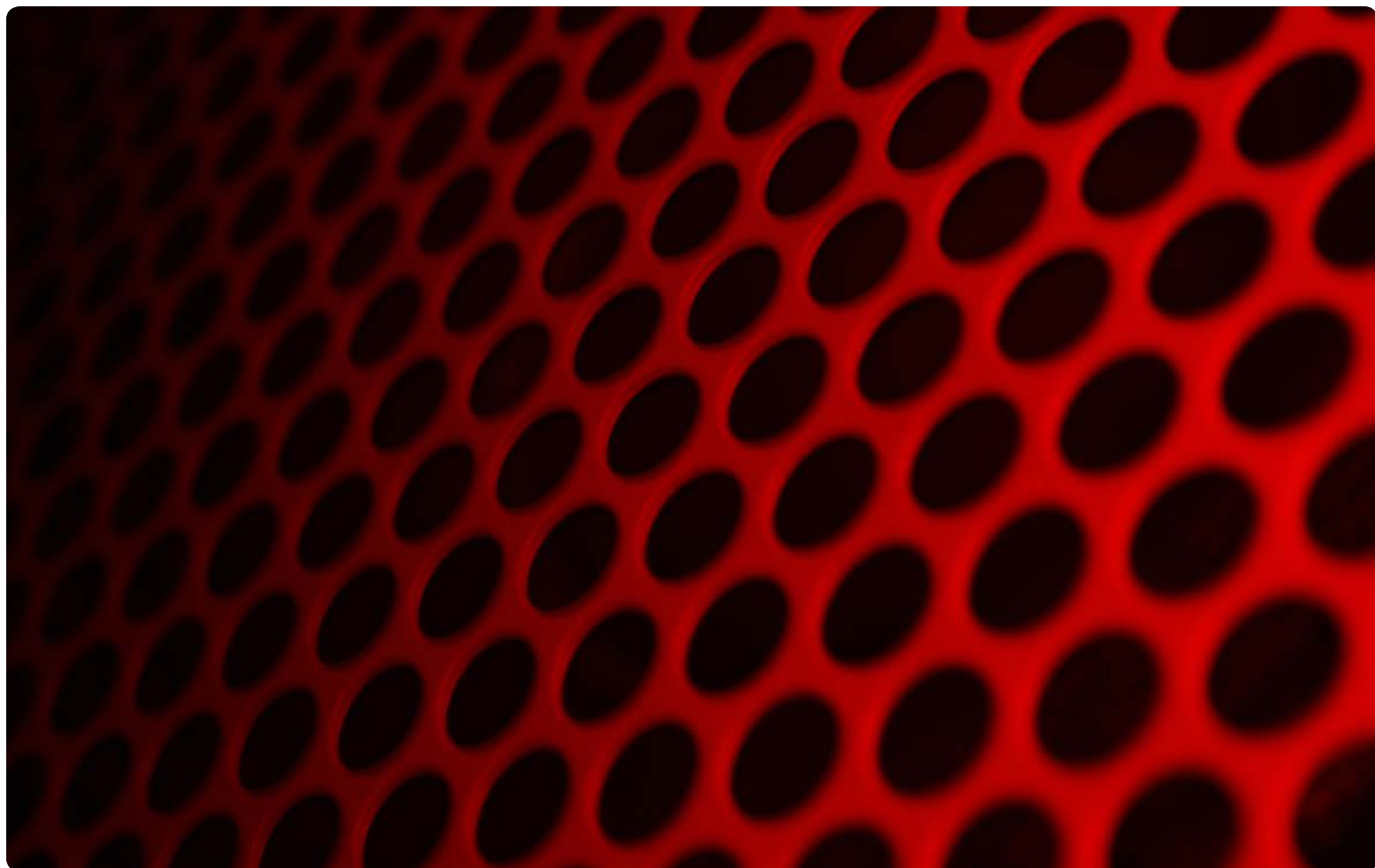


SMART Attribute Details



SMART Attribute Details

Provides a detailed description of SMART Attribute support and how each may be used.

