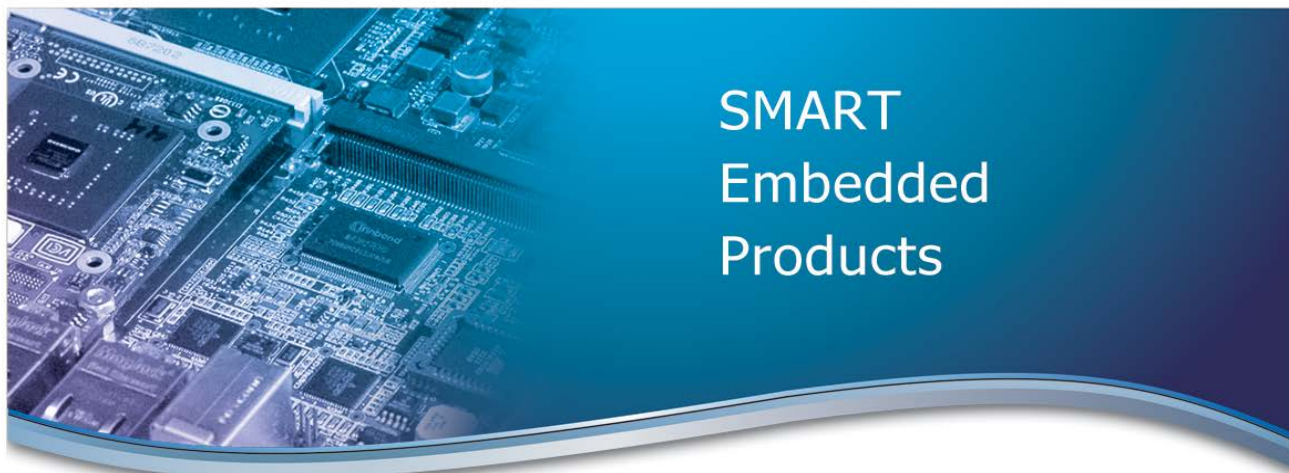




SMART Embedded Products

SMART Value Series MO-297A SLIM SATA SSD

PN: SV9SLM6BxxxGJM2x



January 2016
DSSL253-AB



www.smartm.com

REVISION HISTORY

Date	Revision	Section(s)	Description
September 2015	A	All	Initial Release
January 2016	AB	Figure 2	Updated with new pin drawing Deleted TUV logo



ESD Caution – Handling

Static electricity may be discharged through this disk subsystem. In extreme cases, this may temporarily interrupt the operation or damage components. To prevent this, make sure you are working in an ESD-safe environment. For example, before handling the disk subsystem, touch a grounded device, such as a computer case, prior to handling.

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1. GENERAL DESCRIPTION

1.1. Overview

The SMART Modular SATA Slim SSD embedded (internal) SATA module is a robust, solid state drive product. The low power consumption and fast data throughput are major advantages of the SMART Modular SATA Slim SSD modules over traditional rotating hard disk drives (HDDs).

The mechanical dimensions of the SATA Slim SSD products are compatible with both standoff and card guide mounting methods. The SATA Slim SSD modules are fully MO-297A compliant.

Utilizing an industry-standard SATA interface and connector, SATA Slim SSD modules are easily integrated into a host system without any special BIOS modifications or additional device drivers. These modules are available in capacities of 8 GBytes to 64 GBytes.

SMART Modular SATA Slim SSD products address the need for enhanced reliability by incorporating on-board error detection and correction with static and dynamic wear leveling algorithms that provide reliable operation over the product life cycle.

SMART has built its foundation by providing proven technology and quality products to the most demanding Fortune 100 OEMs.

