

25.5 or 38.4 3 1/2" XT Interface Half-Height Disk Drives

8425XT 8438XT

- Proven rack and pinion, linear stepper motor actuator system
- 68 msec. avg. access time
- Controller to drive transfer rate 5.0 Mbits/sec. for 8425XT, 7.5 Mbits/sec. for 8438XT
- PC/XT system interface
- 12 watts average power requirement with optional 7 watt low power mode
- Single printed circuit board utilizing surface mount technology
- Thin film media
- Head shipping zone
- MTBF 20,000 POH

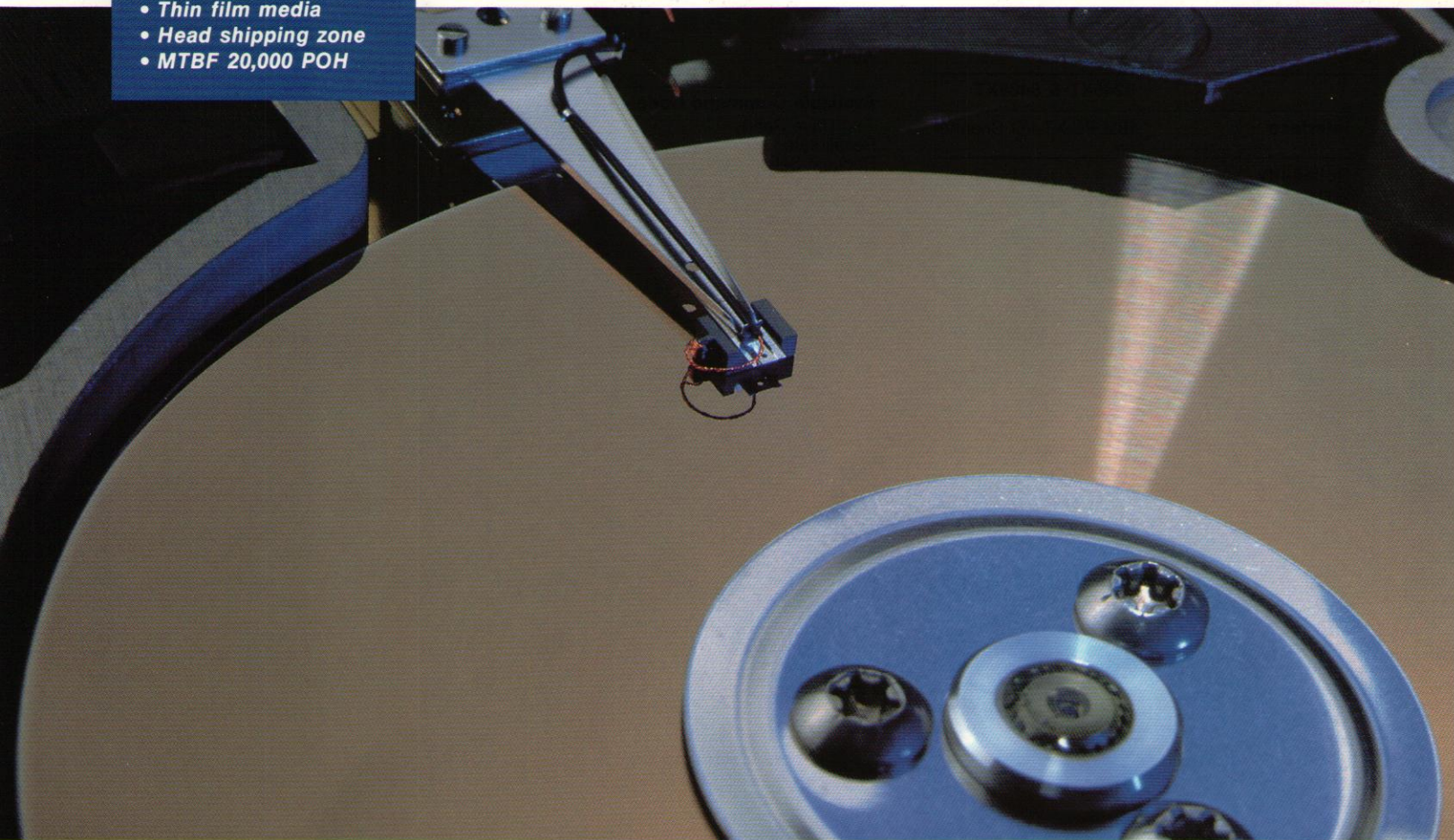
The 8425XT and 8438XT disk drives represent MiniScribe's continuing effort to provide a full range of data storage solutions by including the latest in intelligent interface technology. Now MiniScribe makes available 3 1/2-inch disk drives with an on-board XT I/O Interface, in addition to drives featuring the on-board Small Computer System Interface (SCSI). The 8425XT and 8438XT feature 25.5 and 38.4 MBytes of unformatted storage capacity, respectively, with average access times of 68 msec.

These XT drives incorporate an on-board controller that is compatible with the PC/XT bus, eliminating typical tolerance problems between a separate controller and the disk drive. All control circuitry is designed into the printed circuit board, and data correction and seek retry are entirely transparent to the Host system. The XT interface technology delivers the complete functionality of a subsystem using the highest level of hardware integration (VLSI) and the RLL recording technique.

High performance and high unit reliability are achieved by the utilization of a proven microprocessor spin control and rack-and-pinion stepper mechanism. This provides high density positioning accuracy required throughout temperature extremes in addition to rugged resistance to shock and vibration.

The 8425XT and 8438XT disk drives are designed for automated robotic assembly for high quality and consistent yields. The drives thus contain fewer parts resulting in greater reliability. Like all MiniScribe products, the 8425XT and 8438XT drives undergo a rigorous testing and burn-in process before shipment.

In addition to the 8425XT and 8438XT, MiniScribe produces a complete line of 3 1/2-inch and 5 1/4-inch Winchester disk drives which begins at 12.75 MBytes, extends to high capacity/high performance models, and includes a variety of standard, intelligent and custom interfaces.



