
1.8" Super Small Slim HDD



Y. Hashimoto
Digital Media Network Company
Storage Device Division

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Why 1.8" HDD?

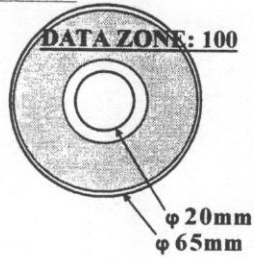
- *Larger Capacity*
 - About half of the 2.5" drive's capacity
 - Can record about 1 hour MPEG2 SDTV (with 2.0GB)
- *Lower Power Consumption*
 - Will be better storage for mobile devices
- *Standard Interface*
 - PC-Card is a standard interface in notebook PCs
 - Used as a bridging media between notebook PCs
 - Can be used as an embedded storage device

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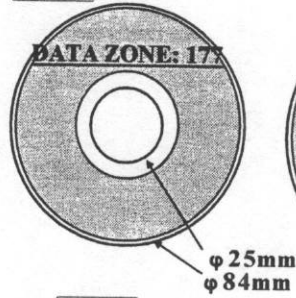
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Form Factor : Media Size

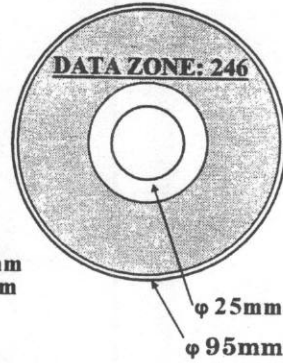
2.5"



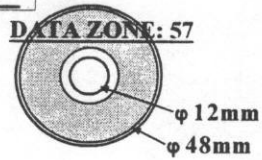
3.0"



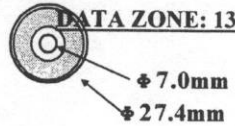
3.5"



1.8"



1.0"

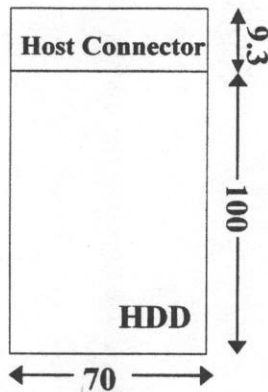


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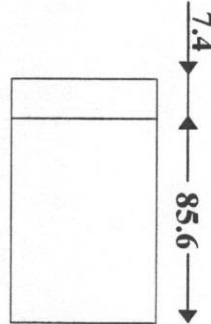
Form Factor : Comparison of Foot Print

2.5" HDD
 (100+9.3) x 70 = 7651



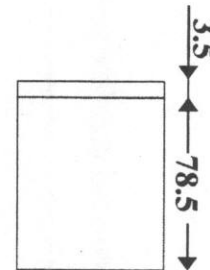
Area factor 100%

1.8" HDD
 (PC Card size)
 (85.6+7.4) x 54 = 5022



Area factor 66% (100%)

1.8" HDD
 (Built-in model)
 (78.5+3.5) x 54 = 4428

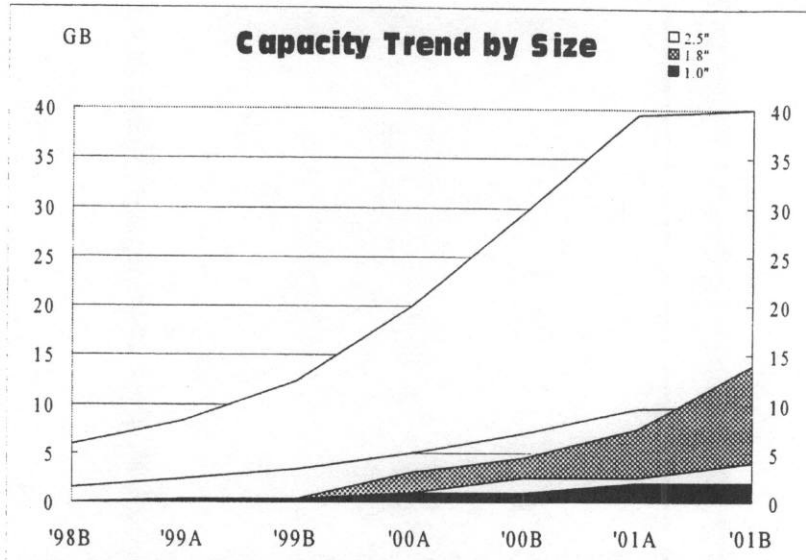


Area factor 58% (88%)

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Capacity Trend by Form Factor



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Product Concept

- *Provides small, light, silent and low power HDD with sufficiently large capacity.*
 - For PC-Card as a bridging media
- *Provides further small footprint HDD with abundantly large capacity for advanced usage.*
 - For built-in drive as ATA interface embedded storage of mobile products
- *Use the same technology (head, media, channel) proven on the former generation 2.5" HDD*
 - Development was focused on mechanical design and production equipment.
 - Parts mounting technology as well as chip size IC package are important.

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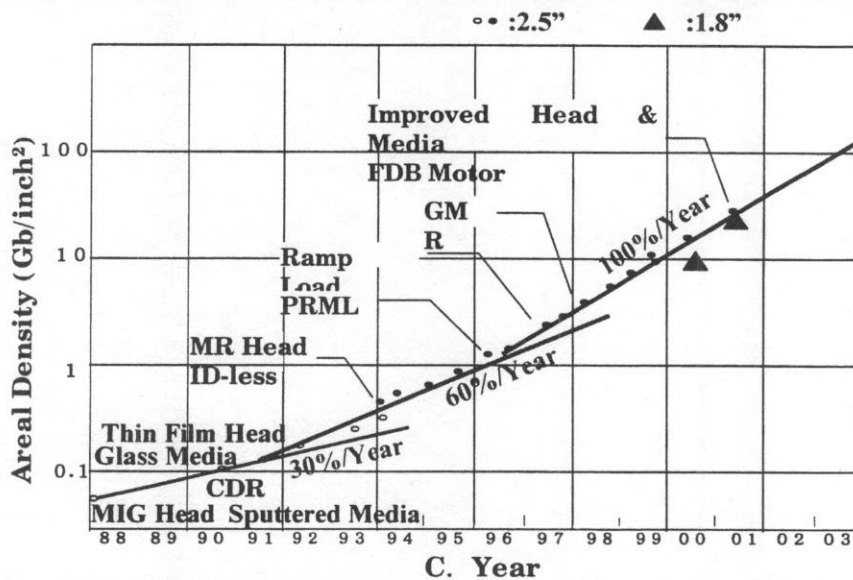
Key Technologies

- **High Recording Density**
 - 5GB/Disk : 22.4Gbps (41.6KTPI, 538KBPI)
 - Advanced servo control
- **Small Form Factor**
 - LSI : Ball Grid Array, Low profile package
 - Mechanical parts: Thinner SPM, VCM, etc.
- **Low Power Consumption**
 - 3.3 Volt operation
 - High efficiency VCM and lower inertia carriage
- **Mechanics**
 - Inertia latch mechanism with ramp-load
 - High stiffness base plate and SPM
- **Low Acoustics**
 - About 10dB less than those of 2.5"

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Recording Density



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Small and slim form factor

• *Printed Circuits Board*

- Use of integrated LSI's
- Low profile package of 0.5mm thickness BGA
- PCB of 0.45mm thickness

• *Base plate*

- Sheet metal of 0.6mm thickness
- Steel base plate by press process
- Used as a yoke of magnet

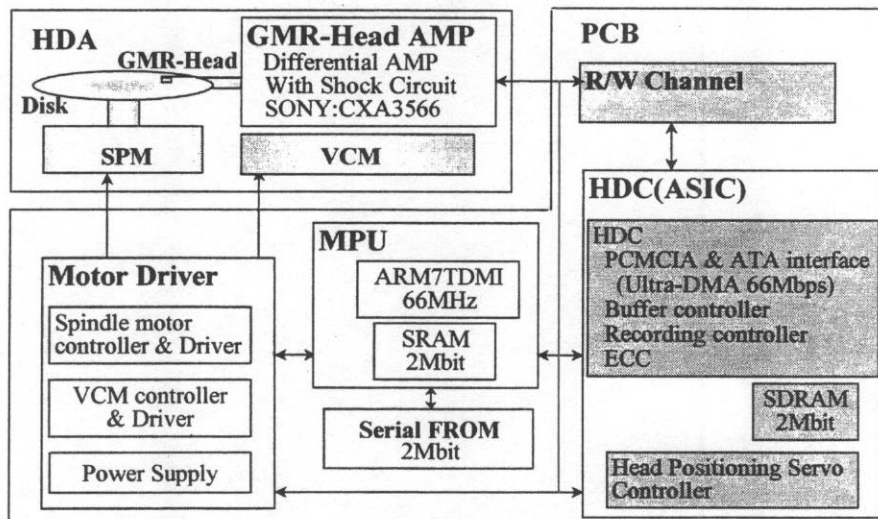
• *Spindle Motor*

- Spindle motor of 4.05mm thickness
- Inner rotor type with ball bearings
- Same size of balls used in 2.5" HDD
for higher shock resistance

