FORESEE SATAIII mSATA SSD S40R Datasheet

Version: A5

2019.08

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Revision History

Revision Number	*Description*	*Revision Date*
A5	Add 32GB capacity.	2019.08
A4	Update endurance.	2019.07
A3	Add 64GB performance.	2018.07
A2	Add 64GB.	2018.06
A1	Update PN.	2018.04
A0	Initial release.	2017.12

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1. General Description

The FORESEE SSD (Solid State Drive) fully consists of semiconductor devices using NAND Flash Memory which provide high reliability and high performance for a storage media. The SSD doesn't have any moving parts such as platter (disk) and head media, which provides a better solution in a notebook PC, Tablet PC and industrial PC for a storage device providing higher performance, reduced latencies, and a low power consumption in a small form factor. SSD has the same host interface with Hard Disk Drives and has a same physical dimension.

●Capacity

– 32/64/128/256GB is available

●Host interface

– Serial ATA interface of 6.0Gbps
– Complies with ATA/ATAPI-8
– Supports NCQ
– Supports TRIM

●Performance

• 32GB
– Read: Up to 410MB/s
– Write: Up to 250MB/s
• 64GB
– Read: Up to 410MB/s
– Write: Up to 250MB/s
• 128GB
– Read: Up to 530MB/s
– Write: Up to 430MB/s
• 256GB
– Read: Up to 530MB/s
– Write: Up to 440MB/s

●Power Consumption

– Active write:1030mW (256GB)
– Active read: 980mW (256GB)

●Form Factor

– JEDEC MO-300 standard

●Temperature

– Operating : 0°C to 70°C

●Shock

– Shock : 1500G, duration 0.5ms, Half Sine Wave
– Vibration : 7~800Hz, 3.08Grms, 30min/axis(X,Y,Z)
* Applicable only for cased product

