

DELKIN DEVICES®

S370 Series

SATA III Industrial 2.5"

Solid State Drive

Engineering Specification

Document Number: 401-0585-00

Revision: A



Product Overview

- **Capacity**
 - 32GB to 256GB
- **SATA Interface**
 - SATA Revision 3.1
 - SATA 1.5Gbps, 3Gbps, and 6Gbps interface
- **Flash Interface**
 - Flash type: SLC
- **Performance**
 - Read: up to 172 MB/s
 - Write: up to 165 MB/s
- **Power Consumption**^{Note1}
 - Active mode: < 2329 mW
 - Idle mode: < 739 mW
- **TBW (Terabytes Written)**^{Note2}
 - 18,720 TBW for 256GB
- **MTBF**
 - More than 2,000,000 hours
- **Features**
 - Global Wear Leveling
 - Bad Block Management
 - TRIM
 - SMART
 - NCQ
 - Over-Provisioning^{Note3}
 - Firmware Update Capability
- **Temperature Range**
 - Operation: -40°C ~ 85°C
 - Storage: -50°C ~ 100°C
- **RoHS compliant**

Notes:

1. Please see "4.2 Power Consumption" for details.
2. Please see "TBW (Terabytes Written)" in Chapter 2" for details.
3. Contact Delkin for overprovisioned configurations

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1. INTRODUCTION

1.1. General Description

Delkin Devices' S370 Series SATA III Industrial SLC 2.5" Solid State Drive (SSD) delivers all the advantages of flash disk technology with Serial ATA III interface and is fully compliant with the standard 2.5" form factor. Delkin's SSD draws significantly less power compared to traditional hard drives and is also hot swappable. The drive is available in high endurance SLC capacities from 32GB to 256GB and can reach speeds up to 138MB/s read as well as 137MB/s write (measured by CrystalDiskMark).

1.2. Product Block Diagram

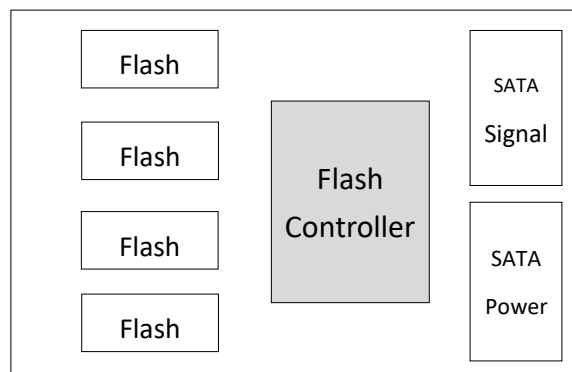


Figure 1-1 SSD Product Block Diagram

1.3. Flash Management

1.3.1. Error Correction Code (ECC)

Flash memory cells will deteriorate with use, which might generate random bit errors in the stored data. Thus, Delkin's SATA III Industrial SLC 2.5" SSD applies a BCH ECC algorithm, which can detect and correct errors occur during read process, ensure data been read correctly, as well as protect data from corruption.

1.3.2. Wear Leveling

NAND flash devices can only undergo a limited number of program/erase cycles, and in most cases, the flash media are not used evenly. If some areas are updated more frequently than others, the lifetime of the device would be reduced significantly. Thus, Wear Leveling is applied to extend the

lifespan of NAND flash by evenly distributing write and erase cycles across the media.

Delkin utilizes advanced Wear Leveling algorithms, which can efficiently distribute flash usage through the whole flash media area. Moreover, by implementing a Global Wear Leveling algorithm, the life expectancy of the NAND flash is greatly improved.

1.3.3. Bad Block Management

Bad blocks are blocks that include one or more invalid bits, and their reliability is not guaranteed. Blocks that are identified and marked as bad by the manufacturer are referred to as "Initial Bad Blocks". Bad blocks that are developed during usage of the flash are named "Later Bad Blocks". Delkin implements an efficient bad block management algorithm to detect the factory-produced bad blocks and manages any bad blocks that appear with use. This practice further prevents data being stored into bad blocks and improves data reliability.

1.3.4. TRIM

TRIM is a feature which helps improve the read/write performance and speed of solid-state drives (SSD). Unlike hard disk drives (HDD), SSDs are not able to overwrite existing data, so the available space gradually becomes smaller with each use. With the TRIM command, the operating system can inform the SSD which blocks of data are no longer in use and can be removed permanently. Thus, the SSD will perform an erase action, which prevents unused data from occupying blocks.

