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SAMSUNG · **SPINPOINT**

SAMSUNG
HARD DISK DRIVE
2007 Product Guide

"provides the most reliable storage solution"
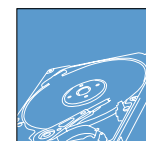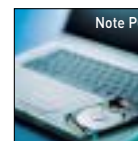
SAMSUNG DIGITall
everyone's invited™

Samsung
Hard Disk Drive

F/Factor	Family	Capacity(GB)	RPM	Interface	Buffer	Model
3.5"	T166	500	7200	SATA2	8	HD500LJ
		500	7200	SATA2	16	HD501LJ
		400	7200	SATA2	8	HD402LJ
		400	7200	SATA2	16	HD403LJ
		320	7200	SATA2	8	HD320KJ
		320	7200	SATA2	16	HD321KJ
		250	7200	SATA2	8	HD251KJ
		250	7200	SATA2	16	HD252KJ
		160	7200	SATA2	8	HD160HJ
		80	7200	SATA2	8	HD080GJ
	T133S	400	7200	SATA2	8	HD400LJ
		400	7200	SATA2	16	HD401LJ
		300	7200	SATA2	8	HD300LJ
	T133	400	7200	PATA	8	HD400LD
		300	7200	PATA	8	HD300LD
	P120S	250	7200	SATA2	8	SP2504C
		200	7200	SATA2	8	SP2004C
	P120	250	7200	PATA	8	SP2514N
		200	7200	PATA	8	SP2014N
	P80SD	160	7200	SATA2	8	HD160JJ
		120	7200	SATA2	8	HD120IJ
		80	7200	SATA2	8	HD080HJ
2.5"	P80	160	7200	PATA	2	SP1644N
		160	7200	PATA	8	SP1654N
		120	7200	PATA	2	SP1243N
		120	7200	PATA	8	SP1253N
		80	7200	PATA	2	SP0842N
	M80S	160	5400	SATA	8	HM160JI
		120	5400	SATA	8	HM120II
		80	5400	SATA	8	HM080HI
	M80	160	5400	PATA	8	HM160JC
		120	5400	PATA	8	HM120IC
		80	5400	PATA	8	HM080HC
	M60S	120	5400	SATA	8	HM120JI
		100	5400	SATA	8	HM100JI
		60	5400	SATA	8	HM060HI
	M60	120	5400	PATA	8	HM120JC
		100	5400	PATA	8	HM100JC
		60	5400	PATA	8	HM060HC
	M40S	80	5400	SATA	8	HM080JI
		40	5400	SATA	8	HM040HI
	M40	80	5400	PATA	8	MP0804H
		40	5400	PATA	8	MP0402H
2.5" Hybrid HDD	MH80S	160	5400	SATA	8	HM16HJI
		120	5400	SATA	8	HM12HII
		80	5400	SATA	8	HM08HHI
1.8"	N40	80	3600	PATA/CEATA	2	HS080JA
		40	3600	PATA/CEATA	2	HS040HA

1.8 inch

MP3

PDA

UM PC

Car Navigation

2.5 inch

Slim PC

Car Navigation

Note PC

3.5 inch

PVR

Digital TV

Game Console

Traditional PC

☐ ☐ ☐ ☐

Capture the World Market with the best Quality

There were enormous changes in the HDD industry in the past decade. The excessive competition among companies had resulted in an industry wide deterioration of profitability for some time.

With large scale restructuring of the industry, Samsung Electronics succeeded in turning around an important yet unprofitable HDD business into a profitable and dynamic one. The improved product competitiveness and commitment to reliability are the keys we relied on to achieve great success in such a difficult market environment. Especially noteworthy, are the critical investments Samsung made years ago to ensure the highest qualities of its products. These investments paid great dividends, and Samsung earned a notable reputation from major OEMs with unmatched high quality standards. We have also succeeded in expanding the product line-up from 3.5inch to 2.5inch hdd.

In addition, paradigm changes in the storage business environment open ample opportunity for Samsung to arise as a total storage solution leader in the industry. Digital convergence trends of IT and consumer electronics dims the boundary between these two different business areas. Samsung, with its well-known CE business experiences, take advantages that no HDD companies can nourish.

Hereby, we contributed to achieving a perfect AV environment of PC by our success in developing acoustic noise suppression technologies such as NoiseGuard™ and SilentSeek™. Samsung will continue to seek ways to leverage our productive R&D efforts, as always.

Samsung plans to accelerate current business momentum with innovations in competitiveness such as best product reliability, fast time-to-market, superior performance, and a noiseless operation environment.

Behold the High Capacity Hard Disk Drive

When the 140MB HDD was introduced in 1973, no one would have even imagined the current 500 Gigabytes HDD in production today. The complexity of programs, and popular use of graphic / AV applications, inevitably makes the PC user to consider the capacity of HDD as an important factor in selecting the PC along with the CPU speed and the size of RAM memory. To address this change in the market, Samsung has succeeded in producing the 500 Gigabytes hard disk drive, constructed from three 166 Gigabytes per platter disks. This page will describe how this high-capacity HDD now provides a new world of enjoyment and convenience to users.

AV Environment in PC With the rapid distribution of the PC and the Internet, more and more users want to implement AV features of TV, VTR, and Recorder in their PCs. Especially, in cases of users in urban areas, they prefer to purchase the PC with AV features, instead of buying other electronic appliances, to make most out of limited living spaces. This has enabled PCs with AV features, such as TV and PVR, to emerge in the market. For example, a PC with a built-in PVR feature, allows the user to use the instant playback function on their PCs, without purchasing any separate PVR devices. With a 160 to 500 Gigabytes high-capacity HDD, they can also store and edit many movies on their PCs. The consequence is that consumers can enjoy almost all AV features, such as music, movies, Internet, and TV programs, with a single PC. The high-capacity HDD allows users to store more movies and music titles on their PCs, and has dramatically increased the range and quality of the PC experience for users.

Increase of PVR demand. When we think of HDD, we usually think of storage mechanism in IT devices. Now, we can find this storage mechanism in device like Personal video Recorder. More and more people tend to store their favorite movies, sports games, and TV shows in their homes. With PVR, they can simply download these contents into HDD inside it. Increasing demand of multimedia contents automatically increase the demand for storage space to store.

High-capacity HDD to Increase Productivity for Professionals
Typically, 10 Gigabytes is required to produce a new catalogue for backup files. When several persons are working together, it is more efficient and convenient to keep the backup files on the HDD rather than on other media, such as CD RW and floppy disks. Therefore, the capacity of the HDD can directly affect the productivity levels of professionals, such as graphic designers.

☐   ☐   ☐   ☐

The Perfect AV Environment with Noiseless Hard Disk Drive

There is an emerging trend to produce PCs focused on AV, that seeks to maximize the efficiency of the AV function through the Internet. For example, this kind of PC would feature high-performance audio equipment such as 20W 2-way speaker to create better sound effects, and even a built-in PVR function. What if the PC, designed around high end AV features, was found to generate too much noise? It would be a significant problem.

Major Index of Quality for PC Recently, acoustic noise level has become the major index of quality for many home appliances, such as air-conditioners and refrigerators. The cooling fan of the CPU and HDD are major parts in the PC that generate noise. In case of the CPU cooling fan that generates constant noise in idle mode, recent improvements in design have significantly reduced noise levels. Further, a new PC without a CPU cooling fan has been introduced to eliminate this kind of noise. A HDD usually generates 2.8 to 3.3 Bels in idle mode, and 3.0 to 3.5 Bels in seek mode. This level of noise can cause distraction and annoyance to users, since many of them use their PC in quiet environments, such as at night, where 3.0 Bels or less noise levels are typical.

The Cause of HDD noise The HDD generates different noise characteristics by the frequency level. The biggest source of the noise is the spindle motor which generates vibration from its rotating motor. The vibration is transferred to the outside of the HDD and causes the noise. Also, the flow of air inside HDD caused by disk rotation can create noise. During seek mode, the movement of the head actuator generates a very high-pitched noise, familiar to all PC owners.

