

MZNLN1T0HALR-00000/07
MZNLN512HAJQ-00000/07
MZNLN256HAJQ-00000/07
MZNLN128HAHQ-00000/07

Target

M.2 SATA 6Gbps PM871b

SAMSUNG Solid State Drive

datasheet

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Revision History

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0.1	1. Initial release.	Mar. 22, 2017	Target	S.J. Oh	S.W. Park

SAMSUNG Solid State Drive PM871b

Part Number	Capacity ¹⁾
MZNLN1T0HALR-00000/07	1TB
MZNLN512HAJQ-00000/07	512GB
MZNLN256HAJQ-00000/07	256GB
MZNLN128HAHQ-00000/07	128GB

FEATURES

- SATA 6.0Gbps (Revision 3.2) Compliant
- M.2 22x80 S3-B-M
- Fully Complies with ATA/ATAPI-7 Standard (Partially Complies with ATA/ATAPI-8)
- Support NCQ (up to 32 depth) Command Set
- Support TRIM Command
- RoHS Compliant
- TurboWrite Technology

PERFORMANCE (TBD)

- Data Transfer Rate ²⁾
 - Sequential Read Up to 540 MB/s
 - Sequential Write (128GB) Up to 500 MB/s
(256/512GB/1TB) Up to 520 MB/s
 - Random Read (4KB) (128GB) Up to 68 KIOPS
(256/256GB/1TB) Up to 97 KIOPS
 - Random Write (4KB) (128GB) Up to 80 KIOPS
(256/256GB/1TB) Up to 88 KIOPS

RELIABILITY

- Non-recoverable Read Error 1 sector per 10¹⁵ bits read
- MTBF 1,500,000 hours

ENVIRONMENTAL SPECIFICATIONS

- Temperature
 - Operating³⁾ 0 ~ 70 °C
 - Non-operating -40 ~ 85 °C
- Humidity (non-condensing) 5 ~ 95%
- Shock (1/2 sine pulse) 1,500 G (0.5ms)
- Vibration (non-operating) 20G, 20 ~ 2,000 Hz, Sinusoidal

POWER REQUIREMENTS (TBD) ⁴⁾⁵⁾

- Supply Voltage 3.3V ± 5%
- Voltage Ripple/Noise (max.) 100mV p-p
- Active (typ.) 150 mW
- Idle (typ.) 50 mW
- Devslp (typ.) 4.0 mW

PHYSICAL DIMENSION (TBD)

- Width 80.0 ±0.15 mm
- Depth 22.0 ±0.15 mm
- Height 2.38 (Max) mm
- Weight TBD

NOTE: Specifications are subject to change without notice.

1) 1MB = 1,000,000 Bytes, 1GB = 1,000,000,000 Bytes, Unformatted Capacity. User accessible capacity may vary depending on operating environment and formatting.

2) Sequential Performance measured using CDM(5.1.0) with queue depth 32 on Max density. Random Performance measured using IOMeter 2008 on Max density. Write cache enabled. Performance vary depending on capacity, TurboWrite Technology

3) Operating Temperature measured by SSD temperature sensor (SMART Attribute 194), Proper airflow recommended.

4) Active Power is measured during execution MobileMark 2014 @ Windows10 64bit.

5) Idle power is measured on Max density with DIPM on.

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1.0 Introduction

1.1 General Description

This document describes the specification of the PM871b SSD which use SATA 6Gb/s interface. PM871b are fully consist of semiconductor device and using NAND Flash Memory which has a high reliability and a high technology for a storage media. As the SSD doesn't have a moving parts such as platter (disk) and head media, it gives a good solution for a storage device with a high performance, high capacity. PM871b delivers 540MB/s for sequential read and 520MB/s for sequential write speed. It could also provide rugged features with an extreme environment with a high MTBF.

1.2 Product List

Formfactor	Density	Part Number
M.2 22x80	1TB	MZNLN1T0HALR-0000/07
	512GB	MZNLN512HAJQ-00000/07
	256GB	MZNLN256HAJQ-00000/07
	128GB	MZNLN128HAHQ-00000/07

1.3 Ordering Information

M Z X X X X X X X X X X - X X X X X
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

1. Memory (M)

2. Module Classification

Z: SSD

3. Form Factor

N: M.2 2280

4. Line-Up

L: 3bit MLC (4th Generation 3D NAND)

5. SSD CTRL

N: SSD controller rev.