Kingston® SF-2000 Based SSD SMART Attribute Menu Details

ID	Attribute Name	Description	Rationale
1	Raw Read Error Rate	<p>Raw error rate relative to the number of sectors read this power cycle. For the SF-2000, this attribute includes both Uncorrectable ECC (UECC) errors, and Uncorrectable RAISE (URAISE) errors.</p> <p><u>Normalized Equation:</u> $10 \log_{10} [\text{BitsRead} / (\text{ReadErrors} + 1)]$</p> <p>SectorsRead= Number of sectors read SectorsToBits= $512 * 8$ BitsRead= SectorsRead * SectorsToBits</p> <p><u>Normalized Value Range:</u> Best = 120 Worst = 38</p> <p><u>Raw Usage:</u> [3-0] : Number of sectors read this power cycle [6-4]: Read errors (UECC+URAISE)</p>	<p>The Raw Read error rate includes two types of ECC errors that are tracked by the SF-2000: UECC and URAISE. The normalized equation for Raw read error rate is logarithmic since the valid BER range of the attribute spans from $1.00E-10$ to $1.00E-12$. To force positive numbers, the numerator and denominator are flipped. One is then added to the number of errors in the denominator to avoid a divide-by-0 condition. By taking the log of the inverted BER and multiplying by ten a reasonable range of normalized values from 120 to 38 (representing a BER range of $1.00E-12$ to $1.68E-04$) are presented.</p> <p>This Attribute reads '120' until a sample size between $10E10$ and $10E12$ is available to be tracked by this Attribute.</p>
5	Retired Block Count	<p>Tracks the total number of retired blocks.</p> <p><u>Normalized Equation:</u> $100 - (100 * \text{RBC} / \text{SBM})$ RBC = Retired RBlock Count SBM = Spare RBlocks at Mfg. Time</p> <p><u>Normalized Value Range:</u> Best = 100 Worst = 1</p> <p><u>Raw Usage:</u> [3-0] : Retired block count 6-4]: None (0x00)</p>	<p>The normalized equation for this attribute decrements as blocks are retired and the reserve (over-provisioned) rblock count is decremented. (Note that all blocks, including reserve blocks, are in service at all times.. Spare rblocks at manufacturing time constitute the OP blocks minus those reserved for FW overhead and defects.)</p> <p>This Attribute represents a count of retired blocks since initial drive deployment.</p>
9	Power-On Hours (POH)	<p>Count of hours in power-on state. The raw value of this attribute shows total count of hours in the power-on state.</p> <p><u>Normalized Equation:</u> $100 - [\text{POH} / (\text{HPY} / 10)]$</p> <p><u>Normalized Value Range:</u> Best = 100 Worst = 1</p> <p><u>Raw Usage:</u> [3-0] : Total number of power-on hours [6-4]: total number of milliseconds since last hour update</p>	<p>The normalized equation for Power-On hours decrements by 1 each 1/10 year.</p> <p>This Attribute represents the number of power-on hours since initial drive deployment.</p>
<p>*Attribute is included in SKC100S3/xx and SKC300S37A/xx drives only. **Attribute is not included in SKC100S3/xx or SKC300S37A/xx drives.</p>			

ID	Attribute Name	Description	Rationale
12	Device Power Cycle Count	<p>This attribute indicates the count of SSD power on/off cycles.</p> <p><u>Normalized Equation:</u> $100 - (PCC / 1024)$</p> <p><u>Normalized Value Range:</u> Best = 100 Worst = 1</p> <p><u>Raw Usage:</u> [3-0] : Cumulative lifetime power cycle count (PCC) [6-4]: None (0x00)</p>	<p>The normalized equation for Power Cycle Count decrements by 1 for each 1024 power cycle.</p> <p>This Attribute represents the number of power cycles since initial drive deployment.</p>
