

# **FORESEE SATAIII 2.5 inch SSD S801 Datasheet**

**Version: A0**

**2020.10**

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**Revision History**

<i>Revision Number</i>	<i>Description</i>	<i>Revision Date</i>
A0	Initial release.	2020.10

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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

- 128/256GB is available

### ●Form Factor

- 2.5 inch 7mm

### ●Host interface

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

### ●MTBF

- 1,500,000 Hours

### ●Performance

- 128GB
- Read: Up to 550MB/s
- Write: Up to 125MB/s
- 256GB
- Read: Up to 550MB/s
- Write: Up to 240MB/s

### ●Power Consumption

- Active write: 2280mW (256GB)
- Active read: 2270mW (256GB)

### ●Temperature

- Operating : 0°C to 70°C
- Non Operating : -40°C to 85°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

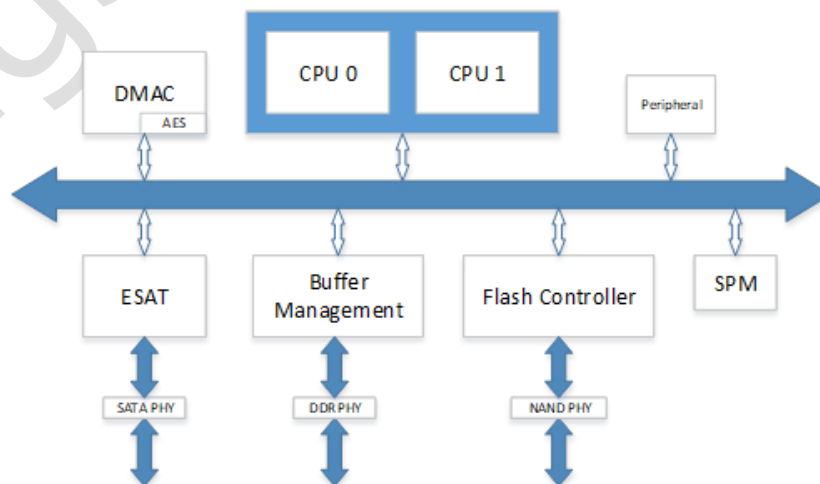
### ●Weight

- 128/256GB
- Max 45g

### ●TBW

- 128GB: 384TB
- 256GB: 768TB

### ●SSD Functional Block Diagram

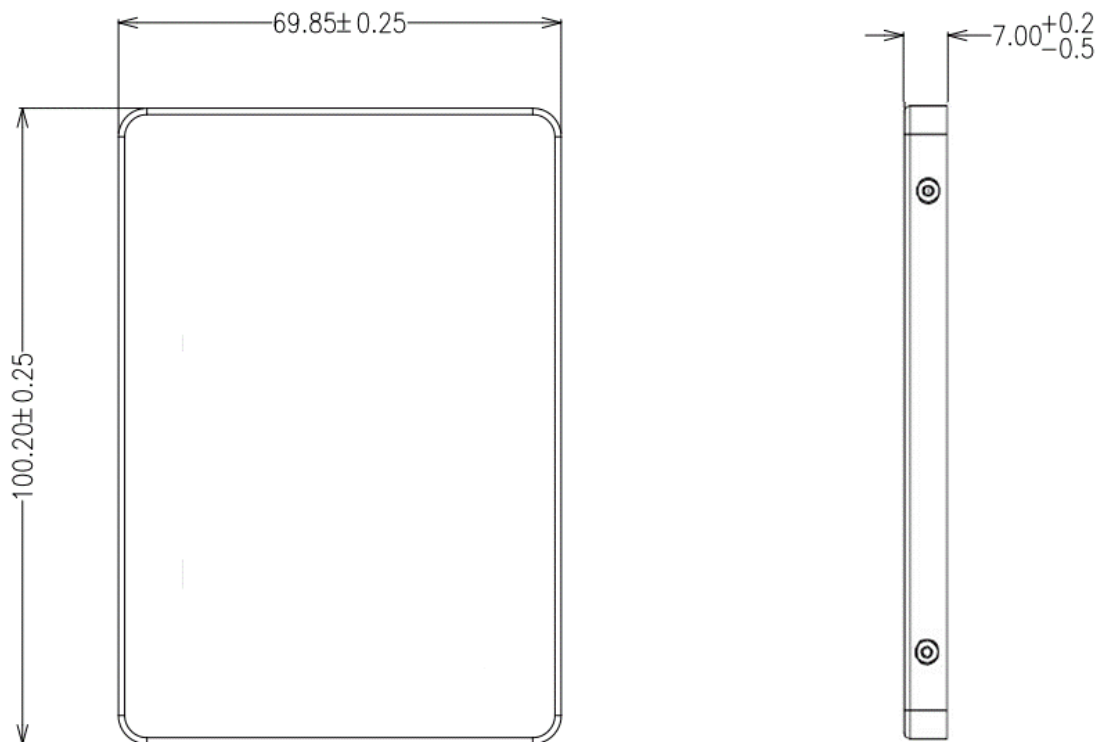


[Figure 1-1] SSD Functional Block Diagram

## 2. Mechanical Specification

### 2.1 2.5 inch SSD physical dimensions and Weight

Capacity	Height (mm)	Width (mm)	Length (mm)	Weight (gram)
128/256GB	7.00 +0.2/-0.5	69.85 ± 0.25	100.20±0.25	Max 45g



[Figure 2-1] 2.5 inch SSD 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	128GB	256GB
Sequential Read (Max)	MB/S	550	550
Sequential Write (Max)	MB/S	125	240
Random Read (4K) QD=32 (Max)	IOPS	55800	78000
Random Write (4K) QD=32 (Max)	IOPS	32000	61000

\* Actual performance may vary depending on use conditions and environment

\* Note

- Performance measured using CrystalDiskMark 5.1.2 x64
- Write cache enabled
- 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	128GB	256GB
Unformatted Capacity	119.24GB	238.47GB
User-Addressable Sectors	250064404	500000000
Bytes per Sector	512 Bytes	

NOTE:

Nominal Capacity: 1 Gigabyte (GB) =1,000,000,000 bytes

