

## Hitachi Travelstar 60GH and 40GN 2.5-inch hard disk drive

### Highlights

- ▶ **Advances notebook hard drive leadership with the highest capacity, highest performing drives**
- ▶ **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

Mobile storage leadership continues with the Hitachi 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, 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 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 Hitachi 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 Hitachi Travelstar 60GH and 40GN hard drives use proven storage technology such as TrueTrack Servo, 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

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

The Travelstar 40GNX redefined state-of-the-art storage for mobile computing. The reduced acoustics, high speeds, and capacities of Hitachi Travelstar drives

## Hitachi Travelstar hard disk drive characteristics

Feature	Benefit
First 60GB mobile hard drive and the fourth-generation 5,400rpm model in the industry	Hitachi 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"> <li>Fluid Dynamic Bearing (FDB) motors on all models</li> <li>VCM acoustic dampening</li> </ul>	Hitachi 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	Hitachi 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	Hitachi 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	Hitachi Travelstar 40GN provides exceptional ruggedness to help withstand shock during read/write operations.
Antiferromagnetically-coupled (AFC) media on all models	The Hitachi Travelstar family incorporates AFC "pixie dust" technology, allowing for higher areal density.

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.

### Hitachi quality, support, and service

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



Hitachi Travelstar 60GH: 12.5mm, 5,400rpm, 60GB ATA-5 hard disk drive<sup>1</sup>



Hitachi Travelstar 40GN: 9.5mm, 4,200rpm, 40GB ATA-5 hard disk drive<sup>1</sup>

## Hitachi family of Travelstar 60GH and 40GN hard disk drives specifications

Product name	Travelstar 60GH	Travelstar 60GH*	Travelstar 40GN	Travelstar 40GN*
Model name	IC25T060ATCS05	IC25T060ATCX05	IC25N040ATCS04 IC25N030ATCS04 IC25N020ATCS04 IC25N010ATCS04	IC25N040ATCX04 IC25N030ATCX04 IC25N020ATCX04 IC25N010ATCX04

\* Enhanced Availability Model

### 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) <sup>2</sup>	2	2	2	2
Rotational speed (rpm)	5,400	5,400	4,200	4,200
Latency (average ms)	5.5	5.5	7.1	7.1
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 <sup>13</sup> bits transferred	< 1 per 10 <sup>13</sup> bits transferred	< 1 per 10 <sup>13</sup> bits transferred	< 1 per 10 <sup>13</sup> 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**

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<sup>1</sup> Clear cover drive models shown for illustration purposes only

<sup>2</sup> Up to 280 KB out of 8048 KB used for firmware

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