Noise Guard™ and Silentseek™ Technologies Samsung has developed and applied NoiseGuard™ technology that is a combined technology to eliminate each noise source or to minimize energy transmission. First, modification of the spindle motor's design minimizes the noise source. In addition, the cover is designed to optimize the flow of air. The Damper utilizes vibration absorbing material, installed on the area of highest density, which maximizes the transmission of energy to the outside. Furthermore, to minimize the data seeking noise that has always irritated users, we have developed and applied SilentSeek™ technology, which makes the movement of the head actuator much smoother. While other competing technologies, such as the AAM option, cause performance degradation to lower the noise level, Samsung's SilentSeek™ technology causes virtually no degradation in performance.

☐   ☐   ☐   ☐

Maximize the Confidence in Data Storage

When the monitor, CD-ROM or RAM malfunctions, the problem is limited to that particular part. However, malfunction in the HDD means far more greater problems in other components. It is because most PC users consider their HDD as the final storage device for their data. Therefore, damage in the HDD generally causes enormous intellectual property loss. This makes PC manufacturers consider the HDD as the most important component to prevent hardware failure and data loss, as well as the brand image loss that would soon follow. Samsung Electronics recognizes that product reliability is the most important aspect of our business, and answers the needs of PC manufacturers, while it leverages our most strategic investments. As a result, the Samsung HDD has been recognized as the most reliable products by major PC OEM manufacturers, which has advanced Samsung's global OEM position. This page provides a brief description of how Samsung improved product reliability.

It would have been impossible to achieve the recent advances in the high product reliability of our HDD product by improving single aspects of the technology or process. Therefore, it could only be achieved by innovation of the entire process from the product design to quality assurance. The most frequent problem that causes HDD malfunction is the collision of the head and disk, a result of the shock that occurs during the transporting or installation of the HDD. Therefore, reducing the possibility of collision between the head and the disk was seen by Samsung to be very important, if significant enhancement of product reliability was to be achieved. By optimizing the head actuator design in the early product design stage, Samsung eventually succeeded in maximizing he shock-resistance without the degradation of the performance. ImpacGuard™, Samsung's patented technology, is designed to prevent any head actuator vibration during a non-operating environment, which reduces the possibility of collision between the head and the disk even further. Besides, HDD parts can also fail due to corrosion or contamination. Samsung analyzed and eliminated these kinds of problems, at the source, and in advance, by applying the best failure analysis technology adapted from our experience in the semi- conductor business. For example, the microscopic pin holes on the disk surface causes corrosion, which then causes one type of hardware failure. Samsung analyzed this fact to solve the problem in cooperation with our disk component suppliers. Automation of the manufacturing process was inescapable, since the HDD consists of microscopic parts using a micrometer. For example, four screws are used to assemble the disk onto the HDD. When this process is performed by manual labor, the torques for each screw will be different, which, in turn, causes minute, but critical, distortions of the disk. Also, when assembling the head actuator onto the disk, even an infinitesimal misalignment can cause the head to scratch the disk. With the most advanced automated manufacturing line in the industry, Samsung minimizes this potential quality deviation that is possible by changes in the manufacturing process. In addition, our specialized technology for HDD manufacturing is applied in the quality assurance stage of production. As a result, our customers are allowed to focus on their core business, reliably, in the most stable storage environment available, anywhere on earth.

..**H** igher..

..**Reliabilit y** ..

..Faster **b** oot and Resume..

..Better shock **r** esistance..

.. **i** nstant access..

..Re **d** uce Power Consumption..

Hybrid HDD
New Era of Storage

Overview

Along with the development of mobile applications, mobile storage media is fast emerging as a hot issue. The growing trend toward mobility can easily be witnessed at some companies where employees are provided with notebook computers so that they can move to conference rooms at their convenience. This is just one example, but it is clear that today there is a demand for improved mobility. At the center of this issue is the hard disk. Mobile applications require several features from hard disks, including low energy consumption and the ability to absorb external shock. These requirements are especially important in the case of notebook computers. Other features required by users of personal computers include fast boot times and data stability. Hybrid hard disk drive (HHDD) refers to a leading product that incorporates the advantages of flash into the hard disk drive, satisfying the requirements like energy consumption and reduced boot time. HHDD adds NV Cache (Non-Volatile Cache) to the conventional hard disk drive; significantly improving the read and write caching functions for the enhancement of data input/output as well as the computer's overall capacity. Indeed, this is the first type to combine a magnetic storage device with digital semiconductor. Unlike the hard disk drive, which requires a certain rotational speed (5400 RPM) in order to boot, HHDD stores the boot-related data in a built-in flash cache memory. This enables an ultra fast boot time of less than five seconds: a remarkable achievement compared to the current standard of between 20 and 30 seconds. Additionally, battery life is expected to increase by approximately 20-50 minutes.

◄ Hybrid Disk Drive Benefits
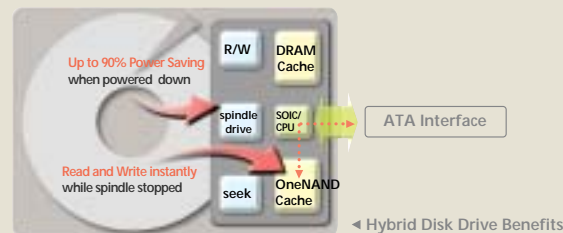
The benefits of the Hybrid HDD

1. Reduced boot time and improved system capacity

HHDD has flash memory playing a supplementary role to DRAM in order to dramatically reduce the boot time and improve system capacity. As the read-function of flash memory is much faster than that of a hard disk drive, it is possible to have the boot image file for a personal computer or other user files stored using the flash beforehand and read in order to achieve a faster system speed. This is particularly valuable for an OS that employs a 3D interface, such as Windows Vista.

2. Reduced power consumption.

HHDD uses less electricity. Through the OS paging-out process (virtual memory manager stores unnecessary data onto the hard disk drive), personal computers regularly write data onto the hard disk drive. In other words, every time data is stored the hard disk drive, the hard drive needs to spin-up, consuming electricity: the more frequent the writing, the more electricity is consumed. HHDD, however, enables write-caching of regular data using flash memory in order to minimize the need for the hard disk drive to spin-up, thereby reducing the system's overall power consumption.

3. Improved durability and reliability

HHDD offers improved durability and reliability. Insofar as the need for the HDD to spin-up is minimized, this also serves to shorten the duty cycle of the HDD, lowering the probability of head-media collisions and errors (off-track write, etc). This can lead to increasing the MTBF.

Can you PMR it?
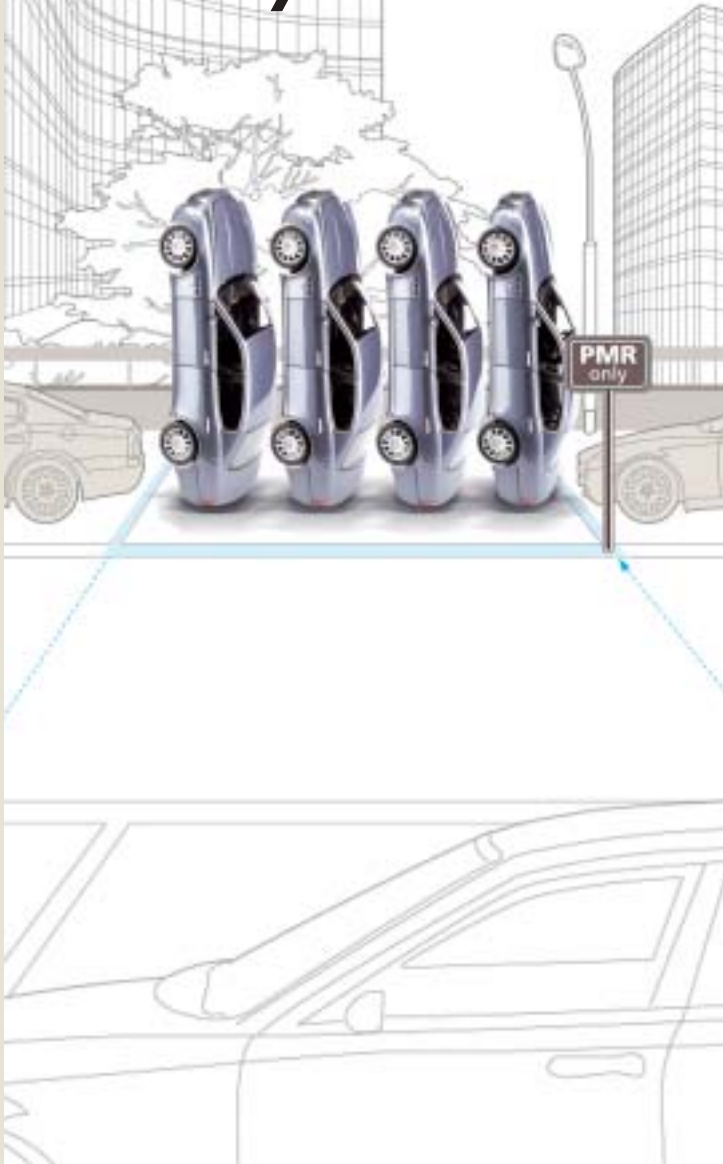
What is PMR?