Unformatted Capacity: 1 Gigabyte (GB) =1,073,741,824 bytes

\*IDEMA standard.

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

### 3.4 Supply Voltage

Item	Requirements
Allowable voltage	5.0V ± 5%
Allowable noise/ripple	100mV p-p or less

**3.5 System Power Consumption**

Input Voltage 5.0V±5%		
Parameter	128GB	256GB
Sequential Read	2245 mW	2270 mW
Sequential Write	1685 mW	2280 mW
Random Read	1580 mW	1605 mW
Random Write	1695 mW	1940 mW
Idle	1055 mW	1060 mW

CPU : Intel Core i5-6600K

DRAM : 4GB DDR4

Chipset : Intel Z170

OS : Windows 7 x64

Test Tool : CrystalDiskMark 5.1.0 x64

**3.6 System Reliability**

<b>MTBF</b>	1,500,000 Hours
-------------	-----------------

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

**3.7 Endurance**

TBW	
128GB	256GB
384TB	768TB

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:

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

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 <sup>1</sup>	Non-Operating
Temperature	0°C to 70°C	-40°C to 85°C
Humidity <sup>2</sup>	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-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 2.5 inch Pin Assignments

	No.	Plug connector pin definition	
Signal	S1	GND	2 <sup>nd</sup> mate
	S2	A+	Differential signal A from Phy
	S3	A-	
	S4	GND	2 <sup>nd</sup> mate
	S5	B-	Differential signal B from Phy
	S6	B+	
	S7	GND	2 <sup>nd</sup> mate
Key and spacing separate signal and power segments			
Power	P1	V33	3.3V power(Unused)
	P2	V33	3.3V power(Unused)
	P3	V33	3.3V power, pre-charge, 2 <sup>nd</sup> mate (Unused)
	P4	GND	1 <sup>st</sup> mate
	P5	GND	2 <sup>nd</sup> mate
	P6	GND	2 <sup>nd</sup> mate
	P7	V5	5V power, pre-charge, 2 <sup>nd</sup> mate
	P8	V5	5V power
	P9	V5	5V power
	P10	GND	2 <sup>nd</sup> mate
	P11	DAS/DSS	Device Activity Signal/Disable Staggered Spinup
	P12	GND	1 <sup>st</sup> mate
	P13	V12	12V power, pre-charge, mate(Unused)
	P14	V12	12V power (Unused)
	P15	V12	12V power(Unused)

