



S A M S U N G H A R D D I S K D R I V E

WINNER 5X



The HDD Power that gets you ahead in business - Samsung HDD

WINNER 5X Series

WU31605A / WU32165A / WU33205A

Features

- 5,400 RPM spindle speed
- Under 11 msec average seek time
- EPR4ML Read Channel
- PIO Mode 4 Multi Word DMA Mode 2
- Ultra DMA Mode Supporting
- Automatic / Host Power Saving Mode
- Rugged : 10 G's of Operating Shock
- 128KB Segmented Read / Write Cache Buffer
- FAST ATA -3 / E-IDE Interface
- Read Ahead Cache
- Write Cache
- Write Auto Reassignment
- Power On Self Diagnosis
- Error correction on the Fly (Multi-burst)
- Automatic Update of ATA Task File Registers

Drive Architecture

Formatted Capacity	
Megabytes per Drive	1,620/2,160/3,241
Megabytes per Surface	810/720/810
Physical Organization	
Disks	1/2/2
Data Surfaces	2/3/4
Read/Write Heads	2/3/4
Cylinder	7,054/6,604/7,054

Functional Specifications

Actuator Type	Rotary Voice Coil
Interface	Fast ATA-3/E-IDE
Servo	Embedded Sector Servo
Recoding Method	16/17 (0,6,8)
Recoding Density (bpi, Max.)	150,700/137,635/150,700
Flux Density (Fcpi, Max.)	160,121/146,237/160,121
Track Density (tpi, @skew 0.)	7,340
Areal Density (Mb/In ² , max)	1,124/1,065/1,124
Sector Size (Bytes)	512

Performance Specifications

Seek Time (Typical)	
Track to Track	< 3 ms
Average	< 10 ms
Full Stroke	< 20 ms
Average Latency	5.6 ms
Spindle Speed	5,400 ± 0.1% rpm
Data Transfer Rate	
To/From Media	69.9/135.3 Mbits/s
To/From Buffer	33.3 Mbytes/s
Buffer Size	128 Kbytes

Reliability Specifications

Seek Error	1 in 10 ⁶ seeks
Recoverable Read Error	1 in 10 ¹⁰ bits
Non-recoverable Read Error	1 in 10 ¹⁴ bits
MTBF (POH)	500,000 hours
MTTR (typical)	5 minutes
Start / Stop Cycles	50,000
Component Design Life	5 years

Environmental Specifications

Temperature	
Operating	5 ~ 55 °C
Non-operating	-40 ~ 70 °C
Thermal Gradient (Max.)	20 °C / hr
Humidity (Non-condensing)	
Operating	5 ~ 80 %
Non-operating	5 ~ 90 %
Maximum Wet Bulb (Operating)	29 °C
(Non-condensing)	40 °C
Altitude (Relative to Sea Level)	
Operating	0 to 10,000 feet
Non-operating	0 to 40,000 feet

Shock and Vibration

Shock (1/2 sine pulse, 11 ms duration)	
Operating	10 G
Non-operating	75 G
Vibration (Swept Sine, 1 Octave per Minute)	
Operating	
5 ~ 21 Hz	0.034" (double amplitude)
22 ~ 400 Hz	1.5 Gp-p
Non-operating (5 ~ 500 Hz)	
5 ~ 21 Hz	0.195" (double amplitude)
22 ~ 500 Hz	8 Gp-p

Power Characteristics (Typical)

Voltage	5V ± 5%	12V ± 10%
Current (Peak)	0.49 Amps	1.5 Amps
Total Power Dissipation (Watts)		
Spin up		
Current Peak		1.5 A
Duration		2 sec
Read/Write (@cylinder 3,000)		5.7 watts
Idle (Typical)		3.7 watts
Standby (Typical)		1.2 watts
Sleep (Typical)		1.1 watts

Acoustic Noise

Maximum Value at 1 Meter	
Idle	33 dbA
Random Read/Write	35 dbA

Physical Dimension

Height	1 inch
Width	4 inches
Depth	5.75 inches
Weight	1.2 pounds

* Design and specifications are subject to change without notice.



HEAD OFFICE (SEOUL, KOREA)

Joong-ang Daily News Bldg.
7, Soonhwa-Dong, Choong-Ku, Seoul, Korea
Tel: +82-2-751-6163 Fax: +82-2-751-6079
Internet Homepage : <http://samsungelectronics.com>

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