1.3.5. SMART

SMART, an acronym for Self-Monitoring, Analysis and Reporting Technology, is an open standard that allows a drive to automatically detect its health and report potential failures. When a failure is recorded by SMART, users can choose to replace the drive to prevent unexpected outage or data loss. Moreover, SMART can inform users of impending failures while there is still time to perform proactive actions, such as copy data to another device.

1.3.6. Over-Provisioning

Over Provisioning refers to the inclusion of extra NAND capacity in a SSD, which is not visible or usable by users. With Over Provisioning, the performance and IOPS (Input/Output Operations per Second) are improved by providing the controller additional space to manage P/E cycles, which enhances the reliability and endurance as well. Moreover, the write amplification of the SSD becomes lower when the controller writes data to the flash. Contact Delkin for this option.

1.3.7. Firmware Upgrades

Firmware can be considered as a set of instructions on how the device communicates with the host. Firmware can be upgraded when new features are added or enhancements are developed, as controlled by the user.

1.4. Advanced Device Security Features

1.4.1. Secure Erase

Secure Erase is a standard ATA command and will write "0xFF" to all cells, to fully wipe all the data on hard drives and SSDs. When this command is issued, the SSD controller will erase its storage blocks and return to its factory default settings.

1.4.2. AES Encryption

For applications requiring an extra level of security, the Delkin 2.5" SSD is available with encryption capability, utilizing an AES-128/256-bit strength.

1.5. SSD Lifetime Management

1.5.1. Terabytes Written (TBW)

TBW (Terabytes Written) is a measurement of SSDs' expected lifespan, which represents the amount of data written to the device. To calculate the TBW of a SSD, the following equation is applied:

$$TBW = [(NAND\ Endurance) \times (SSD\ Capacity) \times (WLE)] / WAF$$

NAND Endurance: NAND endurance refers to the P/E (Program/Erase) cycle rating of NAND flash, per the manufacturer's specification.

SSD Capacity: The SSD capacity is the specific capacity in total of a SSD.

WLE: Wear Leveling Efficiency (WLE) represents the ratio of the average amount of erases on all the blocks to the erases on any block at maximum.

WAF: Write Amplification Factor (WAF) is a numerical value representing the ratio between the amount of data that a SSD controller writes to the flash and the amount of data that the host's flash controller writes. A better WAF, which is near 1, guarantees better endurance and lower frequency of data written to flash memory.

2. PRODUCT SPECIFICATIONS

- **Capacity**
 - 32GB to 256GB SLC

- **Electrical/Physical Interface**
 - SATA Interface
 - ◆ Compliant with SATA Revision 3.1
 - ◆ Compatible with SATA 1.5Gbps, 3Gbps and 6Gbps interface
 - ◆ NCQ support up to queue depth up to 32 commands
 - ◆ Supports SATA Device Sleep (DevSleep)
 - ◆ Supports 48 bit LBA addressing mode commands

- **ECC Scheme**
 - Capable of correcting up to 66 bits per 1K Byte

- **Supports SMART and TRIM commands**

- **Performance and Power Consumption**

Table 2-1 Performance and Power Consumption

Capacity	Performance		Power Consumption		
	CrystalDiskMark		Read (mW)	Write (mW)	IDLE (mW)
	Read (MB/s)	Write (MB/s)			
32GB	172	161	1114	1537	600
64GB	172	165	1853	1853	711
128GB	172	165	1853	1853	711
256GB	143	134	2329	2521	739

NOTE:

For more details on Power Consumption, please refer to Chapter 4.2.

- **Endurance - TBW (Terabytes Written)**

Table 2-2 TBW

Capacity	TBW
32GB	2,340
64GB	4,685
128GB	9,360
256GB	18,720

NOTES:

Many factors affect drive endurance / TBW, including flash configuration, SDR configuration, host platform, usage model, write amplification factor, etc. The figures above are estimates based on the JEDEC JESD219A Client Workload model and are not guaranteed.

- **Part Numbers**

Table 2-3 Standard Part Number

Capacity	Standard Part Number
32GB	DE32TNKNE-35000-D
64GB	DE64TNKNE-35000-D
128GB	DE1HTNJNE-35000-D
256GB	DE2HTNJNE-35000-D

NOTES:

Contact Delkin for customization options, which will involve a modified part number.