PMR Technology

Growth of the HDD industry has in the past been explosive, as recording density effectively doubled each year. But since 2003 this growth rate has radically slowed down, leveling off at about 30-40% a year. This slowdown has been attributed to difficulties in further increasing the density to meet continuing demands for ever-higher recording density. As a result, the HDD industry has continued to devise new technologies capable of allowing for higher recording densities. One such technology is the recording method known as PMR (Perpendicular Magnetic Recording).
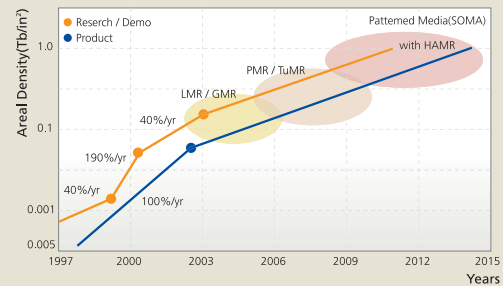
Technology Overview

PMR (Perpendicular Magnetic Recording) and LMR (Longitudinal Magnetic Recording) are recording methods. As indicated by their names, PMR arranges magnetized cells vertically while LMR does so in a horizontal fashion. This vertical arrangement allows PMR to record a greater number of data bits in the same area. The primary reason why density is limited through LMR is a result of what is called superparamagnetism. Superparamagnetism refers to the phenomenon by which magnetized materials move closer as the density increases, to the point where they eventually interfere with one another. As magnetized cells become unstable and as their magnetism changes direction, any stored data can be rendered unusable. By avoiding superparamagnetism, PMR enables one to further increase recording density. It is believed that PMR will reach a maximum recording density of 1 TB/in2 (LMR: 200 GB/in2).
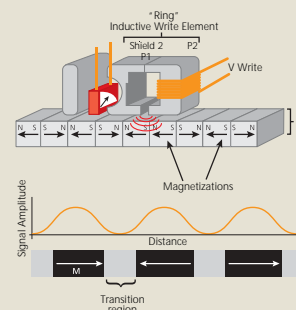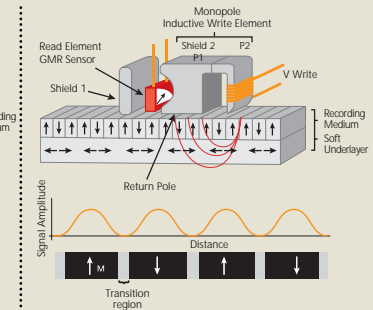
Spinpoint **T166** series

80.0/160.0/250.0/320.0/400.0.500.0GB

Capacity[1]		80GB	160GB	250GB	320GB	400GB	500GB
Model	8MB	HD080GJ	HD160HJ	HD251KJ	HD320KJ	HD402LJ	HD500LJ
	16MB			HD252KJ	HD321KJ	HD403LJ	HD501LJ

DRIVE CONFIGURATION

Interface	Serial ATA II 3.0Gbps
Bytes per Sector	512
Buffer DRAM Size	8 / 16 MB

PERFORMANCE SPECIFICATIONS

Read Seek Time (typ.)

-Track to track	0.8 ms
-Average	8.9 ms
-Full Stroke	18 ms
-Average Latency	4.17 ms
-Rotational Speed[2]	7,200 rpm

Data Transfer Rate

-Media to/from Buffer(max.)	135 MB/sec
-Buffer to/from Host(max.)	300 MB/sec

Drive Ready Time(typ.)	10 sec

RELIABILITY SPECIFICATIONS

Non-recoverable Read Error	1 sector in 10^{14} bits
MTBF	600,000 POH
Start/Stop Cycles(Ambient)	50,000
Component Design Life	5 years

ACOUSTICS (AVERAGE SOUND POWER)[3]

-Idle	80-160GB	2.3 Bel
	250-500GB	2.7 Bel
-Random Read/Write	80-160GB	2.7 Bel
	250-500GB	2.9 Bel

*Notes:Design and specifications are subject to change without prior notice

ENVIRONMENTAL SPECIFICATIONS

Temperature

-Operating	0~60°C
-Non-operating	-40~70°C
-Thermal Gradient (max.)	20°C/hr

Humidity (non-condensing)

-Operating	5~90 %
-Non-operating	5~95 %

Linear Shock (1/2 sine pulse)

-Operating, 2ms		63 G
-Non-operating, 2ms	80-160GB	350 G
	250-500GB	300 G

Vibration (swept sine, 0.25 octave per minute)

Operating	
5 ~ 21 Hz	0.034" (double amplitude)
21 ~ 300 Hz	1.5 G0-p
Non-operating	
5 ~ 21 Hz	0.195" (double amplitude)
21 ~ 500 Hz	8 G0-p

Altitude (relative to sea level)

-Operating	-1,000 to 10,000 feet
-Non-operating	-1,000 to 40,000 feet

POWER REQUIREMENTS

Voltage	+5V° 5% / +12V° 10%		
	80/160GB	250/320GB	400/500GB
Spin Up Current(12V)	2.0A	2.3A	2.4A
Seek[4]	9.5W	12.8W	9.5W
Read/Write	8.0W	8.8W	8.0 W
Idle	6.5W	7.6W	8.2W
Standby[5]	0.5/1.0W	0.7/1.2W	0.7/1.2W
Sleep[5]	0.5/1.0W	0.7/1.2W	0.7/1.2W

PHYSICAL DIMENSION

Height		1 in
Width		4 in
Depth		5.75 in
Weight	80/160GB	1.13 lb
	250/320GB	1.35 lb
	400/500GB	1.41 lb

Specifications are subject to change without notice.

1. 1MB=1,000,000 Bytes 1GB=1,000,000,000 Bytes
   *Accessible capacity may vary as some OS uses binary numbering system for reported capacity
2. 7,200 RPM class. Actual speed can be different a little.
3. Averaged value with a high performance cover.
4. Random seek with 30% duty cycle.
5. Power consumption with/without slumber mode.

- Max. 167GB Formatted Capacity Per Disk
- Serial ATA 3.0Gbps Interface Support
- SATA Native Command Queuing Feature set
- Device Initiated SATA Power Management
- Staggerd Spin-up Support
- High Speed Dual Digital Signal Processor (DSP) Based Architecture
- ATA S.M.A.R.T. Compliant
- ATA Automatic Acoustic Management Feature Set
- ATA 48-bit Address Feature Set
- ATA Streaming Feature Set(Optional)
- ATA Device Configuration Overlay Feature Set
- NoiseGuard™
- SilentSeek™

Spinpoint T133S series

300.0/400.0GB

Capacity[1]		300GB	400GB
Model	SATA,8MB	HD300LJ	HD400LJ

DRIVE CONFIGURATION

Interface	Serial ATA 3.0
Bytes per Sector	512
Buffer DRAM Size[2]	8 MB

PERFORMANCE SPECIFICATIONS

Read Seek Time (typ.)	
-Track to track	0.8 ms
-Average	8.9 ms
-Full Stroke	18 ms
-Average Latency	4.17 ms
-Rotational Speed	7,200 rpm

Maximum Data Transfer Rate	
-Media to/from Buffer(max.)	742/1000 Mbits/sec
-Buffer to/from Host	300 MB/sec
Drive Ready Time(typ.)	10 sec

RELIABILITY SPECIFICATIONS

Non-recoverable Read Error	1 sector in 10^{14} bits
MTBF	600,000 POH
Start/Stop Cycles(Ambient)	50,000
Component Design Life	5 years

ACOUSTICS (AVERAGE SOUND POWER)

-Idle	2.7 Bel
-Random Read/Write	2.9 Bel

*Notes:Design and specifications are subject to change without prior notice

ENVIRONMENTAL SPECIFICATIONS

Temperature	
-Operating	0~60°C
-Non-operating	-40~70°C
-Thermal Gradient (max.)	20°C/hr

Humidity (non-condensing)	
-Operating	5~90 %
-Non-operating	5~95 %

Linear Shock (1/2 sine pulse)	
-Operating, 2ms	63 G
-Non-operating, 2ms	300 G

Vibration (swept sine, 0.5 octave per minute)	
Operating	
5 - 300 - 5 Hz	1.0 G0-p
Non-operating	
5 - 500 - 5 Hz	2.0 G0-p

Altitude (relative to sea level)	
-Operating	-1,000 to 10,000 feet
-Non-operating	-1,000 to 40,000 feet

POWER REQUIREMENTS

Voltage	+5V° 5% / +12V°	10%
Spin Up Current(max.)		880 / 2250 mA
Seek[4] (typ.)		9.4[5] W
Read on-Track(typ.)		8.7[5] W
Idle(typ.)		7.2[5] W
Standby(typ.)		0.6[5] W
Sleep(typ.)		0.6[5] W

PHYSICAL DIMENSION

Height	1 in
Width	4 in
Depth	5.75 in
Weight	1.44 lb

Specifications are subject to change without notice.