**Table 4-1: 2.5 inch Connector Pin Assignment**

## 5. Command Descriptions

### 5.1 Supported ATA Commands

Code	Command
90h	Execute Device Diagnostics
91h	Intialize device parameter
ECh	Identify drive
EFh	Set feature command
C6h	Set multiple
20h	Read sector
C8h	Read DMA
24h	Read sector extend
25h	Read DMA extend
30h	Write sector
CA	Write DMA
34h	Write sector extend
35h	Write DMA extend
60h	Read NCQ
61h	Write NCQ
E4h	Write Buffer
E9h	Read buffer DMA
E7h	Cache flush
E8h	Write buffer
EBh	Write buffer
EAh	Cache flush extend
40h	Read verify sector
42h	Read verify sectors extend
22h	Read long
32h	Write long
2Fh	Read log extend
47h	Read log DMA extend
3Fh	Write log extend
57h	Write log DMA extend
92h	Download micro code
E0h	Standby immediate
E1h	Idle immediate
E2h	Standby
E3h	Idle
E5h	Check POWER MODE
E6h	Sleep
FFh	Vendor Unique
B0h	S.M.A.R.T. command

**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
01	ReadErrorRate
05	ReallocatedSectorsCount
09	PowerOnHours
0C	PowerCycleCount
A0	UncorrectableSecCntOnLine
A1	NumberOfPureSpare
A3	NumberOfInitInvalidBlk
A4	TotalEraseCount
A5	MaxEraseCount
A6	MinEraseCount
A7	AverageEraseCount
A8	MaxEraseCntInSpec
A9	RemainLifePercentage
B1	WearLeavelingCount
B5	ProgramFailCnt
B6	EraseFailCnt
BE	Airflow temperature
C0	PowerOffRetractCount
C2	ControllerTemperature
C3	HardwareEccRecovered
C4	ReallocationEventCnt
C5	CurrentPendingSecCnt
C7	UdmaCrcCnt
E8	AvailableReservedSpace
F1	WriteSecCnt(32MB)
F2	ReadSecCnt(32MB)
F5	FlashWriteCnt(32MB)

**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	0040h	General configuration bit-significant information 15 0=ATA device 14:8 Retired 7 1:removable media device 6 Obsolete 5:3 Retired 2 Response incomplete 1 Retired 0 Reserved
1-6	3FFFh C837h 0010h 0000h 0000h 003Fh	Obsolete/Retired/Specific
7-8	0000h 0000h	Reserved for assignment by the CompactFlash™ Association
9	0000h	Retired
10-19	4933h 3943h 5335h 4830h 3030h 3437h 3020h 2020h 2020h 2020h	Serial number
20-22	0000h 3000h 0000h	Retired/Obsolete
23-26	5631h 2E35h 3920h 2020h	Firmware revision
27-46	4465h 616Eh 6C69h 7465h 2053h 5344h 3120h 2020h 2020h 2020h 2020h 2020h 2020h 2020h 2020h 2020h 2020h 2020h 2020h 2020h	Model number
47	8010h	15-8 80h 7-0 00h = Reserved 01h-10h = Maximum number of sectors that shall be transferred per interrupt on READ/WRITE MULTIPLE commands 11h-FFh = Reserved
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

		<p>10 1 = IORDY may be disabled            9 1 = Shall be set to one (i.e. LBA supported)            8 1 = DMA supported            7-2 Reserved            1-0 Long Physical Sector Alignment Error reporting</p>
50	4000h	<p>Capabilities            15 Shall be cleared to zero.            14 Shall be set to one.            13-2 Reserved.            1 Obsolete            0 1 = There is a minimum Standby time value and it is vendor specific.            0 = There is no minimum Standby timer value.</p>
51-52	X..Xh	Obsolete
53	0006h	<p>15-8 Free-fall Control Sensitivity            00h=Vendor's recommended's 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            0 Obsolete</p>
54-58	3FFFh 0010h 003Fh FC10h 00FBh	Obsolete
59	0000h	<p>15 1 = BLOCK ERASE EXT command is supported            14 1 = OVERWRITE EXT command is supported            13 1 = CRYPTO SCRAMBLE EXT command is supported            12 1 = Sanitize feature set is supported            11 1 = The commands allowed during a sanitize operation are as specified by this standard            0 = The commands allowed during a sanitize operation are as specified by ACS-2            10 1 = The SANITIZE ANTIFREEZE LOCK EXT command is supported            9 Reserved            8 1 = Multiple logical sector setting is valid            7-0 xxh = Current setting for number of logical sectors that shall be transferred per DRQ data block on READ/WRITE Multiple commands</p>