- **Industrial SLC 2.5" (-40 to 85°C Operating Temperature)**

3. ENVIRONMENTAL SPECIFICATIONS

3.1. Environmental Conditions

3.1.1. Temperature and Humidity

- Temperature:
 - ◆ Operational: -40°C to 85°C
 - ◆ Storage: -50°C to 100°C
- Humidity:
 - ◆ RH 95% under 55°C (operational)

3.1.2. Shock & Vibration

- Shock Specification
 - ◆ 20g, 1/2 Sine, 10ms, 3 pulses in each direction (+/-), all 3 Axes
- Vibration Specification
 - ◆ 2Hz to 5000Hz, Random 3 Axis, 19G_{RMS}

3.1.3. EMI Compliance

- Design to be compliant.

3.2. MTBF

MTBF, an acronym for Mean Time Between Failures, is a measure of a device's reliability. Its value represents the average time between a repair and the next failure. The measure is typically in units of hours. The higher the MTBF value, the higher the reliability of the device. The predicted result of the Delkin S370 Series 2.5" SSD is more than 2,000,000 hours at 0°C.

3.3. Certification & Compliance

- RoHS
- SATA III (SATA Rev. 3.2)
- Up to ATA/ATAPI-8 (Including S.M.A.R.T)
- WARNING: This product may contain chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm. For more information go to www.p65warnings.ca.gov.

4. ELECTRICAL SPECIFICATIONS

4.1. Supply Voltage

Table 4-1 Supply Voltage

Parameter	Rating
Operating Voltage	5V

4.2. Power Consumption

Table 4-2 Current Draw

Capacity	Read (mA)	Write (mA)	Idle (mA)
32GB	223	307	120
64GB	280	371	142
128GB	280	371	142
256GB	466	504	148

NOTES:

1. The average value of power consumption is achieved based on 100% conversion efficiency.
2. The measured input power voltage is 5V.
3. Sequential R/W is measured while testing 4000MB sequential R/W 5 times with CrystalDiskMark.
4. Power Consumption may vary with benchmark tool, host platform and test method.

5. INTERFACE

5.1. Pin Assignment and Descriptions

Table 5-1 Signal Segment Pin Assignment and Descriptions

PIN NUMBER	FUNCTION
S1	GND
S2	A+ (DIFFERENTIAL SIGNAL PAIR A)
S3	A- (DIFFERENTIAL SIGNAL PAIR A)
S4	GND
S5	B- (DIFFERENTIAL SIGNAL PAIR B)
S6	B+ (DIFFERENTIAL SIGNAL PAIR B)
S7	GND

Table 0-2 Power Segment Pin Assignment and Descriptions

PIN NUMBER	FUNCTION
P1	NOT USED (3.3V)
P2	NOT USED (3.3V)
P3	DEVSLP
P4	GND
P5	GND
P6	GND
P7	5V PRE-CHARGE
P8	5V
P9	5V
P10	GND
P11	RESERVED
P12	GND
P13	NOT USED (12V PRE-CHARGE)
P14	NOT USED (12V)
P15	NOT USED (12V)

6. SUPPORTED COMMANDS

6.1. ATA Command List

Table 6-1 ATA Command List

Op Code	Description	Op Code	Description
00h	NOP	97h	IDLE
06h	Data Set Management	98h	CHECK POWER MODE
10h-1Fh	Recalibrate	99h	SLEEP
20h	Read Sectors	B0h	SMART
21h	Read Sectors without Retry	B1h	DEVICE CONFIGURATION
24h	Read Sectors EXT	C4h	Read Multiple
25h	Read DMA EXT	C5h	Write Multiple
27h	Read Native Max Address EXT	C6h	Set Multiple Mode
29h	Read Multiple EXT	C8h	Read DMA
2Fh	Read Log EXT	C9h	Read DMA without Retry
30h	Write Sectors	CAh	Write DMA
31h	Write Sectors without Retry	CBh	Write DMA without Retry
34h	Write Sectors EXT	CEh	Write Multiple FUA EXT
35h	Write DMA EXT	E0h	Standby Immediate
37h	Set Native Max Address EXT	E1h	Idle Immediate
38h	CFA WRITE SECTORS WITHOUT ERASE	E2h	Standby
39h	Write Multiple EXT	E3h	Idle
3Dh	Write DMA FUA EXT	E4h	Read Buffer
3Fh	Write Long EXT	E5h	Check Power Mode
40h	Read Verify Sectors	E6h	Sleep
41h	Read Verify Sectors without Retry	E7h	Flush Cache
42h	Read Verify Sectors EXT	E8h	Write Buffer
45h	WRITE UNCORRECTABLE EXT	EAh	Flush Cache EXT
60h	Read FPDMA Queued	ECh	Identify Device
61h	Write FPDMA Queued	EFh	Set Features
70h-7Fh	Seek	F1h	Security Set Password
90h	Execute Device Diagnostic	F2h	Security Unlock
91h	Initialize Device Parameters	F3h	Security Erase Prepare
92h	Download Microcode	F4h	Security Erase Unit
93h	DOWNLOAD MICROCODE DMA	F5h	Security Freeze Lock
94h	STANDBY IMMEDIATE	F6h	Security Disable Password
95h	IDLE IMMEDIATE	F8h	Read Native Max Address
96h	STANDBY	F9h	Set Max Address