1. 1MB=1,000,000 Bytes 1GB=1,000,000,000 Bytes
   *Accessible capacity may vary as some OS uses binary numbering system for reported capacity
2. 128KB is used for firmware
3. For ATA-6 interface models only
4. 30% duty cycle, random seek
5. Power based on enabled DIPM and SATA 3.0Gbps speed

- Serial ATA 3.0 Compliant
- Fluid Dynamic Bearing Spindle Motor Technology
- High Speed Dual Digital Signal Processor (DSP) Based Architecture
- ATA S.M.A.R.T. Compliant
- ATA Security Mode Feature Set
- ATA Host Protected Area Feature Set
- ATA Automatic Acoustic Management Feature Set
- ATA 48-bit Address Feature Set
- ATA Streaming Feature Set[3]
- ATA Device Configuration Overlay Feature Set
- Multi-Burst On-The-Fly Error Correction
- NoiseGuard™
- SilentSeek™

Spinpoint T133 series

300.0/400.0GB

Capacity[1]		300GB	400GB
Model	PATA,8MB	HD300LD	HD400LD

PERFORMANCE SPECIFICATIONS

Interface	ATA 6
Bytes per Sector	512
Buffer DRAM Size[2]	8 MB

PERFORMANCE SPECIFICATIONS

Read Seek Time (typ.)	
-Track to track	0.8 ms
-Average	8.9 ms
-Full Stroke	18 ms
-Average Latency	4.17 ms
-Rotational Speed	7,200 rpm
Maximum Data Transfer Rate	
-Media to/from Buffer(max.)	742/1000Mbits/sec
-Buffer to/from Host	100 MB/sec
Drive Ready Time(typ.)	10 sec

RELIABILITY SPECIFICATIONS

Non-recoverable Read Error	1 sector in 10^{14} bits
MTBF	600,000 POH
Start/Stop Cycles(Ambient)	50,000
Component Design Life	5 years

ACOUSTICS (AVERAGE SOUND POWER)

-Idle	2.7 Bel
-Random Read/Write	2.9 Bel

*Notes:Design and specifications are subject to change
 without prior notice

ENVIRONMENTAL SPECIFICATIONS

Temperature	
-Operating	0~60°C
-Non-operating	-40~70°C
-Thermal Gradient (max.)	20°C/hr
Humidity (non-condensing)	
-Operating	5~90 %
-Non-operating	5~95 %
Linear Shock (1/2 sine pulse)	
-Operating, 2ms	63 G
-Non-operating, 2ms	300 G
Vibration (swept sine, 0.5 octave per minute)	
Operating	
5 - 300 - 5 Hz	1.0 G0-p
Non-operating	
5 - 500 - 5 Hz	2.0 G0-p
Altitude (relative to sea level)	
-Operating	-1,000 to 10,000 feet
-Non-operating	-1,000 to 40,000 feet

POWER REQUIREMENTS

Voltage	+5V° 5% / +12V°	10%
Spin Up Current(max.)		880 / 2250 mA
Seek[5] (typ.)		9.2 W
Read on-Track(typ.)		8.4 W
Idle(typ.)		8.0 W
Standby(typ.)		0.7 W
Sleep(typ.)		0.45 W

PHYSICAL DIMENSION

Height	1 in
Width	4 in
Depth	5.75 in
Weight	1.44 lb

Specifications are subject to change without notice.

1. 1MB=1,000,000 Bytes 1GB=1,000,000,000 Bytes
   *Accessible capacity may vary as some OS uses binary
    numbering system for reported capacity
2. 128KB is used for firmware
3. For ATA-6 interface models only
4. 30% duty cycle, random seek
5. Power based on enabled DIPM and SATA 3.0Gbps speed

- Ultra ATA-100 Compliant
- Fluid Dynamic Bearing Spindle Motor Technology
- High Speed Dual Digital Signal Processor (DSP) Based Architecture
- ATA S.M.A.R.T. Compliant
- ATA Security Mode Feature Set
- ATA Host Protected Area Feature Set
- ATA Automatic Acoustic Management Feature Set
- ATA 48-bit Address Feature Set
- ATA Streaming Feature Set[4]
- ATA Device Configuration Overlay Feature Set
- Multi-Burst On-The-Fly Error Correction
- NoiseGuard™
- SilentSeek™

Spinpoint **P120S** series

200.0/250.0GB

Capacity[1]	200GB	250GB
Model	SP2004C	SP2504C

- 125GB Formatted Capacity Per Disk
- Serial ATA 3.0Gbps Interface Support
- SATA Native Command Queuing Feature set
- Device Initiated SATA Power Management
- Staggered Spin-up Support
- High Speed Dual Digital Signal Processor (DSP) Based
  Architecture
- ATA S.M.A.R.T. Compliant
- ATA Automatic Acoustic Management Feature Set
- ATA 48-bit Address Feature Set
- ATA Streaming Feature Set
- ATA Device Configuration Overlay Feature Set
- NoiseGuard™
- SilentSeek™

DRIVE CONFIGURATION

Interface	Serial ATA 3.0 Gbps
Buffer DRAM Size[2]	8 MB
Bytes per Sector	512

PERFORMANCE SPECIFICATIONS

Read Seek Time (typ.)	
-Track to Track	0.8 ms
-Average	8.9 ms
-Full Stroke	18 ms
-Average Latency	4.17 ms
-Rotational Speed	7,200 rpm
Data Transfer Rate	
-Media to/from Buffer (max.)	973 MB/sec
-Buffer to/from Host (max.)	300 MB/sec
-Drive Ready Time (typ.)	7 sec

RELIABILITY SPECIFICATIONS

Non-recoverable Read Error	1 sector in 10^{14} bits
MTBF	600,000 POH
Start/Stop Cycles (Ambient)	50,000
Component Design Life	5 years

ACOUSTICS (AVERAGE SOUND POWER)

-Idle	2.5 Bel
-Random Read/Write	2.8 Bel

*Notes:Design and specifications are subject to change
  without prior notice

ENVIRONMENTAL SPECIFICATIONS

Temperature	
-Operating	0 ~ 60 ℃
-Non-operating	-40 ~ 70 ℃
-Thermal Gradient (max.)	20 ℃/hr
Humidity (non-condensing)	
-Operating	5 ~ 90 %
-Non-operating	5 ~ 95 %
Linear Shock (1/2 sine pulse)	
-Operating, 2ms	63G
-Non-operating, 2ms	350G
Vibration (swept sine, 1 octave per minute)	
Operating	
5 ~ 21 Hz	0.034″ (double amplitude)
21 ~ 300 Hz	1.5 Gp-p
Non-operating	
5 ~ 21 Hz	0.195″ (double amplitude)
21 ~ 500 Hz	8 Gp-p
Altitude (relative to sea level)	
-Operating	-1,000 to 10,000 ft
-Non-operating	-1,000 to 40,000 ft

POWER REQUIREMENTS

Voltage	+5V±5%,+12V±10%
Spin Up Current (max.)	650 / 1900 mA
Seek (typ.)[3]	9.5 W
Read/Write On-Track (typ.)	8.5 W
Idle (typ.)	7.5 W
Standby (typ.)	0.7/1.5 W[4]
Sleep (typ.)	0.7/1.5 W[4]