13*	Soft Read Error Rate	<p>This attribute tracks the number of correctable ECC errors (CECC). The normalized value is only computed when the number of bits in the "BitsRead" count is greater than 10^{10}. The count is cleared at power-on reset and wraps to 10^{10} when it exceeds 10^{12}.</p> <p><u>Normalized Equation:</u> $10 \log_{10}(\text{BitsRead} / \text{SoftReadErrors} + 1)$</p> <p>SectorsRead= Number of sectors read SectorsToBits= $512 * 8$ BitsRead= SectorsRead*SectorsToBits</p> <p><u>Normalized Value Range:</u> Best = 120 Worst = 38</p> <p><u>Raw Usage:</u> [3-0] : Number of sectors read [6-4]: Soft Read Error Count (CECC)</p>	<p>The Soft Read Error Rate includes all correctable ECC (CECC) errors tracked by the SF-2000. The normalized equation for Soft Read Error Rate is logarithmic since the valid BER range of the attribute spans from $1.00E-10$ to $1.00E-12$. To force positive numbers, the numerator and denominator are flipped. One is then added to the number of errors in the denominator to avoid a divide-by-0 condition. By taking the log of the inverted BER and multiplying by ten a reasonable range of normalized values from 120 to 38 (representing a BER range of $1.00E-12$ to $1.68E-04$) are presented.</p> <p>This Attribute reads '120' until a sample size of $10E10$ is available to be tracked by this Attribute.</p> <p>This Attribute represents the correctable error count since initial drive deployment.</p>
100*	Gigabytes Erased	<p>This attribute counts the Gigabytes of Flash memory erases across the entire drive, over the life of the drive.</p> <p><u>Normalized Value:</u> None (0x00)</p> <p><u>Raw Usage:</u> [3-0] : Gigabytes Erased [6-4]: None (0x00)</p>	<p>This Attribute returns a byte count in increments of 64 GBytes. The count represents the number of bytes erased. The Attribute reads '0' until the byte count reaches 64 GB, at which time the Attribute changes to read '64' (decimal). For Flash memory consisting of blocks consisting of 128 logical 4K-byte pages (i.e., 2-bit-per-cell MLC Flash), each 64 GB increment represents approximately 128,000 blocks erased.</p> <p>This Attribute represents the gigabytes erased since initial drive deployment.</p>
170*	Reserve Block Count	<p>The number of reserve Flash memory blocks.</p> <p><u>Normalized Value:</u> None (0x00)</p> <p><u>Raw Usage:</u> [3-0] : Reserve block count [6-4]: None (0x00)</p>	<p>This Attribute is related to attribute 5: Retired Block Count. It provides a count of reserve (over-provisioned) blocks. (Note that all blocks, including reserve blocks, are in service at all times; reserve blocks constitute Flash memory space over and above the drive's logical capacity).</p> <p>The Attribute value is initially the total Reserve Block count. The value is decremented as the reserve block count diminishes over the drive's life.</p>
171	Program Fail Count	<p>Counts the number of flash program failures.</p> <p><u>Normalized Value:</u> None (0x00)</p> <p><u>Raw Usage:</u> [3-0] : Program Error Count [6-4]: None (0x00)</p>	<p>This Attribute returns the total number of Flash program operation failures since the drive was deployed.</p> <p>This Attribute is identical to Attribute 181.</p>
<p>*Attribute is included in SKC100S3/xx and SKC300S37A/xx drives only. **Attribute is not included in SKC100S3/xx or SKC300S37A/xx drives.</p>			