6.2. Identify Device Data

The following table details the sector data returned by the IDENTIFY DEVICE command.

Table 6-2 List of Device Identification

Word	F: Fixed V: Variable X: Both	Default Value	Description
0	F	0040h	General configuration bit-significant information
1	X	*1	Obsolete – Number of logical cylinders
2	V	C837h	Specific configuration
3	X	0010h	Obsolete – Number of logical heads (16)
4-5	X	00000000h	Retired
6	X	003Fh	Obsolete – Number of logical sectors per logical track (63)
7-8	V	00000000h	Reserved for assignment by the Compact Flash Association
9	X	0000h	Retired
10-19	F	Varies	Serial number (20 ASCII characters)
20-21	X	0000h	Retired
22	X	0000h	Obsolete
23-26	F	Varies	Firmware revision (8 ASCII characters)
27-46	F	Varies	Model number
47	F	8010h	7:0- Maximum number of sectors transferred per interrupt on MULTIPLE commands
48	F	4000h	Trusted Computing feature set options(not support)
49	F	2F00h	Capabilities
50	F	4000h	Capabilities
51-52	X	000000000h	Obsolete
53	F	0007h	Words 88 and 70:64 valid
54	X	*1	Obsolete – Number of logical cylinders
55	X	0010h	Obsolete – Number of logical heads (16)
56	X	003Fh	Obsolete – Number of logical sectors per track (63)
57-58	X	*2	Obsolete – Current capacity in sectors
59	F	0110h	Number of sectors transferred per interrupt on MULTIPLE commands
60-61	F	*3	Maximum number of sector (28bit LBA mode)
62	X	0000h	Obsolete
63	F	0407h	Multi-word DMA modes supported/selected
64	F	0003h	PIO modes supported
65	F	0078h	Minimum Multiword DMA transfer cycle time per word
66	F	0078h	Manufacturer's recommended Multiword DMA transfer cycle time
67	F	0078h	Minimum PIO transfer cycle time without flow control
68	F	0078h	Minimum PIO transfer cycle time with IORDY flow control
69	F	0100h	Additional Supported (support download microcode DMA)
70	F	0000h	Reserved
71-74	F	0000000000000000h	Reserved for the IDENTIFY PACKET DEVICE command
75	F	001Fh	Queue depth
76	F	670eh	Serial SATA capabilities
77	F	0084h	Serial ATA Additional Capabilities
78	F	014Ch	Serial ATA features supported
79	V	0040h	Serial ATA features enabled
80	F	07F8h	Major Version Number
81	F	0000h	Minor Version Number
82	F	346bh	Command set supported
83	F	7d09h	Command set supported
84	F	6063h	Command set/feature supported extension
85	V	3469h	Command set/feature enabled
86	V	bc01h	Command set/feature enabled
87	V	6063h	Command set/feature default