3 1/2" 8425XT / 8438XT Winchester Disk Drive Specifications

8425XT 8438XT

	8425XT	8438XT
Capacity Unformatted		
Per Drive (MBytes)	25.5	38.4
Per Track (Bytes)	10,416	15,624
Capacity Formatted		
Per Drive (MBytes)	21.4	31.4
Per Track (Bytes)	8,704	12,800
Per Sector (Bytes)	512	512
Sectors Per Track	17	25
Functional		
Disks (Thin Film Media)	2	2
Recording Heads	4	4
Total Cylinders	615	615
Data Tracks	2,460	2,460
Track Density (tpi)	804	804
Recording Density (bpi)	13,412	20,118
Data Encoding Method	2.7 RLL	2.7 RLL
Rotational Speed (RPM)	3,600	3,600
Access Time (including settling)		
Average (msec.)	68	68
Track-to-track (msec.)	15	15
Maximum (msec.)	150	150
Latency (average, msec.)	8.33	8.33
8425XT & 8438XT		
Interface	IBM PC-XT I/O Channel	
Reliability		
MTBF	20,000 hours	
PM	None	
MTTR	30 minutes	
Component Design Life	5 years	

8425XT & 8438XT	
Error Rates	
Soft Read Errors	1 per 10 ¹⁰ bits/read
Hard Read Errors	1 per 10 ¹² bits/read
Seek Errors	1 per 10 ⁶ seeks
DC Power Requirements	
+ 5 VDC ±5%	0.55 amps typical
+12 VDC ±5%	0.75 amps typical
Max. Starting (5 sec.)	2.0 amps
Power Dissipation	
	12 watts typical
Low Power Option (Idle State)	7 watts typical
Environmental Limits	
Ambient Temperature	40°F to 122°F (4°C to 50°C)
Thermal Gradient	18°F/hour (10°C/hour) max.
Relative Humidity	8% to 80%
Maximum Wet Bulb	78°F (26°C)
Physical	
Height	1.625 (41.4 mm)
Width	4.00 (101.6 mm)
Depth	6.075 (154.3 mm)
Weight	1.75 (.80 kg)
Available Command Codes:	
Test Drive Ready	
Recalibrate	
Request Sense Status	
Format Drive	
Read Verify	
Format Track	
Format Bad Track	
Read	
Write	
Seek	
Initialize Drive Parameters	
Read ECC Burst Error Length	
Read Sector Buffer	
Write Sector Buffer	
Buffer RAM Diagnostics	
Drive Diagnostics	
Controller Diagnostics	
Read Long	
Write Long	

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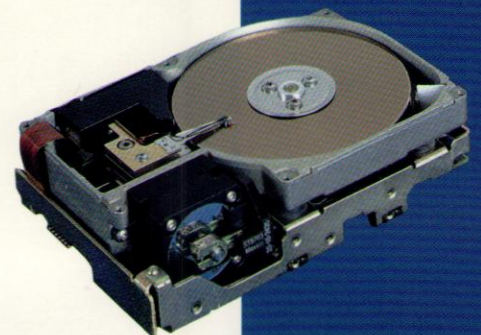
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230 or 380 MByte 5¼" Full-Height High Performance Disk Drives

9000 SERIES

- Vertically split, clamshell HDA
- Superior thermal, shock, and vibration performance
- ESDI, SCSI, and Custom interfaces
- 16 msec. average access time
- Balanced rotary voice coil actuator
- Designed for automated robotic assembly
- Single surface mount PCBA electronics
- MTBF 30,000 POH

MiniScribe enters the high capacity, high performance market with the first two members of its 9000 Series—the 9230 and 9380—full-height rigid Winchester disk drives with capacities of 230 and 380 MByte. These uniquely designed 5¼-inch full-height drives represent the latest in MiniScribe's integration of state-of-the-art disk technology and automated manufacturing.

The distinguishing feature of MiniScribe's 9000 Series is the vertically split, clamshell HDA. This design allows for a stationary shaft actuator supporting up to 15 mini-composite data heads, an in-hub spindle motor supporting up to 8 sputtered disks, and a dedicated center servo. This design greatly enhances thermal, shock, and vibration performance.

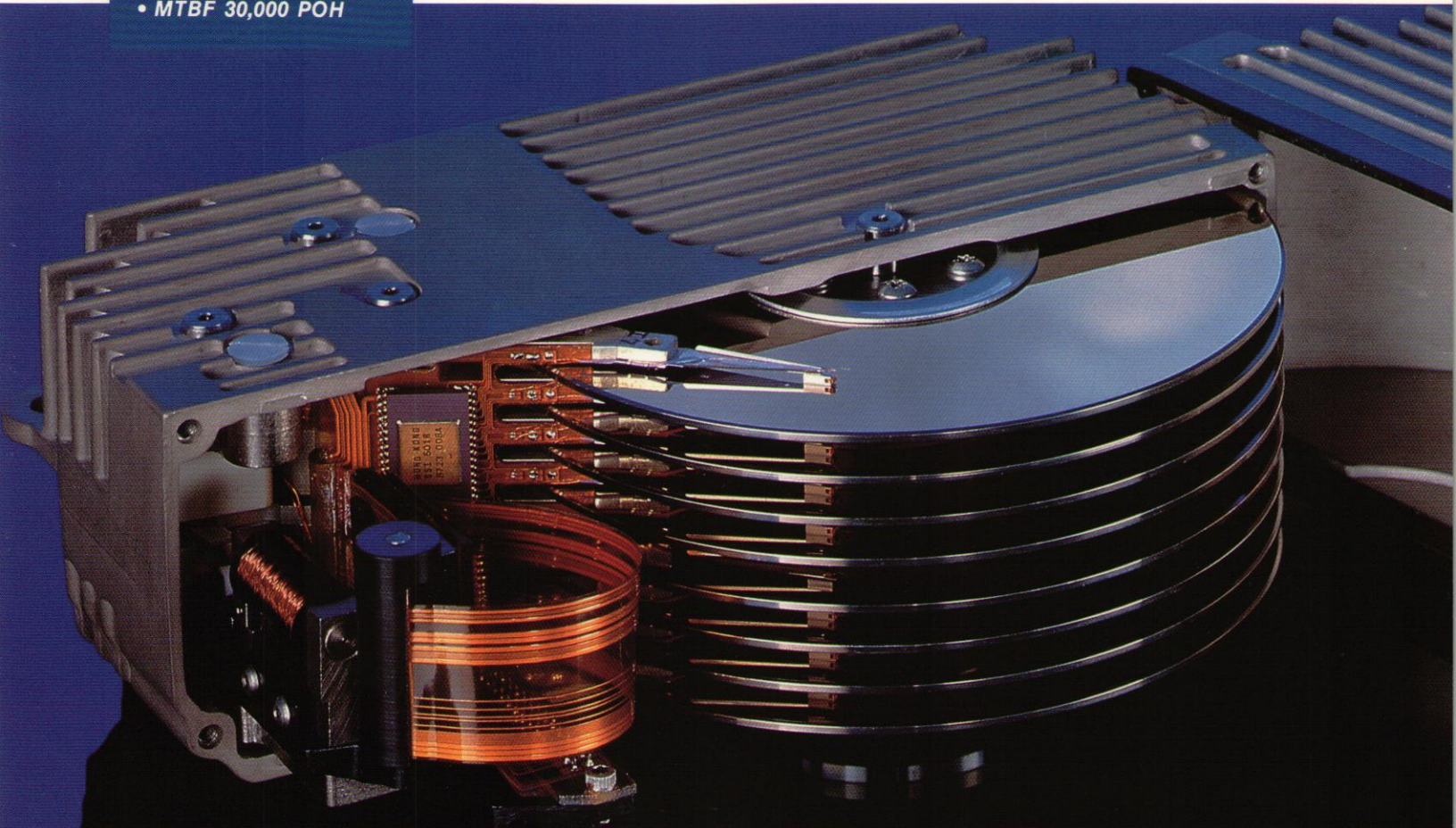
One of the fastest access times in the industry—16 msec—is achieved through a rotary voice coil actuator. The low inertia of the actuator allows for fast access speeds while having low power requirements.

