MG11 SERIES

CLOUD-SCALE CAPACITY HDD

Built on 50 years of Toshiba's HDD innovation, the MG11 Series delivers new levels of capacity, performance, and quality. Packing up to 24 TB [1] into a standard 3.5-inch [2] conventional magnetic recording (CMR) HDD, the MG11 Series enables cloud-scale infrastructure to build higher storage densities at lower TCO. The MG11 Series features up to a 10-disk helium-sealed 3.5-inch design, which leverages Toshiba's innovative Flux Control Microwave Assisted Magnetic Recording (FC-MAMR™) technology to achieve 2.4 TB per disk. Built to meet growing data storage demands, the MG11 Series has a high workload rating of 550 TB with 7200 rpm, and is available in 6 Gbps SATA and 12 Gbps SAS interfaces. Engineered for 24/7 quality and enterprise reliability, the MG11 Series has an MTTF of 2.5 million hours. SED and SIE options are available to secure data and deliver peace of mind. In addition to 24 TB, the MG11 is available in 22 TB, 20 TB, 18 TB, 16 TB, and 14 TB in both SAS and SATA interfaces with SIE and SED options.

Product image may represent a design model.

KEY FEATURES

- Up to 24 TB capacity
- Conventional Magnetic Recording (CMR) for broad compatibility
- Toshiba 2nd generation Flux Control Microwave-assisted Magnetic Recording (FC-MAMR™) Technology
- Industry-leading 10-disk helium-sealed design for superior storage density
- Industry Standard 3.5-inch 26.1 mm height Form Factor
- 7200 rpm Performance
- Lower operational power profile, providing excellent power efficiency (W/TB) for better TCO
- 550 Total TB Transferred per Year Workload Rating [4]
- Sanitize Instant Erase (SIE) option model and Self Encrypting Drive (SED) option model [5]

APPLICATIONS

- Data Center Applications
- Big Data
- Video Surveillance
- Capacity-Optimized Cloud-scale and Rack-Scale Storage Systems
- Compliance Data Archives and Data Life-Cycle Management Storage Systems
- Data Back-up Infrastructure

SPECIFICATION

Item		MG11ACA24T MG11ACP24T	MG11ACA22T MG11ACP22T	MG11ACA20T MG11ACP20T	MG11ACA18T MG11ACP18T	MG11ACA16T MG11ACP16T	MG11ACA14T MG11ACP14T
Interface		SATA-3.5a					
Formatted Capacity		24 TB	22 TB	20 TB	18 TB	16 TB	14 TB
Performance	Interface Speed [3]	6.0 Gbit/s, 3.0 Gbit/s, 1.5 Gbit/s					
	Rotation Speed	7200 rpm					
	Buffer Size [7]	1 GiB					
	Maximum Sustained Data Transfer Speed [6] (Typ.)	295 MiB/s	285 MiB/s	281 MiB/s			
Logical Data Block Length	MG11ACAxxxE/EY [8] MG11ACPxxxE [8]	HOST 512 B, DISK 4096 B					
Supply Voltage	Allowable Voltage	12 V[9] +/-10 %, 5 V[9] +10/-7 %[10]					
Power Consumption	Write / Read (4KB Q1) (Typ.)	8.11 W			7.89 W		7.41 W
	Active Idle (Typ.)	4.35 W			4.16 W		3.66 W
Acoustics [11] (Sound Power)	Idle (Typ.)	20 dB					
	Seek (Typ.)	32 dB					

Item		MG11SCA24T MG11SCP24T	MG11SCA22T MG11SCP22T	MG11SCA20T MG11SCP20T	MG11SCA18T MG11SCP18T	MG11SCA16T MG11SCP16T	MG11SCA14T MG11SCP14T
Interface		SAS-3 and later					
Formatted Capacity		24 TB	22 TB	20 TB	18 TB	16 TB	14 TB
Performance	Interface Speed [3]	12.0 Gbit/s, 6.0 Gbit/s, 3.0 Gbit/s, 1.5 Gbit/s					
	Rotation Speed	7200 rpm					
	Buffer Size [7]	1 GiB					
	Maximum Sustained Data Transfer Speed [6] (Typ.)	295 MiB/s	285 MiB/s	281 MiB/s			
Logical Data Block Length	MG11SCAxxxE/EY [8] MG11SCPxxxE [8]	HOST 512 B, DISK 4096 B HOST 520 B, DISK 4160 B HOST 528 B, DISK 4224 B					
Supply Voltage	Allowable Voltage	12 V[9] +/-10 %, 5 V[9] +10/-7 %[10]					
Power Consumption	Write / Read (4KB Q1) (Typ.)	8.57 W			8.36 W		7.90 W
	Active Idle (Typ.)	4.83 W			4.62 W		4.16 W
Acoustics [11] (Sound Power)	Idle (Typ.)	20 dB					
	Seek (Typ.)	32 dB					

ENVIRONMENTAL LIMITS

Item		Specification
Ambient Temperature	Operating	5 °C to 55 °C (No condensation)
	Non-Operating [12] [13]	-40 °C to 70 °C (No condensation)
Enclosure surface temperature	Operating	5 °C to 60 °C (No condensation)
Relative Humidity	Operating	5 % to 90 % R.H. (No condensation)
	Non-Operating [12]	5 % to 95 % R.H. (No condensation)
Altitude	Operating	-305 m to +3048 m (No condensation)
	Non-Operating [12]	-305 m to +12 192 m (No condensation)
Shock	Operating	490 m/s^2 { 50 G } (2 ms duration)
	Non-Operating [12]	1960 m/s^2 { 200 G } (2 ms duration)
Vibration [14]	Operating [15]	7.35 m/s^2 { 0.75 G } (5 to 300 Hz) 2.45 m/s^2 { 0.25 G } (300 to 500 Hz)
	Non-Operating [12] [16]	29.4 m/s^2 { 3.0 G } (5 to 500 Hz)