PHYSICAL DIMENSION

Height	1 in
Width	4 in
Depth	5.75 in
Weight	1.4 lb

1. 1MB=1,000,000 Bytes 1GB=1,000,000,000 Bytes
   *Accessible capacity may vary as some OS uses binary
    numbering system for reported capacity
2. Upper 128 KB is used for firmware
3. 30% duty cycle, random seek
4. Power consumption with / without slumber mode

Spinpoint P120 series

200.0/250.0GB

Capacity[1]		200GB	250GB
Model	8MB	SP2014N	SP2514N

DRIVE CONFIGURATION

Interface	ATA 7
Bytes per Sector	512
Buffer DRAM Size[2]	8 Mbytes

PERFORMANCE SPECIFICATIONS

Read Seek Time (typical)	
-Track to track	0.8 ms
-Average	8.9 ms
-Full Stroke	18 ms
-Average Latency	4.17 ms
-Rotational Speed	7,200 rpm
Data Transfer Rate	
-Media to/from Buffer(max.)	973 Mbits/s
-Buffer to/from Host(max.)	133 Mbytes/s
Drive Ready Time(typical)	7 sec

RELIABILITY SPECIFICATIONS

Non-recoverable Read Error	1 sector in 10^{14} bits
MTBF	600,000 POH
Start/Stop Cycles(Ambient)	50,000
Component Design Life	5 years

ACOUSTICS (AVERAGE SOUND POWER)

-Idle	2.5 Bel
-Random Read/Write	2.8 Bel

*Notes:Design and specifications are subject to change without prior notice

ENVIRONMENTAL SPECIFICATIONS

Temperature	
-Operating	0~60°C
-Non-operating	-40~70°C
-Thermal Gradient (max.)	20°C/hr
Humidity (non-condensing)	
-Operating	5~90%
-Non-operating	5~95%
Linear Shock (1/2 sine pulse)	
-Operating, 2ms	63 G
-Non-operating, 2ms	350 G

Vibration (swept sine, 1 octave per minute)	
Operating	
5 ~ 21 Hz	0.034" (double amplitude)
21 ~ 300 Hz	1.5 Gp-p
Non-operating	
5 ~ 21 Hz	0.195" (double amplitude)
21 ~ 500 Hz	8 Gp-p
Altitude (relative to sea level)	
-Operating	-1,000 to 10,000 feet
-Non-operating	-1,000 to 40,000 feet

POWER REQUIREMENTS

Voltage	+5V° 5% / +12V° 10%
Spin Up Current(max.)	650 / 1900 mA
Read/Write On-Track(typ.)	7.5 W
Seek (typ.)[3]	9.0 W
Idle(typ.)	7.0 W
Standby(typ.)	0.5 W
Sleep(typ.)	0.4 W

PHYSICAL DIMENSION

Height	1 in
Width	4 in
Depth	5.75 in
Weight	1.4 lb

1. 1MB=1,000,000 Bytes 1GB=1,000,000,000 Bytes
   *Accessible capacity may vary as some OS uses binary numbering system for reported capacity
2. Upper 128 KB is used for firmware
3. 30% duty cycle, random seek
4. Backward compatible with UDMA 33/66/100 Factory default UDMA100 unless customer request

- 125GB Formatted Capacity Per Disk
- Ultra ATA-133 Interface Support
- Fluid Dynamic Bearing Spindle Motor Technology
- High Speed Dual Digital Signal Processor (DSP) Based Architecture
- ATA S.M.A.R.T. Compliant
- ATA Security Mode Feature Set
- ATA Host Protected Area Feature Set
- ATA Automatic Acoustic Management Feature Set
- ATA 48-bit Address Feature Set
- ATA Streaming Feature Set
- ATA Device Configuration Overlay Feature Set
- NoiseGuard™
- SilentSeek™

Spinpoint P80SD series

40.0/80.0/120.0/160.0GB

Capacity[1]	40GB	80GB	120GB	160GB
Model	HD040GJ	HD080HJ	HD120IJ	HD160JJ

DRIVE CONFIGURATION

Interface	Serial ATA 3.0 Gbps
Buffer DRAM Size[2]	8 MB
Bytes per Sector	512

PERFORMANCE SPECIFICATIONS

Read Seek Time (typ.)	
-Track to track	0.8 ms
-Average	8.9 ms
-Full Stroke	18.0 ms
-Average Latency	4.17 ms
-Rotational Speed	7,200 rpm
Maximum Data Transfer Rate	
-Media to/from Buffer	845
-Buffer to/from Host	300 MB/sec
Drive Ready Time (typ.)	7 sec

RELIABILITY SPECIFICATIONS

Non-recoverable Read Error	1 sector in 10[14] bits
MTBF	500,000 POH
Start/Stop Cycles (Ambient)	50,000
Component Design Life	5 years

ACOUSTICS (AVERAGE SOUND POWER)

-Idle	2.5 Bel
-Random Read/Write	2.8 Bel

*Notes:Design and specifications are subject to change without prior notice

ENVIRONMENTAL SPECIFICATIONS

Temperature	
-Operating	5–55°C
-Non-operating	-40~70°C
-Thermal Gradient (max.)	20°C/hr
Humidity (non-condensing)	
-Operating	5~90 %
-Non-operating	5~95 %
Linear Shock (1/2 sine pulse)	
-Operating, 2ms	63 G
-Non-operating, 2ms	350 G

Vibration (swept sine, 1 octave per minute)	
Operating	
5 ~ 21 Hz	0.034" (double amplitude)
21 ~ 300 Hz	1.5 Gp-p
Non-operating	
5 ~ 21 Hz	0.195" (double amplitude)
21 ~ 500 Hz	8 Gp-p
Altitude (relative to sea level)	
-Operating	-1,000 to 10,000 feet
-Non-operating	-1,000 to 40,000 feet

POWER REQUIREMENTS

Voltage	+5V 5% / 12V 10%
Spin Up Current(max.)	650 / 1900 mA
Seek[3] (typ.)	9.0 W
Read/Write On-Track(typ.)	8.0 W
Idle(typ.)	6.8 W
Standby(typ.)	0.7 / 1.5 W[5]
Sleep(typ.)	0.7 / 1.5 W[5]

PHYSICAL DIMENSION

Height	1 in
Width	4 in
Depth	5.75 in
Weight	1.45 lb

Specifications are subject to change without notice.

1. 1MB=1,000,000 Bytes   1GB=1,000,000,000 Bytes
   *Accessible capacity may vary as some OS uses binary numbering system for reported capacity
2. 384 KB is used for firmware
3. 30% duty cycle, random seek
4. Unless otherwise specified, specifications are for both 1 and 2 disk configurations of Serial-ATA models
5. Power consumption with / without slumber mode

- 80GB Formatted Capacity Per Disk
- Native Serial ATA 3.0Gbps with Native Command Queuing (NCQ)
- Fluid Dynamic Bearing Spindle Motor Technology
- High Speed Dual Digital Signal Processor (DSP) Based Architecture
- ATA SMART Compliant
- ATA Security Mode Feature Set
- ATA Host Protected Area Feature Set
- ATA Automatic Acoustic Management Feature Set
- ATA 48-bit Address Feature Set
- ATA Streaming Feature Set
- ATA Power Up In Standby Feature Set
- ATA Device Configuration Overlay Feature Set
- Permuted RLL/ECC On-The-Fly Error Correction
- RoHS-compliant
- NoiseGuard™
- SilentSeek™
- Hot-Plug & Hot-Swap capable

Spinpoint P80 series

80.0/120.0/160.0GB

Capacity[1]		80GB	120GB	160GB
			1MB = 1,000,000 Bytes. 1GB = 1,000,000,000 Bytes	
Model	2MB	SP0842N	SP1243N	SP1644N
	8MB		SP1253N	SP1654N

DRIVE CONFIGURATION

Interface	ATA 6
Bytes per Sector	512
Buffer DRAM Size[1]	2/8 Mbytes

PERFORMANCE SPECIFICATIONS

Read Seek Time (typical)	
-Track to track	0.8 ms
-Average	8.9 ms
-Full Stroke	18.0 ms
-Average Latency	4.17 ms
-Rotational Speed	7,200 rpm
Data Transfer Rate	
-Media to/from Buffer(max.)	840 Mbits/s
-Buffer to/from Host(max.)	133 Mbytes/s
Drive Ready Time(typical)	7 sec

