
HP 97560, 97558 and 97556 Series 5.25-inch SCSI-2 Disk Drives

Product Brief

- 1.60, 1.26 Gbytes and 804 Mbytes
- SCSI-2 interface
- 150,000 hours MTBF
- 5-Year warranty



World-class Performance, Reliability and Value

High capacity, outstanding reliability and world-class SCSI-2 performance are realities with the HP 97560, 97558 and 97556 Series of 5.25-inch disk drives. With capacities of 1.60 gigabytes, 1.26 gigabytes and 804 megabytes, respectively, the HP 97560, 97558 and 97556 are designed within the industry-standard form factor, are backward compatible with SCSI-1 hosts and use low power for ease of integration. State-of-the-art disk spacing provides high capacity, and the symmetrical shell design provides thermal stability. A synchronous channel transfer rate up to 10 megabytes per second is achieved with the SCSI-2 controller. These features result in products that are perfect solutions for a range of system requirements — from high-end PCs and workstations to multiuser minicomputers and mainframes.

150,000 Hours Mean-Time-Between Failure

The MTBF rating for the HP 97560, 97558 and 97556 Series maintains 150,000 hours. Reliability of this caliber is a result of knowledge acquired through generations of disk design, including VLSI and servo designs that significantly reduce electronic part count. A "design-for-reliability" approach to disk drive development and manufacturing means potential failures have been greatly reduced. Data integrity and performance are guaranteed over the widest temperature range in the industry. That's quality and reliability unsurpassed by other 5.25-inch disk drives.

Embedded SCSI-2 Interface

HP's implementation of the SCSI-2 interface has given these 5.25-inch disk drives outstanding performance benefits. Specifications include a 1.5 megabyte-per-second asynchronous transfer rate and up to 10 megabytes-per-second synchronous transfer rate with a controller overhead of less than 1 millisecond. While the HP 97560, 97558 and 97556 Option 001 drives offer a single-ended interface, the HP 97560, 97558 and 97556 Option 002 drives provide a differential interface within the 5.25-inch form factor. Spindle synchronization allows for easy integration into high performance arrays. The SCSI-2 command set with high performance features is supported on these products with a 128-kilobyte micro-cache.

Formatting Flexibility

A hybrid-servo design enables the HP 97560, 97558 and 97556 Series of disk drives to meet the same rugged environmental conditions as Hewlett-Packard embedded servo products while enhancing formatting flexibility. This design increases the total user data per track and boosts performance.

Five-year Warranty and Long-term Support

With these drives, Hewlett-Packard offers customers a low cost of ownership and long-lasting value backed by a five-year warranty. An experienced team of system integration engineers is available to provide assistance, and as always, HP will provide parts support for a minimum of five years after date of last manufacture.

Features

- 1.60, 1.26 gigabytes and 804 megabytes (unformatted)
- SCSI-2 interface
- 150,000 hours MTBF
- Five-year warranty
- < 1 ms controller overhead
- 23 megabits-per-second data transfer rate
- 7.5 ms latency
- 13.5 ms average seek
- Synchronous transfer rate up to 10 megabytes per second
- Operating temperature range of 0° to 50° C (32° to 122° F)

Technical Information

Performance

Channel transfer rate:
Asynchronous:
1.5 Mbytes/second
Synchronous:
up to 10 Mbytes/second

Seek time (includes settling):
Track-to-track: 3 ms
Average: 13.5 ms
Maximum: 25 ms

Average latency: 7.5 ms

Characteristics

Rotational speed: 4,002 rpm

Recording density:
Bits per inch: 42,000
Tracks per inch: 1,865

Reliability

MTBF: 150,000 hours
Service life: greater than 5 years
Recoverable error rate: less than 10 errors in 10¹³ bits transferred
Unrecoverable error rate: less than 10 errors in 10¹⁵ bits transferred
Seek error rate: less than 10 errors in 10⁷ seeks

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Power Requirements

	Single-ended Differential	
+5Vdc (A):		
Typical:	1.7	2.3
Maximum:	1.9	2.6
+12Vdc (A):		
Typical (seeking):	2.3	2.3
Typical (running):	1.6	1.6
Maximum (starting):	5.1	5.1
Power (W):		
Typical (seeking):	35	38
Typical (running):	28	31

Environmental Conditions

Shock:
 Operating: 6 G (11 ms maximum without loss of data)
 Nonoperating: 30 G (11 ms half-sine)

Vibration (5 to 500 Hz):
 Operating: 0.5 G
 Nonoperating: 0.5 G

Power spectral density details are available on request.

