High-Capacity, High-Performance Disk Drives for Desktop Computer Systems

Overview

Quantum Fireball™ TM Series 3.5-inch hard disk drives are designed specifically to provide industry-leading storage capacity and fast data throughput performance for personal computer systems. Offered in six formatted capacities, ranging from 1,089 megabytes (MB) up to 3,860 MB, these drives exceed the stringent requirements of commercial PC manufacturers by providing a superior balance of performance and reliability.

All of these advanced drives incorporate magnetoresistive (MR) heads, a Partial Response Maximum Likelihood (PRML) read channel, and seek times as low as 10.5 milliseconds (ms) to provide storage solutions that meet both current and future requirements. All six of the Quantum Fireball TM capacities are available with a Fast ATA-2 interface; the 1.2, 2.1, and 3.2 gigabyte (GB) models offer an Ultra SCSI-3[1] option as well.

High Capacity and Performance

Many of Quantum's most advanced technologies are used in these drives to reach new levels of capacity and performance. The use of MR heads and an advanced PRML read channel allow storage of more than 1 GB per disk. Data transfer performance is enhanced by combining a rotational speed of 4,500 RPM with an advanced, embedded servo positioning system and an ID-less controller. Internal data rates for these units can reach 95 megabits (Mb) per second. The Fast ATA-2 interface on Quantum

Fireball TM drives supports local-bus AT Programmed Input/Output (PIO) Mode 4 operation, and Multiword Direct Memory Access (DMA) Mode 2 interface protocols. With this interface, data can be supplied to the host at rates of up to 16.6 MB per second. Quantum Fireball TM drives with the Ultra SCSI-3 interface can support burst data rates of up to 20 MB per second, in synchronous mode.

Reliability and Versatility

Quantum Fireball TM drives meet the highest standards for quality and reliability. An advanced Reed Solomon ECC implementation can accommodate triple-burst errors and has the power to detect and correct double-burst errors on-the-fly. Up to 96 bits of data can be corrected, minimizing retry performance penalties.

Both the Fast ATA-2 and Ultra SCSI-3 versions of these products support the latest Plug-and-Play specifications. When combined with host system support, this simplifies disk drive installation by automatically configuring Quantum Fireball TM drives and eliminating the need for manual jumper settings.

The drives include support of the Self-Monitoring, Analysis, and Reporting Technology (S.M.A.R.T.) industry standard. With host computer support of the S.M.A.R.T. System, Revision 2, this feature provides critical disk drive status and overall health information that lets users avoid catastrophic data loss.

[1]SCSI-3 SPI Compatible

Key Features

- Leading desktop capacity (up to 3,860 MB per drive)
- Advanced MR heads
- PRML read channel
- 10.5 ms average seek time
- Fast ATA-2 PIO Mode 4 and Multiword DMA Mode 2 support (all capacities)
- Ultra SCSI-3 interface (1.2, 2.1, and 3.2 GB)
- Advanced embedded servo positioning system
- ID-less controller
- Reed Solomon, double-burst ECC on-the-fly
- AT-Bus Cable Select™
- Plug-and-Play SCSI
- S.M.A.R.T. Revision 2 support
- AutoRead™/AutoWrite™ and AutoTransfer™ support
- Adaptive segmented buffer
- Tagged command queuing (SCSI)
- DisCache® and WriteCache® firmware
- Jumper-selectable active termination (SCSI)
- 400,000-hour MTBF

Quantum™

FIREBALL™

Quantum Fireball TM   1.0   1.2   2.1   2.5   3.2   3.8

Form Factor	3.5 inch (low profile)					
Interface Options	Fast ATA-2	Fast ATA-2 Ultra SCSI-3[1]	Fast ATA-2 Ultra SCSI-3[1]	Fast ATA-2	Fast ATA-2 Ultra SCSI-3[1]	Fast ATA-2
Formatted Capacity (MB[2])	1,089	1,281	2,111	2,564	3,216	3,860