RELIABILITY SPECIFICATIONS

Non-recoverable Read Error	1 sector in 10^{14} bits
MTBF(POH)	500,000 POH
Start/Stop Cycles	50,000
Component Design Life	5 years

ACOUSTICS (AVERAGE SOUND POWER)

-Idle	2.7 Bel
-Random Read/Write	2.8 Bel

*Notes:Design and specifications are subject to change without prior notice

ENVIRONMENTAL SPECIFICATIONS

Temperature	
-Operating	5~55°C
-Non-operating	-40~70°C
-Thermal Gradient (max.)	20°C/hr
Humidity (non-condensing)	
-Operating	5~90%
-Non-operating	5~95%
Linear Shock (1/2 sine pulse)	
-Operating, 2ms	63 G
-Non-operating, 2ms	350 G
Vibration (swept sine, 1 octave per minute)	
Operating	
5 ~ 21 Hz	0.034" (double amplitude)
21 ~ 300 Hz	1.5 Gp-p
Non-operating	
5 ~ 21 Hz	0.195" (double amplitude)
21 ~ 500 Hz	8 Gp-p
Altitude (relative to sea level)	
-Operating	-1,000 to 10,000 feet
-Non-operating	-1,000 to 40,000 feet

POWER REQUIREMENTS

Voltage	5V° 5% / 12V° 10%	
Spin Up Current(max.)	780 / 2250 mA	
Read/Write On-Track(typ.)	8.0 W	
Seek (typ.)[2]	9.0 W	
Idle(typ.)	7.2 W	
Standby(typ.)	0.4 W	
Sleep(typ.)	0.4 W	

PHYSICAL DIMENSION

Height	1 inch
Width	4 inches
Depth	5.75 inches
Weight	1.45 pounds

*Accessible capacity may vary as some OS uses binary numbering system for reported capacity
1. 128 KB is used for firmware
2. 30% duty cycle, random seek

- 80GB Formatted Capacity Per Disk
- Ultra ATA-133 Compatible
- Fluid Dynamic Bearing Spindle Motor Technology
- High Speed Dual Digital Signal Processor
  (DSP) Based Architecture
- ATA S.M.A.R.T. Compliant
- ATA Security Mode Feature Set
- ATA Host Protected Area Feature Set
- ATA Automatic Acoustic Management Feature Set
- ATA 48-bit Address Feature Set
- ATA Streaming Feature Set (Optional)
- ATA Device Configuration Overlay Feature Set
- Multi-Burst On-The-Fly Error Correction
- NoiseGuard™
- SilentSeek™
- ImpacGuard™

Spinpoint M80S series

SERIAL ATA

80.0/120.0/160.0GB

Capacity[1]	80GB	120GB	160GB
Model	HM080HI	HM120II	HM160JI

DRIVE CONFIGURATION

Interface	SATA 1.5Gbps
Buffer DRAM Size[3]	8 Mbytes
Bytes per Sector	512

PERFORMANCE SPECIFICATIONS

Read Seek Time (typ.)

-Track to Track	2 ms
-Average	12 ms
-Full Stroke	22 ms
-Average Latency	5.6 ms
-Rotational Speed	5,400 rpm

Data Transfer Rate

-Media to/from Buffer (max.)	530Mb/s
-Buffer to/from Host (max.)	150MB/s
-Drive Ready Time (typ.)[3]	4 sec
	RELIABILITY

SPECIFICATIONS

Non-recoverable Read Error	1 sector in 10^{14} bits
MTBF	330,000 POH
Controlloed Ramp L/UL	600,000

ACOUSTICS (AVERAGE SOUND POWER)

-Idle	1-Disk	2.2 Bel
	2-Disk	2.4 Bel
-Random Read/Write	1-Disk	2.4 Bel
	2-Disk	2.6 Bel

*Notes:Design and specifications are subject to change without prior notice

Silentec™   **SMART SYSTEM COMPLIANT**   **SilentSeek™**   **SERIAL ATA**

ENVIRONMENTAL SPECIFICATIONS

Temperature

-Operating	5 ~ 55 ºC
-Non-operating	-40 ~ 70 ºC

Humidity (non-condensing)

-Operating	5 ~ 90 %
-Non-operating	5 ~ 95 %

Linear Shock (1/2 sine pulse)

-Operating, 2ms	325G
-Non-operating, 1ms	1000G

Vibration (swept sine, 1/4 octave per minute)

Operating	
5 ~ 500 Hz	1.0 Go-p
Non-operating	
10 ~21 Hz	0.195 in(double amp)
21 ~ 500Hz	5 Go-p
500~800Hz	3 Go-p

Altitude (relative to sea level)

-Operating	-1000 to 10000 ft
-Non-operating	-1400 to 50000 ft

POWER REQUIREMENTS

Voltage	+5V±5%
Spin Up (max.)	4.5 W
Seek (typ.)[5]	2.1 W
Read/Write On-Track (typ.)	2.0 W
Low Power Idle (typ.)	0.60 W
Standby (typ.)	0.25 W
Sleep (typ.)	0.20 W

PHYSICAL DIMENSION

Height	0.37 in
Width	3.94 in
Depth	2.75 in
Weight	0.22 lb

Specifications are subject to change without notice.

1. 1MB=1,000,000 Bytes 1GB=1,000,000,000 Bytes
   *Accessible capacity may vary as some OS uses binary numbering system for reported capacity
2. Upper 128 KB is used for firmware
3. Power-On to Drive Ready
4. 30% duty cycle, random seek
5. Power requirements based on 1.5Gbps speed
6. Unless otherwise specified, specifications are for 2-disk configuration

- 80GB Formatted Capacity Per Disk
- TuMR head with wireless suspension design
- Serial ATA 1.5Gbps Interface Support
- SATA Native Command Queuing Feature set
- Device Initiated SATA Power Management
- Fluid Dynamic Bearing Spindle Motor Technology
- Load/Unload Head Technology
- ATA Security Mode Feature Set
- ATA SMART Feature Set
- ATA Automatic Acoustic Management Feature Set
- ATA Device Configuration Overlay Feature Set
- Multi-Burst On-The-Fly Error Correction
- SilentSeek™
- Hybrid Latch System for Reliability and Quietness

Spinpoint M80 series

80.0/120.0/160.0GB

Capacity[1]	80GB	120GB	160GB
Model	HM080HC	HM120IC	HM160JC

DRIVE CONFIGURATION

Interface	ATA 6
Buffer DRAM Size[3]	8 Mbytes
Bytes per Sector	512

PERFORMANCE SPECIFICATIONS

Read Seek Time (typ.)

-Track to Track	2 ms
-Average	12 ms
-Full Stroke	22 ms
-Average Latency	5.6 ms
-Rotational Speed	5,400 rpm

Data Transfer Rate

-Media to/from Buffer (max.)	530Mb/s
-Buffer to/from Host (max.)	150MB/s
-Drive Ready Time (typ.)[3]	4 sec
	RELIABILITY

SPECIFICATIONS

Non-recoverable Read Error	1 sector in 10^{14} bits
MTBF	330,000 POH
Controlloed Ramp L/UL	600,000

ACOUSTICS (AVERAGE SOUND POWER)

-Idle	1-Disk	2.2 Bel
	2-Disk	2.4 Bel
-Random Read/Write	1-Disk	2.4 Bel
	2-Disk	2.6 Bel

*Notes:Design and specifications are subject to change without prior notice

Silentec™ SMART SYSTEM COMPLIANT SilentSeek™

ENVIRONMENTAL SPECIFICATIONS

Temperature

-Operating	5 ~ 55 ℃
-Non-operating	-40 ~ 70 ℃

Humidity (non-condensing)

-Operating	5 ~ 90 %
-Non-operating	5 ~ 95 %

Linear Shock (1/2 sine pulse)

-Operating, 2ms	325G
-Non-operating, 1ms	1000G

Vibration (swept sine, 1/4 octave per minute)

Operating	
5 ~ 500 Hz	1.0 Go-p
Non-operating	
10 ~21 Hz	0.195 in(double amp)
21 ~ 500Hz	5 Go-p
500~800Hz	3 Go-p

Altitude (relative to sea level)

-Operating	-1000 to 10000 ft
-Non-operating	-1400 to 50000 ft

POWER REQUIREMENTS

Voltage	+5V±5%
Spin Up (max.)	4.5 W
Seek (typ.)[5]	2.1 W
Read/Write On-Track (typ.)	2.0 W
Low Power Idle (typ.)	0.60 W
Standby (typ.)	0.25 W
Sleep (typ.)	0.10 W

PHYSICAL DIMENSION

Height	0.37 in
Width	3.94 in
Depth	2.75 in
Weight	0.22 lb

Specifications are subject to change without notice.