1.2. Features

- **Form Factor:** JEDEC[®] MO-297, SATA Slim
- **Interface:** Industry standard Serial ATA, SATA 3.0 compliant
- **Supported SATA Modes**
 - **PIO Modes:** 0-4
 - **Multiword DMA Modes:** 0-2
 - **Ultra DMA Modes:** 0-6
- **SATA Interface Transfer Rate:** 6 Gbps with support for 3 Gbps & 1.5 Gbps
- **NAND Technology:** Multi-Level Cell (MLC)
- **Capacity:** 8 to 64 GBytes
- **Data Rates:**
 - **Read:**
 - Up to 450 MB/s (32 – 64GB)
 - Up to 250 MB/s (16GB)
 - Up to 140 MB/s (8GB)
 - **Write:**
 - up to 190 MB/s (32 – 64GB)
 - up to 170 MB/s (16GB)
 - up to 100 MB/s (8GB)
- **Operating Temperature:** 0°C to +70°C Standard
- **Input Power:**
 - V_{CC} : 5.0 V

1.3. Unique Features

- Static and Dynamic Wear Leveling
- Advanced Error Detection/Correction circuitry for superior data reliability
- Self-Monitoring Analysis and Reporting Technology (S.M.A.R.T.) support
- Supports for 48bit LBA addressing with larger max transfer size
- Improved shock and vibration performance over rotating media
- ATA and SATA Interface Power Management Support
- External LED Activity Signaling through the connector
- Native Command Queuing (NCQ) support with a maximum queue depth of 32
- Zero seek time
- Noiseless operation
- Supports TRIM command based on the ATA-8 Standard
- Supports ATA Download Microcode
- Low power management
 - o DIPM/HIPM Mode
- Bad Block Management

1.4. Operational Characteristics

All listed values are typical unless otherwise stated.

1.4.1. Performance

Table 1: Performance Characteristics

1.4.2. Power

Item	Capacity	Performance Max
128K Sequential Read Sustained	64GB	450 MB/s
	32GB	450 MB/s
	16GB	250 MB/s
	8GB	140 MB/s
128K Sequential Write Sustained	64GB	190 MB/s
	32GB	190 MB/s
	16GB	170 MB/s
	8GB	100 MB/s
4K Random Read Maximum	64GB	45K IOPS
	32GB	44K IOPS
	16GB	38K IOPS
	8GB	20K IOPS
4K Random Write Maximum	64GB	28K IOPS
	32GB	28K IOPS
	16GB	18K IOPS
	8GB	10K IOPS
Host Interface Transfer Rate	All	6.0 Gbps / 3.0 Gbps / 1.5 Gbps (depends on host connection)
Response Time	All	< 1500ms (max) < 5ms (typical)

Table 2: Power Requirements (5V)

Parameter	Value (Typ)	Value (Max)	Unit
Vcc	5	5.5	V
Read	461	497	mA
Write	401	471	mA
Idle	63	67	mA

Table 3: Power Consumption

Capacity	Read	Write	Partial	Slumber	Idle	Unit
8GB	1,110	735	57.5	33.5	310	mW
16GB	1,180	1,275	55	32	315	mW
32GB	1,640	1,500	56.5	33.5	315	mW
64GB	1,180	1,260	54.5	32	310	mW

1. The average value of power consumption is achieved based on 100% conversion efficiency.
2. The measured power voltage is 5V.
3. Samples were built using Toshiba 15nm Toggle MLC NAND flash and measured under ambient temperature.
4. Sequential R/W is measured while testing 4000MB sequential R/W 5 times by CrystalDiskMark.
5. Power Consumption may differ according to flash configuration, SDR configuration, and platform.

1.4.3. Reliability

Table 4: Reliability Characteristics

Item	Value	
Mean Time Between Failures (MTBF)	> 2 Million hours	
Data Reliability	< 1.0E-15 uncorrectable error rate	
Data Retention (@ 25°C)	10 years > 90% life remaining	
	1 year < 10% life remaining	
Endurance ⁽¹⁾ 100% Sequential Workload	8GB	19 TBW
	16GB	39 TBW
	32GB	79 TBW
	64GB	158 TBW
Endurance ⁽¹⁾ JEDEC Enterprise Class Workload	8GB	TBD
	16GB	TBD
	32GB	TBD
	64GB	TBD
Error Correction / Error Detection	Up to 43 bits for every 1 KB of user data	

(1) Endurance is directly related to the User Specific Workload.