Each drive incorporates a common HDA and utilizes a single surface mounted PCBA. The M9000 is available with an embedded SCSI controller which supports all the required and optional Common Command Sets. The M9000 is also available with an ESDI interface which supports the industry-standard ESDI Command Set.

The 9230 and 9380 are designed for automated robotic assembly for high quality and consistent yields. The drives thus contain fewer parts resulting in greater reliability. Automated assembly also allows for easy expansion of production simply through duplication of assembly lines.

The 9000 Series represents MiniScribe's dedication to providing a full range of high quality data storage solutions on the leading edge of technology.

In addition to the 9000 Series, MiniScribe produces a complete line of 3½-inch and 5¼-inch Winchester disk drives which begins at 12.75 MBytes, extends to high capacity/high performance models, and includes a variety of standard, intelligent and custom interfaces.



5 1/4" Full Height Winchester Disk Drive Specifications

9000 SERIES

9230 9380

Capacity Unformatted

Per Drive (MBytes)	230	382
Per Track (Bytes)	20,832	20,832

Typical Capacity Formatted (ESDI)

Per Drive (MBytes)	203	338
Sector Size (Bytes)	512	512
Sectors/Track	36	36
Number of Cylinders	1,224	1,224

Typical Capacity Formatted (SCSI)

Per Drive (MBytes)	207	347
Sector Size (Bytes)	1,024	1,024
Sectors/Track	19	19
Number of Cylinders	1,224	1,224

Functional

Disks	5	8
Recording Heads	9	15
Total Cylinders	1,224	1,224
Data Tracks	18,316	18,316
Track Density (tpi)	1,100	1,100
Recording Density (bpi)	20,388	20,388
Data Encoding Method	2,7 RLL	2,7 RLL
Rotational Speed (RPM)	3,600	3,600

Access Time (including settling)

Average (msec.)*	16	16
Track-to-track (msec.)	3	3
Maximum (msec.)	35	35
Latency (average, msec.)	8.33	8.33

9230 & 9380

Interface ESDI/SCSI/CUSTOM

Reliability

MTBF	30,000 hours
PM	None
MTTR	30 minutes
Component Design Life	5 years

9230 & 9380

Error Rates

Soft Read Errors	1 per 10 ¹⁰ bits/read
Hard Read Errors	1 per 10 ¹² bits/read
Seek Errors	1 per 10 ⁶ seeks

DC Power Requirements

+ 5 VDC ±5%	.6 amps typical
+12 VDC ±5%	1.2 amps typical
	2.7 amps peak
Max. Starting (15 sec.)	4.0 amps

Power Dissipation

Idle	18 watts typical
Seeking	22 watts typical

Environmental Limits

Ambient Temperature	50°F to 122°F (10°C to 50°C)
Thermal Gradient	18°F/hour (10°C/hour) max.
Relative Humidity	8% to 80%
Maximum Wet Bulb	78°F (26°C)

Physical

Height	3.25 in. (82.6 mm)
Width	5.75 in. (146 mm)
Depth	8.0 in. (203 mm)
Weight	6.0 lbs. (2.7 kg)

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* Average of all possible seeks.

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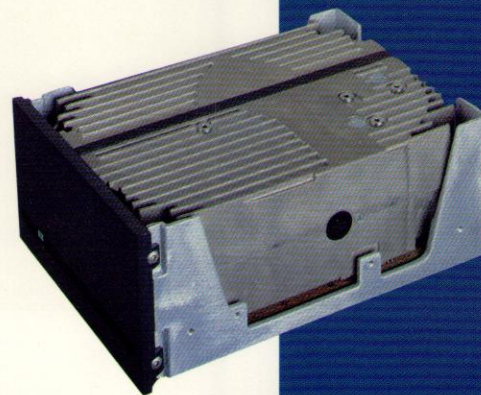
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25.5 MByte 3½" SCSI Half-Height Disk Drive

8425S

- **Proven rack and pinion, linear stepper motor actuator system**
- **68 msec. avg. access time**
- **Device transfer rate 5.0 Mbits/sec. using RLL 2/7 coding scheme**
- **Host transfer rate up to 1.0 Mbytes/sec.**
- **SCSI or Custom interface**
- **12.5 watts avg. power requirement**
- **Single Printed Circuit board utilizing surface mount technology**
- **Dual Ported Buffer allowing one to one interleave**
- **Head shipping zone**
- **MTBF 20,000 POH**

The new 8425S represents MiniScribe's first disk drive with an on-board Small Computer System Interface controller (SCSI). This thin film drive features 25.5 MBytes of unformatted storage capacity and an average access time of 68 msec. The incorporation of the SCSI interface technology delivers the complete functionality of a subsystem using the highest level of hardware integration (VSLI) and the latest technology in recording techniques (RLL 2/7). This eliminates the additional hardware that can cause system redesign and added costs.

The most innovative feature provided by the 8425S disk drives is the single printed circuit board utilizing surface mount technology. This design's use of fewer components will increase reliability and decrease power consumption. Incorporated into the logic of the printed circuit board is the industry standard SCSI interface. The 8425S supports the common command set as well as other options. Defect handling and error management is transparent to