60-61	FFFFh 0FFFh	Total number of user addressable logical sectors for 28-bit commands
62	0000h	Obsolete
63	0007h	<p>15-11 Reserved</p> <p>10 1 = Multiword DMA mode 2 is selected 0 = Multiword DMA mode 2 is not selected</p> <p>9 1 = Multiword DMA mode 1 is selected 0 = Multiword DMA mode 1 is not selected</p> <p>8 1 = Multiword DMA mode 0 is selected 0 = Multiword DMA mode 0 is not selected</p> <p>7-3 Reserved</p> <p>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</p>
64	0003h	<p>15-2 Reserved</p> <p>1-0 PIO modes 3 and 4 supported</p>
65	0078h	<p>Minimum Multiword DMA transfer cycle time per word</p> <p>15-0 Cycle time in nanoseconds</p>
66	0078h	<p>Manufacturer's recommended Multiword DMA cycle time</p> <p>15-0 Cycle time in nanoseconds</p>
67	0078h	<p>Minimum PIO transfer cycle time without flow control</p> <p>15-0 Cycle time in nanoseconds</p>
68	0078h	<p>Minimum PIO transfer cycle time with IORDY flow control</p> <p>15-0 Cycle time in nanoseconds</p>
69	0000h	<p>Additional Supported</p> <p>15 1 = CFast Specification Support</p> <p>14 1 = Deterministic data in trimmed LBA range(s) is supported</p> <p>13 1 = Long Physical Sector Alignment Error Reporting Control is supported</p> <p>12 1 = DEVICE CONFIGURATION IDENTIFY DMA and DEVICE CONFIGURATION SET DMA are supported</p> <p>11 1 = READ BUFFER DMA is supported</p> <p>10 1 = WRITE BUFFER DMA is supported</p> <p>9 1 = SET MAX SET PASSWORD DMA and SET MAX UNLOCK DMA are supported</p>

		<p>8 1 = DOWNLOAD MICROCODE DMA is supported</p> <p>7 Reserved for IEEE 1667</p> <p>6 0 = Optional ATA device 28-bit commands supported</p> <p>5 1 = Trimmed LBA range(s) returning zeroed data is supported</p> <p>4 1 = Device Encrypts All User data</p> <p>3 1 = Extended Number of User Addressable Sectors is supported</p> <p>2 1 = All write cache is non-volatile</p> <p>1-0 Zone Capabilities</p>
70	0000h	Reserved
71-74	0000h 0000h 0000h 0000h	Reserved for IDENTIFY PACKET DEVICE command.
75	001Fh	<p>Queue depth</p> <p>15-5 Reserved</p> <p>4-0 Maximum queue depth - 1</p>
76	230Eh	<p>Serial ATA capabilities</p> <p>15 Supports READ LOG DMA EXT as equivalent to READ LOG EXT</p> <p>14 Supports Device Automatic Partial to Slumber transitions</p> <p>13 Supports Host Automatic Partial to Slumber transitions</p> <p>12 Supports Native Command Queuing priority</p> <p>11 Supports Unload while NCQ commands outstanding</p> <p>10 Supports Phy event counters</p> <p>9 Supports receipt of host-initiated interface power management requests</p> <p>8 Supports native command queuing</p> <p>7-4 Reserved for future Serial ATA signaling speed grades</p> <p>3 1 = Supports Serial ATA Gen-3 signaling speed (6.0Gbps)</p> <p>2 1 = Supports Serial ATA Gen-2 signaling speed (3.0Gbps)</p> <p>1 1 = Supports Serial ATA Gen-1 signaling speed (1.5Gbps)</p> <p>0 Shall be cleared to zero</p>
77	0006h	<p>Serial ATA Additional capabilities</p> <p>15-9 Reserved</p> <p>8 Power Disable feature always enabled</p> <p>7 Supports DevSleep to reduced power state capability</p> <p>6 Supports RECEIVE FPDMA QUEUED and SEND FPDMA QUEUED commands</p> <p>5 Supports NCQ Queue Management Command</p> <p>4 Supports NCQ Streaming</p> <p>3-1 Coded value indicating current negotiated Serial ATA signal speed</p> <p>0 Shall be cleared to zero</p>
78	0044h	<p>Serial ATA features supported</p> <p>15-13 Reserved for Serial ATA</p> <p>12 1 = Supports Power Disabled Feature</p> <p>11 1 = Supports Rebuild Assist</p>