1.4.4. Environmental Conditions

Table 5: Environmental Conditions and Testing

Parameter	Value
Shock	1500G half-sine, 0.5 msec, 1 shock along each axis, X,Y,Z in each direction
Vibration	20G 80-2000Hz, 1.52mm 20-80Hz, 3 axis
Operating Temperature - Commercial	0°C to 70°C
Storage Temperature	-40°C to 85°C
Humidity	40°C, Operation: 90% RH, Storage: 93% RH
Altitude	24,384 m [80,000 ft]
Drop	80cm, 6 face
Bending	≥ 20N
Torque	0.5N-m or ±2.5 deg
ESD	64GB, 24.0°C, 49% (RH), +/- 4KV

1.4.5. Physical Characteristics

Table 6: Physical Characteristics

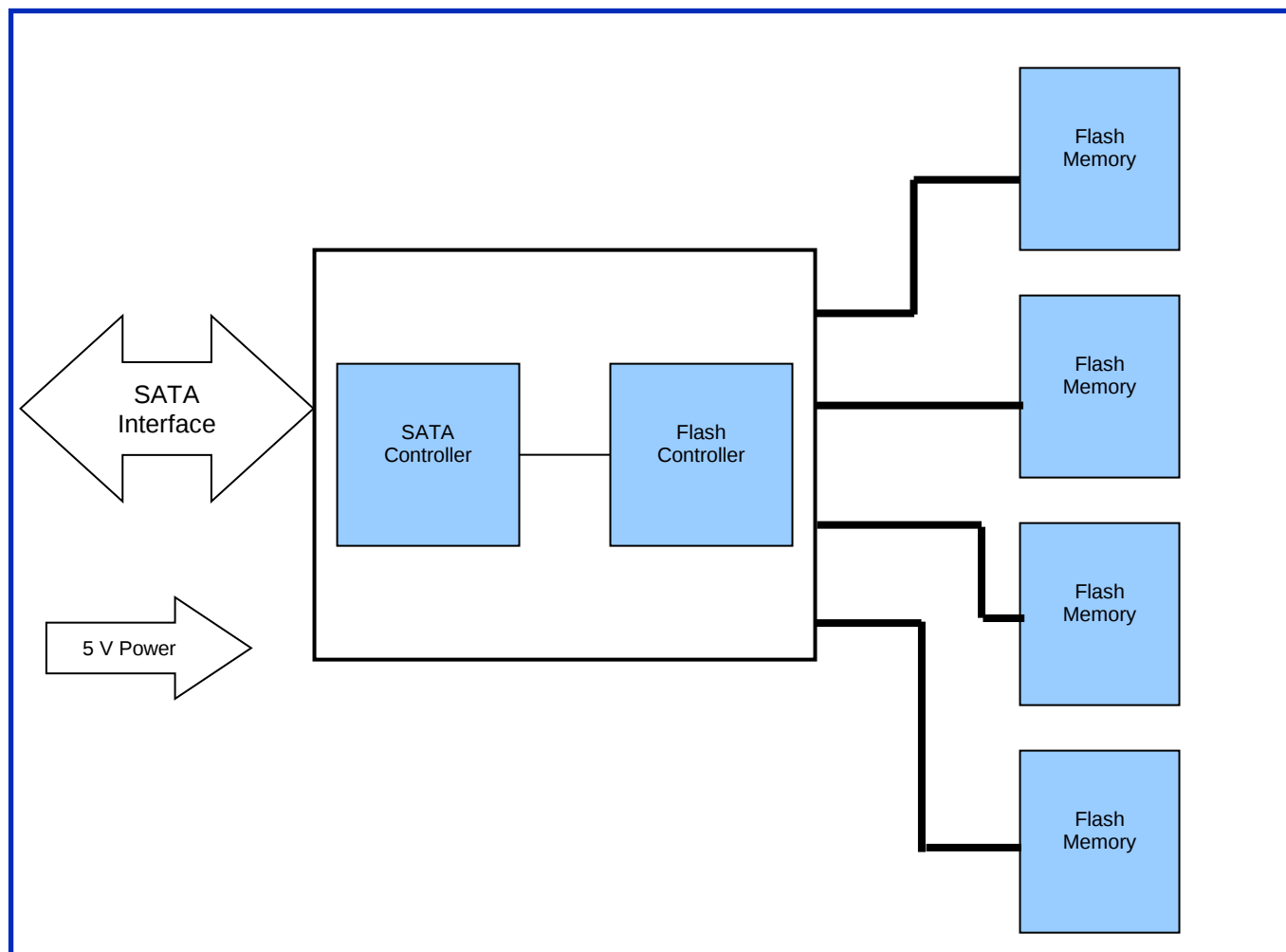
Parameter	Value
Length	54.0 mm
Width	39.0 mm
Height	4.0 mm
Weight (max)	< 11.34g [0.40OZ]