1. 1MB=1,000,000 Bytes 1GB=1,000,000,000 Bytes
   *Accessible capacity may vary as some OS uses binary numbering system for reported capacity
2. Upper 128 KB is used for firmware
3. Power-On to Drive Ready
4. 30% duty cycle, random seek
5. Power requirements based on 1.5Gbps speed
6. Unless otherwise specified, specifications are for 2-disk configuration

- 80GB Formatted Capacity Per Disk
- TuMR head with wireless suspension design
- Ultra ATA-100 Interface
- Fluid Dynamic Bearing Spindle Motor Technology
- Load/Unload Head Technology
- ATA Security Mode Feature Set
- ATA SMART Feature Set
- ATA Automatic Acoustic Management Feature Set
- ATA Device Configuration Overlay Feature Set
- Multi-Burst On-The-Fly Error Correction
- SilentSeek™
- Hybrid Latch System for Reliability and Quietness

Spinpoint M60S series

40.0/60.0/80.0/100.0/120.0GB

Capacity[1]	40GB	60GB	80GB	100GB	120GB
Model	HM040HI	HM060HI	HM080II	HM100JI	HM120JI

DRIVE CONFIGURATION

Interface	SATA 1.5Gbps(3.0Gbps)[3]
Buffer DRAM Size[3]	8 Mbytes
Bytes per Sector	512

PERFORMANCE SPECIFICATIONS

Read Seek Time (typ.)

-Track to Track	2 ms
-Average	12 ms
-Full Stroke	22 ms
-Average Latency	5.6 ms
-Rotational Speed	5,400 rpm

Data Transfer Rate

-Media to/from Buffer (max.)	495Mb/s
-Buffer to/from Host (max.)	150MB/s
-Drive Ready Time (typ.)[4]	4 sec

RELIABILITY

SPECIFICATIONS

Non-recoverable Read Error	1 sector in 10^{14} bits
MTBF	330,000 POH
Controlloed Ramp L/UL	600,000

ACOUSTICS (AVERAGE SOUND POWER)

-Idle	1-Disk	2.2 Bel
	2-Disk	2.4 Bel
-Random Read/Write	1-Disk	2.4 Bel
	2-Disk	2.6 Bel

*Notes:Design and specifications are subject to change without prior notice

ENVIRONMENTAL SPECIFICATIONS

Temperature

-Operating	5 ~ 55 ℃
-Non-operating	-40 ~ 70 ℃

Humidity (non-condensing)

-Operating	5 ~ 90 %
-Non-operating	5 ~ 95 %

Linear Shock (1/2 sine pulse)

-Operating, 2ms	300G
-Non-operating, 1ms	1000G

Vibration (swept sine, 1/4 octave per minute)

Operating	
5 ~ 500 Hz	1.0 Go-p
Non-operating	
10 ~21 Hz	0.195 in(double amp)
21 ~ 500Hz	5 Go-p
500~800Hz	3 Go-p

Altitude (relative to sea level)

-Operating	-1000 to 10000 ft
-Non-operating	-1400 to 40000 ft

POWER REQUIREMENTS

Voltage	+5V±5%
Spin Up (max.)	4.5 W
Seek (typ.)[5]	2.1 W
Read/Write On-Track (typ.)	2.0 W
Low Power Idle (typ.)	0.65 W
Standby (typ.)	0.25 W
Sleep (typ.)	0.15 W

PHYSICAL DIMENSION

Height	0.37 in
Width	3.94 in
Depth	2.75 in
Weight	0.22 lb

1. 1MB=1,000,000 Bytes 1GB=1,000,000,000 Bytes
   *Accessible capacity may vary as some OS uses binary numbering system for reported capacity
2. SATA interface speed switchable with Jumper
3. Upper 128 KB is used for firmware
4. Power-On to Drive Ready
5. 30% duty cycle, random seek
6. Power requirements based on 1.5Gbps speed
7. Unless otherwise specified, specifications are for 2-disk configuration

- Serial ATA 1.5Gbps(3.0Gbps) Interface Support
- SATA Native Command Queuing Feature set
- Device Initiated Power Management
- 60GB Formatted Capacity Per Disk
- GMR/TuMR head with wireless suspension design
- Fluid Dynamic Bearing Spindle Motor Technology
- Load/Unload Head Technology
- ATA Security Mode Feature Set
- ATA SMART Feature Set
- ATA Automatic Acoustic Management Feature Set
- ATA Device Configuration Overlay Feature Set
- Multi-Burst On-The-Fly Error Correction
- Hybrid Latch System for Reliability and Quietness
- SilentSeek[TM]

Spinpoint M60 series

40.0/60.0/80.0/100.0/120.0GB

Capacity[1]	40GB	60GB	80GB	100GB	120GB
Model	HM040HC	HM060HC	HM080IC	HM100JC	HM120JC

DRIVE CONFIGURATION

Interface	ATA 6
Buffer DRAM Size[2]	8 Mbytes
Bytes per Sector	512

PERFORMANCE SPECIFICATIONS

Read Seek Time (typ.)

-Track to Track	2 ms
-Average	12 ms
-Full Stroke	22 ms
-Average Latency	5.6 ms
-Rotational Speed	5,400 rpm

Data Transfer Rate

-Media to/from Buffer (max.)	495Mb/s
-Buffer to/from Host (max.)	100MB/s
-Drive Ready Time (typ.)[3]	4 sec

RELIABILITY SPECIFICATIONS

Non-recoverable Read Error	1 sector in 10^{14} bits
MTBF	330,000 POH
Controlloed Ramp L/UL	600,000

ACOUSTICS (AVERAGE SOUND POWER)

-Idle	1-Disk	2.2 Bel
	2-Disk	2.4 Bel
-Random Read/Write	1-Disk	2.4 Bel
	2-Disk	2.6 Bel

*Notes:Design and specifications are subject to change without prior notice

Silentec™   SMART SYSTEM COMPLIANT   SilentSeek™

ENVIRONMENTAL SPECIFICATIONS

Temperature

-Operating	5 ~ 55 ℃
-Non-operating	-40 ~ 70 ℃

Humidity (non-condensing)

-Operating	5 ~ 90 %
-Non-operating	5 ~ 95 %

Linear Shock (1/2 sine pulse)

-Operating, 2ms	300G
-Non-operating, 1ms	1000G

Vibration (swept sine, 1/4 octave per minute)

Operating	
5 ~ 500 Hz	1.0 Go-p
Non-operating	
10 ~21 Hz	0.195 in(double amp)
21 ~ 500Hz	5 Go-p
500~800Hz	3 Go-p

Altitude (relative to sea level)

-Operating	-1000 to 10000 ft
-Non-operating	-1400 to 40000 ft

POWER REQUIREMENTS

Voltage	+5V±5%
Spin Up (max.)	4.5 W
Seek (typ.)[5]	2.1 W
Read/Write On-Track (typ.)	2.0 W
Low Power Idle (typ.)	0.65 W
Standby (typ.)	0.25 W
Sleep (typ.)	0.1 W

PHYSICAL DIMENSION

Height	0.37 in
Width	3.94 in
Depth	2.75 in
Weight	0.22 lb

1. 1MB=1,000,000 Bytes   1GB=1,000,000,000 Bytes
   *Accessible capacity may vary as some OS uses binary numbering system for reported capacity
2. Upper 128 KB is used for firmware
3. Power-On to Drive Ready
4. 30% duty cycle, random seek
5. Unless otherwise specified, specifications are for 2-disk configuration

- Device Initiated Power Management
- 60GB Formatted Capacity Per Disk
- GMR/TuMR head with wireless suspension design
- Fluid Dynamic Bearing Spindle Motor Technology
- Load/Unload Head Technology
- ATA Security Mode Feature Set
- ATA SMART Feature Set
- ATA Automatic Acoustic Management Feature Set
- ATA Device Configuration Overlay Feature Set
- Multi-Burst On-The-Fly Error Correction
- Hybrid Latch System for Reliability and Quietness
- SilentSeek™

Spinpoint M40S series

SERIAL ATA

40.0/60.0/80.0GB

Capacity[1]	40GB	60GB	80GB
Model	HM040HI	HM060II	HM080JI

DRIVE CONFIGURATION

Interface	SATA 1.5Gbps
Buffer DRAM Size[2]	8 Mbytes
Bytes per Sector	512

PERFORMANCE SPECIFICATIONS

Read Seek Time (typ.)