6~8. SSD Density

128: 128 GB

256: 256 GB

512: 512 GB

1T0: 1TB

9. NAND PKG + NAND Voltage

H: BGA

10. Flash Generation

A: 2nd Generation

11~12. NAND Density

LR: 4T HDP 4CE

JQ: 2T ODP 4CE

HQ: 1T QDP 4CE

13. " - "

14. Default

"0"

15. HW revision

0: No revision

16. Packing type

0: Bulk

17~18. Customer

00: General

07: SED

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2.0 Product Specifications (TBD)

2.1 Interface and Compliance

- SATA 6.0Gbps (Partially Complies with revision 3.2)
- Fully compatible with ATA/ATAPI-7 Standard (Partially Complies with ATA/ATAPI-8)
- Native Command Queuing (NCQ) support up to queue depth of 32
- Support Trim (Data Set Management) Command
- RoHS Compliant
- TurboWrite Technology

2.2 Drive Capacity

[Table 1] User Capacity and Addressable Sectors

	128GB	256GB	512GB	1TB
User-Addressable Sectors	250,069,680	500,118,192	1,000,215,216	2,000,409,264
Bytes per Sector	512 Bytes			

NOTE:

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

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

2.3 Performance

[Table 2] Read / Write Performance

Read / Write	128GB	256GB	512GB	1TB
Sequential Read (Up to)	540 MB/s	540 MB/s	540 MB/s	540 MB/s
Sequential Write (Up to)	500 MB/s	520 MB/s	520 MB/s	520 MB/s
Random Read (Up to)	68 KIOPS	97 KIOPS	97 KIOPS	97 KIOPS
Random Write (Up to)	80 KIOPS	88 KIOPS	88 KIOPS	88 KIOPS

NOTE:

1) Sequential Performance measured using CDM 5.1.0 (QD=32)

2) Random performance measured using IOMeter 2008 (QD=32)

3) Write cache enabled. Actual performance may vary depending on use conditions and environment.

2.4 Electrical Characteristics

[Table 3] Operating Voltage

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

[Table 4] Power Consumption

Read/Write	128GB	256GB	512GB	1TB
Active (typ.)	150 mW	150 mW	150 mW	150 mW
Idle (typ.)	50 mW	50 mW	50 mW	50 mW
Devslp (typ.)	2.5 mW	2.5 mW	2.5 mW	4.0 mW

NOTE:

1) Active Power is measured during execution MobileMark 2014 @ Windows10 64bit.

2) Idle power is measured with DIPM on.

3) Typical power consumption may vary depending on use conditions and environment.

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[Table 5] Inrush Current

Parameter	Requirements
Inrush Current	Max. 1A

NOTE:

1) Power on slew rate should be over 1ms.

2.5 Environmental Specifications

[Table 6] Environmental Specifications

Parameter	Operating	Non-Operating
Operating Temperature	0 ~ 70 °C ¹⁾	-40 ~ 85 °C
Non-Operating Temperature	-40 °C to 85 °C	
Humidity	5 % to 95 %, non-condensing	
Shock	1500G, 0.5ms half sine wave	
Vibration	20G, 20 ~ 2,000 Hz, Sinusoidal	

NOTE:

1) Measured by SMART Temperature. Proper airflow recommended

2.6 Reliability

[Table 7] MTBF Specifications

Parameter	128GB	256GB	512GB	1TB
MTBF	1,500,000hrs			

NOTE:

1) MTBF is Mean Time Between Failure, and is the predicted elapsed time between inherent failures of a system during operation.

[Table 8] UBER Specifications

Parameter	128GB	256GB	512GB	1TB
UBER	1 sector per 10 ¹⁵ bits read			

NOTE:

1) Uncorrectable Bit Error Rate (UBER) is a metric for the rate of occurrence of data errors, equal to the number of data errors per bits read as specified in the JESD218 document of JEDEC standard.