2. PRODUCT DESCRIPTION

The SMART SATA Slim SSD contains a 6 Gb/sec SATA interface controller and a NAND flash controller with corresponding flash memory devices. This system architecture logically and efficiently translates standard SATA HDD commands into flash memory accesses. Parallel access to the flash memory allows overlapped, multi-block access to complete data transfer requests rapidly. Efficient local voltage converters provide the power for logic and memory from the standard SATA power connection using switching regulators to minimize wasted power.

2.1. Functional Block Diagram

Figure 1: SATA Slim SSD Block Diagram

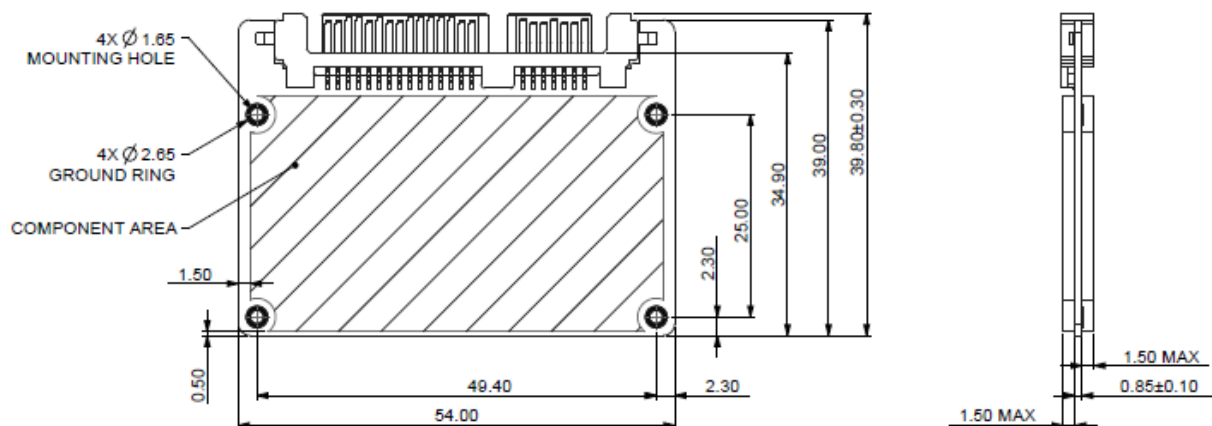


2.2. Mechanical Specification

Conforms to JEDEC MO-297A

Figure 2. SATA Slim Dimensions (in mm)

Dimensions: 54mm(L) x 39mm(W) x 4.00mm (H)



2.3. Endurance

- **Static & Dynamic Wear Leveling:** This feature eliminates overstressing flash media by spreading the data writes across all flash physical address space, including logical areas that are not written by the user. The data is wear leveled across the entire drive.
- **ECC:** utilize BCH ECC to provide correction of up to 43 random single-bit errors per 1 KByte block of user data.
- **Bad Block Management:** This feature tracks all manufacturing and run-time bad blocks of flash media and replaces them with new ones from the spare pool.

2.4. Mean Time Between Failures (MTBF)

MTBF can be calculated using Telcordia SR-232. issue 2 Parts count method.