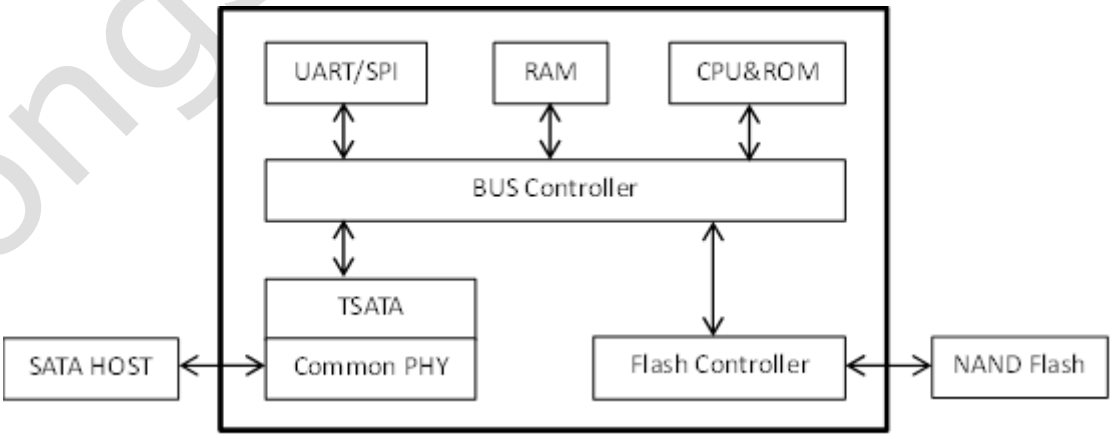
●MTBF

– 1,500,000 Hours

●Weight

– 32/64/128/256GB
– Max 8g

●SSD Functional Block Diagram

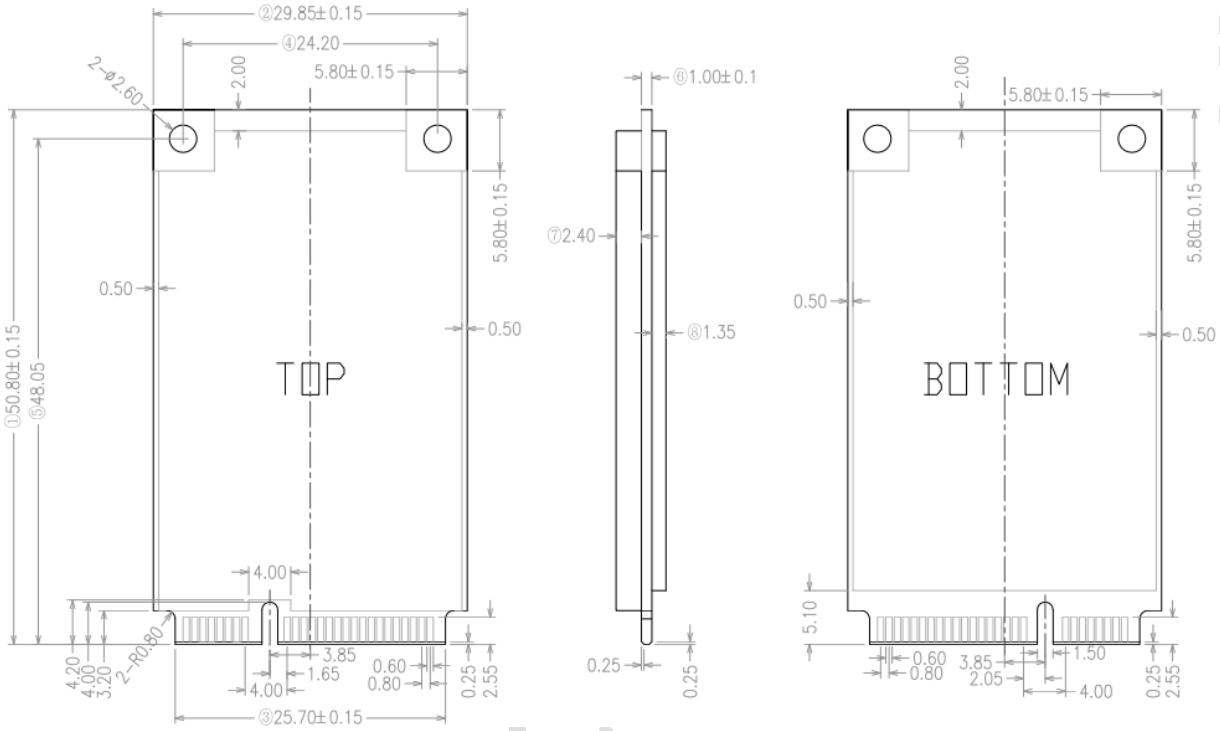


[Figure 1-1] SSD Functional Block Diagram

2. Mechanical Specification

2.1 mSATA SSD physical dimensions and Weight

Capacity(GB)	Height (mm)	Width (mm)	Length (mm)	Weight (gram)
32/64/128/256	Max 4.85	29.85 ±0.15	50.80 ±0.15	Max 8g



[Figure 2-1] mSATA Physical dimension

3. Product Specifications

3.1 System Interface and Configuration

Burst read/write rate is 600 MB/sec (6.0 Gb/sec).

3.2 System Performance

SATA 6Gb/s host interface					
Parameter	**Unit**	**32GB**	**64GB**	**128GB**	**256GB**
Sequential Read (Max)	MB/S	300	410	530	530
Sequential Write (Max)	MB/S	145	250	430	440
Random Read (4K) QD=32 (Max)	IOPS	24000	30720	39168	39680
Random Write (4K) QD=32 (Max)	IOPS	32000	48640	51200	51200

* Actual performance may vary depending on use conditions and environment

* Note

1. Performance measured using CrystalDiskMark 3.0.3 x64
2. Write cache enabled
3. 1MB/sec = 1,048,576 bytes/sec was used in sequential performance

-System: Intel Z170 Chipset, Intel Core i5-6600K@3.5GHz, 4GB DDR4

-OS: Windows 7 x64

3.3 Drive Capacity

Nominal Capacity	**32GB**	**64GB**	**128GB**	**256GB**
Unformatted Capacity	29.82GB	59.63GB	119.24GB	238.47GB
User-Addressable Sectors	62533296	125045424	250069680	500118192
Bytes per Sector	512 Bytes			

NOTE:

1 Megabyte (MB) = 1 Million bytes; 1 Gigabyte (GB) =1 Billion bytes

*Actual usable capacity may be less (due to formatting, partitioning, operating system, applications or otherwise)

3.4 Supply Voltage

Item	**Requirements**
Allowable voltage	3.3V ± 5%
Allowable noise/ripple	100mV p-p or less

3.5 System Power Consumption

Input Voltage 3.3V±5%				
Parameter	**32GB**	**64GB**	**128GB**	**256GB**
Sequential Read	340 mW	850 mW	920 mW	980 mW
Sequential Write	290 mW	800 mW	1020 mW	1030 mW
Random Read	260 mW	600 mW	610 mW	980 mW
Random Write	290 mW	610 mW	620 mW	630 mW
Idle	150mW	320 mW	320 mW	320 mW

CPU : Intel Core i5-6600K

DRAM : 4GB DDR4

Chipset : Intel Z170

OS : Windows 7 x64

Test Tool : IO Meter 2006

3.6 System Reliability

MTBF	1,500,000 Hours

MTBF is Mean Time Between Failure. As same word, annual failure ratio is 0.4%.