Specifications

	HP 97560	HP 97558	HP 97556
Capacity			
Unformatted	1.606 Gbytes	1.268 Gbytes	804 Mbytes
Formatted*	1.355 Gbytes	1.069 Gbytes	677 Mbytes
Per Track (bytes)			
Unformatted	43,100	43,100	43,100
Formatted	36,864	36,864	36,864
Per Sector (bytes)			
Unformatted*	595	595	595
Formatted*	512	512	512
Per Surface (Mbytes)			
Unformatted	84.5	84.5	73.1
Formatted	72.3	72.3	62.5
Disks	10	8	6
Data Heads	19	15	11
Sectors*	72	72	72
Cylinders**	1,935	1,935	1,670

Ambient temperature:
 Operating:
 0° to 50° C (32° to 122° F)
 Nonoperating:
 -40° to 70° C (-40° to 149° F)

Relative humidity:
 Operating: 8 to 80%
 Nonoperating: 8 to 80%

Maximum wetbulb: 28° C (82° F)

Altitude:
 Operating: -61 to 3,048 m (-200 to 10,000 ft)
 Nonoperating: -305 to 15,240 m (-1,000 to 50,000 ft)

Acoustic noise (while seeking):
 <5.5 bels sound power

Physical Specifications

Height: 83 mm (3.25 in.)
 Width: 146 mm (5.75 in.)
 Depth: 204 mm (8.0 in.)
 Weight: 3.4 kg (7.5 lbs) unit
 4.5 kg (10 lbs) shipping

*Other configurations available.
 **Tracks reserved for spares have been removed.

SCSI Interface

Controller overhead:
 < 1 ms typical

Buffer size: 128 kilobytes

Sector interleave: 1:1
 Physical sector size (formatted):
 Variable from 180 to 744 bytes

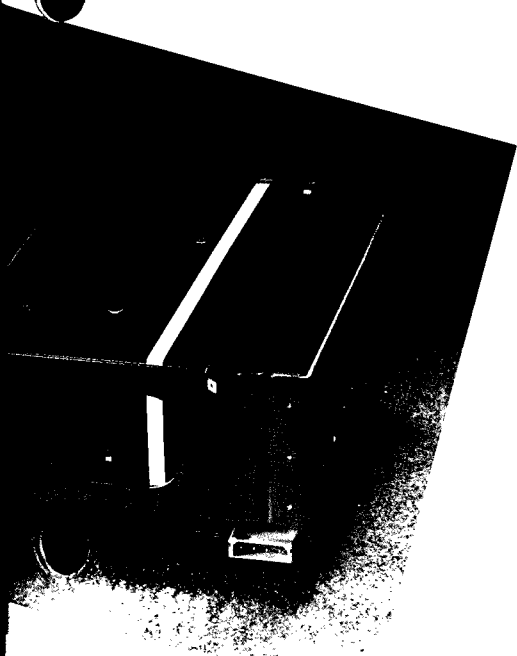
Variable logical block size:
 512, 1024, 2048 and 4096 bytes (blocking factor 1,2,4,8)
 User variations available upon request.

Advanced Controller Features

SCSI-2 command interface:
 Reed-Solomon Error Correction Code (ECC)
 128 kilobyte micro-cache
 Full parity
 Read prefetch
 Glitch-free power on and power down operation

SCSI-2 Commands Supported

Mode pages (1,2,3,3F,4,8,9)
 Read data buffer
 Read long
 Write data buffer
 Write long



SCSI-1 Messages Supported

Abort
Bus device reset
Command complete
Disconnect
Identify
Initiator detected error
Message parity error
Message reject
No operation
Save data pointers
Synchronous data transfer request

SCSI-1 Commands Supported

Format unit
Inquiry
Mode pages (1,2)
Mode select (6)
Mode sense (6)
Mode select (10)
Mode sense (10)
Read (6) and (10)
Read capacity
Reassign block
Receive diagnostic results
Release
Request sense
Reserve
Rezero unit
Seek (6) and (10)
Send diagnostics
Start/stop unit
Test unit ready
Verify
Write and verify
Write (6) and (10)

Note: Customer unique requirements accommodated.

Ordering Information

Product Numbers

97560 - 1.60-Gbyte disk drive
97558 - 1.26-Gbyte disk drive
97556 - 804-Mbyte disk drive
(capacities are unformatted)

Option Numbers

Option 001 - specifies single-ended SCSI-2 controller
Option 002 - specifies differential SCSI-2 controller

Hewlett-Packard Company has been an international manufacturer of high reliability, high performance disk drives for over 20 years. Other 5.25-inch disk products include:

- HP C3007, C3009 and C3010 Series
 - 1.6, 2.21 and 2.47 gigabytes (unformatted)
 - SCSI-2 interface
 - Single-ended, differential, wide differential or dual-port differential
- HP 97556, 97558 and 97560 ESDI Series
 - 804 megabytes, 1.26 and 1.6 gigabytes (unformatted)
 - ESDI interface
- HP 97549T/P Series
 - 1.18 gigabytes (unformatted)
 - SCSI-2 interface
 - Single-ended or differential
- HP 97544 and 97548 Series
 - 397 and 795 megabytes (unformatted)
 - ESDI, SCSI-1 and SCSI-2 interface
 - Single-ended or differential

3.5-inch disk products available include:

- HP C2247 Series
 - 1.05 gigabytes (formatted)
 - SCSI-2 interface
 - Single-ended, differential or wide differential
- HP C2233, C2234 and C2235 Series
 - 234, 328 and 422 megabytes (formatted)
 - SCSI-2 and ATA interfaces
 - Single-ended or differential SCSI-2

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