3A.5.1.3 Number of Defective Logical [SectorsBlocks](#) in the Solid State Media ~~(Lifetime)~~****A.5.2.3.1A.5.1.3.1 Description**

Number of Defective Logical [SectorsBlocks \(Lifetime\)](#) in the Solid State Media [statistics](#) is a counter that records the number of defected [Logical Sectorssectors \(LBA blocks\)](#) that has been found after the device is manufactured. ~~This statistics~~[Number of Defective Logical Blocks \(Lifetime\) in the Solid State Media](#) is incremented by one for each defected [Logical SectorLBA block](#) found.

**A.5.2.3.2A.5.1.3.2 Update Interval**

~~Number of Defective Logical Blocks (Lifetime) in the Solid State Media is updated on the following events.~~ When the device is operational ~~this statistics~~[the counter](#) is updated and stored in a non-volatile location at a ~~maximum~~[minimum](#) interval of one hour.

**A.5.2.3.3A.5.1.3.3 Measurement Unit**

~~Unsigned value of Logical Sector~~[Measure Unit: LBA Block](#)

**A.5.2.3.4A.5.1.3.4 Initialization**

~~This statistics~~[Number of Defective Logical Blocks \(Lifetime\) in the Solid State Media](#) shall be initialized to zero at the time of manufacture.

**A.5.2.4A.5.1.4 Number of Solid State Media Erase Operations ~~(Lifetime)~~****A.5.2.4.1A.5.1.4.1 Description**

Number of Solid State Media Erase Operations [statistics\(Lifetime\)](#) is a counter that records the number of erase performed by the device after the device is manufactured. ~~This statistics~~[Number of Solid State Media Erase Operations \(Lifetime\)](#) is incremented by one for each erase operation-~~is~~ performed.

**A.5.2.4.2A.5.1.4.2 Update Interval**

~~Number of Solid State Media Erase Operations (Lifetime) is updated on the following events.~~ When the device is operational ~~this statistics~~[the counter](#) is updated and stored in a non-volatile location at a ~~maximum~~[minimum](#) interval of one hour.

**A.5.2.4.3A.5.1.4.3 Measurement Unit**

~~Unsigned value of event~~[Measure Unit: Event](#)

**A.5.2.4.4A.5.1.4.4 Initialization**

~~This statistics~~[Number of Solid State Media Erase Operations \(Lifetime\)](#) shall be initialized to zero at the time of manufacture.

**A.5.2.5A.5.1.5 Percentage of the Rated Lifetime Used****A.5.2.5.1A.5.1.5.1 Description**

Percentage of the Rated Lifetime Used [statistics](#) is a value that records the percentage of current usage state of the solid state media. The rated lifetime of the solid state media is set by the number of erase cycles the device is capable of. The value of the percentage of the rated lifetime used is calculated from the current erase cycle divided by the rated erase cycles. This value may be greater than 100 percent. [This statisticsPercentage of the Rated Lifetime Used](#) is measured in the percentage of erase cycles.

**A.5.2.5.2A.5.1.5.2 Update Interval**

[Percentage of the Rated Lifetime Used is updated on the following events.](#) When the device is operational [this statisticsthe counter](#) is updated and stored in a non-volatile location at a [maximumminimum](#) interval of one hour.

**A.5.2.5.3A.5.1.5.3 Measurement Unit**

[Unsigned value of percentMeasure Unit: Percent](#)

**A.5.2.5.4A.5.1.5.4 Initialization**

[This statisticsPercentage of the Rated Lifetime Used](#) shall be initialized to zero at the time of manufacture.

**A.5.2.6A.5.1.6 Percentage of Spare Blocks Remaining in Solid State Media****A.5.2.6.1A.5.1.6.1 Description**

Percentage of Spare Blocks Remaining in Solid State Media [statistics](#) is a value that records the percentage of remaining spare blocks which can be used for defect reassign. The percentage is calculated from the remaining number of spare blocks compare with the original number of spare blocks. [This statisticsPercentage of Spare Blocks Remaining in Solid State Media](#) is measured in the percentage of remaining spare blocks available.

**A.5.2.6.2A.5.1.6.2 Update Interval**

[Percentage of Spare Blocks Remaining in Solid State Media is updated on the following events.](#) When the device is operational [this statisticsthe counter](#) is updated and stored in a non-volatile location at a [maximumminimum](#) interval of one hour.

**A.5.2.6.3A.5.1.6.3 Measurement Unit**

[Unsigned value of percentMeasure Unit: Percent](#)

**A.5.2.6.4A.5.1.6.4 Initialization**

[This statisticsPercentage of Spare Blocks Remaining in Solid State Media](#) shall be initialized to one hundred at the time of manufacture.

**A.5.2.7A.5.1.7 Number of Error Events on Erase (Lifetime)****A.5.2.7.1A.5.1.7.1 Description**

Number of Error Events on Erase ~~statistics(Lifetime)~~ is a counter that records the number of events the device detects error in the erase operation after the device is manufactured. ~~This statistics~~~~Number of Error Events on Erase (Lifetime)~~ is incremented by one for each error found while the erase operation ~~is~~ performed.

#### ~~A.5.2.7.2~~A.5.1.7.2 **Update Interval**

~~Number of Error Events on Erase (Lifetime) is updated on the following events.~~ When the device is operational ~~this statistics~~~~the counter~~ is updated and stored in a non-volatile location at a ~~maximum~~~~minimum~~ interval of one hour.

#### ~~A.5.2.7.3~~A.5.1.7.3 **Measurement Unit**

~~Unsigned value of event~~~~Measure Unit: Event~~

#### ~~A.5.2.7.4~~A.5.1.7.4 **Initialization**

~~This statistics~~~~Number of Error Events on Erase (Lifetime)~~ shall be initialized to zero at the time of manufacture.

### ~~A.5.2.8~~A.5.1.8 **Number of Error Events on Program (Lifetime)**

#### ~~A.5.2.8.1~~A.5.1.8.1 **Description**

Number of Error Events on Program ~~statistics(Lifetime)~~ is a counter that records the number of events the device detects error in the program operation after the device is manufactured. Device program operation is for device to write the solid state media. ~~This statistics~~~~Number of Error Events on Program (Lifetime)~~ is incremented by one for each error found while the program operation ~~is~~ performed.

#### ~~A.5.2.8.2~~A.5.1.8.2 **Update Interval**

~~Number of Error Events on Program (Lifetime) is updated on the following events.~~ When the device is operational ~~this statistics~~~~the counter~~ is updated and stored in a non-volatile location at a ~~maximum~~~~minimum~~ interval of one hour.

#### ~~A.5.2.8.3~~A.5.1.8.3 **Measurement Unit**

~~Unsigned value of event~~~~Measure Unit: Event~~

#### ~~A.5.2.8.4~~A.5.1.8.4 **Initialization**

~~This statistics~~~~Number of Error Events on Program (Lifetime)~~ shall be initialized to zero at the time of manufacture.