		<p>10 1 = Supports Device Initiated Interface Power Management Software Settings Preservation</p> <p>9 1 = Supports Hybrid Information</p> <p>8 1 = Device Sleep supported</p> <p>7 1 = Supports NCQ Autosense</p> <p>6 1 = Supports software settings preservation</p> <p>5 1 = Hardware Feature Control is supported</p> <p>4 1 = Supports in-order data delivery</p> <p>3 1 = Supports dev initiate interface power management</p> <p>2 1 = Supports DMA Setup Auto-Activate optimization</p> <p>1 1 = Supports non-zero buffer offsets in DMA Setup FIS</p> <p>0 Shall be cleared to zero</p>
79	0040h	<p>Serial ATA features enabled</p> <p>15-12 Reserved</p> <p>11 1 = Rebuild Assist enabled</p> <p>10 1 = Power Disable feature enabled</p> <p>9 1 = Hybrid Information feature is enabled</p> <p>8 1 = Device Sleep enabled</p> <p>7 1 = Device Automatic Partial to Slumber transitions enabled</p> <p>6 1 = software settings preservation enabled</p> <p>5 1 = Hardware Feature Control is enabled</p> <p>4 1 = In-order data delivery enabled</p> <p>3 1 = Device initiating interface power management enabled</p> <p>2 1 = DMA Setup Auto-Activate optimization enabled</p> <p>1 1 = Non-zero buffer offsets in DMA Setup FIS enabled</p> <p>0 Shall be cleared to zero</p>
80	0FE0h	<p>Major version number</p> <p>0000h or FFFFh = device does not report version</p> <p>15-12 Reserved</p> <p>11 1 = Supports ACS-4</p> <p>10 1 = Supports ACS-3</p> <p>9 1 = Supports ACS-2</p> <p>8 1 = Supports ATA8-ACS</p> <p>7 1 = Supports ATA/ATAPI-7</p> <p>6 1 = Supports ATA/ATAPI-6</p> <p>5 1 = Supports ATA/ATAPI-5</p> <p>4 1 = Supports ATA/ATAPI-4</p> <p>3 Obsolete</p> <p>2 Obsolete</p> <p>1 Obsolete</p> <p>0 Reserved</p>

81	0028h	<p>Minor revision number</p> <p>0000h or FFFFh = device does not report version</p> <p>0001h-000Ch = Obsolete</p> <p>000Dh = ATA/ATAPI-4 X3T13 1153D revision 6</p> <p>000Eh = ATA/ATAPI-4 T13 1153D revision 13</p> <p>000Fh = ATA/ATAPI-4 X3T13 1153D revision 7</p> <p>0010h = ATA/ATAPI-4 T13 1153D revision 18</p> <p>0011h = ATA/ATAPI-4 T13 1153D revision 15</p> <p>0012h = ATA/ATAPI-4 published ANSI NCITS 317-1998</p> <p>0013h = ATA/ATAPI-5 T13 1321D revision 3</p> <p>0014h = ATA/ATAPI-4 T13 1153D revision 14</p> <p>0015h = ATA/ATAPI-5 T13 1321D revision 1</p> <p>0016h = ATA/ATAPI-5 published ANSI NCITS 340-2000</p> <p>0017h = ATA/ATAPI-4 T13 1153D revision 17</p> <p>0018h = ATA/ATAPI-6 T13 1410D revision 0</p> <p>0019h = ATA/ATAPI-6 T13 1410D revision 3a</p> <p>001Ah = ATA/ATAPI-7 T13 1532D revision 1</p> <p>001Bh = ATA/ATAPI-6 T13 1410D revision 2</p> <p>001Ch = ATA/ATAPI-6 T13 1410D revision 1</p> <p>001Dh = ATA/ATAPI-7 published ANSI INCITS 397-2005</p> <p>001Eh = ATA/ATAPI-7 T13 1532D revision 0</p> <p>001Fh-0020h = Reserved</p> <p>0021h = ATA/ATAPI-7 T13 1532D revision 4a</p> <p>0022h = ATA/ATAPI-6 published, ANSI INCITS 361-2002</p> <p>0023h-0026h = Reserved</p> <p>0027h = ATA8-ACS version 3c</p> <p>0028h = ATA8-ACS version 6</p> <p>0029h = ATA8-ACS version 4</p> <p>0030h = Reserved</p> <p>0031h = ACS-2 Revision 2</p> <p>0032h = Reserved</p> <p>0033h = ATA8-ACS version 3e</p> <p>0034h-0038h = Reserved</p> <p>0039h = ATA8-ACS version 4c</p> <p>0040h-0041h = Reserved</p> <p>0042h = ATA8-ACS version 3f</p> <p>0043h-0051h = Reserved</p> <p>0052h = ATA8-ACS version 3b</p> <p>0053h-0106h = Reserved</p> <p>0107h = ATA8-ACS version 2d</p> <p>0108h-010Fh = Reserved</p> <p>0110h = ACS-2 Revision 3</p> <p>0111h-FFFEh = Reserved</p>
82	3069h	<p>Commands and feature set supported</p> <p>15 Obsolete</p> <p>14 1 = NOP command supported</p>