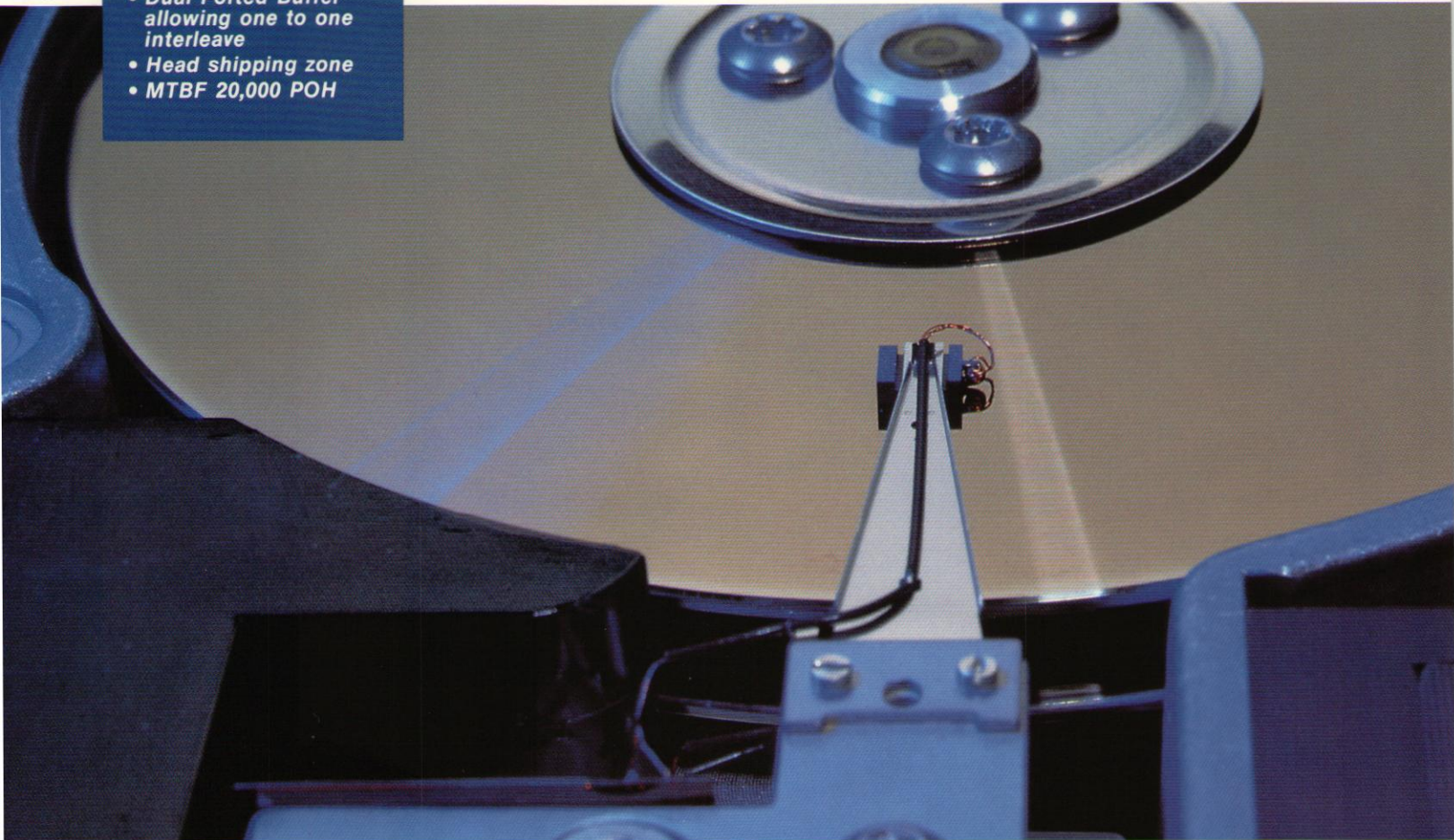
the user allowing for higher unit reliability and production yields.

The 8425S disk drive utilizes MiniScribe's field-proven rack and pinion linear actuator system. This provides high density positioning accuracy required throughout temperature extremes in addition to rugged resistance to shock and vibration.

The 8425S, has a mounting configuration identical to the industry standard 3½-inch microfloppy drives. In addition, the 8425S is available with a 5¼-inch bracket which enables the 3½-inch drive to be inserted into a 5¼-inch slot. For shipping and handling, the R/W heads can be positioned over a non-data area of the disk until power is applied.

Like all MiniScribe products, the 8425S undergoes a rigorous testing and burn-in process before shipment.

The MiniScribe line of 3½-inch and 5¼-inch Winchester disk drives begins at 12.75 MBytes and extends to high capacity/high performance models.



3 1/2" SCSI Winchester Disk Drive Specifications

8425S

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Capacity Unformatted	
Per Drive (MBytes)	25.5
Per Track (Bytes)	10,416

Capacity Formatted (including alternatives)	
Per Drive (MBytes)	21.3
Per Track (Bytes)	8,704
Per Sector (Bytes)	512
Sectors Per Track	17

Functional	
Disks	2
R/W Heads	4
Cylinders	612
Total Data Tracks	2,448
Track Density (tpi)	804
Recording Density (bpi)	13,412
Areal Density (Mbits/sq.in.)	10.78
Rotational Speed (RPM)	3,600

Data Transfer Rate	
Device (Mbits per second)	5.0
Host (MBytes per second)	0 to 1.0

Access Time (including settling)	
Average (msec.)	68
Track-to-track (msec.)	15
Maximum (msec.)	150
Latency (average, msec.)	8.33

Interface	
	SCSI/Custom

Reliability	
MTBF	20,000 hours
PM	None
MTTR	30 minutes
Component Design Life	5 years

Error Rates	
Soft Read Errors	1 per 10 ¹⁰ bits
Hard Read Errors	1 per 10 ¹² bits
Seek Errors	1 per 10 ⁶ seeks

DC Power Requirements	
+ 5 VDC ±5%	0.7 amps typical
+12 VDC ±5%	0.7 amps typical
Max. Starting (5 sec.)	2.0 amps

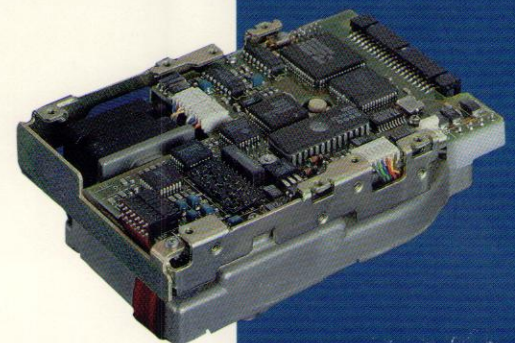
Power Dissipation	
	12.5 watts avg.