ID	Attribute Name	Description	Rationale
172	Erase Fail Count	<p>Counts the number of flash erase failures.</p> <p><u>Normalized Value:</u> None (0x00)</p> <p><u>Raw Usage:</u> [3-0] : Erase Error Count [6-4]: None (0x00)</p>	<p>This Attribute returns the total number of Flash erase operation failures since the drive was deployed.</p> <p>This Attribute is identical to Attribute 182.</p>
174	Unexpected Power Loss	<p>Counts the number of unexpected power loss events—that is, the number of times power was removed without first issuing an ATA Sleep, ATA Standby Immediate or ATA Idle Immediate command.</p> <p><u>Normalized Value:</u> None (0x00)</p> <p><u>Raw Usage:</u> [3-0] : Unexpected Power Loss Event Count [6-4]: None (0x00)</p>	<p>This Attribute returns the total number of unexpected power loss events since initial drive deployment</p>
177	Wear Range Delta	<p>Provides a value equal to the delta between the max worn Flash block and the least worn Flash block, as a percentage of the max rated wear of the SSD.</p> <p><u>Equation:</u> $\text{Wear Range Delta} = ((\text{MW} - \text{LW}) / \text{MRW}) \times 100$ MW = P-E Cycles experienced by Most Worn block LW = P-E Cycles experienced by Least Worn block MRW = Max Rated Wear = P-E Cycle rating for the Flash memory </p> <p><u>Normalized Value:</u> None (0x00)</p> <p><u>Raw Usage:</u> [3-0] : Wear Range delta [6-4]: None (0x00)</p>	<p>This Attribute identifies the “delta” between most-worn and least-worn Flash blocks, as a percentage of the max rated wear of the Flash memory on the SSD.</p> <p>For 10,000-cycle Flash, where 1% of rated cycles is 100 cycles, a value of 2 for this Attribute means the difference in wear between the least worn block and the most-worn block is 200 Erase cycles.</p>
181	Program Fail Count	<p>Counts the number of flash program failures.</p> <p><u>Normalized Value:</u> None (0x00)</p> <p><u>Raw Usage:</u> [3-0] : Program Error Count [6-4]: None (0x00)</p>	<p>This Attribute returns the total number of Flash program operation failures since the drive was deployed.</p> <p>This Attribute is identical to Attribute 171.</p>
182	Erase Fail Count	<p>Counts the number of flash erase failures.</p> <p><u>Normalized Value:</u> None (0x00)</p> <p><u>Raw Usage:</u> [3-0] : Program Error Count [6-4]: None (0x00)</p>	<p>This Attribute returns the total number of Flash erase operation failures since the drive was deployed.</p> <p>This Attribute is identical to Attribute 172.</p>
<p>*Attribute is included in SKC10053/xx and SKC300537A/xx drives only. **Attribute is not included in SKC10053/xx or SKC300537A/xx drives.</p>			

ID	Attribute Name	Description	Rationale
184*	Reported I/O Error Detection Code Errors (IOEDC errors)	<p>This attribute tracks the number of I/O errors encountered during reads from Flash memory.</p> <p><u>Normalized Equation:</u> $100 - (\text{IOEDC Errors})$</p> <p><u>Normalized Value Range:</u> Best = 100 Worst = 1</p> <p><u>Raw Usage:</u> [3-0] : Cumulative lifetime IOEDC error count [6-4]: None (0x00)</p>	<p>The SF-2000 SSD processor minimizes the risk of unreported data errors by appending CRC to data before it is written to flash. The CRC is based on the data values and the logical sector address of the data. The CRC is subsequently verified when data is read from the flash.</p> <p>This attribute tracks any CRC errors encountered while reading data from flash. The normalized equation for IOEDC Error Count (i.e., internal CRC error count) decrements by 1 for each IOEDC error.</p>