3.0 Mechanical Specification (TBD)

[Table 9] Physical Dimensions and Weight

Model	Form Factor	Height (mm)	Width (mm)	Length (mm)	Weight (gram)
128/256/512GB/1TB	M.2 2280-S3-B-M	2.38 (Max)	22.0 ±0.15	80.0 ±0.15	TBD g (Max)

[TOP VIEW]

[BOTTOM VIEW]

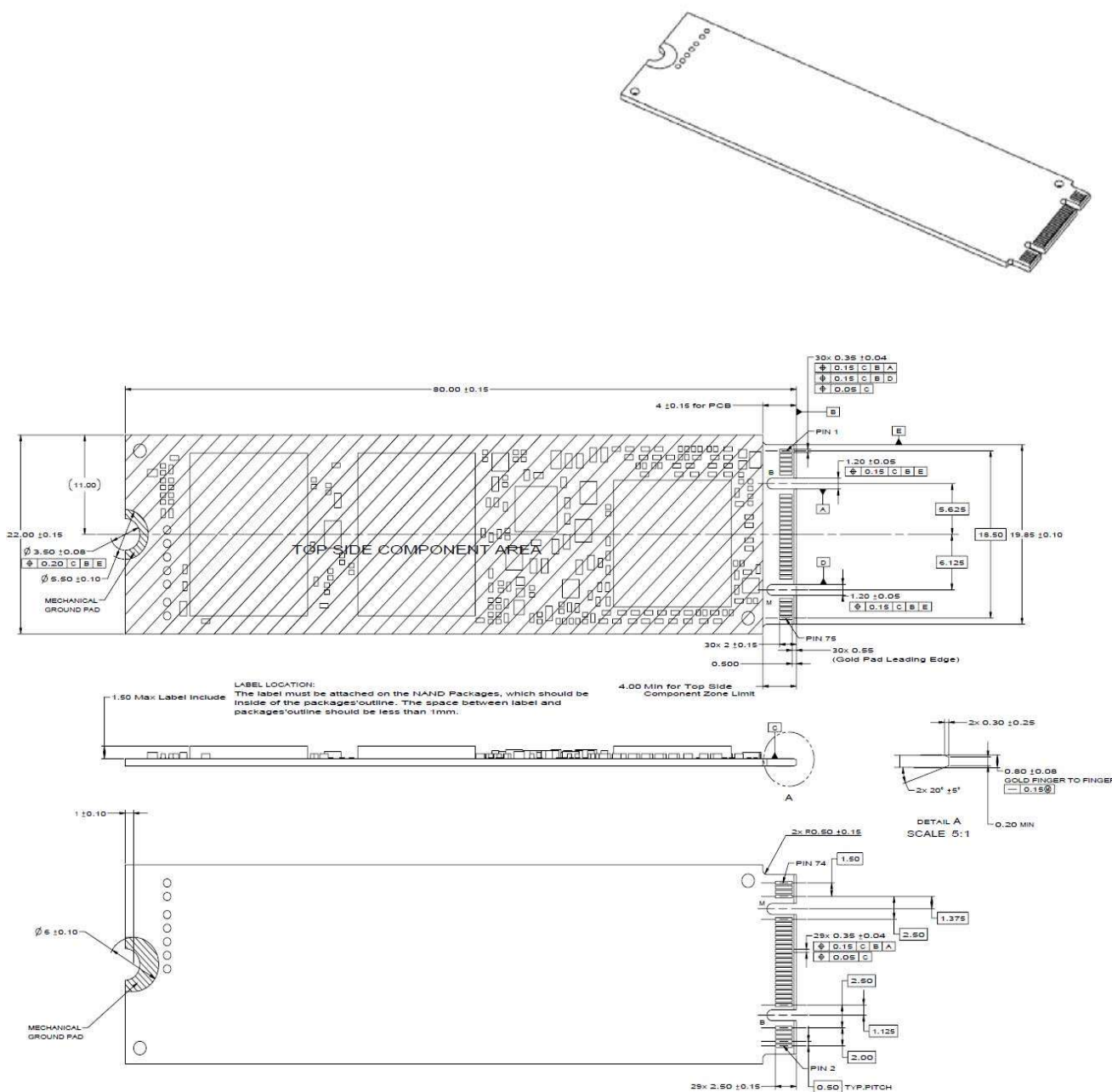
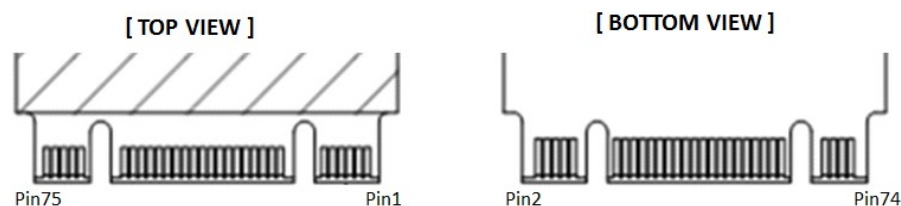