88	V	003Fh	Ultra DMA Modes
89	F	0001h	Time required for security erase unit completion
90	F	001Eh	Time required for Enhanced security erase completion
91	V	0000h	Current advanced power management value
92	V	FFFEh	Master Password Revision Code
93	F	0000h	Hardware reset result. The contents of the bits (12:0) of this word can be changed only during the execution of hardware reset.
94	V	0000h	Vendor's recommended and actual acoustic management value
95	F	0000h	Stream Minimum Request Size
96	V	0000h	Streaming Transfer Time – DMA
97	V	0000h	Streaming Access Latency – DMA and PIO
98-99	F	0000h	Streaming Performance Granularity
100-103	V	*4	Maximum user LBA for 48 bit Address feature set
104	V	0000h	Streaming Transfer Time – PIO
105	F	0008h	Maximum number of 512-byte blocks per DATA SET MANAGEMENT command
106	F	4000h	Physical sector size/Logical sector size
107	F	0000h	Inter-seek delay for ISO-7779 acoustic testing in microseconds
108-111	F	0000000000000000h	Unique ID
112-115	F	0000000000000000h	Reserved
116	V	0000h	Reserved
117-118	F	00000000h	Words per logical Sector
119	F	4014h	Supported settings
120	F	4014h	Command set/Feature Enabled/Supported
121-126	F	0h	Reserved
127	F	0h	Removable Media Status Notification feature set support
128	V	0021h	Security status
129-140	X	0h	Vendor specific
141	X	0001h	Vendor specific
142-159	X	0h	Vendor specific
160	F	0h	Compact Flash Association (CFA) power mode 1
161-167	X	0h	Reserved for assignment by the CFA
168	F	3h 2.5" 4h 1.8" 5h Less than 1.8"	Device Nominal Form Factor
169	F	0001h	DATA SET MANAGEMENT command is supported
170-173	F	0h	Additional Product Identifier
174-175		0h	Reserve
176-205	V	0h	Current media serial number
206	F	0h	SCT Command Transport
207-208	F	0h	Reserved
209	F	4000h	Alignment of logical blocks within a physical block
210-211	V	0000h	Write-Read-Verify Sector Count Mode 3 (not supported)
212-213	F	0000h	Write-Read-Verify Sector Count Mode 2 (not supported)
214-216		0000h	NV Cache relate (not supported)
217	F	0001h	Non-rotating media device
218	F	0h	Reserved
219	F	0h	NV Cache relate (not supported)
220	V	0h	Write read verify feature set current mode

Word	F: Fixed V: Variable X: Both	Default Value	Description
221		0h	Reserved
222	F	107Fh	Transport major version number
223	F	0h	Transport minor version number
224-229		0h	reserved
230-233		0h	Extend number of user addressable sectors
234		0001h	Minimum number of 512-byte data blocks per DOWNLOAD MICROCODE command for mode 03h
235		0080h	Maximum number of 512-byte data blocks per DOWNLOAD MICROCODE command for mode 03h
236-254	F	0h	Reserved
255	X	XXA5h XX is variable	Integrity word (Checksum and Signature)

7. SMART FEATURE SET

The Delkin Devices S370 Series 2.5" supports the SMART command set and defines vendor-specific data to report information about the status of the drive.

7.1. SMART Feature Register Values

Value	Command	Value	Command
D0h	Read Data	D5h	Read Log
D1h	Read Attribute Threshold	D6h	Write Log
D2h	Enable/Disable Autosave	D8h	Enable SMART Operations
D3h	Save Attribute Values	D9h	Disable SMART Operations
D4h	Execute Off-line Immediate	Dah	Return Status

If the reserved size is below the threshold, the status can be read from the Cylinder Register using the Return Status command (DAh.)

7.1.1. SMART Data Structure

The following 512 Bytes make up the device SMART data structure. Users can obtain the data using the "Read Data" command (D0h.)

Byte	F/V	Description
0 - 1	X	Revision code
2 - 361	X	Vendor specific (see 7.1.2)
362	V	Off-line data collection status
363	X	Self-test execution status byte
364 - 365	V	Total time in seconds to complete off-line data collection activity
366	X	Vendor specific
367	F	Off-line data collection capability
368 - 369	F	SMART capability
370	F	Error logging capability - 7-1 Reserved - 0 1 = Device error logging supported
371	X	Vendor specific
372	F	Short self-test routine recommended polling time (in minutes)
373	F	Extended self-test routine recommended polling time (in minutes)
374	F	Conveyance self-test routine recommended polling time (in minutes)
375 - 385	R	Reserved
386 - 395	F	Firmware version/date code
396 - 399	F	Reserved
400 - 405	F	Reserved
406 - 510	X	Vendor specific
511	V	Data structure checksum

Notes:

1. F = content (byte) is fixed and does not change
2. V = content (byte) is variable and may change depending on the state of the device or the commands executed by the device
3. X = content (byte) is vendor specific and may be fixed or variable.
4. R = content (byte) is reserved and shall be zero.

7.1.2. SMART Attributes

The following table defines the vendor specific data in byte 2 to 361 of the 512-byte SMART data.

