

> MD04ABAxxxV SERIES SPECIALITY SURVEILLANCE HDD

Toshiba's MD04ABA-V series of low spin surveillance HDD deliver up to 5 TB^[1] of storage capacity and support for up to 32 high definition cameras. The MD04ABA-V is designed for demanding 24x7 surveillance environments. For great reliability and scalability in RAID and multi-HDD environments, the MD04ABA-V uses RV sensors to compensate for rotational vibration. The large capacities and great performance of Toshiba's MD04ABA-V series HDDs enable storage of high resolution camera feeds and support for long data retention periods.

HDD



> KEY FEATURES

- Up to 5 TB of Data Storage Capacity for High Resolution Camera Feeds
- Support for up to 32^[2] Cameras High-Definition Streams
- Rotational Vibration (RV) Sensors for Great Scalability and Good Performance
- MTTF^[3] of 1,000,000 hours
- 24x7^[4] Operation
- 128 MiB^[5] Buffer/Cache for Good Streaming Performance
- Low-Spin Design For Great Energy Efficiency

> APPLICATIONS

- Surveillance Network Video Recorders (sNVR)
- Surveillance Digital Video Recorders (sDVR)
- Hybrid sDVR (analog and IP)
- RAID Storage Arrays for Surveillance

> SPECIFICATIONS (TABLE 1)

Model Number		MD04ABA500V	MD04ABA400V
Interface		SATA-2.6/3.0 (1.5 Gbit/s, 3.0 Gbit/s, 6.0 Gbit/s)	
Formatted Capacity		5 TB	4 TB
Performance	Interface Speed	6.0 Gbit/s Max.	
	Rotation Speed	Low spin	
	Average Latency Time	5.56 ms	
	Buffer Size	128 MiB	
Logical Data Block Length	MD04ABAxxxV	HOST: 512 B, DISK: 4,096 B	
Supply Voltage	Allowable Voltage	12 V + 10 % / 5 V + 5% ^[6]	
Power Consumption	Read / Write	7.5 W	
	Low Power Idle	3.5 W	
Acoustics (Sound Power)	Ready	26 dB	

> ENVIRONMENTAL LIMITS

Item		Specification
Temperature	Operating ^[7]	0 °C to 70 °C
	Non-Operating	- 40 °C to 70 °C
	Gradient	20 °C/h or less
Humidity	Operating	5 % to 90 % R.H. (No condensation)
	Non-Operating	5 % to 95 % R.H. (No condensation)
Shock	Operating	686 m/s ² {70 G} (2 ms duration)
	Non-Operating	2,940 m/s ² {300 G} (2 ms duration)
Vibration	Operating	7.35 m/s ² {0.75 G} (5 to 300Hz) 2.45 m/s ² {0.25 G} (300 to 500Hz)
	Non-Operating	49 m/s ² {5 G} (5 to 500Hz)
Altitude	Operating	- 305 m to +3,048 m {-1,000 to +10,000 feet}
	Non-Operating	- 305 m to +12,192 m {-1,000 to +40,000 feet}

> ENVIRONMENTAL FEATURE

Model Number	MD04ABA500V MD04ABA400V
RoHS ^[8]	Compatible
Halogen free ^[9]	Yes
Antimony free ^[9]	Yes