Table 7: MTBF Values

Drive@50C	MTBF (Hours)
All Capacities	> 2,000,000

3. ELECTRICAL SPECIFICATION

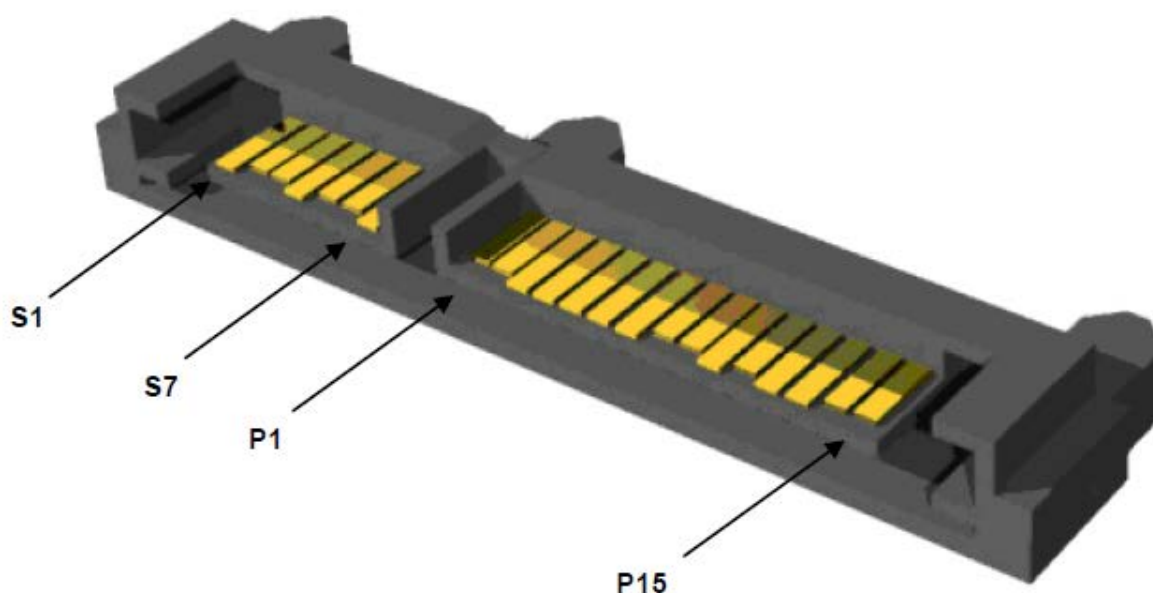
3.1. Electrical Interface

The SATA Slim drive is compliant with the SATA III, 6.0 Gb/sec standard.

3.1.1. SATA Interface Connector

The SATA connector on the SATA Slim includes a signal bay (S1 to S7) and a power bay (P1 to P15). The SATA connector can support both cabled and backplane plug-in connections. The connector complies with Telcordia GR-78 standard (NEBS), meeting the minimum requirement of 30 μinches of gold over a nickel base of 50 μinches.

Figure 3. SATA Interface Connector



3.1.2. Signal Pinout Descriptions

Table 8: Signal Pinout Descriptions

Pin	Signal Name	Signal Description
S1	GND	2 nd Mate
S2	Dev Rx+	Receive differential pair A from Phy
S3	Dev Rx-	
S4	GND	2 nd mate
S5	Dev Tx-	Transmit differential pair B from Phy
S6	Dev Tx+	
S7	GND	2 nd mate

3.1.3. Power Pinout Descriptions

Table 9: Power Pinout Descriptions

Pin	Signal Name	Signal Description
P1	V3.3	3.3V Power (not used)
P2	V3.3	3.3V Power (not used)
P3	V3.3	3.3V Power (not used)
P4	GND	1st mate
P5	GND	2nd mate
P6	GND	2nd mate
P7	V5	5 V power
P8	V5	5 V power
P9	V5	5 V power
P10	GND	2nd mate
P11	Reserved	Reserved
P12	GND	1st mate
P13	V12	12 V power (not used)
P14	V12	12 V power (not used)
P15	V12	12 V power (not used)

3.2. Absolute Maximum Ratings

Table 10: Absolute Maximum Ratings*

Symbol	Parameter	Minimum Value	Maximum Value	Unit
V _{CC}	5 V Supply Voltage	-0.3	6.0	V
V _{IN}	Input Voltage	GND – 0.5	V _{CC} + 0.5	V
T _A	Operating Temperature – (Commercial)	0	+70	°C
T _{STG}	Storage Temperature	-40	+85	°C

* Stress beyond the Absolute Maximum Rating conditions may result in permanent damage to the device. These are stress ratings only and functional operation should be restricted to those indicated in the operational sections of this specification. Exposure to conditions beyond recommended, up to and including the Absolute Maximum Rating conditions, for extended periods may affect device reliability.