		<p>13 1 = READ BUFFER command supported                  12 1 = WRITE BUFFER command supported                  11 Obsolete                  10 1 = Host Protected Area feature set supported                  9 1 = DEVICE RESET command supported                  8 1 = SERVICE interrupt supported                  7 1 = release interrupt supported                  6 1 = look-ahead supported                  5 1 = write cache 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 = Security Mode feature set supported                  0 1 = SMART feature set supported</p>
<p>83</p>	<p>7401h</p>	<p>15 Shall be cleared to zero                  14 Shall be set to one                  13 1 = FLUSH CACHE EXT command supported                  12 Shall be set to one to indicate that the mandatory FLUSH CACHE command is supported                  11 1 = Device Configuration Overlay feature set supported                  10 1 = 48-bit Address feature set supported                  9 1 = Automatic Acoustic Management feature set supported                  8 1 = SET MAX security extension supported                  7 Reserved for the Address Offset Reserved Area Boot Method                  6 1 = SET FEATURES subcommand required to spin-up after power-up                  5 1 = Power-Up In Standby features set supported                  4 Obsolete                  3 1 = Advanced Power Management feature set supported                  2 1 = CFA feature set supported                  1 1 = TCQ feature set supported                  0 1 = DOWNLOAD MICROCODE command supported</p>
<p>84</p>	<p>4120h</p>	<p>Command set/feature supported extension.                  15 Shall be cleared to zero                  14 Shall be set to one                  13 1 = IDLE IMMEDIATE with UNLOAD FEATURE supported                  12 Reserved for technical report INCITS TR-37-2004 (TLC)                  11 Reserved for technical report INCITS TR-37-2004 (TLC)                  10-9 Obsolete                  8 Shall be set to one (i.e. 64-bit Word wide name supported)                  7 1 = WRITE DMA QUEUED FUA EXT command supported                  6 1 = WRITE DMA FUA EXT and WRITE MULTI FUA EXT commands supported                  5 1 = General Purpose Logging feature set supported</p>

		<p>4 1 = Streaming feature set supported            3 1 = Media Card Pass Through Command feature set supported            2 1 = Media serial number supported            1 1 = SMART self-test supported            0 1 = SMART error logging supported</p>
85	3009h	<p>Command set/feature enabled.            15 Obsolete            14 1 = NOP command supported            13 1 = READ BUFFER command supported            12 1 = WRITE BUFFER command supported            11 Obsolete            10 1 = Host Protected Area feature set enabled            9 Shall be cleared to zero to indicate that the DEVICE RESET command is not supported            8 1 = SERVICE interrupt enabled            7 1 = release interrupt enabled            6 1 = Read look-ahead enabled            5 1 = write cache 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 Power Management feature set is supported            2 Obsolete            1 1 = Security Mode feature set enabled            0 1 = SMART feature set enabled</p>
86	F401h	<p>Command set/feature enabled.            15 1 = Words 120-119 are valid            14 Reserved            13 1 = FLUSH CACHE EXT command supported            12 1 = FLUSH CACHE command supported            11 1 = Device Configuration Overlay supported            10 1 = 48-bit Address features set supported            9 1 = Automatic Acoustic Management feature set enabled            8 1 = SET MAX security enabled by SET MAX SET PASSWORD            7 Reserved for address Offset Reserved Area Boot, INCITS TR27:2001            6 1 = SET FEATURES subcommand required to spin-up after power-up            5 1 = Power-Up In Standby features set enabled            4 Obsolete            3 1 = Advanced Power Management feature set enabled            2 1 = CFA feature set supported            1 1 = TCQ feature set supported</p>