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Block Diagram : 5GB Card type



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LSI's (1/2)

- **HDC(ASIC)**
 - 0.25um CMOS, 5.5x5.5mm, 2Mbit SDRAM+220Kgates
 - PC Card Bus & ATA interface, 5V Tolerant Inputs/Outputs
 - 7Burst - 3Way interleave ECC, Ultra-DMA 66Mbps
 - Servo Controller, Cache & Buffer controller

- **MPU**
 - 0.15um CMOS, 5.0x5.0mm
 - ARM7 Core, 2Mbits SRAM, 16Kbits ROM & Peripherals

- **R/W Channel : Marvell - 88C4310**
 - 0.25um CMOS, 3.5x3.5mm
 - 32-34/64-66 ENDEC with Post-Processor
 - Modified EE PRML
 - Servo Detector & Demodulator for Digital Servo Control
 - Data Rate : Up to 550Mbps (Drive's Data Rate: 90-130Mbps)

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LSI's (2/2)

- **Motor Driver : TI - TLS2256(Toki)**
 - 0.8um Linear Bi-CMOS
 - Spindle Motor Controller with 600mA Driver
 - FLL & PLL Speed Controller
 - Voice Coil Motor Controller with 400mA Driver
 - 12bit DAC/ADC
 - Ramp Load Control & Emergency Retract Circuits
 - Power Controller
 - 3.3, 2.5 & 1.8V Outputs for 5 or 3.3V Input
 - Power Monitor for Input & Output Voltages
 - Shock Sensor & Detector Circuits

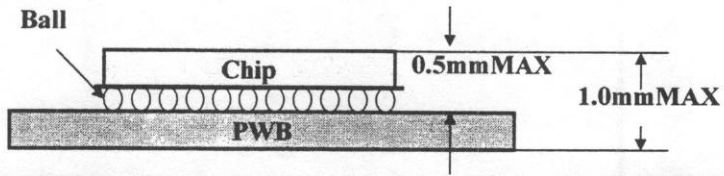
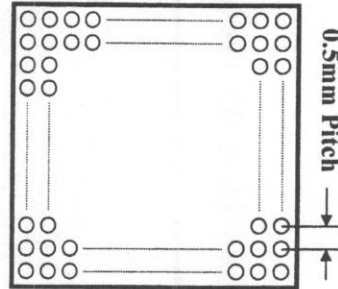
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Package

Smaller & Low Profile Package

- et-BGA
(Extremely Thin Ball Grid Array)
- Wafer Level BGA
(Chip Size Package)
- 0.5mm height

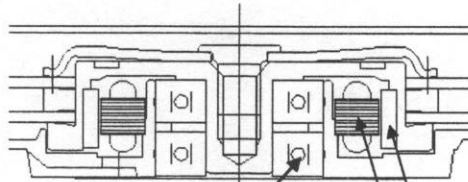


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Spindle Motor

2.5inch HDD

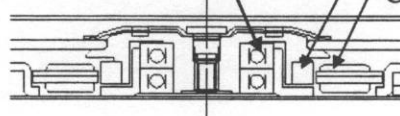


Same size
of Ball

Rotor
Magnet

1.8inch HDD

Stator
Coil



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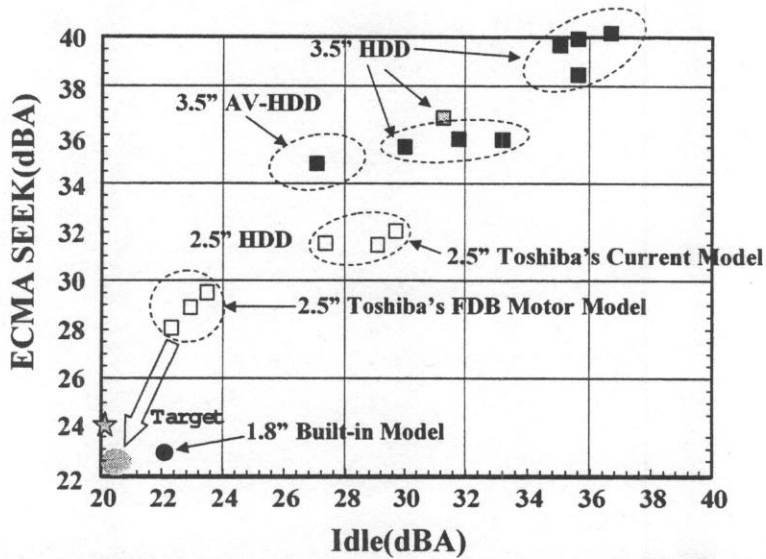
Advanced Tracking Technology

- **Adaptive Feed-forward Control**
 - Compensating large media shift and disk deflection
- **High Performance Servo Controller**
 - Improving servo stability by reduced output delay
- **Multi-rate Control**
 - Extending servo bandwidth by reduced phase delay
 - Canceling arm-suspension vibratory mode

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Acoustic Noise(Sound Power)



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Table-1 1.8" HDD, Major specifications

Model	PC Card Type		Built-in Type		2.5"	
	2GB 1 Disk	5GB 1 Disk	5GB 1 Disk	10GB 2 Disks	10GB 1 Disk	
Capacity (Gbytes)	2.0	5.0	5.0	10.0	10.1	
Number of disks	1	←	←	2	1	
Number of heads	2	←	←	4	2	
TPI (k)	24.2	41.6	←	←	36.0	
BPI (k)	372	507	538	←	489	
Recording density (Gbps)	9.0	21.1	22.4	←	17.6	
Rotation speed (RPM)	4,200	3,990	4,200	←	←	
Transfer rate	Internal (Mbits/sec)	75 - 130	94 - 123	118 - 175	←	121 - 234
	Host (Mbytes/sec)					
	ATA					
	Ultra DMA mode	66.7	←	←	←	←
	PIO mode	16.6	←	←	←	←
PC Card						
Memory mode	20	←				
I/O mode	5.2	←				
Buffer size (kbytes)	256	1,024	←	←	←	
Average seek time (msec)	15	←	←	←	13	

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Table-1 1.8" HDD, Major specifications

Model	PC Card Type		Built-in Type		2.5"	
	2GB 1 Disk	5GB 1 Disk	5GB 1 Disk	10GB 2 Disks	10GB 1 Disk	
Supply voltage (volts)	3.3 or 5	←	3.3	←	5	
Power consumption (W Typ.)	Read/Write	1.2 / 1.3	←	1.3 / 1.3	←	2.2/2.2
	Low power Idle	0.5	←	←	←	0.7
	Stand-by	0.23	←	←	←	0.3
Shock (G's)	Operation	150	200	←	←	150
	Non-operation	1,000	←	←	←	700
Acoustics idle mode (dB Typ.)	22	←	←	←	32	
Dimension (mm)	Width	54	←	←	←	69.85
	Depth	85.6	←	78.5	78.5	100
	Height	5	←	←	8	9.5
Weight (gram)	55	←	50	60	94	

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END

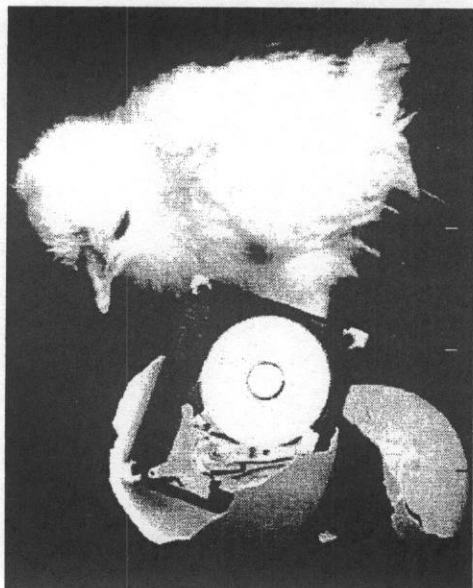
Thank you

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Microdrive: High Capacity Storage for the Handheld Revolution



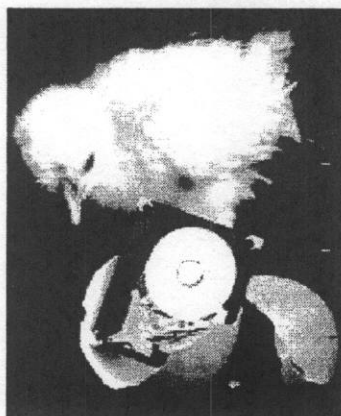
IBM Almaden Research Center
San Jose, CA