4. ATA COMMANDS

This section documents the host interface commands the SATA Slim supports.

4.1. Supported ATA Commands

The SATA Slim supports the standard commands listed in the table below. For more detailed descriptions of the commands, please refer to the ATA-8 specification.

Table 11: Supported ATA Commands

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

4.2. Supported S.M.A.R.T. Operations

Self-monitoring analysis and reporting technology (S.M.A.R.T.) commands provide diagnostic information regarding drive operation and, in certain cases, can assist in predicting drive degradation. Because S.M.A.R.T. alerts the host of possible drive problems, users can assess the situation and back up data prior to an operational failure.

Each S.M.A.R.T. attribute monitors a specific drive condition, with threshold levels configured for select attributes. When the drive exceeds these thresholds, the S.M.A.R.T. attribute reports the condition. In many cases, exceeding the threshold simply indicates you should monitor the drive more closely. Host systems initiate commands, generated manually or with a third-party diagnostic tool, to monitor S.M.A.R.T. attributes.

Although the SATA Slim supports several S.M.A.R.T. operations, which are subcommands of the S.M.A.R.T. Operations command (see Table 12), the S.M.A.R.T. Return Status and S.M.A.R.T. Read Data subcommands are used for monitoring the drive.

Initiating a S.M.A.R.T. Return Status command returns the current state of the drive, specifying whether or not an attribute exceeded the assigned threshold. If an attribute has exceeded a threshold level, SMART Modular Technologies recommends issuing the S.M.A.R.T. Read Data command to identify the specific attribute (see Table 16).

S.M.A.R.T. commands are issued with B0h in the Command register and the code for the desired operation in the Features register. A S.M.A.R.T. Enable Operations must be issued before any other S.M.A.R.T. command can be performed.

4.2.1. Supported S.M.A.R.T. Subcommands

Table 12: Supported S.M.A.R.T. Subcommands

Subcommand Name	Feature Code (Hex)
S.M.A.R.T. Read Data	D0
S.M.A.R.T. Read Attribute Thresholds	D1 (obsolete)
S.M.A.R.T. Enable/Disable Autosave	D2
S.M.A.R.T. Save Attribute Values	D3 (obsolete)
S.M.A.R.T. Execute Off-Line Immediate	D4
S.M.A.R.T. Enable Operations	D8
S.M.A.R.T. Disable Operations	D9
S.M.A.R.T. Return Status	DA

4.2.2. Supported S.M.A.R.T. Data Structure

Table 13: Supported S.M.A.R.T. Data Structure

Byte	Description
0-1	Revision code
2-361	Vendor-specific
362	Offline data collection status
363	Self-test execution status byte
364-365	Total time in seconds to complete offline data collection activity
366	Vendor-specific
367	Offline data collection capability
368-369	S.M.A.R.T. capability
370	Error logging capability 7-1 Reserved 0 1 = Device error logging supported
371	Vendor-specific
372	Short self-test routine recommended polling time (in minutes)
373	Extended self-test routine recommended polling time (in minutes)
374	Conveyance self-test routine recommended polling time (in minutes)
386-395	Firmware version/data code
396-397	Number of initial invalid block (396 = MSB, 397 = LSB)
400-406	SMART
407-415	Vendor-specific
417	Program/write the strong page only
418-419	Number of spare blocks
446-510	Vendor-specific
511	Data structure checksum