Figure 1. Physical Dimension

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4.0 Electrical Interface Specification (TBD)

4.1 Serial ATA Interface Connector



4.2 Pin Assignments

[Table 10] Pin Assignments

Pin#	Assignment	Description	Pin#
		GND	75
74	3.3V	GND	73
72	3.3V	GND	71
70	3.3V	GND	69
68	N/C	N/C	67
66	Module Key	Module Key	65
64	Module Key	Module Key	63
62	Module Key	Module Key	61
60	N/C	Module Key	59
58	N/C	GND	57
56	N/C	N/C	55
54	N/C	N/C	53
52	N/C	GND	51
50	N/C	SATA A+	49
48	N/C	SATA A-	47
46	N/C	GND	45
44	N/C	SATA B-	43
42	N/C	SATA B+	41
40	N/C	GND	39
38	DEVSLP	N/C	37
36	N/C	N/C	35
34	N/C	GND	33
32	N/C	N/C	31
30	N/C	N/C	29
28	N/C	GND	27
26	N/C	N/C	25
24	N/C	N/C	23
22	N/C	GND	21
20	N/C	Module Key	19
18	Module Key	Module Key	17
16	Module Key	Module Key	15
14	Module Key	Module Key	13

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12	Module Key	N/C	11
10	DAS/DSS#(Refer to [Table 11])	N/C	9
8	N/C	N/C	7
6	N/C	N/C	5
4	3.3V	GND	3
2	3.3V	GND	1

[Table 11] Simple Indicator Protocol for Device Activity (Pin 10)

Device State	Pin Out
Active	Toggle
Idle	Low ¹⁾
Devslp	Low

NOTE:

1) DAS Pin is toggle when host initiated Background job.

5.0 Command Descriptions (TBD)

5.1 Supported ATA Commands

[Table 12] Supported ATA Commands Summary

Command Name	Command Code (Hex)	Command Name	Command Code (Hex)
CHECK POWER MODE	E5h / 98h	SEND FPDMA QUEUED	64h
DEVICE CONFIGURATION	B1h	SET FEATURES	EFh
DOWNLOAD MICROCODE	92h	SET MAX ADDRESS	F9h
DOWNLOAD MICROCODE DMA	93h	SET MAX ADDRESS EXT	37h
EXECUTE DEVICE DIAGNOSTIC	90h	SET MULTIPLE MODE	C6h
FLUSH CACHE	E7h	SLEEP	E6h / 99h
FLUSH CACHE EXT	EAh	S.M.A.R.T.	B0h
IDENTIFY DEVICE	ECh	STANDBY	E2h / 96h
IDLE	E3h / 97h	STANDBY IMMEDIATE	E0h / 94h
IDLE IMMEDIATE	E1h / 95h	TRIM	06h
INITIALIZE DEVICE PARMETERS	91h	WRITE BUFFER	E8h
NOP	00h	WRITE BUFFER DMA	EBh
READ BUFFER	E4h	WRITE DMA	Ca
READ BUFFER DMA	E9h	WRITE DMA (w/o retry)	CBh
READ DMA	C8h	WRITE DMA EXT	35h
READ DMA (w/o retry)	C9h	WRITE DMA FUA EXT	3Dh
READ DMA EXT	25h	WRITE FPDMA QUEUED	61h
READ FPDMA QUEUED	60h	WRITE LOG DMA EXT	57h
READ LOG DMA EXT	47h	WRITE LOG EXT	3Fh
READ LOG EXT	2Fh	WRITE MULTIPLE	C5h
READ MULTIPLE	C4h	WRITE MULTIPLE EXT	39h
READ MULTIPLE EXT	29h	WRITE MULTIPLE FUA EXT	CEh
READ NATIVE MAX ADDRESS	F8h	WRITE SECTORS	30h
READ NATIVE MAX ADDRESS EXT	27h	WRITE SECTORS (w/o retry)	31h
READ SECTORS	20h	WRITE SECTORS EXT	34h
READ SECTORS (w/o retry)	21h	WRITE UNCORRECTABLE EXT	45h
READ SECTORS EXT	24h		
READ VERIFY SECTORS	40h		
READ VERIFY SECTORS (w/o retry)	41h		
READ VERIFY SECTORS EXT	42h		
RECALIBRATE	10h		
RECEIVE FPDMA QUEUED	65h		
SECURITY DISABLE PASSWORD	F6h		
SECURITY ERASE PREPARE	F3h		
SECURITY ERASE UNIT	F4h		
SECURITY FREEZE LOCK	F5h		
SECURITY SET PASSWORD	F1h		
SECURITY UNLOCK	F2h		
SEEK	70h		

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5.2 Individual Attribute Data Structure

The following defines the 12 bytes that make up the information for each Attribute entry in the Device Attribute Data Structure.

