



IBM Travelstar™ 60GH and 40GN 2.5-inch hard disk drives

Highlights

- ***IBM advances its notebook hard drive leadership with the highest capacity, highest performing drives***
- ***IBM offers new models that operate with the Enhanced Availability feature***
- ***60GH—the fourth generation of 5,400rpm models—offers highest capacity and highest performance in the industry with a 60GB capacity***
- ***40GN provides areal densities of up to 34Gbits/sq.inch, yielding up to 20GB of capacity per disk***
- ***All models contain Fluid Dynamic Bearing (FDB) motor technology for industry-leading idle and operating acoustic performance***
- ***Travelstar provides industry-leading operational shock rating of up to 200Gs (2ms)***
- ***Travelstar leverages latest antiferromagnetically coupled (AFC) media, also known as “pixie dust”***

Leading-edge technology

IBM continues its tradition of mobile storage leadership with the IBM Travelstar 60GH and 40GN hard drives. The Travelstar 60GH is the industry's first 60GB notebook hard disk drive employing four disks in a 12.5mm high design and is the fourth-generation of 5,400rpm mobile drives in the industry.

The innovative hard drive design combines AFC Media, Fluid Dynamic Bearing (FDB) motor technology, an ATA-100 interface, IBM giant magnetoresistive (GMR) head technology, Partial Response Maximum Likelihood (PRML) digital channel, a head load/unload feature, and Enhanced Adaptive Battery Life Extender™ (ABLE) 3.0. This design provides the exceptional quietness, storage capacity, performance, power management, quality, and reliability required by today's notebook systems.

The Travelstar family of hard disk drives incorporates the latest IBM storage technology—antiferromagnetically coupled (AFC) media, informally known as “pixie dust.” This technology sandwiches a three-atom-thick layer of ruthenium, a precious metal, between two magnetic layers on a disk, allowing for a higher

areal density, breaking through limitations of the super paramagnetic effect.

As a result, the new IBM Travelstar drives are suitable for demanding, high-capacity Internet, digital audio, video streaming, and real-time multimedia applications—whether users are in the office or on the road. In non-traditional applications, Travelstar drives can now incorporate into such products as Point-of-Sale Systems, Set-Top Boxes, Telemetry (automobile) applications, and communications and entertainment systems.

Performance and reliability

The IBM Travelstar 60GH and 40GN hard drives use proven IBM technology such as TrueTrack Servo, IBM Drive Fitness Test™ (DFT), and Self-Monitoring Analysis and Reporting Technology (S.M.A.R.T.), as well as a thermistor, an adaptive control device that helps maintain high performance and fast seek times at high environmental temperatures.

Enhanced Availability models

IBM also offers enhanced availability features on selected new Travelstar models. These industry-first models increase the hard disk drive's available



IBM Travelstar 60GH: 12.5mm, 5,400rpm, 60GB ATA-5 hard drive¹



IBM Travelstar 40GN: 9.5mm, 4,200rpm, 40GB ATA-5 hard drive¹

IBM Travelstar hard disk drive characteristics

Feature	Benefit
First 60GB mobile hard drive and the fourth-generation 5,400rpm model in the industry	IBM Travelstar 60GH has the industry-leading capacity and performance to enable mobile users to work with a new range of emerging storage-intensive applications.
Drive Noise Suppression System (DNSS) <ul style="list-style-type: none"> Fluid Dynamic Bearing (FDB) motors on all models VCM acoustic dampening 	IBM Travelstar 60GH and 40GN incorporate state-of-the-art noise suppression technology for industry-leading quiet operation.
Fast Ultra-DMA 100 2.5-inch mobile hard drives	IBM Travelstar 60GH and 40GN all feature industry-standard high data transfer rates to help ensure ultimate performance.
High max areal density of 34Gbits/sq. inch resulting in up to 20GB of capacity per disk	IBM Travelstar 40GN maximizes areal density to enable more data storage per disk in standard, compact packages.
Industry-leading operating shock rating (200Gs/2ms) for a 2.5-inch mobile hard drive	IBM Travelstar 40GN provides exceptional ruggedness to help withstand shock during read/write operations.
Antiferromagnetically coupled (AFC) media on all models	The IBM Travelstar family incorporates AFC "pixie dust" technology, allowing for higher areal density.

"power-on" hours for emerging applications with continuous operation. At a read/write or data access rate of up to 50 percent—a typical usage cycle for 24x7 blade server environments—the drives are designed to allow users to leave these drives powered on around-the-clock.

Advanced mobile systems

With these new drives, IBM has once again redefined state-of-the-art storage for mobile computing. The reduced acoustics, high speeds, and capacities of IBM Travelstar drives support superior digital content creation capabilities, higher quality digital audio and video, and significantly faster processing for data-intensive multimedia and Internet applications.

By using one of the new Travelstar drives in a laptop system, you can unchain your multimedia studio from the desktop, enabling high-end multimedia creativity as mobile as your imagination.

IBM quality, support, and service

The new IBM Travelstar mobile hard drives share common field-proven components to provide manufacturers with superior-quality hard drives backed by IBM warranty and IBM technical support and services.