4.2.3. Supported S.M.A.R.T. Attributes

Table 14: Support S.M.R.T. Attributes

Attribute Name	ID		Flags		Val	Min	Raw Attribute Value						
	Dec	Hex	1	2	3	4	5	6	7	8	9	10	11
UECC Count	1	01h	0Bh	00h	64h	64h	Uncorrectable ECC Count		00h	00h	00h	00h	00h
Reallocated Block Count	5	05h	13h	00h	64h	64h	Grown Bad Block Count		00h	00h	00h	00h	00h
Power On Hours	9	09h	12h	00h	64h	64h	Power on Hours				00h	00h	00h
Power Cycle Count	12	0Ch	12h	00h	64h	64h	Power on/off cycles				00h	00h	00h
Device Capacity	14	0Eh	12h	00h	64h	64h	Device Capacity				00h	00h	00h
User Capacity	16	0Fh	12h	00h	64h	64h	User Capacity				00h	00h	00h
Initial Spare Blocks Available	17	10h	12h	00h	64h	64h	Spare Blocks Available		00h	00h	00h	00h	00h
Spare Blocks Remaining*	18	11h	12h	00h	64h	64h	Remaining Spare Blocks		00h	00h	00h	00h	00h
Total PE cycle Count (Drive)	100	64h	12h	00h	64h	64h	Total Erase Count						00h
SATA PHY Error Count	168	A8h	12h	00h	64h	64h	SATA PHY Error Count			00h	00h	00h	00h
Total Bad Block Count	170	AAh	03h	00h	64h	64h	Initial Bad Block		00h	00h	00h	00h	00h
Total Block Erase Failures	172	ACH	12h	00h	64h	64h	Total Block Erase Failures		00h	00h	00h	00h	00h
Max PE cycle Count (Block)	173	ADh	12h	00h	64h	64h	Max Erase Count		00h	00h	00h	00h	00h
Unexpected Power Loss Count	174	AEh	12h	00h	64h	64h	Surprise Power Removal Count				00h	00h	00h
Average PE cycle Count (Block)	175	AFh	12h	00h	64h	64h	Average Erase Count				00h	00h	00h
Total Block Program Failure	181	B5h	12h	00h	64h	64h	Program Fail Count		00h	00h	00h	00h	00h
Background read UECC	187	BBh	12h	00h	64h	64h	UNC Error Count		00h	00h	00h	00h	00h
Temperature	194	C2h	23h	00h	100 - Highest value	100 - Highest value	Fixed Temperature		00h	00h	00h	00h	1Eh
N/A	197	C5h	32h	00h	64h	64h	00h	00h	00h	00h	00h	00h	00h
N/A	198	C6h	12h	00h	64h	64h	00h	00h	00h	00h	00h	00h	00h
SATA FIS CRC Errors	199	C7h	0Bh	00h	64h	64h	CRC Error Count				00h	00h	00h
% of Drive Life Used ⁽¹⁾	202	CAh	12h	00h	64h	64h	% Life Used		00h	00h	00h	00h	00h
% of Drive Life Used ⁽¹⁾	231	E7h	13h	00h	64h	64h	% Life Remain		00h	00h	00h	00h	00h
Read Failure Count	232	E8h	13h	00h	64h	64h	Read Failure Count		00h	00h	00h	00h	00h
Total Flash Sectors Read	234	EAh	0Bh	00h	64h	64h	Lifetime Reads from Flash (Sector)						00h
Total Flash Sectors Written	235	EBh	0Bh	00h	64h	64h	Lifetime Writes to Flash (Sector)						00h
Total Host Sectors Written	241	F1h	12h	00h	64h	64h	Lifetime Writes from Host (Sector)						00h
Total Host Sectors Read	242	F2h	12h	00h	64h	64h	Lifetime Reads from Host (Sector)						00h

4.3. Supported DCO Subcommands

Device Configuration Overlay (DCO) subcommands are issued with B1h in the Command register and the code for the desired command in the Feature register. See the following table for the supported subcommands and the corresponding Feature code.

Table 15: Supported DCO Subcommands

Subcommand Name	Code (Hex)
Device Configuration Freeze Lock	C1
Device Configuration Identify	C2
Device Configuration Restore	C0
Device Configuration Set	C3

4.4. Supported HPA Subcommands

Host Protected Area (HPA) subcommands are issued with F9h in the Command register and the code for the desired command in the Feature register. See the following table for the supported subcommands and the corresponding Feature code.

Table 16: Supported HPA Subcommands

Subcommand Name	Code (Hex)
Set Max Address	00
Set Max Freeze Lock	04
Set Max Lock	02
Set Max Set Password	01
Set Max Unlock	03

4.5. Identify Drive

This command passes to the Host one sector of data describing the Flash drive's parameters. The following table contains a detailed description of the Identify Drive data.