[Table 13] Attribute Entry in Device Attribute Data Structure

Byte	Descriptions
0	Attribute ID number 01-FFh
1 - 2	Status flag bit 0 (pre-failure / advisory bit) bit 0 = 0: If attribute value is less than the threshold, the drive is in advisory condition. Product life period may expired. bit 0 = 1: If attribute value is less than the threshold, the drive is in pre-failure condition. The drive may have failure. bit 1 (on-line data collection bit) bit 1 = 0: Attribute value will be changed during off-line data collection operation. bit 1 = 1: Attribute value will be changed during normal operation. bit 2 (Performance Attribute bit) bit 3 (Error rate Attribute bit) bit 4 (Event Count Attribute bit) bit 5 (Self-Preserving Attribute bit) bit 6 - 15 Reserved
3	Attribute value 01h - FDh *1 00h, FEh, FFh = Not in use 01h = Minimum value 64h = Initial value Fdh = Maximum value
4	Worst Ever normalized Attribute Value (valid values from 01h - FEh)
5 - 10	Raw Attribute Value Attribute specific raw data (FFFFFFh - reserved as saturated value)
11	Reserved (00h)

*1 For ID = 199 CRC Error Count

The device supports following Attribute ID Numbers.

[Table 14] SMART Attributes (TBD)

ID (word)	Attribute name	Remark
5	Re-Assigned Sector Count	
9	Power-On Hours	
12	Power Cycle Count	
170	Grown Bad Block Count	
171	Program Fail Count	
172	Erase Fail Count	
173	Program Erase Count	
174	Unexpected Power Loss Count	
178	Used Reserved Block Count	
180	Unused Reserved Block Count	
184	Error Detection	
187	Uncorrectable Error Count	
194	Device Temperature	
199	Ultra DMA CRC Error Count (0 count)	
233	Media Wearout Levels	
241	Host GB Written Count	
242	Host GB Read Count	
249	NAND GB Written Count	

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6.0 Identify Device Data (TBD)