IBM Mobile Storage Development
Fujisawa, Japan

IBM Storage Systems Division
San Jose, CA



Recent History



Autumn 1998
Technology
Introduction

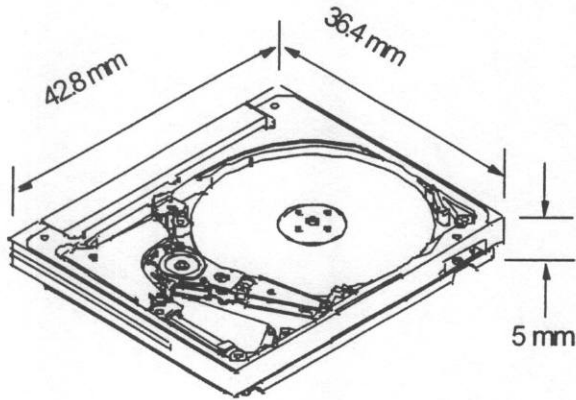


June 1999
Gen 1 Product



June 2000
Gen 2 Product

CompactFlash Type II Form Factor

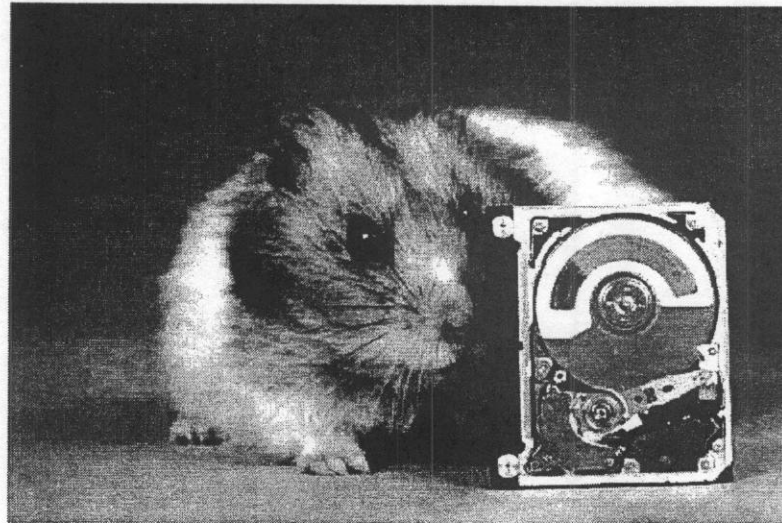


- CompactFlash type I already established as leading storage form factor for cameras, hand-held PCs
- Type II (introduced by CFA 12/98) is identical to Type I except height increased from 3.3 mm to 5 mm
- Microdrive brings high capacity HDD storage to hand-held devices

Microdrive: Selected Specs

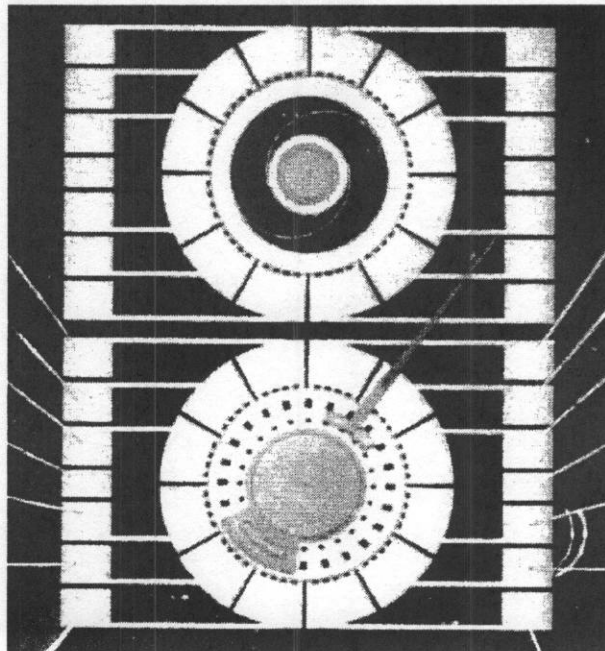
<u>Specification</u>	<u>Gen 1 (340 MB)</u>	<u>Gen 2 (1.0 GB)</u>
Dimensions	42.8 x 36.4 x 5.0 mm	42.8 x 36.4 x 5.0 mm
Capacity	340 / 170 MB	340 / 512 MB/ 1.0 GB
Disk diameter	27.4 mm	27.4 mm
Areal Density (Gb/sq.in.)	5.04 (Max)	15.2 (Max)
Avg Seek Time	15ms	12ms
Data Rate (MB/s)	3.2 (Max)	4.2 (Max)
Rotational Speed (RPM)	4500	3600
Power Requirements	+3.3 v, 5.0 v +/- 5%	+3.3 v, 5.0 v +/- 5%
- Spin Up	260mA	260mA
- Read/Write	300mA	250mA
- Idle	220mA	140mA
- Standby	65mA	20mA
Shock: - Non-OP	1000 G	1500 G
- Operating	150 G	175 G
Weight	16g	16 g
Interface	CF (ATA)	CF (ATA)

Microdrive Technology



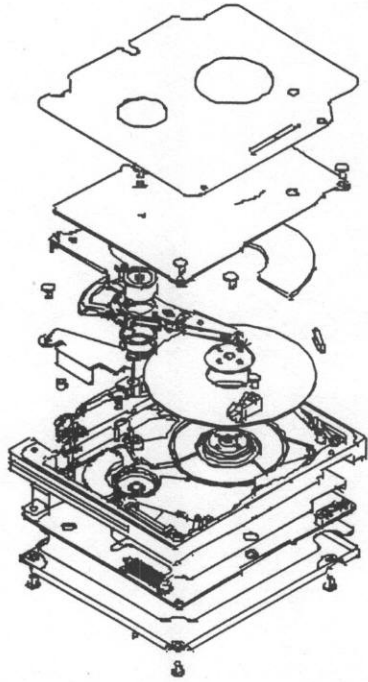
Are micromechanics required to make a microdrive?

- Microdrive project started with goal of using MEMS to make a disk drive....



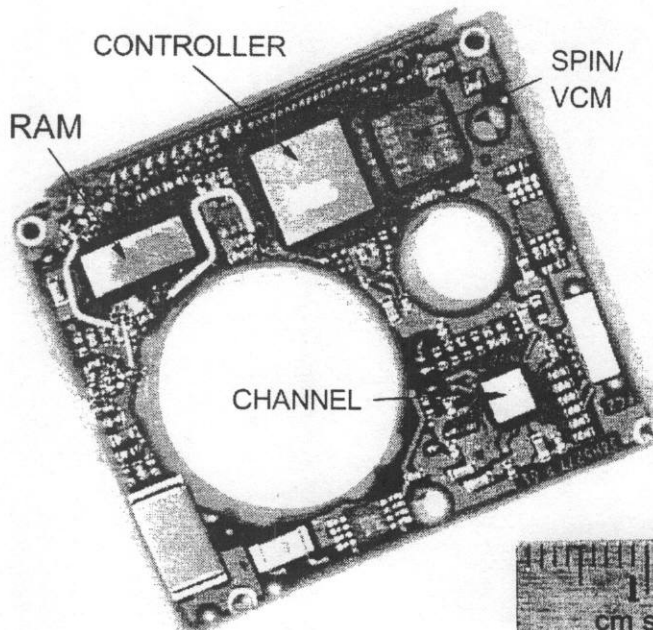
(L.S. Fan)

Microdrive: Intelligently Scaled Conventional Design



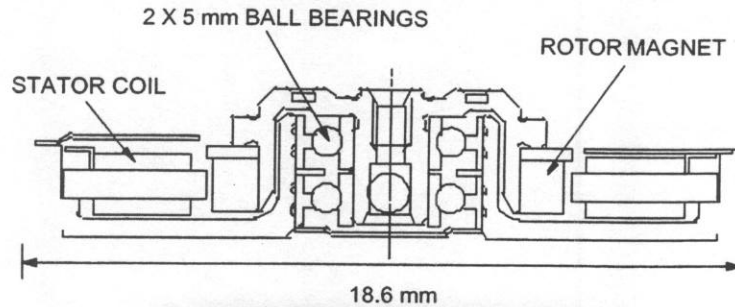
- Properly scaled conventional designs turned out to be a cheaper and better approach.
- MEMS technology is not ready to replace most components yet:
 - bearings (lubrication and life)
 - motors (available torque)
 - expense (too high)