187	Reported Uncorrectable Errors (URAISE)	<p>This attribute tracks the number of uncorrectable RAISE (URAISE) error events reported back to the host for all data access commands.</p> <p><u>Normalized Equation:</u> $100 - (\text{URAISE})$</p> <p><u>Normalized Value Range:</u> Best = 100 Worst = 1</p> <p><u>Raw Usage:</u> [1-0] : Cumulative lifetime URAISE errors (maximum raw value is 65,535 errors). [6-2]: None (0x00)</p>	<p>The uncorrectable ECC error rate tracks SF-2000 Uncorrectable RAISE (URAISE) errors. The normalized equation for Uncorrectable Error Count decrements by 1 for each URAISE error, up to 100 URAISE events. Uncorrectable errors reported in this field are uncorrectable by any level of ECC protection, including RAISE.</p>
194	Temperature	<p>Temperature of the SSD assembly. That is, the temperature inside the SSD housing.</p> <p><u>Normalized Equation:</u> Current Temperature (Celsius)</p> <p><u>Normalized Value Range:</u> Low Value = -127 High Value = 127</p> <p><u>Raw Usage:</u> [1-0] : Current temperature (C; from sensor) [3-2]: Highest temperature (C; lifetime max) [5-4]: Lowest temperature (C; lifetime min) [6]: None (0x00)</p>	<p>The normalized temperature is a straight Celsius value as obtained from the primary SSD temperature sensor.</p> <p>The raw values represent current and historical Celsius temperature values from the primary SSD temperature sensor.</p> <p>For SSD designs incorporating no temperature sensor, or if temperature data is not retrievable from the installed sensor(s), all temperature values for this Attribute default to 25 degrees C.</p>
195	ECC On-the-Fly Error Count	<p>This attribute tracks the number of uncorrectable ECC errors (UECC). The normalized value is only computed when the number of bits in the "BitsRead" count is greater than 10^{10}. The count is cleared at power-on reset and wraps to 10^{10} when it exceeds 10^{12}.</p> <p><u>Normalized Equation:</u> $10 \log_{10}(\text{BitsRead} / \text{ECCOnTheFlyErrors} + 1)$</p> <p>SectorsRead= Number of sectors read SectorsToBits= $512 * 8$ BitsRead= SectorsRead*SectorsToBits</p> <p><u>Normalized Value Range:</u> Best = 120 Worst = 38</p> <p><u>Raw Usage:</u> [3-0] : Number of sectors read [6-4]: ECCOnTheFlyErrors (UECC) count</p>	<p>The ECC On The Fly error rate includes all uncorrectable ECC errors (UECC) tracked by the SF-2000. The normalized equation for ECC On The Fly error rate is logarithmic since the valid BER range of the attribute spans from $1.00\text{E}-10$ to $1.00\text{E}-12$. To force positive numbers, the numerator and denominator are flipped. One is then added to the number of errors in the denominator to avoid a divide-by-0 condition. By taking the log of the inverted BER and multiplying by ten a reasonable range of normalized values from 120 to 38 (representing a BER range of $1.00\text{E}-12$ to $1.68\text{E}-04$) are presented. As defined, this Attribute is identical to Attribute 201 and Attribute 204.</p> <p>This Attribute reads '120' until a sample size between $10\text{E}10$ and $10\text{E}12$ is available to be tracked by this Attribute.</p> <p>Note that all UECC errors counted by this Attribute are corrected by RAISE correction.</p>

*Attribute is included in SKC100S3/xx and SKC300S37A/xx drives only.