Table 7-1 SMART Attributes Descriptions

Attribute ID (Hex / Dec)	Attribute Name	Reset in Power On	Raw Data Value Max Size (Bytes)	Attribute Description
0x01/1	Raw Read Error Rate	Yes	4	The rate of the total of SATA PHY CRC errors occurred during communication via the SATA link(Events RD&WR) over the total LBAs of Read.
0x05/ 5	Reallocated Sectors Count	No	2	Total number of bad blocks generated during run- time.
0x09/ 9	Power-On Time Count	No	4	Total accumulated hours the device is powered-on.
0x0C/ 12	Power Cycle Count	No	4	Total number of power cycles that have occurred during the life of the drive.
0xA0/ 160	Uncorrectable Sector Count when read/write	Yes	4	Total accumulated count of uncorrectable ECC error occurred for one host Read or Write command.
0xA1/ 161	Number of Pure Spare Block	No	2	The total pure spare blocks number (valid number) at the moment of the card initialization completed.
0xA3/ 163	Number of Initial Invalid Block	No	2	Total number of bad blocks found during the card initialization (manufactory + PT screened).
0xA4/ 164	Total Erase Count	No	4	Total number of erase operations those have been performed on all the super blocks (excluding the system blocks, bad blocks, and reserved blocks).
0xA5/165	Maximum Erase Count	No	4	The maximum number of erase operations those have ever been performed on one super block (excluding the system blocks, bad blocks, and reserved blocks).
0xA6/ 166	Minimum Erase Count	No	4	The minimum number of erase operations those have ever been performed on one super block (excluding the system blocks, bad blocks, and reserved blocks).
0xA7/ 167	Average Erase Count	No	4	The average number of erase operations over the whole available valid super blocks (excluding the system blocks, bad blocks, and reserved blocks).
0xA8/ 168	NAND Endurance	No	4	The maximum number of erase operations (P/E cycle) as specified in the NAND datasheet.
0xA9 / 169	UECC Power On	No	1	UECC Power On repair counter
0xB1/ 177	Total wear level count	No	4	Total accumulated number of wear-leveling events taken place.
0xB2/ 178	Run-time invalid block count	No	2	Total number of spare blocks that has been used to replace bad blocks during run-time.
0xB5/ 181	Total Program Fail	No	4	Total number of NAND flash program fails basing on super block.
0xB6/ 182	Total Erase Fail	No	2	Total number of NAND flash erase fails basing on nature NAND block.
0xC0/ 192	Unsafe Power Off	No	4	Total number of times of sudden power-off when drive is in active state that affects the data reliability. The value shall be incremented by one on each sudden power off.

0xC2/ 194	Current Temperature	Yes	1	Current temperature of the SSD device.
0xC3/ 195	ECC correctable count	No	4	Total count of the event when read flash ECC error but read retries successfully recover it.
0xC4/ 196	Uncorrectable ECC count	No	4	Total count of read page UECC occurred.(After read retry, the page is still ECC fail)
0xC5/ 197	Total Pending LBA with UECC Counter	Yes	4	Total pending LBA with UECC (defect) count for FW to handle. It will be reset to 0 after power cycle.
0xC6/ 198	Offline Uncorrectable ECC Count	No	4	Total count of read page UECC occurred during garbage collection only (After read retry, the page is still ECC fail)
0xC7/ 199	Ultra DMA CRC Error Count	No	2	Total count of SATA PHY CRC errors occurred during communication via the SATA link(Events RD&WR).
0xD7/215	TRIM command Count	No	4	Lifetime TRIM command count
0xE8/232	Available Reserved Space	No	1	Percentage of spare blocks remaining on the SSD (a value from 100 to 0), normalized to 100, basing upon the Number of Pure Spare Block (0xA1) scaled by the Run-time invalid block count (0xB2).
0xEB/235	Total Flash LBAs written	No	7	Total Flash LBAs written - Lower 7 bytes of total 12 bytes
0xED/237	Total Flash LBAs written	No	5	Total Flash LBAs written - Higher 5 Bytes from 0xEB
0xF1/ 241	Total LBAs Written	No	7	Total number of LBAs written to the device
0xF2/ 242	Total LBAs Read	No	7	Total number of LBAs read from the device
0xF3/243	Total LBAs Written	No	5	upper 5 bytes of 0xF1
0xF4/244	Total LBAs Read	No	5	Upper 5 bytes of 0xF2
0xF5/ 245	Total LBA written to flash	No		Total number of LBAs written to the flash
0xF9/249	Remain Life Percentage	No	8	The SSD life remaining percentage based on average PE (a value from 100 to 0)

8. PHYSICAL DIMENSIONS

Table 8-1 Dimensions

Dimension	Measurement
Height	9.20 mm \pm 0.15 (0.36")
Width	69.75 mm \pm 0.25/-0.15 (2.75")
Length	99.70 mm \pm 0.25 (3.93")