- [1] Definition of capacity: Toshiba defines a megabyte (MB) as 1,000,000 bytes, a gigabyte (GB) as 1,000,000,000 bytes and a terabyte (TB) as 1,000,000,000,000 bytes. A computer operating system, however, reports storage capacity using powers of 2 for the definition of 1GB = 230 = 1,073,741,824 bytes and therefore shows less storage capacity. Available storage capacity (including examples of various media files) will vary based on file size, formatting, settings, software and operating system, such as Microsoft Operating System and/or pre-installed software applications, or media content. Actual formatted capacity may vary.
- [2] Number of surveillance cameras support capability is defined by performance simulation with High Definition cameras as 2MiB/s rate.
- [3] MTTF (Mean Time to Failure) is not a guarantee or estimate of product life; it is a statistical value related to mean failure rates for a large number of products which may not accurately reflect actual operation. Actual operating life of the product may be different from the MTTF.
- [4] Cannot be applied for high operating ratio system kind of the business-critical.
- [5] A kibibyte (KiB) means 2¹⁰, or 1,024 bytes, a mebibyte (MiB) means 2²⁰, or 1,048,576 bytes, and a gibibyte (GiB) means 2³⁰, or 1,073,471,824 bytes.
- [6] Make sure the value is not less than -0.3V DC (less than -0.6V, 0.1ms) when turning on or off the power.
- [7] The temperature of the enclosure surface must be kept under 70 °C at any moment.
- [8] Toshiba Semiconductor & Storage Products Company defines "RoHS-Compatible" products as products that either (i) contain no more than a maximum concentration value of 0.1% by weight in Homogeneous Materials for lead, mercury, hexavalent chromium, polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs) and of 0.01% by weight in Homogeneous Materials for cadmium; or (ii) fall within any of the application exemptions set forth in the Annex to the RoHS Directive (Directive 2011/65/EC of the European Parliament and of the Council of 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment). "Homogeneous Material" means a material of uniform composition that cannot be mechanically disjointed (meaning separated, in principle, by mechanical actions such as unscrewing, cutting, crushing, grinding and/or abrasive processes) into different materials. Examples of "Homogeneous Materials" would be individual types of plastics, ceramics, glass, metals, alloys, paper, board, resins and coatings.
- [9] Toshiba Semiconductor & Storage Products Company defines halogen-free and antimony-free SSD and HDD products as those meeting all of the following requirements: (a) containing bromine (Br) and chlorine (Cl) at no more than 900 parts per million (ppm) by weight for each element, and containing bromine and chlorine in an aggregate amount not exceeding 1500 ppm by weight; and (b) containing no more than 1000 ppm antimony (Sb) by weight. For the avoidance of doubt, Halogen-Free/Antimony-Free SSD or HDD products may not be entirely free of bromine, chlorine, or antimony, and may contain other element of the halogen family.

> RELIABILITY

Model Number	MD04ABA500V MD04ABA400V
MTTF ^[10]	1,000,000 hours
AFR (Annual Failure Rate)	0.876 %
Non-recoverable Error Rate	1 error per 10 ¹⁴ bits read
Load / Unload	600,000 times (Max.)
Availability	24 hours/day, 7 days/week
Rated Annual Workload (Total TB Transferred per Year, R/W)	110 TB/year
POH (Power On Hours per Year) ^[11]	8,760 hours

> MODEL NUMBERS

Model Number	Interface	Formatted Capacity	Sector Format
MD04ABA500V	SATA-2.6/3.0	5 TB	512e
MD04ABA400V	SATA-2.6/3.0	4 TB	512e

[10] MTTF (Mean Time to Failure) is not a guarantee or estimate of product life; it is a statistical value related to mean failure rates for a large number of products which may not accurately reflect actual operation. Actual operating life of the product may be different from the MTTF.

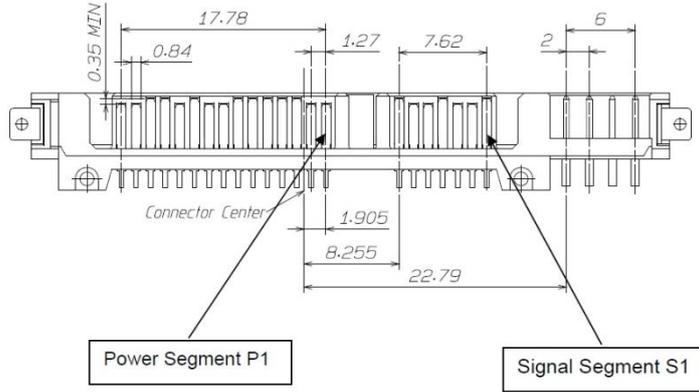
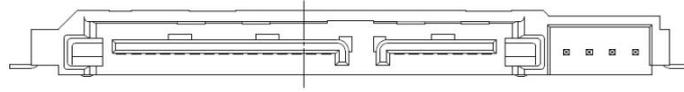
[11] POH: 24 hours/day, 7 days/week, average HDA surface temperature: 40°C or less, for normal surveillance usage.

> SAFETY / EMI STANDARDS

Title	Description	Region
UL (Underwriters Laboratories)	UL 60950-1	USA
CSA (Canadian Standard Association)	CAN/CSA-C22.2 No.60950-1	Canada
TÜV (Technischer Überwachungs Verein)	EN 60950-1	Germany
BSMI (Bureau of Standards, Metrology and Inspection)	CNS 13438 (CISPR Pub. 22 Class B):D33003	Taiwan
MSIP (Ministry of Science, ICT & Future Planning)	電磁波障害防止基準 KN22, KN24 (CISPR Pub. 22 Class B) (Note)	Korea
ACMA (Australian Communications and Media Authority)	AS/NZS CISPR22	Australia