**Attribute is not included in SKC100S3/xx or SKC300S37A/xx drives.

ID	Attribute Name	Description	Rationale
196	Reallocation Event Count	<p>Tracks the total number of reallocated Flash blocks.</p> <p><u>Normalized Equation:</u> $100 - (100 * RBC / MRC)$ RBC = Retired Block Count (Grown) MRE = Maximum reallocation count</p> <p><u>Normalized Value Range:</u> Best = 100 Worst = 1</p> <p><u>Raw Usage:</u> [3-0] : Retired block count [6-4]: None (0x00)</p>	<p>The normalized equation for this attribute decrements as blocks are retired and the reserve (over-provisioned) block count is decremented. (Note that all blocks, including reserve blocks, are in service at all times. Maximum reallocation count is the maximum number of reallocations that the map can handle.)</p> <p>This Attribute represents a count of retired blocks since initial drive deployment.</p>
198*	Uncorrectable Sector Count	<p>Uncorrectable sector count relative to the number of sectors read this power cycle. The normalized value is only computed when the number of bits in the "BitsRead" count is greater than 10^{10}. The count is cleared at power-on reset and wraps to 10^{10} when it exceeds 10^{12}.</p> <p><u>Normalized Equation:</u> $10 * \log_{10}(\text{BitsRead} / \text{URAISE} + 1)$</p> <p>SectorsRead= Number of sectors read SectorsToBits= $512 * 8$ BitsRead= SectorsRead*SectorsToBits</p> <p>URAISE= Uncorrectable Error Count</p> <p><u>Normalized Value Range:</u> Best = 120 Worst = 38</p> <p><u>Raw Usage:</u> [3-0] : Uncorrectable sector count (URAISE) this power cycle [6-4] : Number of sectors read this power cycle</p>	<p>The normalized equation for this Attribute is logarithmic since the valid BER range of the attribute spans from $1.00E-10$ to $1.00E-12$.</p> <p>This Attribute reads '120' until a sample size between $10E10$ and $10E12$ is available to be tracked by this Attribute.</p>
199*	SATA R-Errors Error Count	<p>This attribute tracks the number of SATA TX R_Errors + SATA RX R_Errors.</p> <p><u>Normalized Equation:</u> $200 - (R\text{Errors} * \text{SampleSize} / \text{NumSectorsTransferred})$</p> <p>SampleSize= 8000 NumSectorsTransferred= Total number of sectors transferred to/ from Host this power cycle.</p> <p><u>Normalized Value Range:</u> Best = 200 Worst = 1</p> <p><u>Raw Usage:</u> [3-0] : Current SATA RError count this power cycle [6-4]: None (0x00)</p>	<p>This attribute records the number of SATA TX R_Errors + SATA RX R_Errors.</p> <p>Until the sample size reaches or exceeds 8000, the normalized value reads '200'.</p>
<p>*Attribute is included in SKC100S3/xx and SKC300S37A/xx drives only. **Attribute is not included in SKC100S3/xx or SKC300S37A/xx drives.</p>			

ID	Attribute Name	Description	Rationale
201	Uncorrectable Soft Read Error Rate (UECC)	<p>Number of soft read errors that cannot be fixed on-the-fly and requires deep recovery provided by RAISE. The normalized value is only computed when the number of bits in the "BitsRead" count is greater than 10^{10}. The count is cleared at power-on reset and wraps to 10^{10} when it exceeds 10^{12}.</p> <p><u>Normalized Equation:</u> $10 \log_{10}(\text{BitsRead}/\text{UECC} + 1)$</p> <p>SectorsRead= Number of sectors read SectorsToBits= 512×8 BitsRead= SectorsRead*SectorsToBits</p> <p><u>Normalized Value Range:</u> Best = 120 Worst = 38</p> <p><u>Raw Usage:</u> [3-0] : Number of sectors read [6-4]: Uncorrectable Soft error count (UECC)</p>	<p>The Uncorrectable Soft Read Error Rate includes all uncorrectable ECC errors (UECC) tracked by the SF-2000. The normalized equation for ECC On The Fly error rate is logarithmic since the valid BER range of the attribute spans from $1.00\text{E}-10$ to $1.00\text{E}-12$. To force positive numbers, the numerator and denominator are flipped. One is then added to the number of errors in the denominator to avoid a divide-by-0 condition. By taking the log of the inverted BER and multiplying by ten a reasonable range of normalized values from 120 to 38 (representing a BER range of $1.00\text{E}-12$ to $1.68\text{E}-04$) are presented. As defined, this Attribute is identical to Attribute 195 and Attribute 204.</p> <p>This Attribute reads '120' until a sample size between $10\text{E}10$ and $10\text{E}12$ is available to be tracked by this Attribute.</p> <p>Note that all UECC errors counted by this Attribute are corrected by RAISE correction.</p>