Environmental Limits	
Ambient Temperature	40°F to 122°F (4°C to 50°C)
Relative Humidity	8% to 80%
Maximum Wet Bulb	78°F (26°C)

Physical	
Height	1.625 in. (41.3 mm)
Width	4.00 in. (101.6 mm)
Depth	5.75 in. (146 mm)
Weight	1.81 lbs. (.82 kg)

Available SCSI Command Sets:	
Ready	Rezero
Format	Write
Read	Seek
Verify	Reserve
Release	Inquiry
Start/Stop	Mode Select
Mode Sense	Reassign Blocks
Request Sense	Write Extended
Seek Extended	Receive Diagnostic Results
Read Buffer	Send Diagnostic Results
Write Buffer	Ready Capacity
Read Extended	Write & Verify
Read Defect Data	

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ScribeCard™ 25.6 or 38.4 MByte Drive-on-a-Card

80SC

- 1½ slots (1 slot in some systems)
- Based on MiniScribe's 8000 family of 3½-inch disk drives
 - Over 400,000 unit field population
 - 68 msec. average access time (including head settling)
 - Low power consumption
 - Highly resistant to shock, vibration and temperature extremes
- 25.6 and 38.4 megabyte (unformatted) versions
- Custom mechanical configurations for OEM's
- Product family growth to faster access times and higher capacities in the same form factor.

The MiniScribe 80SC ScribeCard™ family is an innovative approach to adding hard disk storage to IBM PC XT™ or compatible systems. For OEMs developing IBM PC AT™ compatible systems, an AT version ScribeCard™ is also available (true AT performance). All versions fit in a maximum of 1½ slots (1 slot in some systems), and feature ease of installation.

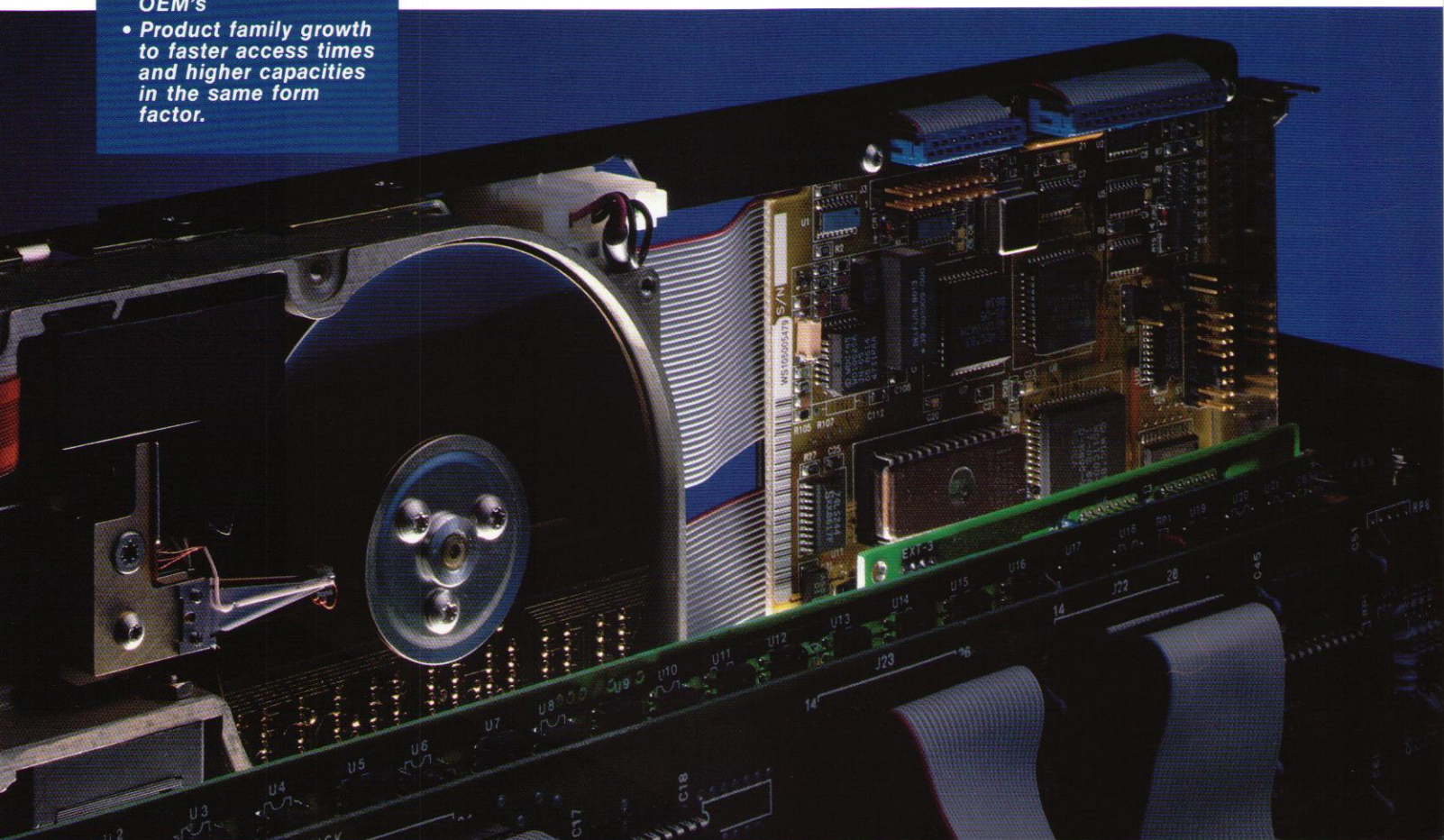
Based on MiniScribe's 8000 family of 3½-inch Winchester disk drives, the ScribeCard offers low power consumption, a quick 68 msec. average access time and a field-proven rack and pinion linear actuator system.

The rack and pinion provides resistance to shock and vibration, as well as high density positioning accuracy throughout temperature extremes.

In some new, low-profile systems, space utilization becomes critical. Fitting the ScribeCard inside the card cage will free up the peripheral stack for tape or diskette backup systems.

With a strong current product offering, and with planned enhancements in access times and higher capacities, the ScribeCard line is the solution to your current and future storage requirements.

In addition to the ScribeCard, MiniScribe produces a complete line of 3½-inch and 5¼-inch Winchester disk drives which begins at 12.75 MBytes and extends to high capacity/high performance models.