Electronics Card



- Total card area: 10 cm^2
- double sided (most on one side)
- 6X smaller than 2.5" HDD card, with all the same functions
- All modules: direct chip attach (no package, no wire bonding)
- One of the most compact electronics cards in industry today
- card thickness: 0.4 mm (4 layer)
- component height: 0.9 mm

Spindle Motor

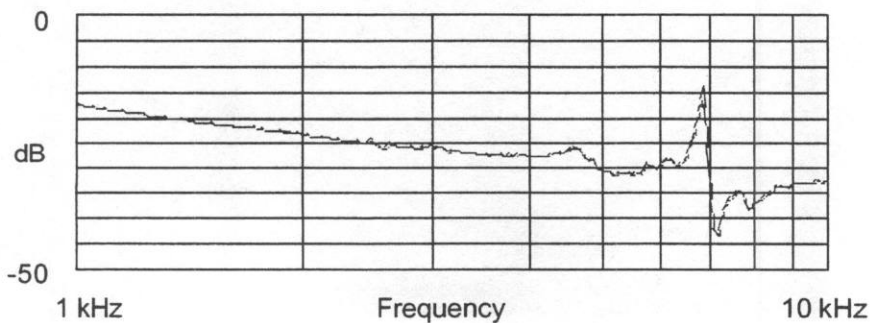
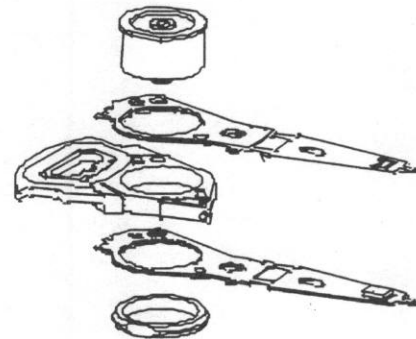


INNER ROTOR DESIGN

- rotating mass dominated by spindle rotor, not disk (unlike most drives)
- oversize (not scaled) bearings (for manufacturability, shock resistance)
- reduced mass (increased resistance to linear shock)
- reduced rotational inertia (spin up time ~ 0.5 sec)
- reduced tilt inertia (increased resistance to rotational shock)
- increased K_t (more room for windings)
- 12-pole 9-slot design; $K_t = 0.0025 \text{ Nm/A}$
- future: fluid dynamic bearing (higher track dens, better acoustics, better shock)

Actuator

- transfer function clean out to ~ 7 kHz
- similar to moving-suspension secondary actuators in larger drives
- may achieve dual-stage performance without second stage



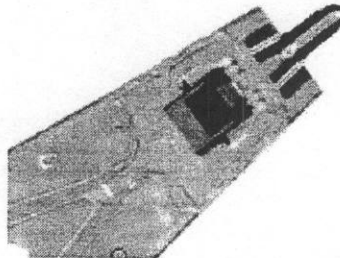
- 127 turn coil
- overmolded plastic carriage
- integrated lead suspension
- $K_t \sim 0.002 \text{ Nm/A}$
- $I \sim 0.1 \text{ g cm}^2$

Air Bearing

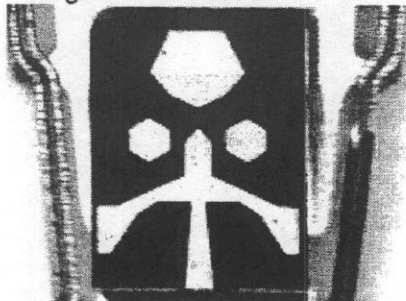
Can a conventional ABS work in a microdrive?

Requirements:

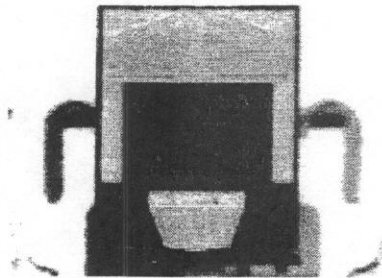
- 2.2 - 4.2 m/sec linear velocity
- sub 1 microinch FH
- good tolerances



ILS suspension with pico slider



nano ABS from early prototype



pico subambient pad ABS used in product

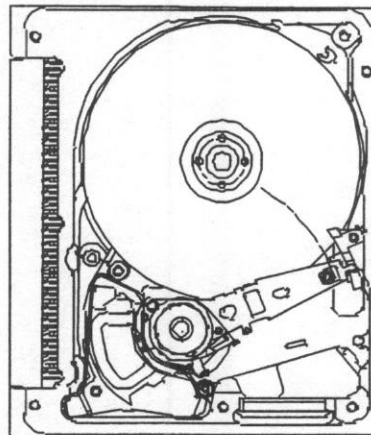
Load/Unload

SPINDLE TORQUE TOO LOW FOR CONTACT START-STOP

- limited coil winding space
- CompactFlash requires 3.3 V operation, limits K_f
- oversize bearing (not scaled) results in disproportionately high drag

OTHER ADVANTAGES OF L/UL

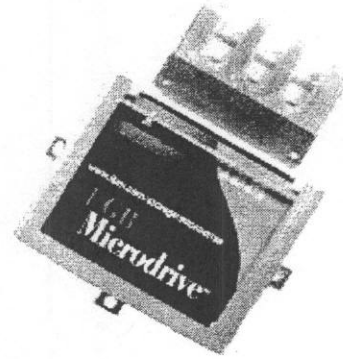
- increased nonoperating shock resistance (eliminates head slap)
- elimination of stiction/wear failures
- reduced power consumption (unlimited start/stops for aggressive power savings)
- increased areal density (smooth disk for low noise, low flying height)
- ease of assembly (no head merge operation)



Design Considerations for SHOCK

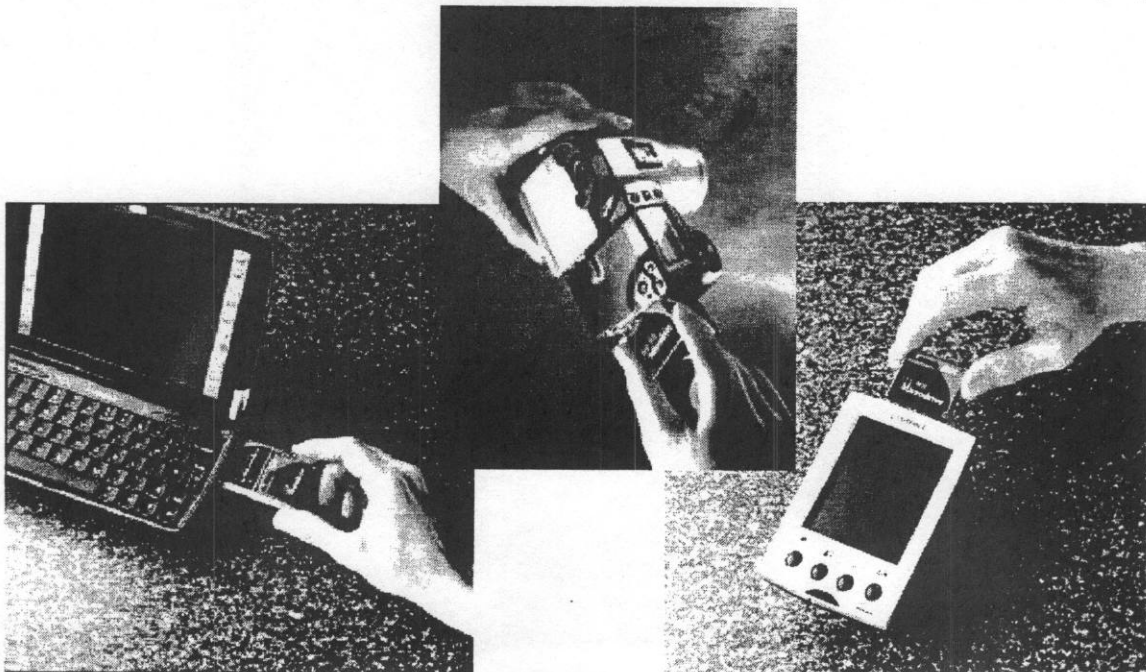
- Microdrive has 1500 G nonop shock spec (industry best)
- Contributing factors:
 - Load/Unload (eliminate head slap)
 - Oversize spindle and actuator bearings (higher brining threshold)
 - Suspension limiters (prevent gimbal damage, slider-slider contact)
 - Inertia latch (keep actuator reliably parked)
 - "True Track" super-harmonic servo (allows for some disk slip)

For "throw it against the wall" durability:

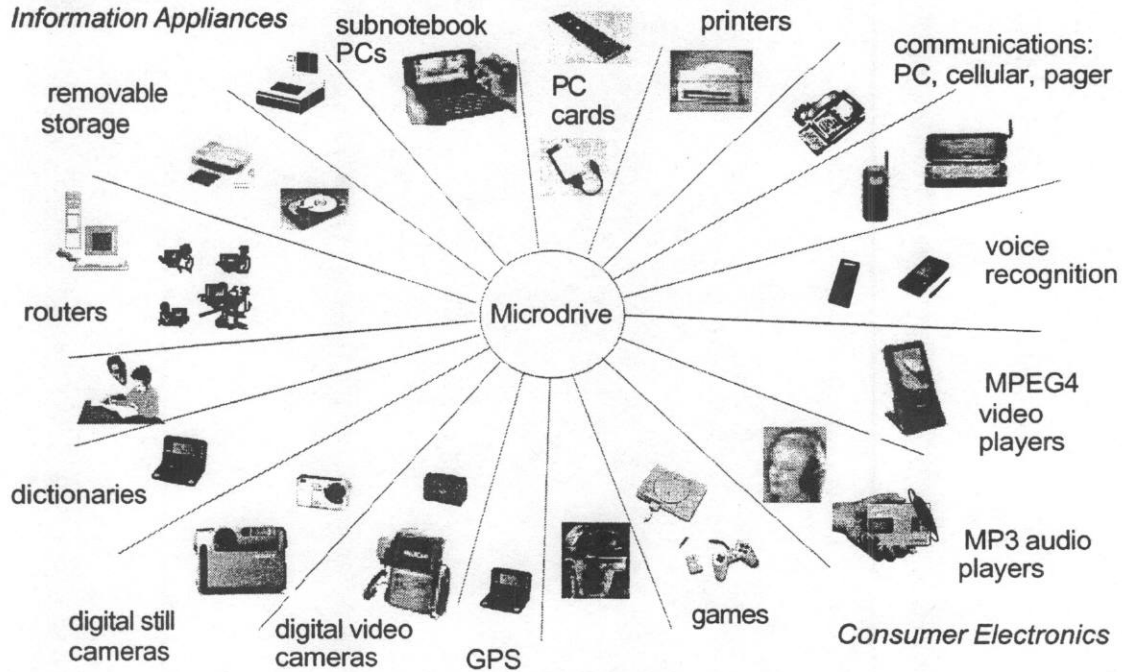


Compact shock mounting system from Edapting Solutions

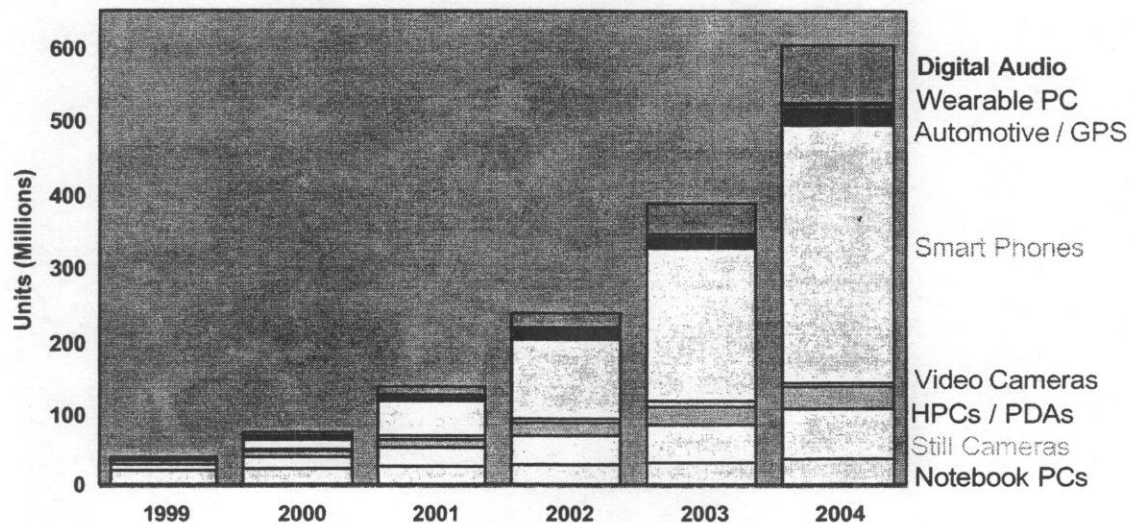
Microdrive Applications



Microdrive Opportunity

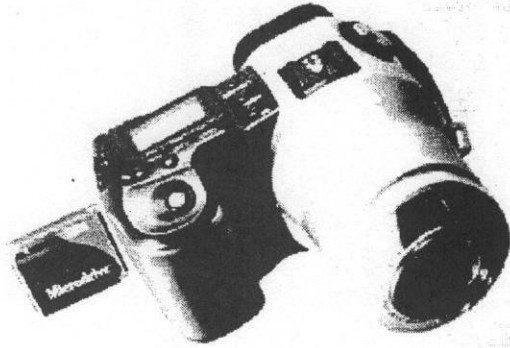


Potential Host Devices: Volume Projections



* even a small percentage penetration into these markets represents significant volume

Digital Cameras



(Canon digital camera)

- most popular use of Microdrive
- image capacity for 1 GB:
 - Casio QV3000 camera (3.3 Mpel)
 - compressed:
 - 710 images @ 2048 x 1530 pel
 - 2750 images @ 1024 x 768 pel
 - uncompressed:
 - 100 images @ 2048 x 1530 pel
- uncompressed images:
 - superior quality
 - better for subsequent editing
 - 10 MB per image @ 3.3 MP
 - only practical with Microdrive

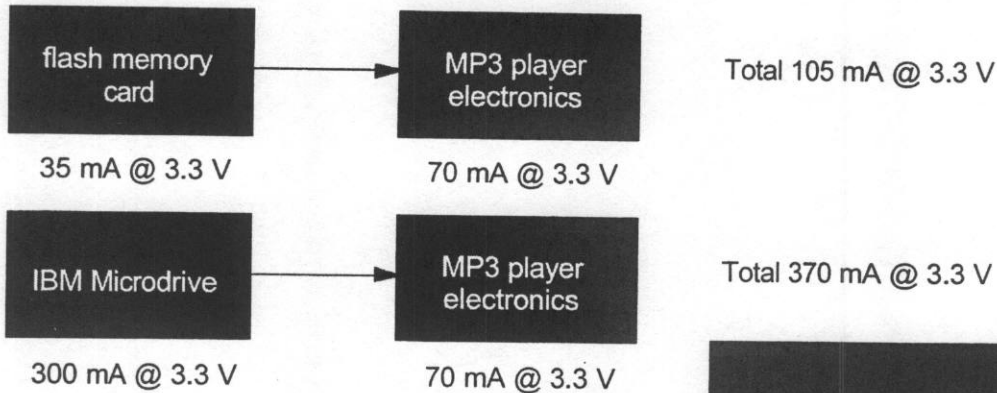
MP3 Audio Players



Microdrive-based MP3 Player
designed by e.Digital
(coming to market soon)

- MPEG-1 audio layer 3
- compressed audio
(16X smaller than CD)
- data rate 128 kb/sec
(16 KB/sec, ~1 MB/min)
- competition uses solid
state flash memory
(typically 32-128 MB)
- flash is not a very good
solution (too expensive)
- high capacity of Microdrive
is ideal

Mythical Problem: Microdrive Power Consumption

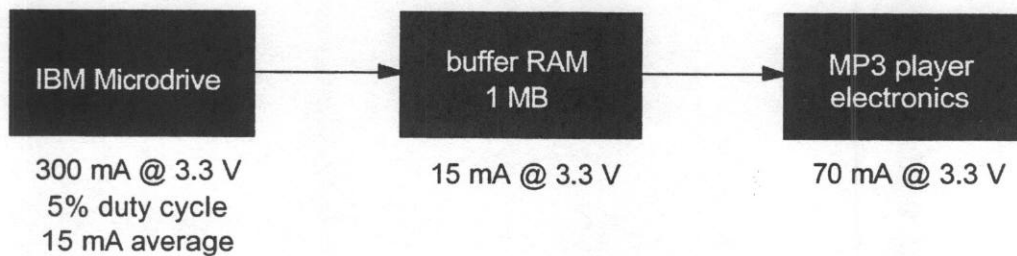


3.6 X more current
more than 5X
shorter battery life

There is a better way...

Solution: Add a Data Buffer

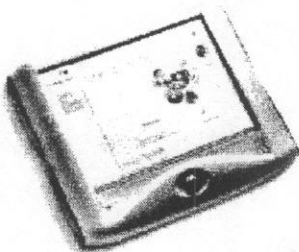
- MP3 data rate: 16 KB/sec
- Microdrive minimum sustained data rate: 1.8 MB/sec
- Microdrive is > 100X too fast!