3.7 Endurance

TBW			
32GB	**64GB**	**128GB**	**256GB**
48TB	96TB	192TB	384TB

Notes:

1-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) x (SSD Capacity)] / WAF

NAND Endurance: NAND endurance refers to the P/E (Program/Erase) cycle of a NAND flash.

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

WAF: Write Amplification Factor (WAF) is a numerical value representing the ratio between the amount of data that a SSD controller needs to write 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-The above TBW values are calculated based on WAF=1.

3-TBW may differ according to flash configuration and platform.

4-The endurance of SSD could be estimated based on user behavior, NAND endurance cycles, and write amplification factor. It is not guaranteed by flash vendor.

3.8 Environmental Specifications

Features	Operating	Non-Operating
Temperature	0°C to 70°C	-40°C to 85°C
Humidity	5% to 95%, non-condensing	
Vibration	7~800Hz, 3.08Grms, 30min/axis(X,Y,Z)	
Shock	1500G, duration 0.5ms, Half Sine Wave	

Notes:

1-Temperature is measured by SMART Temperature .Proper airflow recommended.

2-Humidity is measured in non-condensing.

3-Test condition for shock: 0.5ms duration with half sine wave.

4-Test condition for vibration: 10Hz to 2,000Hz, 15mins/axis on 3axis.

4. Electrical Interface Specification

4.1 mSATA Pin Assignments

Pin#	Assignment	Description	Pin#	Assignment	Description
1	N/A	N/A	27	GND	Return Current Path
2	+3.3V	3.3V source	28	N/A	N/A
3	N/A	N/A	29	GND	Return Current Path
4	GND	Return Current Path	30	N/A	N/A
5	N/A	N/A	31	-A (port 1)	SATA Differential RX- based on SSD
6	N/A	N/A	32	N/A	N/A
7	N/A	N/A	33	+A (port 1)	SATA Differential RX+ based on SSD
8	N/A	N/A	34	GND	Return Current Path
9	GND	Return Current Path	35	GND	Return Current Path
10	N/A	N/A	36	N/A	N/A
11	N/A	N/A	37	GND	Return Current Path
12	N/A	N/A	38	N/A	N/A
13	N/A	N/A	39	+3.3V	3.3V Source
14	N/A	N/A	40	GND	Return Current Path
15	GND	Return Current Path	41	+3.3V	3.3V Source
16	N/A	N/A	42	N/A	N/A
17	N/A	N/A	43	N/A	N/A
18	GND	Return Current Path	44	DEVSLP	Device Sleep Mode Enable (Unused)
19	N/A	N/A	45	N/A	N/A

20	N/A	N/A	46	N/A	N/A
21	GND	Return Current Path	47	N/A	N/A
22	N/A	N/A	48	N/A	N/A
23	+B(port 1)	SATA Differential TX+ based on SSD	49	DA/DSS	Device Activity / Disable Staggered Spin-up
24	+3.3V	3.3V Source	50	GND	Return Current Path
25	-B(port 1)	SATA Differential TX- based on SSD	51	Presence Detection	Shall be pulled to GND by device
26	GND	Return Current Path	52	+3.3V	3.3V Source

Table 4-1: mSATA Connector Pin Assignment

5. Command Descriptions

5.1 Supported ATA Commands

Command	Code	Protocol
General Feature Set		
Execute Device Diagnostic	90h	Execute device diagnostic
Flush Cache	E7h	Non-data
Identify Device	ECh	PIO data-in
Initialize Drive Parameters	91h	Non-data
Read DMA	C8h	DMA
Read Multiple	C4h	PIO data-in
Read Sector(s)	20h	PIO data-in
Read Verify Sector(s)	40h or 41h	Non-data
Set Feature	EFh	Non-data
Set Multiple Mode	C6h	Non-data
Write DMA	CAh	DMA
Write Multiple	C5h	PIO data-out
Write Sector(s)	30h	PIO data-out
NOP	00h	Non-data
Read Buffer	E4h	PIO data-in
Write Buffer	E8h	PIO data-out
Power Management Feature Set		
Check Power Mode	E5h or 98h	Non-data
Idle	E3h or 97h	Non-data
Idle Immediate	E1h or 95h	Non-data
Sleep	E6h or 99h	Non-data
Standby	E2h or 96h	Non-data
Standby Immediate	E0h or 94h	Non-data
SMART Feature Set		
SMART Read Data	B0h	PIO data-in
SMART Read Threshold	B0h	PIO data-in
Host Protected Area Feature Set		
Read Native Max Address	F8h	Non-data
48-bit Address Feature Set		
Flush Cache Ext	EAh	Non-data
Read Sector(s) Ext	24h	PIO data-in
Read DMA Ext	25h	DMA
Read Multiple Ext	29h	PIO data-in
Read Native Max Address Ext	27h	Non-data
Read Verify Sector(s) Ext	42h	Non-data
Write DMA Ext	35h	DMA
Write Multiple Ext	39h	PIO data-out
Write Sector(s) Ext	34h	PIO data-out
NCQ Feature Set		