 MiniScribe

ScribeCard™ Model 80SC DOAC Specifications

	MFM	RLL
Capacity Unformatted		
Per Drive (MBytes)	25.6	38.4
Per Track (Bytes)	10,416	15,624
Capacity Formatted		
Per Drive (MBytes)	21.4	32.7
Per Track (Bytes)	8,704	13,312
Per Sector (Bytes)	512	512
Sectors Per Track	17	26
Functional		
Disks	2	2
R/W Heads	4	4
Cylinders	615	615
Total Data Tracks	2,460	2,460
Track Density (tpi)	804	804
Recording Density (bpi)	13,412	19,900
Areal Density (Mbits/sq.in.)	10.78	16.0
Rotational Speed (RPM)	3,600	3,600
Data Transfer Rate		
(Mbits per second)	5.0	7.5
Access Time (including settling)		
Average (msec.)	68	68
Track-to-track (msec.)	15	15
Maximum (msec.)	150	150
Latency (average, msec.)	8.33	8.33
Interface		
	XT	XT/AT
Reliability		
Drive MTBF	20,000 hrs.	20,000 hrs.
Controller MTBF	20,000 hrs.	20,000 hrs.
80SC (as a unit)	10,000 hrs.	10,000 hrs.
PM	None	None
MTTR	30 min.	30 min.
Component Design Life	5 years	5 years

MFM & RLL	
Error Rates	
Soft Read Errors	1 per 10 ¹⁰ bits transferred
Hard Read Errors	1 per 10 ¹² bits transferred
Seek Errors	1 per 10 ⁶ seeks
DC Power Requirements	
+ 5 VDC ±5%	1.3 amps typ.
+12 VDC ±5%	.7 amps typ.
Max. Starting (10 sec.)	2.0 amps
Power Dissipation	
(Idle State)	14 watts typ. 11.5 watts typ.
Shock	
Operating	10G's, 10 msec. pulse duration, ½ sine wave (10 hits)
Non-Operating	50G's, 10 msec. pulse duration, ½ sine wave (10 hits)
Environmental Limits	
Ambient Temperature	40°F to 122°F (4°C to 50°C)
Relative Humidity	8% to 80%
Maximum Wet Bulb	78°F (26°C)

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80SC

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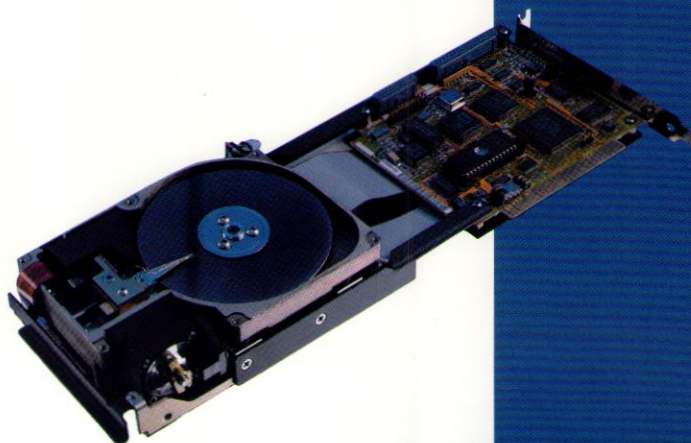
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Now up to 38.4MB RLL

12.8–38.4 MByte 3½" Winchester Disk Drives

MiniScribe's rugged 8000 family of 3½ inch Winchester disk drives has been in high volume production since early 1985, supporting the growing market demand for lap-portable personal computers, transportables and increased disk storage in a smaller physical size. The 8000 family consists of 12.8, 25.6 and 38.4 MByte models, each with an average access time of 68 milliseconds. The drives feature an unusually low average power consumption of 9.9 watts.

The 8000's utilize MiniScribe's field-proven rack and pinion linear actuator system. Having manufactured and installed over 1 million rack and pinion based drives, MiniScribe has refined this system to perfection. The rack and pinion provides high density positioning accuracy throughout temperature extremes in addition to rugged resistance to shock and vibrations. The 8000 family also utilizes a single printed circuit board employing four custom

integrated circuits that increase reliability and reduce component count and power consumption. In addition, the printed circuit board contains customer selectable options such as two low power modes.

The 8000 family mounting requirements are identical to 3½ inch micro-floppy drives and the drives incorporate the industry standard ST506/ST412 interface. Like all MiniScribe products, the 8000 family continues the tradition of a rigorous testing and burn-in process. For shipping and handling, the R/W heads can be positioned over a non-data area of the disk until power is applied.

The MiniScribe line of 3½ inch and 5¼ inch Winchester disk drives begins at 12.75 MBytes and extends to high capacity/high performance models. MiniScribe's tradition of excellence continues to lead the industry in Winchester disk drive technology.

8000 Family Key Features

- Storage Capacities of 12.8, 25.6 and 38.4 MBytes Unformatted
- 615 Cylinders
- 68 msec. Average Access Time (including settling)
- 1.625" H X 4.00" W X 5.75" L
- Rack and Pinion Linear Actuator
- 9.9 Watts Average Power Requirement
- Whitney Technology Flexures and Sliders
- Single Printed Circuit Board For Improved Reliability
- ST506/ST412 Compatible Interface
- Optional 5¼ inch Bracket Available

3 1/2" Winchester Disk Drive Specifications

Model	8438	8425	8212
Capacity Unformatted			
Per Drive (MBytes)	38.4	25.6	12.8
Per Track (Bytes)	15,624	10,416	10,416
Capacity Formatted			
Per Drive (MBytes)	32.7	21.4	10.7
Per Track (Bytes)	13,312	8,704	8,704
Per Sector (Bytes)	512	512	512
Sectors Per Track	26	17	17
Functional			
Disks	2	2	1
R/W Heads	4	4	2
Cylinders	615	615	615
Total Data Tracks	2,460	2,460	1,230
Track Density (tpi)	804	804	804
Recording Density (bpi)	19,900	13,412	13,412
Areal Density (Mbits/sq. in.)	16.0	10.78	10.78
Rotational Speed (RPM)	3,600	3,600	3,600
Data Transfer Rate			
Mbits per Second	7.5	5.0	5.0
Recording Method	2,7 RLL	MFM	MFM
Access Time (including Settling)			
Average (msec.)	68		
Track-to-Track (msec.)	15		
Maximum (msec.)	150		
Latency (average, msec.)	8.33		
Interface	ST506/ST412		
Reliability			
MTBF	20,000 Hours		
PM	None		
MTTR	30 Minutes		
Component Design Life	5 Years		

Error Rates

Soft Read Errors	1 per 10 ¹⁰ bits transferred
Hard Read Errors	1 per 10 ¹² bits transferred
Seek Errors	1 per 10 ⁶ seeks

DC Power Requirements

+5 V DC ±5%	0.45 amps typical
+12 V DC ±5%	0.65 amps typical
Max. Starting (10 sec.)	2.0 amps

Power Dissipation

9.9 watts typical

Shock

Operational	10 G's, 10 msec. pulse duration, 1/2 sine wave (10 hits)
Non-Operational	50 G's, 10 msec. pulse duration, 1/2 sine wave (10 hits)

Environmental Limits

Ambient Temperatures	40°F to 122°F (4°C to 50°C)
Relative Humidity	8% to 80%
Maximum Wet Bulb	78°F (26°C)

Physical

Height	1.625 in. (41.3 mm)
Width	4.00 in. (101.6 mm)
Depth	5.75 in. (146 mm)
Weight	1.8 lbs. (0.82 kg)