[Table 15] Identify Device Data

Word	128GB	256GB	512GB	1TB	General Information
0	0040h	0040h	0040h	0040h	Obsolete
1	3FFFh	3FFFh	3FFFh	3FFFh	Obsolete
2	C837h	C837h	C837h	C837h	Obsolete
3	0010h	0010h	0010h	0010h	Retired
4 - 5	0000h	0000h	0000h	0000h	Obsolete
6	003Fh	003Fh	003Fh	003Fh	Obsolete
7 - 8	0000h	0000h	0000h	0000h	Reserved for the Compact Flash Association
9	0000h	0000h	0000h	0000h	Retired
10 - 19	XXXXh	XXXXh	XXXXh	XXXXh	Serial Number (ATA string)
20-21	0000h	0000h	0000h	0000h	Obsolete
22	0000h	0000h	0000h	0000h	Obsolete
23-26	XXXXh	XXXXh	XXXXh	XXXXh	Firmware Revision (ATA string)
27-46	XXXXh	XXXXh	XXXXh	XXXXh	Model Number
47	####h	####h	####h	####h	Read / Write Multiple Support (-00000) 8010h (-00007) 8001h
48	####h	####h	####h	####h	Trusted Computing Feature Set Options (-00000) 4000h (-00007) 4001h
49	2F00h	2F00h	2F00h	2F00h	Capabilities
50	4000h	4000h	4000h	4000h	Capabilities
51-52	0200h	0200h	0200h	0200h	Obsolete
53	0007h	0007h	0007h	0007h	Obsolete
54	3FFFh	3FFFh	3FFFh	3FFFh	Obsolete
55	0010h	0010h	0010h	0010h	Obsolete
56	003Fh	003Fh	003Fh	003Fh	Obsolete
57	FC10h	FC10h	FC10h	FC10h	Obsolete
58	00FBh	00FBh	00FBh	00FBh	Obsolete
59	####h	####h	####h	####h	Multiple Logical Setting (-00000) 0110h (-00007) 0101h
60-61	0###_####h	0###_####h	0###_####h	0###_####h	Total number of user addressable logical sectors for 28-bit commands
62	0000h	0000h	0000h	0000h	Obsolete
63	0007h	0007h	0007h	0007h	Multi-word DMA Transfer
64	0003h	0003h	0003h	0003h	PIO Transfer Modes Supported
65	0078h	0078h	0078h	0078h	Minimum Multiword DMA Transfer Cycle Time per Word (ns)
66	0078h	0078h	0078h	0078h	Manufacturer's Recommended Multiword DMA Cycle Time (ns)
67	0078h	0078h	0078h	0078h	Minimum PIO Transfer Cycle Time without IORDY Flow Control (ns)
68	0078h	0078h	0078h	0078h	Minimum PIO Transfer Cycle Time with IORDY Flow Control (ns)
69	####h	####h	####h	####h	Additional Supported (-00000) 0F00h (-00007) 0F10h
70-74	0000h	0000h	0000h	0000h	Reserved
75	001Fh	001Fh	001Fh	001Fh	Queue Dept
76	850Eh	850Eh	850Eh	850Eh	Serial ATA Capabilities
77	00C6h	00C6h	00C6h	00C6h	Serial ATA Additional Capabilities
78	016Ch	016Ch	016Ch	016Ch	Serial ATA Features Supported
79	0040h	0040h	0040h	0040h	Serial ATA Features Enabled
80	03FCh	03FCh	03FCh	03FCh	Major Version Number
81	0039h	0039h	0039h	0039h	Minor Version Number
82	746Bh	746Bh	746Bh	746Bh	Commands and Feature Sets Supported
83	7D01h	7D01h	7D01h	7D01h	Commands and Feature Sets Supported
84	4163h	4163h	4163h	4163h	Commands and Feature Sets Supported or Enabled
85	7469h	7469h	7469h	7469h	Commands and Feature Sets Supported or Enabled

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86	BC01h	BC01h	BC01h	BC01h	Commands and Feature Sets Supported or Enabled
87	4163h	4163h	4163h	4163h	Commands and Feature Sets Supported or Enabled
88	407Fh	407Fh	407Fh	407Fh	Ultra DMA Modes
89	####h	####h	####h	####h	Normal Security Erase Unit Time (-00000) 0001h (-00007) 0010h
90	0004h	0004h	0004h	0004h	Enhanced Security Erase Unit Time
91	0000h	0000h	0000h	0000h	Advanced Power Management Level
92	FFFEh	FFFEh	FFFEh	FFFEh	Master Password Revision Code
93	0000h	0000h	0000h	0000h	Hardware Reset Result
94	0000h	0000h	0000h	0000h	Obsolete
95	0000h	0000h	0000h	0000h	Stream Minimum Request Size
96	0000h	0000h	0000h	0000h	Streaming Transfer Time - DMA
97	0000h	0000h	0000h	0000h	Streaming Access Latency - DMA and PIO
98-99	0000h	0000h	0000h	0000h	Streaming Performance Granularity (DWord)
100-103	XXXXh	XXXXh	XXXXh	XXXXh	Total Number of User 48-Bit LBA
104	0000h	0000h	0000h	0000h	Streaming Transfer Time - PIO
105	0008h	0008h	0008h	0008h	Maximum Number of 512byte Data Blocks of LBA Range Entries per DATA SET MANAGEMENT Command
106	4000h	4000h	4000h	4000h	Physical Sector Size / Logical Sector Size
107	0000h	0000h	0000h	0000h	Inter-seek Delay for ISO 7779 Standard Acoustic Testing
108	5002h	5002h	5002h	5002h	World Wide Name
109	538Dh	538Dh	538Dh	538Dh	World Wide Name
110-111	XXXXh	XXXXh	XXXXh	XXXXh	World Wide Name
112-115	0000h	0000h	0000h	0000h	Reserved
116	0000h	0000h	0000h	0000h	Reserved for TLC
117-118	0000h	0000h	0000h	0000h	Logical Sector Size (Dword)
119	401Eh	401Eh	401Eh	401Eh	Commands and Feature Sets Supported
120	401Ch	401Ch	401Ch	401Ch	Commands and Feature Sets Supported or Enabled
121-126	0000h	0000h	0000h	0000h	Reserved for Expanded Supported and Enabled Settings
127	0000h	0000h	0000h	0000h	Obsolete
128	0021h	0021h	0021h	0021h	Security Status
129-159	0000h	0000h	0000h	0000h	Vendor Specific
160	0000h	0000h	0000h	0000h	CFA Power Mode
161-167	0000h	0000h	0000h	0000h	Reserved for the Compact Flash Association
168	0007h	0007h	0007h	0007h	Device Nominal Form Factor
169	0001h	0001h	0001h	0001h	DATA SET MANAGEMENT is Supported
170-173	2020h	2020h	2020h	2020h	Additional Product Identifier (ATA string)
174-175	0000h	0000h	0000h	0000h	Reserved
176-205	0000h	0000h	0000h	0000h	Current Media Serial Number
206	003Dh	003Dh	003Dh	003Dh	SCT Command Transport
207-208	0000h	0000h	0000h	0000h	Reserved for CE-ATA
209	4000h	4000h	4000h	4000h	Alignment of Logical Blocks within a Physical Block
210-211	0000h	0000h	0000h	0000h	Write-Read-Verify Sector Count Mode 3
212-213	0000h	0000h	0000h	0000h	Write-Read-Verify Sector Count Mode 2
214	0000h	0000h	0000h	0000h	Obsolete
215-216	0000h	0000h	0000h	0000h	Obsolete
217	0001h	0001h	0001h	0001h	Nominal Media Rotation Rate
218	0000h	0000h	0000h	0000h	Reserved
219	0000h	0000h	0000h	0000h	Obsolete
220	0000h	0000h	0000h	0000h	Write Read Verify Mode
221	0000h	0000h	0000h	0000h	Reserved
222	107Fh	107Fh	107Fh	107Fh	Transport Major Version Number
223	0000h	0000h	0000h	0000h	Transport Minor Version Number
224-229	0000h	0000h	0000h	0000h	Reserved
230-233	0000h	0000h	0000h	0000h	Extended Number of User Addressable Sectors
234	0000h	0000h	0000h	0000h	Minimum Number of 512-byte Data Blocks per DOWNLOAD MICROCODE Command for Mode 03h
235	0800h	0800h	0800h	0800h	Maximum Number of 512-byte Data Blocks per DOWNLOAD MICROCODE Command for Mode 03h