Read FPDMA Queued	60h	DMA Queued
Write FPDMA Queued	61h	DMA Queued
Others		
Data Set Management	06h	DMA
Seek	70h	Non-data

5.2 SMART Attributes

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

SMART Data Vendor-specific Attributes

Attribute ID (hex)	Attribute Name
05	Number of New Bad Block
09	Power On Hours
0C	Power Cycle Count
A1	Reserved
A4	Total Erase Count
A5	Max Erase Count
A6	Min Erase Count
A7	Average Erase Count
A9	Remain Life Percentage.
C0	Power off Retract Count
C2	Controlled temperature
C3	Reserved
B0	Reserved
B1	Reserved
B2	Reserved
C7	SATA CRC Error Count
F1	Total LBAs Written (each write unit = 1GB)
F2	Total LBAs Read (each read unit = 1GB)
F3	Reserved
F4	Reserved
FA	Reserved
FB	Reserved
FC	Reserved
FD	Reserved
FE	Reserved

6. Identify Device Data

The Identify Device command enables the host to receive parameter information from the SSD. This command has the same protocol as the Read Sector(s) command. The parameter words in the buffer have the arrangement and meanings defined in the following table.

ID Table Information

Word	Default Value	Description
0	045Ah	General configuration 15 0=ATA device 14:8 Retired 7:6 Obsolete 5:3 Retired 2 Response incomplete 1 Retired 0 Reserved
1	3FFFh	Obsolete
2	C837h	Specific configuration
3	0010h	Obsolete
4 - 5	00000000h	Retired
6	003Fh	Obsolete
7 - 8	00000000h	Reserved for the CompactFlash Association
9	0000h	Retired
10 - 19	X..Xh	Serial number in ASCII (Right justified)
20 - 21	00000000h	Retired
22	0000h	Obsolete
23 - 26	X..Xh	Firmware revision in ASCII
27 - 46	X..Xh	Model number in ASCII (Left justified) Big Endian Byte Order in Word
47	8001h	15:8 80h 7:0 01h=Maximum number of logical sectors that shall be DRQ data block on READ/WRITE MULTIPLE commands
48	4000h	Trusted Computing feature set options 15 Shall be cleared to zero 14 Shall be set to one 13:1 Reserved for the Trusted Computing Group 0 1=Trusted Computing feature set is supported

49	2F00h	Capabilities 15:14 Reserved for the IDENTIFY PACKET DEVICE command. 13 1 = Standby timer values as specified in this standard are supported 0 = Standby timer values shall be managed by the device 12 Reserved for the IDENTIFY PACKET DEVICE command. 11 1 = IORDY supported 0 = IORDY may be supported 10 1 = IORDY may be disabled 9 Shall be set to one to indicate that LBA is supported. 8 1 = DMA supported 7:2 Reserved 1:0 Current Long Physical Sector Alignment setting
50	4000h	Capabilities 15 Shall be cleared to zero 14 Shall be set to one 13:2 Reserved 1 Obsolete 0 Shall be set to one to indicate a vendor specific Standby timer value minimum
51 - 52	00000000h	Obsolete
53	0007h	15:8 Free-fall Control Sensitivity 00h = Vendor's recommended setting 01h-FFh = Sensitivity level. A larger number is a more sensitive setting. 7:3 Reserved 2 1 = the fields reported in word 88 are valid 0 = the fields reported in word 88 are not valid 1 1 = the fields reported in words (70:64) are valid 0 = the fields reported in words (70:64) are not valid X 0 Obsolete
54 - 58	X..Xh	Obsolete
59	0000h	15 1 = The BLOCK ERASE EXT command is supported 14 1= The OVERWRITE EXT command is supported 13 1 = The CRYPTO SCRAMBLE EXT command is supported 12 1 = The Sanitize feature set is supported 11:9 Reserved 8 1 = Multiple logical sector setting is valid 7:0 Current setting for number of logical sectors that shall be transferred per DRQ data block on READ/WRITE Multiple commands
60 - 61	X..Xh	Total number of user addressable logical sectors for 28-bit commands (DWord)
62	0000h	Obsolete