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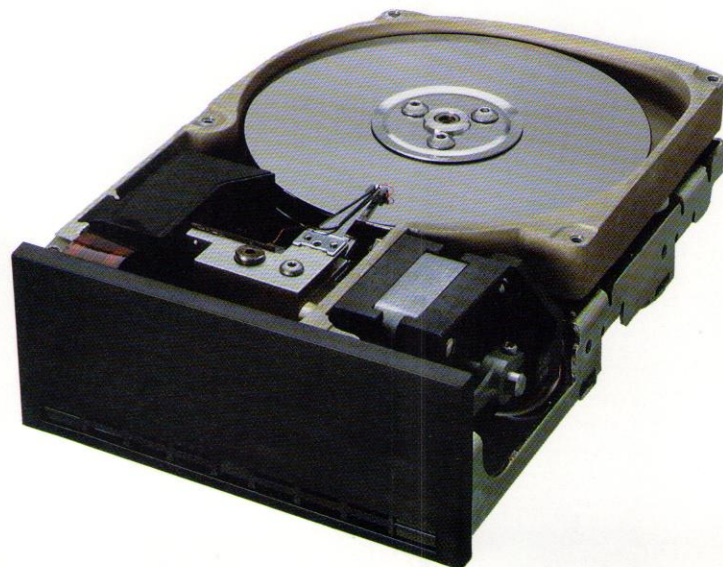
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Now up to 38.4MB RLL

25.6–38.4 MByte 5¼" Half-Height Disk Drives

When higher capacity and shock and vibration performance in a half-height was required, MiniScribe met the challenge with its 3425. As a major supplier of half-height Winchester disk drives, the company developed the 3425 into an innovative two disk, four head 25.6 MByte configuration with an average access time of 85 milliseconds.

The 3438 now joins the MiniScribe family of products. This is a 38.4 MByte product designed for 2,7 RLL compatible applications. This new product further demonstrates MiniScribe's technical leadership by delivering one of the most favorable cost-per-megabyte solutions among half-heights.

Like other MiniScribe products, the 3425/3438 incorporate the company's high standards of quality and innovation. The drive's rack and pinion actuator provides positioning accuracy throughout temperature extremes. The company's patented breather filter system with a recirculating air filter keeps the 3425/3438's pressurized HDA Chamber at a cleanliness level exceeding a Class 100 environment. The 3425/3438's IC preamplifier is positioned inside the sealed HDA, close to the recording heads for high-clarity signal processing.

The 3425/3438's mounting requirements are identical to half-height 5¼ inch floppy drives. With heat dissipation of only 14-14.5 watts, the

3425/3438 require minimal power for their rugged designs. In addition, the drives incorporate the industry standard ST506/ST412 interface. For shipping and handling, the 3425/3438's heads can be fixed over a non-data area of the disk until power is applied.

Like all MiniScribe products, the 3425/3438 undergo a rigorous testing and burn-in process. The MiniScribe line of 3½ inch and 5¼ inch Winchester disk drives begins at 12.75 MBytes and extends to high capacity/high performance models. MiniScribe's tradition of excellence continues to lead the industry in Winchester disk drive technology.

5 1/4" Winchester Disk Drive Specifications

Model	3425	3438	Error Rates	3425	3438
Capacity Unformatted			Soft Read Errors	1 per 10 ¹⁰ bits transferred	1 per 10 ¹⁰ bits transferred
Per Drive (MBytes)	25.6	38.4	Hard Read Errors	1 per 10 ¹² bits transferred	1 per 10 ¹² bits transferred
Per Track (Bytes)	10,416	15,624	Seek Errors	1 per 10 ⁶ seeks	1 per 10 ⁶ seeks
Capacity Formatted			DC Power Requirements		
Per Drive (MBytes)	21.4	32.7	+ 5 V DC ±5%	0.5 amps typical	0.5 amps typical
Per Track (Bytes)	8,704	13,312	+12 V DC ±5%	1.0 amps typical	1.0 amps typical
Per Sector (Bytes)	512	512	Max. Starting (10 sec.)	3.5 amps	3.5 amps
Sectors Per Track	17	26	Power Dissipation	14.5 watts	14.5 watts
Functional			Environmental Limits		
Rotational Speed (RPM)	3,600	3,600	Ambient Temperatures	40°F to 122°F (4°C to 50°C)	
Recording Density	10,030	15,048	Relative Humidity	8% to 80%	
Areal Density (Mbits/sq. in.)	5.9	8.85	Maximum Wet Bulb	78°F (26°C)	
Track Density (tpi)	588	588	Physical		
Total Data Tracks	2,460	2,460	Height	1.625 in. (41.3 mm)	
Cylinders	615	615	Width	5.75 in. (146 mm)	
R/W Heads	4	4	Depth	8.00 in. (203 mm)	
Disks	2	2	Weight	2.2 lbs. (1.4 kg)	
Data Transfer Rate			Available in plated or oxide media		
(Mbits per Second)	5.0	7.5			
Recording Method	MFM	2,7 RLL			
Access Time (including Settling)					
Average (msec.)	85	85			
Track-to-Track (msec.)	15	15			
Maximum (msec.)	190	190			
Latency (average, msec.)	8.33	8.33			
Interface	ST506/ST412	ST506/ST412			
Reliability					
MTBF	20,000 Hours				
PM	None				
MTTR	30 Minutes				
Component Design Life	5 Years				

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5 1/4" Half-Height Kits 25.6 or 38.4 MBytes

3425K 3438K

- **Kit Contents: 25.6/38.4 MByte disk drive, compatible controller board, cable set, hardware, installation guide**
- **Based on MiniScribe's 3000 family of 5 1/4 inch half-height disk drives**
 - Low power consumption (14-14.5 watts)
 - Field-proven rack and pinion actuator provides positioning accuracy throughout temperature extremes
 - Industry standard ST412/506 interface
- Custom kit configurations available
- Controller board options
- Easy installation
- Product family growth to faster access times and higher capacities

The MiniScribe 3425K/3438K Kit family provides alternatives to adding hard disk storage to single-user and desk-top systems. Featuring controller board options and custom kit configurations, the 3000 Kit family is a complete hard drive upgrade package which includes a 25.6 MByte or 38.4 MByte (unformatted capacity) disk drive, compatible hard disk controller, cable set, hardware and an easy to follow installation guide.