(Note) Marks of KC	MD04ABA500V MD04ABA400V
Made in Japan	 <ul style="list-style-type: none"> 1. 기기의 명칭(모델명) : MD04ABA500V 2. 인증번호 : MSIP-REM-TSD-MD04ABA500V 3. 인증받은 자의 상호 : TOSHIBA CORPORATION 4. 제조년월일 : 2014-06 5. 제조자 / 제조국가 : TOSHIBA CORPORATION / 일본
Made in Philippines	 <ul style="list-style-type: none"> 1. 기기의 명칭(모델명) : MD04ABA500V 2. 인증번호 : MSIP-REM-TSD-MD04ABA500V 3. 인증받은 자의 상호 : TOSHIBA CORPORATION 4. 제조년월일 : 2014-06 5. 제조자 / 제조국가 : TOSHIBA CORPORATION / 필리핀

> INTERFACE CONNECTOR



Interface Connector (SATA Plug) Signal Allocation: CN1			
Signal Segment	S1	GND	2 nd Mate
	S2	A+	Differential Pair A from PHY
	S3	A-	
	S4	GND	2 nd Mate
	S5	B-	Differential Pair B from PHY
	S6	B+	
	S7	GND	2 nd Mate
Signal Segment "L"			
Central Connector Polarizer			
Power Segment "L"			
Power Segment	P1	V33	3.3 V Power (Unused)
	P2	V33	3.3 V Power (Unused)
	P3	V33	3.3 V Power Pre-Charge 2 nd Mate (Unused)
	P4	GND	1 st Mate
	P5	GND	2 nd Mate
	P6	GND	2 nd Mate
	P7	V5	5 V Power Pre-Charge 2 nd Mate
	P8	V5	5 V Power
	P9	V5	5 V Power
	P10	GND	2 nd Mate
	P11 ^[12]	Spin/ ACT	-Staggered Spin-up Mode Detect (Input) -Activity LED Drive (Output)
	P12	GND	1 st Mate
	P13	V12	12 V Power Pre-Charge 2 nd Mate
	P14	V12	12 V Power
	P15	V12	12 V Power
Power Segment Key			

[12] Notice: This drive uses 5V and 12V power. 3.3V power is not used.
HDA (Head Disk Assembly) and DC ground (ground pins on interface) are connected electrically each other..

> COMMAND TABLE (Part 1)

Op-Code	Command Name
E5h/98h	CHECK POWER MODE
B1h	DEVICE CONFIGURATION
92h	DOWNLOAD MICROCODE
90h	EXECUTE DIAGNOSTICS
E7h	FLUSH CACHE
EAh	FLUSH CACHE EXT
ECh	IDENTIFY DEVICE
E3h/97h	IDLE
E1h/95h	IDLE IMMEDIATE
91h	INITIALIZE DEVICE PARAMETERS
00h	NOP
E4h	READ BUFFER
C8h	READ DMA
25h	READ DMA EXT
60h	READ FPDMA QUEUED
2Fh	READ LOG EXT
47h	READ LOG DMA EXT
C4h	READ MULTIPLE
29h	READ MULTIPLE EXT
F8h	READ NATIVE MAX ADDRESS
27h	READ NATIVE MAX ADDRESS EXT
20h	READ SECTOR(S)
24h	READ SECTOR(S) EXT
40h	READ VERIFY SECTOR(S)
42h	READ VERIFY SECTOR(S) EXT

> COMMAND TABLE (Part 2)

Op-Code	Command Name
1xh	RECALIBRATE
F1h	SECURITY SET PASSWORD
F2h	SECURITY UNLOCK
F3h	SECURITY ERASE PREPARE
F4h	SECURITY ERASE UNIT
F5h	SECURITY FREEZE LOCK
F6h	SECURITY DISABLE PASSWORD
7xh	SEEK
EFh	SET FEATURES
F9h	SET MAX
37h	SET MAX ADDRESS EXT
C6h	SET MULTIPLE MODE
E6h/99h	SLEEP
B0h	SMART Function Set
E2h/96h	STANDBY
E0h/94h	STANDBY IMMEDIATE
E8h	WRITE BUFFER
CAh	WRITE DMA
35h	WRITE DMA EXT
3Dh	WRITE DMA FUA EXT
61h	WRITE FPDMA QUEUED
3Fh	WRITE LOG EXT
57h	WRITE LOG DMA EXT
C5h	WRITE MULTIPLE
39h	WRITE MULTIPLE EXT
CEh	WRITE MULTIPLE FUA EXT
30h	WRITE SECTOR(S)
34h	WRITE SECTOR(S) EXT
45h	WRITE UNCORRECTABLE EXT
3Ch	WRITE VERIFY

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