- Microdrive consumes only 15% of total power
- negligible effect on battery life vs. flash memory
- 10-20 hrs battery life with pair of AA batteries

Digital Video Players

Enterprise to Entertainment



MPEG4 Video with 8 MB buffer

Data Rate	Duty Cycle*	Ave. Current
300 kb/s	3.3%	8 mA
1 Mb/s	10%	25 mA
1.6 Mb/s	15%	38 mA

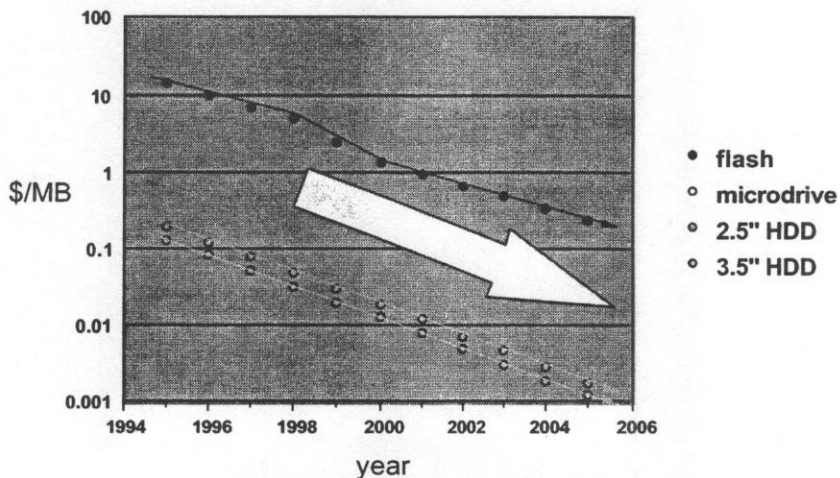
Assumptions:

- 2 MB/sec sustained data rate
- 2 seconds overhead per buffer cycle

Negligible effect on battery life vs flash memory

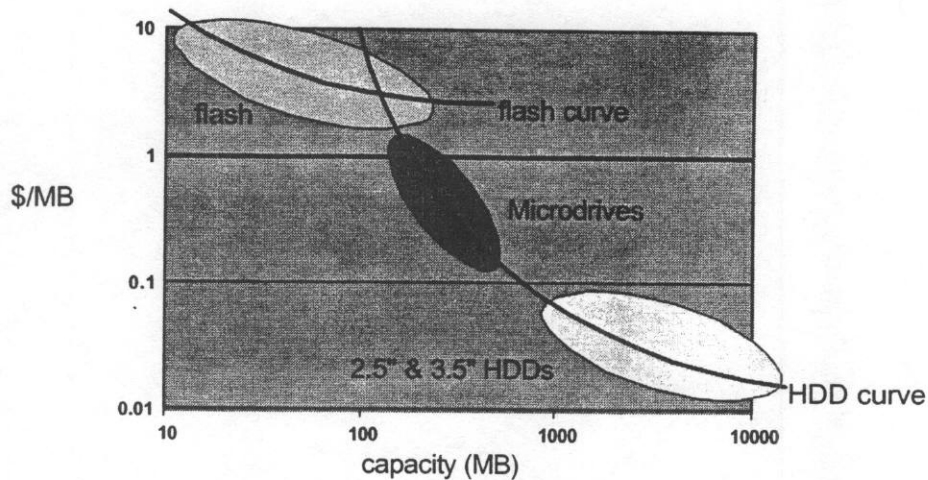
1 inch today => 1 cm tomorrow?

Price trends for storage



Microdrive market occupies widening gap between flash and larger HDDs

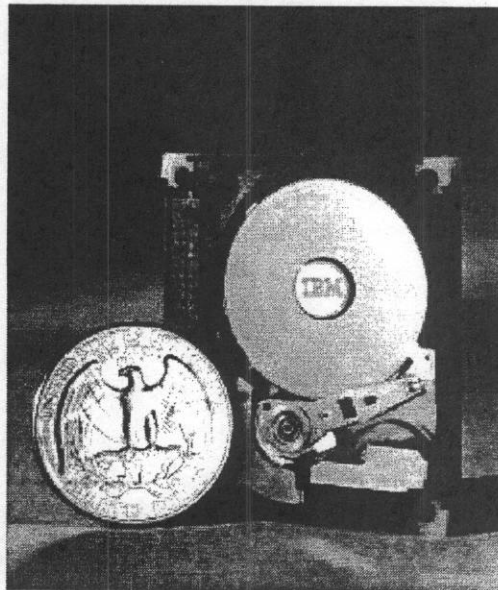
1 inch today => 1 cm tomorrow?



Fixed costs of HDDs needs to be reduced before further downward scaling in size (Flash scales down better)

Microdrive: Summary

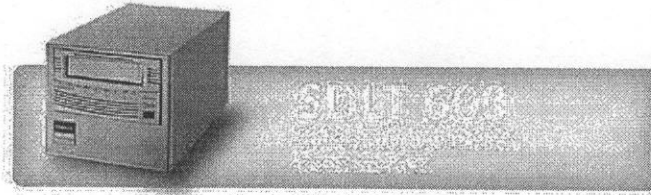
- World's smallest, lightest HDD
- World's lowest power HDD
- World's most shock resistant HDD
- Based on intelligently scaled conventional design
- Most important applications:
 - digital cameras
 - MP3 audio players
 - MPEG4 video players
- Achieves excellent battery life in sequential access applications (audio, video)



Products

- Autoloaders
- DLTape Drives
 - SDLT 600
 - SDLT 320
 - DLT 8000
 - DLT VS160
 - DLT VS80
 - DLT Racks
 - Retired Products
 - Promotions

- Enhanced Backup Systems
- Tape Libraries
- Quantum Media



Related Information

- Data Sheet (PDF)
- International Data Sheets
- Specifications
- Request More Information
- Warranty Information

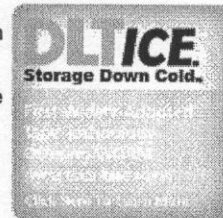
OVERVIEW

Brace yourself for the fastest super drive in the world! The NEW SDLT 600. Featuring an unprecedented 72 MB/s compressed transfer rate and a colossal 600 GB of compressed storage, there's never been anything quite like it. Additionally, the SDLT 600 is backward compatible to the SDLT 320 and DLT VS160.

In addition to its heart-pounding performance, the SDLT 600 is also highly intelligent. It includes the revolutionary DLTsage™, a suite of management tools designed to give you the power of knowing – that your data is safe and protected while applications remain available and secure.

FEATURES AND BENEFITS

- **Superior Manageability** – Communicates status to the user through DLTsage, Quantum's industry unique drive management system.
- **DLTice™ Storage Down Cold™** - The first Super drive to utilize standard media for both traditional backup and archiving as well as for regulatory compliance ¹.
- **Superior Capacity** – Highest DLTape storage capacity: 300GB native (600GB compressed).
- **High-Speed Interfaces**
 - Ultra 160 SCSI
 - 2Gb Fibre Channel in enterprise libraries



Related Products

- DLT Rack Series
- DLTSage
- SDLT 320
- DLTape Media
- SDLT CleaningTape
- DLTice



Related Links

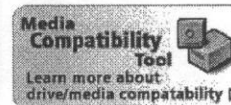
- Get DLTice Now
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- White Papers
- Where To Buy
- Product Registration Promotions
- Search our FAQs
- Software Download Center
- Software Compatibility Guide (PDF)
- Media Compatibility Guide
- User Guides and Manuals

WHAT'S IN THE BOX

- **Quantum SDLT 600 tape drive, Bare, SCSI 160**
Includes Quick Start Guide, Product Documentation CD and SCSI jumpers.

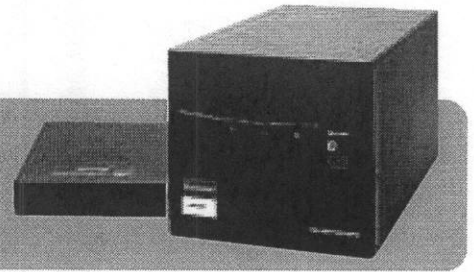
Model number (color):
TR-S34AX-BR (beige)
- **Quantum SDLT 600 tape drive, Internal Kit, SCSI 160**
Includes data cartridge, cleaning cartridge, Quick Start Guide, Product Documentation CD and SCSI jumpers.

Model number (color):
TRS34AX-EY (black)
TR-S34AX-YF (beige)
- **Quantum SDLT 600 tape drive, External Kit, SCSI 160**
Includes data cartridge, cleaning cartridge, HD68 to HD68-pin SCSI cable, SCSI terminator, power cord, Quick



Quantum.