IBM family of Travelstar 60GH and 40GN hard disk drives at a glance

Product name	Travelstar 60GH	Travelstar 60GH Enhanced Availability	Travelstar 40GN	Travelstar 40GN Enhanced Availability
Model name	IC25T060ATCS05	IC25T060ATCX05	IC25N040ATCS04 IC25N030ATCS04 IC25N020ATCS04 IC25N010ATCS04	IC25N040ATCX04 IC25N030ATCX04 IC25N020ATCX04 IC25N010ATCX04
Configuration				
Interface	ATA-5	ATA-5	ATA-5	ATA-5
Capacity (GB)	60	60	40, 30, 20, 10	40, 30, 20, 10
Sector size (bytes)	512	512	512	512
Recording zones	16	16	16	16
Data heads	8	8	4, 3, 2, 1	4, 3, 2, 1
Disks	4	4	2, 2, 1, 1	2, 2, 1, 1
Max. areal density (Gbits/sq.inch)	28	28	34	34
Performance				
Data buffer (MB) ²	2	2	2	2
Rotational speed (rpm)	5,400	5,400	4,200	4,200
Latency (average ms)	5.5	5.5	71	71
Max. media transfer rate (Mbits/sec)	262	262	245	245
Max. interface transfer rate (MB/sec)	100MB/sec Ultra DMA mode-5	100MB/sec Ultra DMA mode-5	100MB/sec Ultra DMA mode-5	100MB/sec Ultra DMA mode-5
Seek time (ms)				
Average (typical)	12	12	12	12
Track to track (typical)	2.5	2.5	2.5	2.5
Full stroke (typical)	23	23	23	23
Reliability				
Error rate (non-recoverable)	< 1 per 10 ¹³ bits transferred	< 1 per 10 ¹³ bits transferred	< 1 per 10 ¹³ bits transferred	< 1 per 10 ¹³ bits transferred
Load/Unload cycle	300,000	300,000	300,000	300,000
DFT (Drive Fitness Test)	Enabled	Enabled	Enabled	Enabled
Recommended power-on hours (monthly)	333	732	333	732
Max. read/write duty cycle	<20%	<50%	<20%	<50%
Power				
Requirement	+5VDC(±5%)	+5VDC(±5%)	+5VDC(±5%)	+5VDC(±5%)
Dissipation (typical)				
Startup (max. peak)	5.0 W	5.0 W	4.7 W	4.7 W
Seek (average)	2.6 W	2.6 W	2.3 W	2.3 W
Read (average)	2.5 W	2.5 W	2.1 W, 2.1 W, 2.0 W, 2.0 W	2.1 W, 2.1 W, 2.0 W, 2.0 W
Write (average)	2.7 W	2.7 W	2.2 W, 2.2 W, 2.1 W, 2.1 W	2.2 W, 2.2 W, 2.1 W, 2.1 W
Performance idle (average)	2.0 W	2.0 W	1.85 W	1.85 W
Active idle (average)	1.3 W	not applicable	0.95 W, 0.95 W, 0.85 W, 0.85 W	not applicable
Low power idle (average)	0.9 W	not applicable	0.65 W	not applicable
Standby (average)	0.25 W	0.25 W	0.25 W	0.25 W
Sleep	0.1 W	0.1 W	0.1 W	0.1 W
Power consumption efficiency (watts/GB)	0.015	0.015	0.016, 0.022, 0.033, 0.065	0.016, 0.022, 0.033, 0.065
Physical size				
Height (mm)	12.5	12.5	9.5	9.5
Width (mm)	70	70	70	70
Depth (mm)	100	100	100	100
Weight (g)	155	155	99, 99, 95, 95	99, 99, 95, 95
Environmental characteristics				
Operating				
Ambient temperature	5° to 55° C	5° to 40° C	5° to 55° C	5° to 40° C
Relative humidity (non-condensing)	8% - 90%	8% - 90%	8% - 90%	8% - 90%
Maximum wet bulb (non-condensing)	29.4° C	29.4° C	29.4° C	29.4° C
Shock (half sine wave)	150Gs (2ms)	150Gs (2ms)	200Gs (2ms)	200Gs (2ms)
Vibration (RMS)				
Random (RMS)	0.67G (5 - 500Hz)	0.67G (5 - 500Hz)	0.67G (5 - 500Hz)	0.67G (5 - 500Hz)
Swept sine	1G 0-P (5 - 500Hz) 1G (300Hz) - 0.33G (350Hz) 0.33G (350 - 500Hz)	1G 0-P (5 - 500Hz) 1G (300Hz) - 0.33G (350Hz) 0.33G (350 - 500Hz)	1G 0-P (5 - 500Hz)	1G 0-P (5 - 500Hz)
Non-operating				
Ambient temp	-40° to 65° C	-40° to 65° C	-40° to 65° C	-40° to 65° C
Relative humidity (non-condensing)	5% - 95%	5% - 95%	5% - 95%	5% - 95%
Maximum wet bulb (non-condensing)	40° C	40° C	40° C	40° C
Shock (half sine wave)	700Gs/1ms	700Gs/1ms	800Gs/1ms	800Gs/1ms
Vibration (random (RMS))	3.01G (5 - 500Hz)	3.01G (5 - 500Hz)	3.01G (5 - 500Hz)	3.01G (5 - 500Hz)
Acoustics (A-Weighted Sound Power (Bels))				
Idle (typical)	2.5	2.5	2.4, 2.4, 2.1, 2.1	2.4, 2.4, 2.1, 2.1
Op (typical)	3.5	3.5	3.1, 3.1, 2.7, 2.7	3.1, 3.1, 2.7, 2.7

For more information

Internet and e-mail:

- ibm.com/harddrive
- drive@us.ibm.com

IBM TECH FAX document server:

- 408-256-5418 (*requires touch-tone phone*)
- *International callers must call from a fax machine*

IBM hard drive product information:

- 1-888-IBM-5214 (*United States*)
- 507-253-4110



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IBM Storage Technology Division
5600 Cottle Road
San Jose, CA 95193

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² Up to 280 KB out of 2048 KB used for firmware

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