204	Soft ECC Correction Rate (UECC)	<p>Number of errors corrected by RAISE that cannot be fixed on-the-fly and requires RAISE to correct. The normalized value is only computed when the number of bits in the "BitsRead" count is greater than 10^{10}. The count is cleared at power-on reset and wraps to 10^{10} when it exceeds 10^{12}.</p> <p><u>Normalized Equation:</u> $10 \log_{10}(\text{BitsRead}/\text{UECC} + 1)$</p> <p>SectorsRead= Number of sectors read SectorsToBits= 512×8 BitsRead= SectorsRead*SectorsToBits</p> <p><u>Normalized Value Range:</u> Best = 120 Worst = 38</p> <p><u>Raw Usage:</u> [3-0] : Number of sectors read [6-4]: Soft ECC correction count (UECC)</p>	<p>The Soft ECC Correction Rate includes all uncorrectable ECC errors (UECC) tracked by the SF-2000. The normalized equation for ECC On The Fly error rate is logarithmic since the valid BER range of the attribute spans from $1.00\text{E}-10$ to $1.00\text{E}-12$. To force positive numbers, the numerator and denominator are flipped. One is then added to the number of errors in the denominator to avoid a divide-by-0 condition. By taking the log of the inverted BER and multiplying by ten a reasonable range of normalized values from 120 to 38 (representing a BER range of $1.00\text{E}-12$ to $1.68\text{E}-04$) are presented. As defined, this Attribute is identical to Attribute 195 and Attribute 201.</p> <p>This Attribute reads '120' until a sample size between $10\text{E}10$ and $10\text{E}12$ is available to be tracked by this Attribute.</p> <p>Note that all UECC errors counted by this Attribute are corrected by RAISE correction.</p>
230	Drive Life Protection Status	<p>Current state of drive operation based upon the Life Curve. Extreme conditions will require the drive to protect itself to ensure the warranty period.</p> <p><u>Normalized Equation:</u> $100 = \text{usage does not require protection}$ $90 = \text{currently protected}$</p> <p><u>Normalized Value Range:</u> Best = 100 Worst = 90 (protection active)</p> <p><u>Raw Usage:</u> None (0x00)</p>	<p>When protection is not active, this value reads 100.</p> <p>If the PE Cycle usage trajectory threatens to violate the Life Curve usage schedule for the block that has the minimum PE cycles left unused, protection activates to forbid such violation and this value reads 90.</p>
<p>*Attribute is included in SKC100S3/xx and SKC300S37A/xx drives only. **Attribute is not included in SKC100S3/xx or SKC300S37A/xx drives.</p>			

ID	Attribute Name	Description	Rationale
231	SSD Life Left	<p>Indicates the approximate SDD life left, in terms of PE cycles or Flash blocks currently available for use.</p> <p><u>Normalized Equation:</u> SSD Life Left = MIN[MAX(termA, 10), termB] termA = (Unused)/(Rated) x 100 Unused = (unused PE cycles) Rated = (rated PE cycles) termB = (100* SBN) / SBM SBN = Spare RBlocks Now SBM = Spare RBlocks at Mfg. Time</p> <p><u>Normalized Value Range:</u> 100 = Best = Full SSD life remains 1 = Worst = Insufficient Flash blocks remain in service for proper SSD operation</p> <p><u>Raw Usage:</u> [0]: 0 = Life driven by PE cycles 1 = Life driven by Spare Blocks [6-1]: None (0x00)</p>	<p>SSD life left is based on actual usage and takes into account PE cycle consumption (life curve status) and Flash block retirement.</p> <p>Typically, PE cycles will dominate this attribute until the end of life when the defects start to play a larger role.</p> <p>Note that term B is the same as attribute 5.</p>