63	0007h	15:11 Reserved 10 1 = Multiword DMA mode 2 is selected 0 = Multiword DMA mode 2 is not selected 9 1 = Multiword DMA mode 1 is selected 0 = Multiword DMA mode 1 is not selected 8 1 = Multiword DMA mode 0 is selected 0 = Multiword DMA mode 0 is not selected 7:3 Reserved 2 1 = Multiword DMA mode 2 and below are supported 1 1 = Multiword DMA mode 1 and below are supported 0 1 = Multiword DMA mode 0 is supported
64	0003h	15:8 Reserved 7:0 PIO modes supported
65	0078h	Minimum Multiword DMA transfer cycle time per word 15:0 Cycle time in nanoseconds
66	0078h	Manufacturer's recommended Multiword DMA transfer cycle time 15:0 Cycle time in nanoseconds
67	0078h	Minimum PIO transfer cycle time without flow control 15:0 Cycle time in nanoseconds
68	0078h	Minimum PIO transfer cycle time with IORDY flow control 15:0 Cycle time in nanoseconds
69	4C20h	Additional Supported 15 1 = CFast Specification Support 14 1 = Deterministic read after Trim is supported 13 1 = Long Physical Sector Alignment Error Reporting Control is supported 12 1 = DEVICE CONFIGURATION IDENTIFY DMA and DEVICE CONFIGURATIONSET DMA are supported 11 1 = READ BUFFER DMA is supported 10 1 = WRITE BUFFER DMA is supported 9 1 = SET MAX SET PASSWORD DMA and SET MAX UNLOCK DMA are supported 8 1 = DOWNLOAD MICROCODE DMA is supported 7 Reserved for IEEE-1667 6 0 = Optional ATA device 28-bit commands supported 5 1 = Read zero after Trim is supported 4:0 Reserved
70	0000h	Reserved
71 - 74	X..Xh	Reserved for the IDENTIFY PACKET DEVICE command
75	001Fh	Queue depth 15:5 Reserved 4:0 Maximum queue depth - 1

76	E10Eh	Serial ATA Capabilities 15:13 Reserved for Serial ATA 12 1 = Supports NCQ priority information 11 1 = Supports Unload while NCQ commands are outstanding 10 1 = Supports Phy Event Counters 9 1 = Supports receipt of host initiated power management requests 8 1 = Supports the NCQ feature set 7:3 Reserved for Serial ATA 2 1 = Supports SATA Gen2 Signaling Speed (3.0Gb/s) 1 1 = Supports SATA Gen1 Signaling Speed (1.5Gb/s) 0 Shall be cleared to zero
77	00C6h	Reserved for Serial ATA
78	0104h	Serial ATA features supported 15:7 Reserved for Serial ATA 6 1 = Device supports Software Settings Preservation 5 Reserved for Serial ATA 4 1 = Device supports in-order data delivery 3 1 = Device supports initiating power management 2 1 = Device supports DMA Setup auto-activation 1 1 = Device supports non-zero buffer offsets 0 Shall be cleared to zero
79	00C4h	Serial ATA features enabled 15:7 Reserved for Serial ATA 6 1 = Software Settings Preservation enabled 5 Reserved for Serial ATA 4 1 = In-order data delivery enabled 3 1 = Device initiated power management enabled 2 1 = DMA Setup auto-activation enabled 1 1 = Non-zero buffer offsets enabled 0 Shall be cleared to zero
80	07F8h	Major version number 15:9 Reserved 8 1 = supports ATA8-ACS 7 1 = supports ATA/ATAPI-7 6 1 = supports ATA/ATAPI-6 5 1 = supports ATA/ATAPI-5 4 1 = supports ATA/ATAPI-4 3 Obsolete 2 Obsolete 1 Obsolete 0 Reserved
81	011Bh	Minor version number