-Track to Track	2 ms
-Average	12 ms
-Full Stroke	22 ms
-Average Latency	5.6 ms
-Rotational Speed	5,400 rpm

Data Transfer Rate

-Media to/from Buffer (max.)	428Mb/s
-Buffer to/from Host (max.)	150MB/s
-Drive Ready Time (typ.)[3]	4 sec

RELIABILITY SPECIFICATIONS

Non-recoverable Read Error	1 sector in 10^{14} bits
MTBF	330,000 POH
Controlloed Ramp L/UL	600,000

ACOUSTICS (AVERAGE SOUND POWER)

-Idle	1-Disk	2.2 Bel
	2-Disk	2.4 Bel
-Random Read/Write	1-Disk	2.4 Bel
	2-Disk	2.6 Bel

*Notes:Design and specifications are subject to change without prior notice

Silentec™ **SMART SYSTEM COMPLIANT** **SilentSeek™** **SERIAL ATA**

ENVIRONMENTAL SPECIFICATIONS

Temperature

-Operating	5 ~ 55 ℃
-Non-operating	-40 ~ 70 ℃

Humidity (non-condensing)

-Operating	5 ~ 90 %
-Non-operating	5 ~ 95 %

Linear Shock (1/2 sine pulse)

-Operating, 2ms	300G
-Non-operating, 1ms	900G

Vibration (swept sine, 1/4 octave per minute)

Operating	
5 ~ 500 Hz	1.0 Go-p
Non-operating	
10 ~21 Hz	0.195 in(double amp)
21 ~ 500Hz	5 Go-p
500~800Hz	3 Go-p

Altitude (relative to sea level)

-Operating	-1000 to 10000 ft
-Non-operating	-1400 to 40000 ft

POWER REQUIREMENTS

Voltage	+5V±5%
Spin Up (max.)	4.5 W
Seek (typ.)[4]	2.1 W
Read/Write On-Track (typ.)	2.0 W
Low Power Idle (typ.)	0.65 W
Standby (typ.)	0.25 W
Sleep (typ.)	0.15 W

PHYSICAL DIMENSION

Height	0.37 in
Width	3.94 in
Depth	2.75 in
Weight	0.22 lb

1. MB=1,000,000 Bytes   1GB=1,000,000,000 Bytes
   *Accessible capacity may vary as some OS uses binary numbering system for reported capacity
2. Upper 128 KB is used for firmware
3. Power-On to Drive Ready
4. 30% duty cycle, random seek
5. Unless otherwise specified, specifications are for 2-disk configuration

- 40GB Formatted Capacity Per Disk
- GMR head technology with wireless suspension design
- Ultra ATA-100 Interface Serial ATA 1.5Gbps
- Fluid Dynamic Bearing Spindle Motor Technology
- Load/Unload Head Technology
- ATA Security Mode Feature Set
- ATA SMART Feature Set
- ATA Automatic Acoustic Management Feature Set
- ATA Device Configuration Overlay Feature Set
- Multi-Burst On-The-Fly Error Correction
- SilentSeek™
- Hybrid Latch System for Reliability and Quietness

Spinpoint M40 series

40.0/60.0/80.0GB

Capacity[1]	40GB	60GB	80GB
Model	MP0402H	MP0603H	MP0804H

DRIVE CONFIGURATION

Interface	ATA 6
Buffer DRAM Size[1]	8 Mbytes
Bytes per Sector	512

PERFORMANCE SPECIFICATIONS

Read Seek Time (typ.)

-Track to Track	2 ms
-Average	12 ms
-Full Stroke	22 ms
-Average Latency	5.6 ms
-Rotational Speed	5,400 rpm

Data Transfer Rate

-Media to/from Buffer (max.)	431Mb/s
-Buffer to/from Host (max.)	100MB/s
-Drive Ready Time (typ.)[2]	4 sec

RELIABILITY

SPECIFICATIONS

Non-recoverable Read Error	1 sector in 10^{14} bits
MTBF	330,000 POH
Controlloed Ramp L/UL	600000
Component Design Life	5 years

ACOUSTICS (AVERAGE SOUND POWER)

Idle	1-Disk	2.2 Bel
	2-Disk	2.4 Bel
Random Read/Write	1-Disk	2.4 Bel
	2-Disk	2.6 Bel

*Notes:Design and specifications are subject to change without prior notice

Silentec™ Hybrid Latch   S·M·A·R·T SYSTEM COMPLIANT   SilentSeek™

ENVIRONMENTAL SPECIFICATIONS

Temperature

-Operating	5 ~ 55 ℃
-Non-operating	-40 ~ 70 ℃

Humidity (non-condensing)

-Operating	5 ~ 90 %
-Non-operating	5 ~ 95 %

Linear Shock (1/2 sine pulse)

-Operating, 2ms	300G
-Non-operating, 1ms	900G

Vibration (swept sine, 1/4 octave per minute)

Operating	
-5 ~ 500 Hz	1.0 Go-p
Non-operating	
-10 ~21 Hz	0.195 in(double amp)
-21 ~ 500Hz	5 Go-p
-500~800Hz	3 Go-p

Altitude (relative to sea level)

Operating	-1000 to 10000 ft
Non-operating	-1400 to 50000 ft

POWER REQUIREMENTS

Voltage	+5V±5%
Spin Up Current (max.)	5.0 W
Seek (typ.)[3]	2.4 W
Read/Write On-Track (typ.)	2.4 W
Low Power Idle (typ.)	0.85 W
Standby (typ.)	0.25 W
Sleep (typ.)	0.1 W

PHYSICAL DIMENSION

Height	0.37 in
Width	3.94 in
Depth	2.75 in
Weight	0.22 lb

*Accessible capacity may vary as some OS uses binary numbering system for reported capacity
1. Upper 128 KB is used for firmware
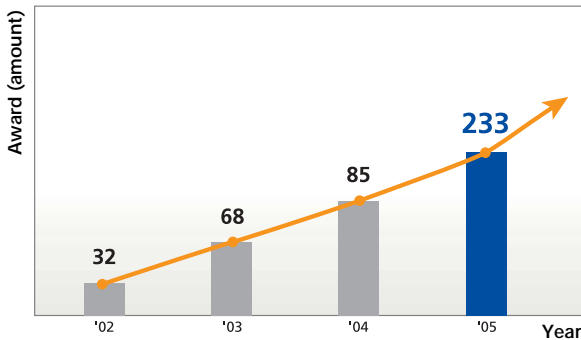2. Power-On to Drive Ready
3. 30% duty cycle, random seek
* Unless otherwise specified, specifications are for 2-disk configuration

- 40GB Formatted Capacity Per Disk
- GMR head technology with wireless suspension design
- Ultra ATA-100 Interface
- Fluid Dynamic Bearing Spindle Motor Technology
- Load/Unload Head Technology
- ATA Security Mode Feature Set
- ATA SMART Feature Set
- ATA Automatic Acoustic Management Feature Set
- ATA 48-bit Address Feature Set
- ATA Device Configuration Overlay Feature Set
- Multi-Burst On-The-Fly Error Correction
- SilentSeek™

Why Samsung
Hard Disk Drive?

Our quality is based on our ACCESS TO FUNDAMENTAL TECHNOLOGY, not only for Samsung's own R&D resources within the HDD division, but also from various R&D resources within the Samsung group. SAIT(Samsung Advanced Institute of Technology) developed Acoustic Noise Suppression Technology, which is utilized in all Samsung HDDs. SAIT also provides Head Stack, Read Channel, Spindle Motor, Servo Control System and Optical Technologies. Similarly, Samsung Electronic's corporate R&D center developed vibration suppression technology.

SAMSUNG AWARD WINNING

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