Disk Drive Configuration

Disks	1	1	2	2	3	3
Heads/Recording Surfaces	2	2	4	4	5	6
Tracks per Surface	6,810					
Sectors per Track	104 to 232					
Bytes per Sector	512					
Track Density (tpi)	6,775					
Max. Flux Density (fci)	139,000					
Max. Recording Density (bpi)	130,000					
Encoding/Detection Method	16/17 PRML					

Performance Specifications

Typical Seek Times[3] (ms)						
Average (read)	12	12	10.5	10.5	10.5	10.5
Track-to-Track	3					
Full Stroke	21	21	18	18	18	18
Average Rotational Latency (ms)	6.67					
Rotational Speed (RPM)	4,500					
Internal Data Rate (Mb/sec)	41 to 95					
Data Transfer Rates (MB/sec)						
Fast ATA-2 (MB/sec)						
PIO Mode 4	16.67					
DMA Mode 2	16.67					
Ultra SCSI-3 (MB/sec)						
Asynchronous	N/A	6	6	N/A	6	N/A
Synchronous	N/A	20	20	N/A	20	N/A
Buffer Size[4] (KB)	128					

Reliability Specifications

Projected Field MTBF (hrs)	400,000
Start/Stop Cycles (controlled)	40,000
Preventive Maintenance	Not required
Data Errors (per bits read)	
Recoverable	<10 per 10^{11}
Nonrecoverable	<10 per 10^{15}
Error-Correction Method	224-bit Reed Solomon
Warranty[5] (years)	3

Physical Specifications

Dimensions—inches (mm)						
Width	4.0 (101.6)					
Length	5.75 (146.1)					
Height	1.0 (25.4)					
Weight—pounds	0.8	0.8	1.1	1.1	1.1	1.1
kilograms	0.36	0.36	0.50	0.50	0.50	0.50

Environmental Limits

Operating						
Temperature (°C)	0 to 55					
Non-Condensing Humidity (%)	10 to 90					
Maximum Wet Bulb (°C)	29					
Shock (G, 11 ms)	10					
Vibration (G, 5 to 400 Hz, peak-to-peak)	1					
Altitude (ft.)	-650 to 10,000					
Non-Operating						
Temperature (°C)	-40 to 65					
Non-Condensing Humidity (%)	5 to 95					
Maximum Wet Bulb (°C)	35					
Shock (G, 11 ms)	70					
Vibration (G, 5 to 500 Hz, peak-to-peak)	2					
Altitude (ft.)	-650 to 40,000					
Idle Sound (typ)						
Pressure (dBA)	30	30	32	32	32	32
Power (bels)	3.5	3.5	3.6	3.6	3.6	3.6

Power Specifications

Nominal Voltage (V)	+5/+12
Voltage Margin (%)	±5/±10
Typical Power Draw (W) (Quantum Fireball TM 3.8)	
Standby	1.2
Idle	3.8
Operating[6]	6.0
Peak Current (mA on +5/+12)	461/1,310

[1] SCSI-3 SPI compatible.
[2] Quantum defines a megabyte (MB) as 10^6 or 1,000,000 bytes.
[3] Seek times are at nominal environmental conditions and include settling.
[4] Up to 60 KB used for firmware.
[5] This warranty is standard when products are purchased directly through authorized Quantum distributors/dealers. Unless otherwise agreed, a one-year warranty is provided to all OEMs purchasing directly from Quantum. End-user warranties provided by computer manufacturers may vary.
[6] Operating is defined as 40% seeking, 30% reading, and 30% writing.

FAST-ATA2

Yes
NetWare®

S·M·A·R·T
S Y S T E M

For More Information

For more information about Quantum's quality products, call toll-free: 1-800-624-5545 in the U.S.A. and Canada, or visit our World Wide Web site: http://www.quantum.com

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Specifications subject to change without notice.

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