SDLT 600



FEATURES AND BENEFITS

- **Superior Manageability** - Communicates status to the user through DLTSage, Quantum's industry-unique drive management system.
- **DLT/ce™ Storage Down Cold™** - The first Super drive to utilize standard media for both traditional backup and archiving as well as for regulatory compliance*. For more information, visit www.quantum.com.
- **Superior Capacity** - Highest DLTtape storage capacity: 300GB native (600GB compressed).
- **Superior Reliability** - Tested to 250,000 hours MTBF at 100% duty cycle.
- **High-Speed Interfaces** -
 - Ultra 160 SCSI
 - 2Gb Fibre Channel in enterprise libraries

A New Landscape of Improved Manageability, Enhanced Reliability, and Superior Performance

The Quantum SDLT 600 is the first tape drive designed to take full advantage of DLTSage™, a revolutionary new data management offering. IT professionals are now empowered to better manage, predict and proactively prevent storage system errors.

And now users can extend their investments in the SDLT 600 tape drive and Super DLTtape™II media to leverage DLT/ce™ as an integral component in today's rigorous regulatory compliance requirements. Supported by DLTSage, DLT/ce provides WORM (Write Once, Read Many) archival functionality with a complete set of management tools and strong software support. With DLT/ce the SDLT 600 is the first Super drive that can utilize standard media for both traditional backup and archiving as well as for regulatory compliance.

The SDLT 600, the third generation super drive from DLTtape™ Technology, incorporates a host of technical improvements, making it the most advanced super drive available today. Not only is it the largest capacity Super Drive, it also boasts the fastest native transfer rate and uses media that delivers the lowest cost per gigabyte available today.

Winning Performance

The SDLT 600 boasts a native capacity of 300GB (600GB compressed*) and delivers native transfer rates of up to 36MB/sec, making it capable of restoring a complete MS Exchange Information Store in under four minutes!

Improved Manageability

With its implementation of DLTSage, the SDLT 600 delivers predictive and preventative maintenance diagnostic offerings that will enable customers to more simply manage their tape storage environments.

From a desktop or a handheld device, IT professionals can obtain status and history for both drive and media.

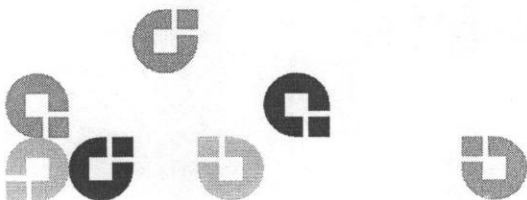
Enhanced Reliability

Designed and tested extensively, the SDLT 600 delivers new levels of reliability.

Compatible Growth

As with previous generations of DLTtape Technology, the SDLT 600 protects prior DLTtape investments by reading information stored on Super DLTtape™I and DLTtape™ VS1 cartridges.

*Assumes 2:1 compression



SDLT 600 SPECIFICATIONS

Performance

Sustained Transfer Rate (MB/sec)	
Native	36
Compressed	72 (2:1 ratio)
Burst Transfer Rate (MB/sec)	
Ultra 160 SCSI (max)	160
Fibre Channel (max)	200
Formatted Capacity (GB)	
Native	300
Compressed	600
Cartridge Load Times (sec)	
To BOT (formatted)	12
To BOT (unformatted)	40
Average File Access Time (sec)	79
Interfaces Available	Ultra 160 SCSI 2Gb Fibre Channel in enterprise libraries

Tape Format Specifications

Recording Format	640 track serial serpentine
Recording Density	233 k bits per inch
Track Density	1490 tracks per inch
Encoding Method	Partial Response Maximum Likelihood (PRML)
Data Compression	DLZ

Manageability

DLTSage	Full
DLTSage xTalk	Cross-platform interface Windows HP-UX Solaris Linux
DLTSage iTalk	Infrared interface Windows Windows CE

Reliability

MTBF (hours)	250,000 @ 100% duty cycle
Media Durability	1,000,000 passes
Uncorrected Error Rate	1 x 10 ¹⁷ bits read
Undetected Error Rate	1 x 10 ²⁷ bits read
Warranty (years)	3

Physical Specifications

Dimensions – inches (mm)	
Internally-configured Drive	
Width	5.75 (146.05)
Depth	8.48 (215.39)
Height	3.25 (82.55)
Weight – pounds (kg)	5 lbs 4 oz (2.38)

Physical Specifications (cont)

Tabletop Drive	
Width	6.88 (174.75)
Depth	12.6 (320.04)
Height	6.48 (164.46)
Weight – pounds (kg)	13 lbs 13 oz (6.27)
Rack-mount Drive	
Width	16.75 (425.5)
Depth	22.38 (568.5)
Height	3.43 (87.1)
Weight – pounds (kg)	54 lbs (24.5)

Environmental Limits

Operating	
Temperature °F (°C)	50° to 104° (10° to 40°)
Non-Condensing Humidity (%)	20 to 80
Altitude (ft. maximum)	-500 to 30,000
Non-Operating	
Temperature °F (°C)	-40° to 151° (-40° to 66°) excluding media
Non-Condensing Humidity (%)	10 to 95

Power

Voltage (V)	+5, +12
Power Consumption (W)	32 W typical streaming/writing

Media/Format Compatibility

Super DLTtape™ II (read/write)	300GB native capacity
Super DLTtape™ I (read only)	160GB native capacity 110GB native capacity
DLTtape™ VS1 (read only)	80GB native capacity

Media Specifications

Tape Width	0.498" (12.65mm)
Tape Length	1,957' (596.5 m)
Cartridge Dimensions	4.1" x 4.1" x 1.0" (104.1mm x 104.1mm x 25.4mm)

Archive Storage

More than 30 years with less than 10% loss in demagnetization at 20° C and 40% non-condensing humidity

Average 1,000,000 head passes in a typical office/computing environment

Durability
Limited lifetime warranty, approved for use in all Super DLTtape drives

Warranty

1. The integrity of a compliant WORM implementation requires V30 or higher firmware.

Quantum.
SDLT 600



For more information,
visit quantum.com

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141 Innovation Drive
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U.S.A.
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200 Creek Street
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phone +61 7 3839 0950
fax +61 7 3839 0955

Products

Autoloaders

DLTape Drives

- SDLT 600
- SDLT 320
- DLT 8000
- DLT VS160
- DLT VS80
- DLT Racks
- Retired Products
- Promotions

Enhanced Backup Systems

Tape Libraries

Quantum Media

Specifications

SDLT 600

PERFORMANCE

Sustained Transfer Rate

Native	36MB/sec
Compressed (2:1 ratio)	72MB/sec

Burst Transfer Rate

Ultra 160	160MB/sec (max)
Fibre Channel	200MB/sec (max)

Formatted Capacity

Native	300GB
Compressed	600GB

Cartridge Load Time

To BOT (Formatted)	12 seconds
To BOT (Unformatted)	40 seconds

Average File Access Time

79 seconds

Interfaces Available

- Ultra 160 SCSI
- 2 Gb Fibre Channel in enterprise libraries

TAPE FORMAT

Recording Format	640 track serial serpentine
Recording Density	233K bits per inch
Track Density	1490 tracks/inch
Encoding Method	Partial Response Maximum Likelihood (PRML)
Data Compression	DLZ

MANAGEABILITY

DLTSage Support	Full
DLTSage xTalk	Cross Platform Interface: Windows, HP-UX, Solaris, Linux
DLTSage iTalk	Infrared Interface: Windows, Windows CE

RELIABILITY

MTBF	250,000 hours @ 100% duty cycle
Media Durability	1,000,000 passes
Uncorrected Error Rate	1 x 10 ¹⁷ bits read
Undetected Error Rate	1 x 10 ²⁷ bits read
Warranty	3 years

PHYSICAL SPECIFICATIONS

Internally Configured Drive

Width	5.75" (146.05 mm)
Depth	8.48" (215.39 mm)
Height	3.25" (82.55 mm)
Weight	5 lbs, 4 oz (2.38 kg)

Tabletop Drive

Width	6.88" (174.75 mm)
Depth	12.6" (320.04 mm)

Related Information

- Data Sheet (PDF)
- International Data Sheets
- Specifications
- Request More Information
- Warranty Information

Related Products

- DLTSage
- SDLT 320
- SDLT 220
- DLTape Media
- SDLT CleaningTape

Related Links

- Technology Roadmap
- Awards
- Success Stories
- White Papers
- Where To Buy
- Product Registration
- Search our FAQs
- Software Download Center
- Software Compatibility Guide (PDF)
- Media Compatibility Guide
- User Guides and Manuals



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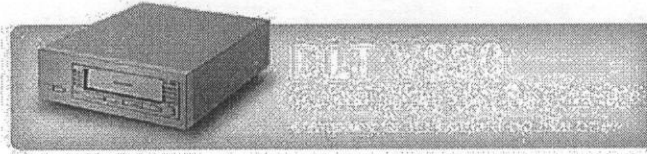
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Home : Products : DLTape Drives : DLT VS80

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Products**Autoloaders****DLTape Drives**

SDLT 600
SDLT 320
DLT 8000
DLT VS160

DLT VS80
DLT Racks
Retired Products
Promotions

Enhanced Backup Systems**Tape Libraries****Quantum Media****OVERVIEW**

The Quantum DLT VS80 fills the need for reliable tape storage in a compact, reliable tape drive. The DLT VS80 offers the industry's first half-high, 5.25-inch form factor and offers 40GB of native capacity (80GB compressed) and a 3MB/second native transfer rate (6MB/second compressed). Available as an internally configured unit, the DLT VS80 uses the standard DLTape IV media, and is backward read compatible with the popular DLT 4000 tape format.