Table 17: Identify Device Information

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 (xxxxxxxx)
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	00000000h	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)

Table 17: Identify Device Information (continued)

Word	F: Fixed V: Variable X: Both	Default Value	Description
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

Table 17: Identify Device Information (continued)

Word	F: Fixed V: Variable X: Both	Default Value	Description
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 inch 4h 1.8 inch 5h Less than 1.8 inch	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 support)
212-213	F	0000h	Write-Read-Verify Sector Count Mode 2 (not support)

Table 17: Identify Device Information (continued)

Word	F: Fixed V: Variable X: Both	Default Value	Description
214-216		0000h	NV Cache relate (not support)
217	F	0001h	Non-rotating media device
218	F	0h	Reserved
219	F	0h	NV Cache relate (not support)
220	V	0h	Write read verify feature set current mode
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)

Table 18: Device Identification by Capacity

Capacity (GB)	*1 (Word 1/Word 54)	*2 (Word 57 - 58)	*3 (Word 60 - 61)	*4 (Word 100 - 103)
8	3CA5h	EEC9B0h	EEC9B0h	EEC9B0h
16	3FFFh	FBFC10h	1DD40B0h	1DD40B0h
32	3FFFh	FBFC10h	3BA2EB0h	3BA2EB0h
64	3FFFh	FBFC10h	7740AB0h	7740AB0h

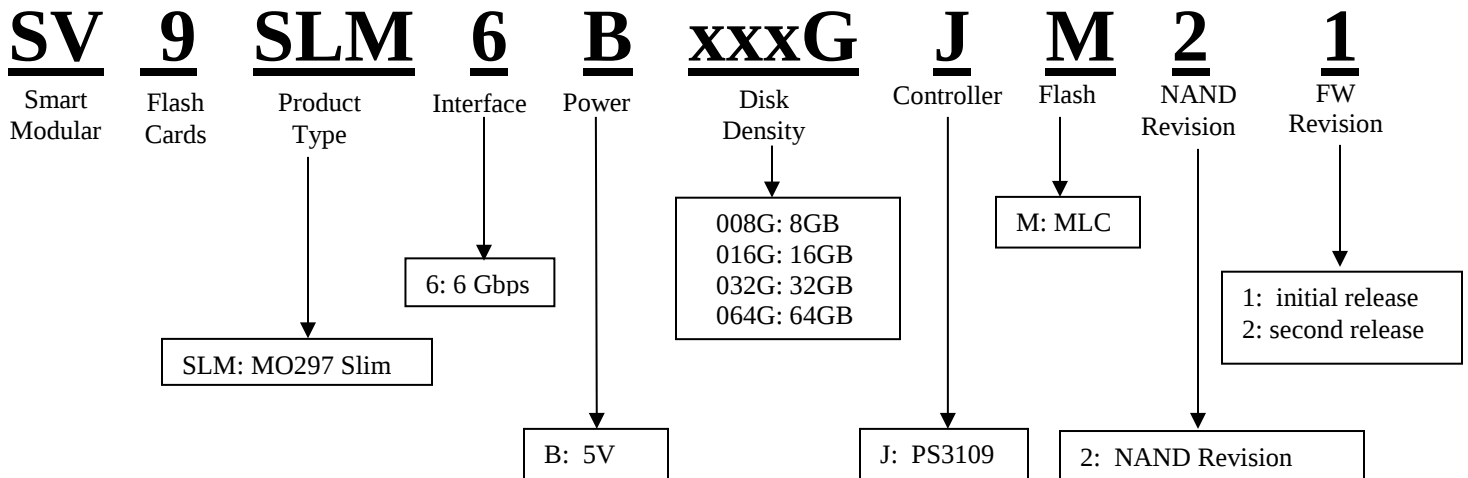
5. PART NUMBERS

5.1. Part Numbering Information

Table 14: Part Numbering Information

SMART Part Number	Capacity
SV9SLM6B008GJM21	8 GBytes
SV9SLM6B016GJM21	16 GBytes
SV9SLM6B032GJM21	32 GBytes
SV9SLM6B064GJM21	64 GBytes

5.2. Part Number Decoder



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