		0 1 = DOWNLOAD MICROCODE command supported
87	4120h	<p>Command set/feature enabled/supported.</p> <p>15 Shall be cleared to zero</p> <p>14 Shall be set to one</p> <p>13 1 = IDLE IMMEDIATE with UNLOAD FEATURE supported</p> <p>12 Reserved for technical report- INCITS tr-37-2004 (TLC)</p> <p>11 Reserved for technical report- INCITS TR-37-2004 (TLC)</p> <p>10-9 Obsolete</p> <p>8 Shall be set to one (i.e. 64 bit Word wide name supported)</p> <p>7 1 = WRITE DMA QUEUED FUA EXT command supported</p> <p>6 1 = WRITE DMA FUA EXT and WRITE MULTIPLE FUA EXT commands supported</p> <p>5 1 = General Purpose Logging feature set supported</p> <p>4 Obsolete</p> <p>3 1 = Media Card Pass Through Command feature set supported</p> <p>2 1 = Media serial number is valid</p> <p>1 1 = SMART self-test supported</p> <p>0 1 = SMART error logging supported 3 Shall be set to one to indicate that the mandatory Power Management feature set is supported</p> <p>2 Obsolete</p> <p>1 1 = The Security feature set is supported</p> <p>0 1 = The SMART feature set is supported</p>
88	207Fh	<p>15 Reserved</p> <p>14 1 = Ultra DMA mode 6 is selected 0 = Ultra DMA mode 6 is not selected</p> <p>13 1 = Ultra DMA mode 5 is selected 0 = Ultra DMA mode 5 is not selected</p> <p>12 1 = Ultra DMA mode 4 is selected 0 = Ultra DMA mode 4 is not selected</p> <p>11 1 = Ultra DMA mode 3 is selected 0 = Ultra DMA mode 3 is not selected</p> <p>10 1 = Ultra DMA mode 2 is selected 0 = Ultra DMA mode 2 is not selected</p> <p>9 1 = Ultra DMA mode 1 is selected 0 = Ultra DMA mode 1 is not selected</p> <p>8 1 = Ultra DMA mode 0 is selected 0 = Ultra DMA mode 0 is not selected</p> <p>7 Reserved</p> <p>6 1 = Ultra DMA mode 6 and below are supported</p> <p>5 1 = Ultra DMA mode 5 and below are supported</p> <p>4 1 = Ultra DMA mode 4 and below are supported</p> <p>3 1 = Ultra DMA mode 3 and below are supported</p> <p>2 1 = Ultra DMA mode 2 and below are supported</p> <p>1 1 = Ultra DMA mode 1 and below are supported</p> <p>0 1 = Ultra DMA mode 0 is supported</p>

89	0000h	<p>15 1 = Extended Time is reported in bits 14:0          0 = Time is reported in bits 7:0 and bits 14:8 are reserved          14-8 Extended Time required for Normal Erase mode SECURITY ERASE UNIT command          7-0 Extended Time required for Normal Erase mode SECURITY ERASE UNIT command          and Time required for Normal Erase mode SECURITY ERASE UNIT command</p>
90	0000h	<p>15 1 = Extended Time is reported in bits 14:0          0 = Time is reported in bits 7:0 and bits 14:8 are reserved          14-8 Extended Time required for Enhanced Erase mode SECURITY ERASE UNIT command          7-0 Extended Time required for Enhanced Erase mode SECURITY ERASE UNIT command          and Time required for Enhanced Erase mode SECURITY ERASE UNIT command</p>
91	0000h	<p>Current advanced power management level value          15-8 Reserved          7-0 Current APM level value          00h = Reserved          01h = Minimum power consumption with Standby          02h-7Fh = Intermediate power management levels with Standby          80h = Minimum power consumption without Standby          81h-FDh = Intermediate power management levels without Standby          FEh = Maximum performance          FFh = Reserved</p>
92	0000h	Master Password Identifier
93	0000h	<p>Hardware reset result. For SATA devices, word 93 shall be set to the value 0000h.          15 Shall be cleared to zero.          14 Shall be set to one for PATA device.          13 1 = dev detected CBLID- above ViH.          0 = dev detected CBLID- above ViL.</p>