FEATURES

- Native capacity of 40GB at 3MB/second transfer rate
- 2:1 compression allows for 80GB capacity at 6MB/second transfer rate
- Half-high, 5.25-inch form factor
- Read and write compatible with the DLT1
- Read compatible with the DLT 4000
- Internal and external configurations available
- Uses DLTape IV media cartridges

WHAT'S IN THE BOX

- **Quantum DLT VS80 tape drive, Bare, LVD**
Includes Quick Start Guide, mounting screws and SCSI jumpers.
Model number (color):
BHHA-YA (beige)
- **Quantum DLT VS80 tape drive, Internal Kit, LVD**
Includes data cartridge, cleaning cartridge, Quick Start Guide, mounting screws and SCSI jumpers.
Model number (color):
BHHA-EY (black)
BHHA-YF (beige)
- **Quantum DLT VS80 tape drive, External Kit, LVD**
Includes data cartridge, cleaning cartridge, HD68 to HD68-pin SCSI cable, SCSI terminator, power cord and Quick Start Guide.
Model number (color):
BHBA-YF (beige)
- **Quantum DLT Rack1 w/ DLT VS80 tape drive(s), LVD**
Includes HD68 to HD68-pin SCSI cable(s), SCSI terminator(s), mounting hardware, power cord and Quick Start Guide.
Model number (color):
BHDA-EY (black)/single tape drive
BHECA-EY (black)/dual tape drive

Related Information

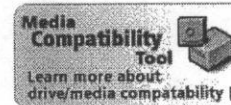
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Related Products

DLT Rack Series
DLT VS160
DLTape Media

Related Links

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Value DLTtape™ Drives

DLT VS80



FEATURES AND BENEFITS

- **Outstanding capacity and performance** – 40 GB native capacity at 3 MB/s. 2:1 compression allows 80 GB at 6 MB/s
- **Compact Size** – Half-high form factor optimizes space without sacrificing optimal performance or reliability.
- **Single-cartridge backup** – one DLTtape™ IV cartridge can back up an entire small-to- medium sized storage network or workstation.
- **DLTtape IV cartridge compatibility** – the DLT VS80 tape drives use industry-standard DLTtape IV cartridges that are fully backward read compatible with the popular DLT1 and DLT 4000 formats.
- **Industry-leading product roadmap** – The DLTtape platform leverages best-of-breed tape solutions for the entire server data protection market.

Good things come in small packages. As the server market migrates to smaller packages for improved density, the Quantum DLT VS80 provides mission-critical reliable tape storage with space to spare. The DLT VS80 features a half-high 5.25-inch form factor and offers 40 GB of native capacity and a 3 MB/s native transfer rate. It offers the definitive Value DLTtape™ combination of price, performance, and packaging.

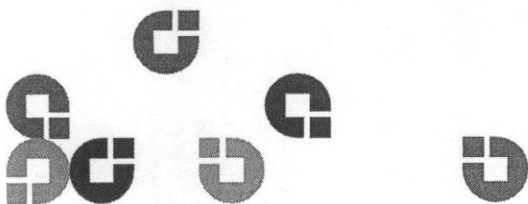
Scalability is the Solution

The DLT VS80 provides a safe and easy transition into high-reliability tape technology because it offers true scalability. DLTtape™ IV media is the defacto standard for reliability and data integrity, with over 80 million tape cartridges sold. As part of the industry-leading DLTtape family, the DLT VS80 provides a strong, scalable solution that can be used with confidence. The DLT VS80 is read and write compatible with the DLT1 and read compatible with the DLT 4000.

an internally configured or a self-standing enclosed unit. For a complete list of application software package and hardware platforms compatible with the Quantum DLT VS80, go to quantum.com. Move up to the system that's exceeding the standard of value in DLTtape backup.

Easy Integration

For maximum ease of installation, the DLT VS80 works with virtually all popular backup software packages, enabling straightforward integration with new and existing networks and systems. The drive is available in either



DLT VS80 SPECIFICATIONS

Performance

Sustained Transfer Rate (MB/sec)	
Native	3
2:1 Compressed	6 ¹
Burst Transfer Rate (MB/sec)	
Synchronous	16
Formatted Capacity (GB)	
Native	40
2:1 Compressed	80 ¹
Average File Access Time (sec)	
Interface	68
	Wide Ultra SCSI-2 (Low Voltage Differential)

Tape Format Specifications

Recording Format	168 tracks, as 84 logical track pairs
Recording Density	123 k bits/inch
Track Density	336 tracks per inch
Encoding Method	RLL 1,7
Data Compression	DLZ

Reliability

MTBF (hours)	> 200,000 hours at 100% duty cycle
Head Life (hours)	> 30,000 hours
Uncorrected Error Rate	1 x 10 ¹⁷ bits read
Undetected Error Rate	1 x 10 ¹⁷ bits read
Warranty (years)	3

Physical Specifications

Dimensions—inches (mm)	
Embedded Drive²	
Width	5.75 (146.05)
Length	8.50 (216.14)
Height	1.62 (41.70)
Weight	1.45 kg
Table Top	
Width	8.35 (212.13)
Length	10.73 (27.49)
Height	2.61 (66.24)
Weight	3.48 kg

Environmental Limits

Operating	
Temperature °F (°C)	50 to 104 (10 to 40)
Non-Condensing Humidity (%)	20 to 80
Altitude (ft. maximum)	30,000 (9,144 m)

Power

Voltage (V)	+5, +12
Power Consumption (W)	15 (average read/write operation)

Media/Format Compatibility

DLTape™ IV	40 GB native capacity
DLT VS CleaningTape	20 uses
Read Compatibility	DLT 4000

Tape Life

Archive Storage	More than 30 years with less than 5% loss in demagnetization (at 20°C and 40% non-condensing humidity)
Media Durability	Average 1,000,000 head passes in typical office/computing environment

Quantum DLTape Media Cartridges

DLTape half-inch cartridges are backed by a limited lifetime warranty and are approved for use in all DLTape™ drives.

¹ Actual transfer rate and capacity will vary depending on data.

² Excluding bezel.

Quantum.
DLT VS80



For more information, visit quantum.com

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Products

Autoloaders

DLTape Drives

Enhanced Backup Systems

Tape Libraries

Quantum Media

Today's networked business world demands the highest levels of performance, scalability, and reliability. Our extensive product line provides simple and scalable data protection for every environment. From our innovative technologies to our comprehensive customer support, we are dedicated to helping you protect your most critical data. Our industry standard Super DLTape platform and our groundbreaking Enhanced Backup Solutions are testaments to our 20-year legacy in storage and our strong commitment to the future.

Products and Services



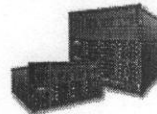
Autoloaders

Quantum provides a full range of autoloaders from entry level automation to a scalable, high-density solution.



DLTape Drives

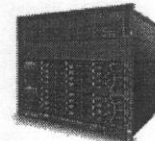
DLTape products deliver the industry's highest performing tape backup solution based on the technology more companies trust.



Enhanced Backup Systems

Our new EBS products provide you with the speed of disk-based storage coupled with the strength of a tape library.

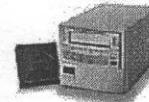
Introducing the DX100



Superior disk-based backup for the enterprise.

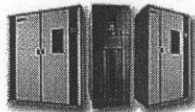
[\[Learn More \]](#)

Introducing the SDLT 600



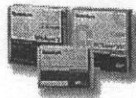
The most advanced, highest performing super drive in the world!

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Tape Libraries

Quantum tape libraries enable you to scale your tape backup storage and provide a smart way to optimize your total backup investment.



Quantum Media

Quantum media family offers you more choices to better manage your data over time.

Introducing the PX720



Your hunt for the industry's best enterprise class tape storage solution is over.

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