82	7069h	Commands and feature sets supported 15 Obsolete 14 1 = The NOP command is supported 13 1 = The READ BUFFER command is supported 12 1 = The WRITE BUFFER command is supported 11 Obsolete 10 1 = The HPA feature set is supported 9 Shall be cleared to zero to indicate that the DEVICE RESET command is not supported 8 1 = The SERVICE interrupt is supported 7 1 = The release interrupt is supported 6 1 = Read look-ahead is supported 5 1 = The volatile write cache is supported 4 Shall be cleared to zero to indicate that the PACKET feature set is not supported 3 Shall be set to one to indicate that the mandatory Power Management feature set is supported 2 Obsolete 1 1 = The Security feature set is supported 0 1 = The SMART feature set is supported
83	7409h	Commands and feature sets supported 15 Shall be cleared to zero 14 Shall be set to one 13 1 = The FLUSH CACHE EXT command is supported 12 Shall be set to one to indicate that the mandatory FLUSH CACHE command is supported 11 1 = The DCO feature set is supported 10 1 = The 48-bit Address feature set is supported 9 1 = The AAM feature set is supported 8 1 = The SET MAX security extension is supported 7 Reserved for the Address Offset Reserved Area Boot Method 6 1 = SET FEATURES subcommand is required to spin-up after power-up 5 1 = The PUIS feature set is supported 4 Obsolete 3 1 = The APM feature set is supported 2 1 = The CFA feature set is supported X 1 Obsolete 0 1 = The DOWNLOAD MICROCODE command is supported

84	4160h	Commands and feature sets supported 15 Shall be cleared to zero 14 Shall be set to one 13 1 = The IDLE IMMEDIATE command with UNLOAD feature is supported 12 Reserved for TLC 11 Reserved for TLC 10:9 Obsolete 8 1 = The 64-bit World wide name is supported 7 Obsolete 6 1 = The WRITE DMA FUA EXT and WRITE MULTIPLE FUA EXT commandsare supported 5 1 = The GPL feature set is supported 4 1 = The Streaming feature set is supported 3 1 = The Media Card Pass Through Command feature set is supported 2 1 = Media serial number is supported 1 1 = The SMART self-test is supported 0 1 = SMART error logging is supported
85	0769h	Commands and feature sets supported or enabled 15 Obsolete 14 1 = The NOP command is supported 13 1 = The READ BUFFER command is supported 12 1 = The WRITE BUFFER command is supported 11 Obsolete 10 1 = HPA feature set is supported 9 Shall be cleared to zero to indicate that the DEVICE RESET command is not supported 8 1 = The SERVICE interrupt is enabled 7 1 = The release interrupt is enabled 6 1 = Read look-ahead is enabled 5 1 = The volatile write cache is enabled 4 Shall be cleared to zero to indicate that the PACKET feature set is not supported 3 Shall be set to one to indicate that the mandatory Power Management feature set is supported 2 Obsolete 1 1 = The Security feature set is enabled 0 1 = The SMART feature set is enabled

86	B409h	Commands and feature sets supported or enabled 15 1 = Words 119..120 are valid 14 Reserved 13 1 = FLUSH CACHE EXT command supported 12 1 = FLUSH CACHE command supported 11 1 = The DCO feature set is supported 10 1 = The 48-bit Address features set is supported 9 1 = The AAM feature set is enabled 8 1 = the SET MAX security extension is enabled by SET MAX SET PASSWORD 7 Reserved for Address Offset Reserved Area Boot Method 6 1 = SET FEATURES subcommand is required to spin-up after power-up 5 1 = The PUIS feature set is enabled 4 Obsolete 3 1 = The APM feature set is enabled 2 1 = The CFA feature set is supported 1 Obsolete 0 1 = The DOWNLOAD MICROCODE command is supported
87	4160h	Commands and feature sets supported or enabled 15 Shall be cleared to zero 14 Shall be set to one 13 1 = The IDLE IMMEDIATE command with UNLOAD FEATURE is supported 12 Reserved for TLC 11 Reserved for TLC 10:9 Obsolete 8 1 = The 64-bit World wide name is supported 7 Obsolete 6 1 = The WRITE DMA FUA EXT and WRITE MULTIPLE FUA EXT commandsare supported 5 1 = The GPL feature set is supported 4 Obsolete 3 1 = The Media Card Pass Through Command feature set is supported 2 1 = Media serial number is valid 1 1 = SMART self-test supported 0 1 = SMART error logging is supported
88	407Fh	Ultra DMA modes 15 Reserved 14 1 = Ultra DMA mode 6 is selected 0 = Ultra DMA mode 6 is not selected 13 1 = Ultra DMA mode 5 is selected 0 = Ultra DMA mode 5 is not selected 12 1 = Ultra DMA mode 4 is selected 0 = Ultra DMA mode 4 is not selected