232*	Available Reserved Space	<p>Indicates the amount of reserve Flash memory space in service.</p> <p><u>Normalized Value:</u> None (0x00)</p> <p><u>Raw Usage:</u> [3-0]: [(RB) x (BPB)] / (1024^3) RB = Reserve Blocks (see Attribute 170) BPB = Bytes per Block [6-4]: None (0x00)</p>	<p>This Attribute returns a count of GB equal to the number of Flash Blocks in service over and above the minimum block count required. This Attribute is Attribute 170 presented in units of GB.</p> <p>The Attribute value is returned in units of Gigabytes at an update resolution of 1 GByte. The value is initially the number of GB equal to the total Reserve Block Count. As the value is updated (decremented), it decrements in GB resolution. For example, if the initial value is n, the next update will decrement the value to (n- 1).</p>
235**	Power Fail Backup Health	<p>Indicates the condition of an external hold up circuit based on test results from the SF-2000 "SuperCap Test".</p> <p><u>Normalized Equation:</u> $\min(100, (100 * (\text{scapCurDischgMs} - 10) / (\min(\text{scapTestDischgToutMs}, \text{scapInitDischgMs}) - 10)))$</p> <p>where scapCurDischgMs = Most recent discharge time (limited by apTestDischgToutMs). scapTestDischgToutMs = timeout "ceiling" (msec), specified via ConfigDrive Unique scapInitDischgMs = Initial discharge time for SuperCap characterization at mfg time (characterization may be performed with a higher timeout "ceiling")</p> <p><u>Normalized Value Range:</u> Best = 100 ("SuperCap test" passed) Worst = 1 (indicates the hold-up capability has degraded too far)</p> <p><u>Raw Usage:</u> [1-0]: Latest "SuperCap test" discharge time (in milliseconds). [6-2]: None (0x00)</p>	<p>Power Fail Backup Health is an estimation of capacitive hold-up capability based on a timed discharge test, wherein discharge (past a pre-defined voltage threshold) faster than a predefined time-value threshold indicates a capacitor bank whose capacitance value is degraded past the point of reliability to protect SSD data.</p> <p>If an SSD has never run a "SuperCapacitor Test", the normalized value of this Attribute remains at '100'.</p>
<p>*Attribute is included in SKC100S3/xx and SKC300S37A/xx drives only. **Attribute is not included in SKC100S3/xx or SKC300S37A/xx drives.</p>			

ID	Attribute Name	Description	Rationale
241	Lifetime Writes from Host System	<p>Indicates the number of bytes (in 64GB resolution) written to the drive by a host system, over the life of the drive.</p> <p><u>Normalized Value:</u> None (0x00)</p> <p><u>Usage:</u> [3-0]: Count of GB written [6-4]: None (0x00)</p>	<p>This Attribute returns a byte count, in units of Gigabytes at an update resolution of 64 GBytes. The count represents the number of bytes written. The Attribute reads '0' until the number of bytes written reaches 64GB; at 64GB the Attribute increments to a value of '64' (decimal).</p>
242	Lifetime Reads to Host System	<p>Indicates the number of bytes (in 64GB resolution) read from the drive by a host system, over the life of the drive.</p> <p><u>Normalized Value:</u> None (0x00)</p> <p><u>Usage:</u> [3-0]: Count of GB written [6-4]: None (0x00)</p>	<p>This Attribute returns a byte count, in units of Gigabytes at an update resolution of 64 GB. The count represents the number of bytes read. The Attribute reads '0' until the number of bytes read reaches 64GB; at 64GB the count increments to a value of '64' (decimal).</p>
<p>*Attribute is included in SKC100S3/xx and SKC300S37A/xx drives only. **Attribute is not included in SKC100S3/xx or SKC300S37A/xx drives.</p>			