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION
IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR
HEADQUARTERS OF SAMSUNG ELECTRONICS.

236-242	0000h	0000h	0000h	0000h	Reserved
243	####h	####h	####h	####h	FDE Security Features (-00000) 0000h (-00007) 4000h
244-254	0000h	0000h	0000h	0000h	Reserved
255	XXA5h	XXA5h	XXA5h	XXA5h	Integrity Word

7.0 Product Compliance

[Table 16] Certifications and Declarations

Category	Certification
CE	Comunaute Europeenne
BSMI	Bureau of Standards, Metrology and Inspection
KCC	Korea Communications commission
VCCI	Voluntary Control Council for Interference
RCM	Regulatory Compliance Mark
FCC	Federal Communications Commission
IC	Industry Canada
UL	Underwriters Laboratories, Inc.
TUV	Technischer Überwachungs Verine e.V
CB	Scheme of the IECEE for Mutual Recognition of Test Certificates for Electrical Equipment



Caution: Any changes or modifications in construction of this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio / TV technician for help.

Modifications not expressly approved by the manufacturer could void the user's authority to operated the equipment under FCC rules.



Industry Canada ICES-003 Compliance Label:

CAN ICES-3 (B)/NMB-3(B)

IF THERE IS ANY OTHER OPERATION TO IMPLEMENT IN ADDITION TO SPECIFICATION IN THE DATASHEET OR JEDEC STANDARD, PLEASE CONTACT EACH BRANCH OFFICE OR HEADQUARTERS OF SAMSUNG ELECTRONICS.

8.0 References

[Table 17] Standards References

Item	Website
Serial ATA Revision 3.2	http://www.sata-io.org
ATA/ATAPI Command Set - 3 (ACS-3)	http://www.t13.org
PCI Express M.2 Electromechanical Specification, Rev 0.9	http://pcisig.com
Solid-State Drive Requirements and Endurance Test Method (JESD218A)	http://www.jedec.org/standards-documents/docs/jesd218a
Solid-State Drive Requirements and Endurance Test Method (JESD219A)	http://www.jedec.org/standards-documents/docs/jesd219a