		11 1 = Ultra DMA mode 3 is selected 0 = Ultra DMA mode 3 is not selected 10 1 = Ultra DMA mode 2 is selected 0 = Ultra DMA mode 2 is not selected 9 1 = Ultra DMA mode 1 is selected 0 = Ultra DMA mode 1 is not selected 8 1 = Ultra DMA mode 0 is selected 0 = Ultra DMA mode 0 is not selected 7 Reserved 6 1 = Ultra DMA mode 6 and below are supported 5 1 = Ultra DMA mode 5 and below are supported 4 1 = Ultra DMA mode 4 and below are supported 3 1 = Ultra DMA mode 3 and below are supported 2 1 = Ultra DMA mode 2 and below are supported 1 1 = Ultra DMA mode 1 and below are supported 0 1 = Ultra DMA mode 0 is supported
89	0005h	15:8 Reserved 7:0 Time required for Normal Erase mode SECURITY ERASE UNIT command
90	0005h	15:8 Reserved 7:0 Time required for an Enhanced Erase mode SECURITY ERASE UNIT command
91	00FEh	Current APM level value
92	0000h	Master Password Identifier
93	0000h	Hardware reset result 15 Shall be cleared to zero. 14 Shall be set to one. 13 1 = device detected CBLID- above ViHB 0 = device detected CBLID- below ViLB 12:8 Device 1 hardware reset result. Device 0 shall clear these bits to zero. Device 1 shall set these bits as follows: 12 Reserved. 11 0 = Device 1 did not assert PDIAG-. 1 = Device 1 asserted PDIAG-. 10:9 These bits indicate how Device 1 determined the device number: 00 = Reserved. 01 = a jumper was used. 10 = the CSEL signal was used. 11 = some other method was used or the method is unknown. 8 Shall be set to one. 7:0 Device 0 hardware reset result. Device 1 shall clear these bits to zero. Device 0 shall set these bits as follows: 7 Reserved.

		6 0 = Device 0 does not respond when Device 1 is selected. 1 = Device 0 responds when Device 1 is selected. 5 0 = Device 0 did not detect the assertion of DASP-. 1 = Device 0 detected the assertion of DASP-. 4 0 = Device 0 did not detect the assertion of PDIAG-. 3 0 = Device 0 failed diagnostics. 1 = Device 0 passed diagnostics. 2:1 These bits indicate how Device 0 determined the device number: 00 = Reserved. 01 = a jumper was used. 10 = the CSEL signal was used. 11 = some other method was used or the method is unknown. 0 Shall be set to one.
94	0000h	Current AAM value 15:8 Vendor's recommended AAM value. 7:0 Current AAM value.
95	0000h	Stream Minimum Request Size
96	0000h	Streaming Transfer Time - DMA
97	0000h	Streaming Access Latency - DMA and PIO
98 - 99	00000000h	Streaming Performance Granularity (DWord)
100 - 103	X..Xh	Total Number of User Addressable Logical Sectors for 48-bit commands (QWord)
104	0000h	Streaming Transfer Time - PIO
105	0008h	Maximum number of 512-byte blocks of LBA Range Entries per DATA SET MANAGEMENT command
106	4000h	Physical sector size / logical sector size 15 Shall be cleared to zero 14 Shall be set to one 13 1 = Device has multiple logical sectors per physical sector. 12 1 = Device Logical Sector longer than 256 Words 11:4 Reserved 3:0 2XP logical sectors per physical sector
107	0000h	Inter-seek delay for ISO 7779 standard acoustic testing
108 - 111	X..Xh	World wide name
112 - 115	X..Xh	Reserved
116	0000h	Reserved for TLC
117 - 118	00000000h	Logical sector size (DWord)
119	401Ch	Commands and feature sets supported (Continued from words 82..84) 15 Shall be cleared to zero 14 Shall be set to one 13:8 Reserved 7 1 = Extended Power Conditions feature set is supported 6 1 = Extended Status Reporting feature set is supported