RELIABILITY

Item	Specification
MTTF / MTBF (AFR) [17]	2 500 000 hours (0.35 %)
Non-recoverable Error Rate	10 per 10^{16} bits read
Load / Unload	600 000 times
Availability	24 hours/day, 7 days/week
Rated Annual Workload	550 TB per year

MECHANICAL SPECIFICATIONS

Item	Specification
Width (Max)	101.85 mm
Height (Max)	26.1 mm
Length (Max)	147.0 mm
Weight (Max)	730 g

[1] Definition of capacity: Toshiba defines 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 1TB = 2^{40} = 1 099 511 627 776 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] "3.5-inch" mean the form factor of HDDs. They do not indicate drive's physical size.
[3] Read and write speed may vary depending on the host device, read and write conditions, and file size.
[4] Workload is defined as the amount of data written, read or verified by commands from host system.
[5] SED supports TCG Enterprise SSCs. And the HDDs which have any security function may not be available in the countries where the use of such HDDs is prohibited or limited due to export control and local regulations.
[6] The maximum sustained data rate and interface speed may be restricted to the response speed of host system and by transmission characteristics.
   1 Gbit/s = 1 000 000 000 bits/s. 1 MiB/s = 1 048 576 bytes/s
[7] 1 GiB (gibibyte) = 1 073 741 824 bytes. 1 MiB (mebibyte) = 1 048 576 bytes.
[8] Read–modify-write is supported.
[9] Input voltages are specified at the HDD connector side, during HDD ready state.
[10] Make sure the value is not less than -0.3 V DC (less than -0.6 V, 0.1 ms) when turning on or off the power.
[11] The measuring method is based on ISO 7779.
[12] Non-operating condition (except storage condition) assumes short term transportation.
[13] The range of altitude is 3048 m or less. Up to 55 °C at 7620 m. Up to 40 °C at 12 192 m.
[14] Vibration applied to the HDD is measured at near the mounting screw hole on the frame as much as possible.
[15] At random seek write/read and default on retry setting with log sweep vibration.
[16] At power-off state after installation
[17] MTTF / MTBF (Mean Time to Failure / Mean Time Between Failure) of the HDDs during its life time is 2 500 000 hours and AFR (Annualized Failure Rate) is 0.35 %. (POH: 8760 hours per one year (24 hours per one day, 7 days per one week). Average HDA surface temperature: 40 °C or less, workloads: 550 TB per one year, which is defined as the amount of data written, read or verified by commands from host system). Continual or sustained operation at case HDA surface temperature above 40 °C may degrade product reliability.

MODEL NUMBER

Model Number	Interface	Capacity	Sector Format	Optional Security
MG11ACA24TE	SATA-3.5a	24 TB	512e	
MG11ACA22TE	SATA-3.5a	22 TB	512e	
MG11ACA20TE	SATA-3.5a	20 TB	512e	
MG11ACA18TE	SATA-3.5a	18 TB	512e	
MG11ACA16TE	SATA-3.5a	16 TB	512e	
MG11ACA14TE	SATA-3.5a	14 TB	512e	
MG11ACA24TEY	SATA-3.5a	24 TB	512e	SIE
MG11ACA22TEY	SATA-3.5a	22 TB	512e	SIE
MG11ACA20TEY	SATA-3.5a	20 TB	512e	SIE
MG11ACA18TEY	SATA-3.5a	18 TB	512e	SIE
MG11ACA16TEY	SATA-3.5a	16 TB	512e	SIE
MG11ACA14TEY	SATA-3.5a	14 TB	512e	SIE
MG11ACP24TE	SATA-3.5a	24 TB	512e	SED
MG11ACP22TE	SATA-3.5a	22 TB	512e	SED
MG11ACP20TE	SATA-3.5a	20 TB	512e	SED
MG11ACP18TE	SATA-3.5a	18 TB	512e	SED
MG11ACP16TE	SATA-3.5a	16 TB	512e	SED
MG11ACP14TE	SATA-3.5a	14 TB	512e	SED

* Default configuration is 512e. Convert between 512 and 4096 byte logical size formats.

Model Number	Interface	Capacity	Sector Format	Optional Security
MG11SCA24TE	SAS-3.0	24 TB	512e	
MG11SCA22TE	SAS-3.0	22 TB	512e	
MG11SCA20TE	SAS-3.0	20 TB	512e	
MG11SCA18TE	SAS-3.0	18 TB	512e	
MG11SCA16TE	SAS-3.0	16 TB	512e	
MG11SCA14TE	SAS-3.0	14 TB	512e	
MG11SCA24TEY	SAS-3.0	24 TB	512e	SIE
MG11SCA22TEY	SAS-3.0	22 TB	512e	SIE
MG11SCA20TEY	SAS-3.0	20 TB	512e	SIE
MG11SCA18TEY	SAS-3.0	18 TB	512e	SIE
MG11SCA16TEY	SAS-3.0	16 TB	512e	SIE
MG11SCA14TEY	SAS-3.0	14 TB	512e	SIE
MG11SCP24TE	SAS-3.0	24 TB	512e	SED
MG11SCP22TE	SAS-3.0	22 TB	512e	SED
MG11SCP20TE	SAS-3.0	20 TB	512e	SED
MG11SCP18TE	SAS-3.0	18 TB	512e	SED
MG11SCP16TE	SAS-3.0	16 TB	512e	SED
MG11SCP14TE	SAS-3.0	14 TB	512e	SED

* Default configuration is 512e. Convert between 512 and 4096 byte logical size formats.

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Could-Scale Capacity HDD MG11 Product Overview

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