		<p>12-8 Device 1 HW reset result. Device 0 shall clear these bits to 0. 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 Dev 1 determined 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 0. Device 0 shall set these bits as follows: 7 Reserved. 6 0 = Device 0 not respond when Device 1 is selected. 1 = Device 0 responds when Device 1 is selected. 5 0 = Device 0 did not detect assertion of DASP-. 1 = Device 0 detected assertion of DASP-. 4 0 = Device 0 did not detect assertion of PDIAG-. 1 = Device 0 detected assertion of PDIAG-. 3 0 = Device 0 failed diagnostics. 1 = Device 0 passed diagnostics. 2-1 These bits indicate how Device 0 determined device number: 00 = Reserved. 01 = a jumper was used. 10 = the CSEL signal was used. 11 = some other method was used or the method unknown. 0 Shall be set to one for PATA devices. 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</p>
94	0000h	15-8 Vendor's recommended acoustic management value. 7-0 Current automatic acoustic management 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(98-99)
100-103	12B03B9E00000000h	Number of User Addressable Logical Sectors.
104	0000h	Streaming Transfer Time - PIO
105	0008h	Maximum number of 512-byte blocks per DATA SET MANAGEMENT command
106	0000h	Streaming Performance Granularity (DWord)
107	0000h	Inter-seek delay for ISO 7779 standard acoustic testing
108	0000h	15-12 NAA (3-0)

		11-0 IEEE OUI (23-12)
109	0000h	15-4 IEEE OUI (11-0) 3-0 Unique ID (35-32)
110	0000h	15-0 Unique ID (31-16)
111	0000h	15-0 Unique ID (15-0)
112-115	0000000000000000h	Reserved for 128 bit world wide name extension to 128 bits
116	0000h	Reserved for INCITS TR-37-2004
117-118	00000000h	Words per Logical Sector
119	0000h	Commands and feature sets supported (Continued from words 84-82) 15 Shall be cleared to zero 14 Shall be set to one 13-10 Reserved 9 1 = DSN feature set is supported 8 1 = Accessible Max Address Configuration feature set is supported 7 1 = Extended Power Conditions feature set is supported 6 1 = Sense Data 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 Disable Data Transfer
120	0000h	Commands and feature sets supported or enabled (Continued from words 87-85) 15 Shall be cleared to zero 14 Shall be set to one 13-10 Reserved 9 1 = DSN feature set is enabled 8 Reserved 7 1 = Extended Power Conditions feature set is enabled 6 1 = Sense Data 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 Disable Data Transfer
121-126	000000000000 000000000000h	Reserved for expanded supported and enable 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	0000000000000000 0000000000000000 0000000000000000 0000000000000000 0000000000000000 0000000000000000h	Vendor specific
160	0000h	CFA power mode 1 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	0000000000000000 00000000000000h	Reserved for assignment by the CompactFlash™ Association
168	0000h	Device Nominal Form Factor 15-4 Reserved 3-0 Device Nominal Form Factor
169	0001h	DATA SET MANAGEMENT command is supported 15-1 Reserved 0 1 = the Trim bit in the DATA SET MANAGEMENT command is supported
170-173	0000000000000000h	Additional Product Identifier(ATA String)
174-175	00000000h	Reserved
176-205	0000...0000h	Current media serial number (60 ASCII characters)
206	0000h	SCT Command Transport 15-12 Vender Specific 11-6 Reserved 5 SCT Command Transport Data Tables support 4 SCT Command Transport Features Control supported 3 SCT Command Transport Error Recovery control supported 2 SCT Command Transport Write Same supported 1 SCT Command Transport Long Sector Access supported 0 SCT Command Transport supported



	000000000000h	
230-233	0000000000000000h	Extended Number of User Addressable Sectors(QWord)
234	0001h	Minimum number of 512 byte units per DOWNLOAD MICROCODE command mode 3
235	0800h	Maximum number of 512 byte units per DOWNLOAD MICROCODE command mode 3
236-254	0000...0000h	Reserved
255	EEA5h	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 2.5 inch SSD

Type	Capacity	MODEL	Part Number
SATA3 2.5 inch SSD	128GB	S801S128G	FSCRSEC-128G
SATA3 2.5 inch SSD	256GB	S801S256G	FSCRSEC-256G

## 8. Contact information

Tel: +86-755-8616-8848

Fax: +86-755-8616-9388

Email: [sales@longsys.com](mailto:sales@longsys.com)

Website: [www.longsys.com](http://www.longsys.com)

Add: 8/F, 1 Building, Finance Base, No.8, Kefa Road, High-Tech Park, Shenzhen, China