		5 1 = The Free-fall Control feature set is supported 4 1 = The DOWNLOAD MICROCODE command with mode 3 is supported 3 1 = The READ LOG DMA EXT and WRITE LOG DMA EXT commands are supported 2 1 = The WRITE UNCORRECTABLE EXT command is supported 1 1 = The Write-Read-Verify feature set is supported 0 Reserved for DDT
120	401Ch	Commands and feature sets supported or enabled (Continued from words 85..87) 15 Shall be cleared to zero 14 Shall be set to one 13:8 Reserved 7 1 = At least one Extended Power Conditions Idle timer is enabled 6 1 = Extended Status Reporting feature set is enabled 5 1 = The Free-fall Control feature set is enabled 4 1 = The DOWNLOAD MICROCODE command with mode 3 is supported 3 1 = The READ LOG DMA EXT and WRITE LOG DMA EXT commands are supported 2 1 = The WRITE UNCORRECTABLE EXT command is supported 1 1 = The Write-Read-Verify feature set is enabled 0 Reserved for DDT
121 - 126	X..Xh	Reserved for expanded supported and enabled settings
127	0000h	Obsolete
128	0000h	Security status 15:9 Reserved 8 Master Password Capability: 0 = High, 1 = Maximum 7:6 Reserved 5 1 = Enhanced security erase supported 4 1 = Security count expired 3 1 = Security frozen 2 1 = Security locked 1 1 = Security enabled 0 1 = Security supported
129 - 159	X..Xh	Vendor specific
160	0000h	CFA power mode 15 Word 160 supported 14 Reserved 13 CFA power mode 1 is required for one or more commands implemented by the device 12 CFA power mode 1 disabled 11:0 Maximum current in ma
161 - 167	X..Xh	Reserved for the CompactFlash Association
168	0000h	15:4 Reserved 3:0 Device Nominal Form Factor

169	0001h	DATA SET MANAGEMENT is supported 15:1 Reserved 0 1 = the Trim bit in the DATA SET MANAGEMENT is supported
170 - 173	X..Xh	Additional Product Identifier (ATA String)
174 - 175	X..Xh	Reserved
176 - 205	X..Xh	Current media serial number (ATA string)
206	0000h	SCT Command Transport 15:12 Vendor Specific 11:6 Reserved 5 The SCT Data Tables command is supported 4 The SCT Feature Control command is supported 3 The SCT Error Recovery Control command is supported 2 The SCT Write Same command is supported 1 Obsolete 0 The SCT Command Transport is supported
207 - 208	00000000h	Reserved for CE-ATA.
209	4000h	Alignment of logical blocks within a physical block 15 Shall be cleared to zero 14 Shall be set to one 13:0 Logical sector offset within the first physical sector where the first logical sector is placed
210 - 211	00000000h	Write-Read-Verify Sector Count Mode 3 (DWord)
212 - 213	00000000h	Write-Read-Verify Sector Count Mode 2 (DWord)
214	0000h	NV Cache Capabilities 15:12 NV Cache feature set version 11:8 NV Cache Power Mode feature set version 7:5 Reserved 4 1 = NV Cache feature set enabled 3:2 Reserved 1 1 = NV Cache Power Mode feature set enabled 0 1 = NV Cache Power Mode feature set supported
215 - 216	00000000h	NV Cache Size in Logical Blocks (DWord)
217	0001h	Nominal media rotation rate
218	0000h	Reserved
219	0000h	NV Cache Options 15:8 Reserved 7:0 Device Estimated Time to Spin Up in Seconds
220	0000h	15:8 Reserved 7:0 Write-Read-Verify feature set current mode
221	0000h	Reserved

222	10FFh	Transport major version number 0000h or FFFFh = device does not report version 15:12 Transport Type 0h = Parallel 1h = Serial 2h-Fh = Reserved Parallel Serial 11:6 Reserved Reserved 5 Reserved SATA Rev 3.0 4 Reserved SATA Rev 2.6 3 Reserved SATA Rev 2.5 2 Reserved SATA II: Extensions 1 ATA/ATAPI-7 SATA 1.0a 0 ATA8-APT ATA8-AST
223	0000h	Transport minor version number
224 - 233	X..Xh	Reserved
234	0008h	Minimum number of 512-byte data blocks per DOWNLOAD MICROCODE command for mode 03h
235	0400h	Maximum number of 512-byte data blocks per DOWNLOAD MICROCODE command for mode 03h
236 - 254	X..Xh	Reserved
255	XXXXh	Integrity word 15:8 Checksum 7:0 Checksum Validity Indicator

Notes:

X = content (byte) is vendor specific and may be fixed or variable.

7. Product Line up

7.1 SATA3 mSATA

Type	Capacity	MODEL	Part Number
SATA3 mSATA SSD	32GB	S40RM032G	FSAGMMC-032G
SATA3 mSATA SSD	64GB	S40RM064G	FSAGMMC-064G FSAGMNC-064G
SATA3 mSATA SSD	128GB	S40RM128G	FSAGMMC-128G FSAGMNC-128G
SATA3 mSATA SSD	256GB	S40RM256G	FSAGMMC-256G FSAGMOC-256G

8. Contact information

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