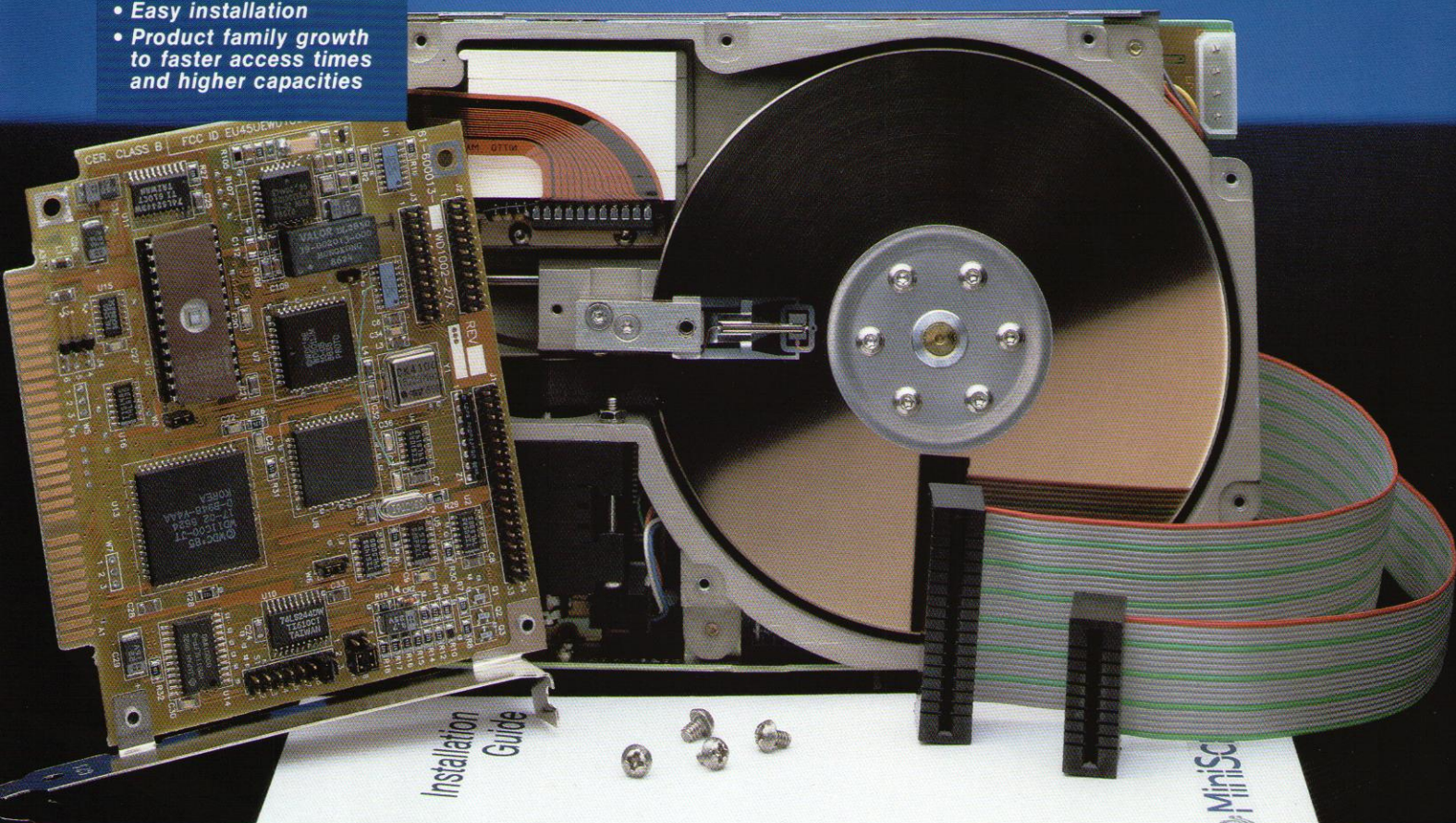
Based on the MiniScribe 3000 family of 5 1/4" half-height Winchester disk drives, the 3425K/3438K offer an average access time of 85 milliseconds, low power consumption of 14-14.5 watts, and the industry standard ST412/506 interface.

Like other MiniScribe products, the 3425K/3438K incorporate the company's high standards of quality and innovation. Both the 25.6 MByte MFM, model 3425K, and the 38.4 MByte 2,7 RLL, model 3438K, utilize a rack and pinion linear actuator system which provides positioning

accuracy throughout temperature extremes as well as rugged resistance to shock and vibration.

With planned enhancements in access times and higher storage capacities, the 3425K/3438K Kit family is the solution to current and future storage requirements.

In addition to the 3000 Kit family, MiniScribe produces a complete line of 3 1/2" and 5 1/4" Winchester disk drives which begins at 12.75 MBytes, extends to high capacity/high performance models, and includes a variety of standard, intelligent and custom interfaces.



 **MiniScribe**

3425K/3438K Kit Specifications

Model	MFM 3425K	RLL 3438K
Capacity Unformatted		
Per Drive (MBytes)	25.6	38.4
Per Track (Bytes)	10,416	15,624
Capacity Formatted		
Per Drive (MBytes)	21.4	31.4
Per Track (Bytes)	8,704	13,312
Per Sector (Bytes)	512	512
Sectors per Track	17	26
Functional		
Disks	2	3
R/W Heads	4	4
Cylinders	615	615
Total Data Tracks	2,460	2,460
Track Density (tpi)	588	588
Recording Density (bpi)	10,030	15,048
Areal Density (Mbits/sq. in.)	5.9	8.85
Rotational Speed (RPM)	3,600	3,600
Data Transfer Rate		
(Mbits per Second)	5.0	7.5
Recording Method	MFM	2,7 RLL
Access Time (incl. settling)		
Average (msec.)	85	85
Track-to-Track (msec.)	15	15
Maximum (msec.)	190	190
Latency (avg. msec.)	8.33	8.33
Interface		
	ST412/506	
Reliability		
MTBF	20,000 hours	
PM	None	
MTTR	30 Minutes	
Component Design Life	5 Years	

Model	MFM 3425K	RLL 3438K
Error Rates		
Soft Read Errors	1 in 10 ¹⁰ bits transferred	
Hard Read Errors	1 in 10 ¹² bits transferred	
Seek Errors	1 per 10 ⁶ seeks	
DC Power Requirements		
+5V DC +/-5%	0.4 amps typ.	0.5 amps typ.
+12V DC +/-5%	1.0 amps typ.	1.0 amps typ.
Max. Starting (20 sec.)	3.5 amps typ.	3.5 amps typ.
Power Dissipation (Drive Only)		
	14.5 watts	14.5 watts
Environmental Limits		
Ambient Temp.	40°F - 122°F (4°C to 50°C)	
Relative Humidity	8% - 80%	
Maximum Wet Bulb	78°F (26°C)	
Physical (Drive Only)		
Height	1.625 in. (41.3 mm)	
Width	5.75 in. (146 mm)	
Depth	8.00 in. (203 mm)	
Weight	2.2 lbs. (1 Kg)	
Features and specifications subject to change without notice.		
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3425K 3438K

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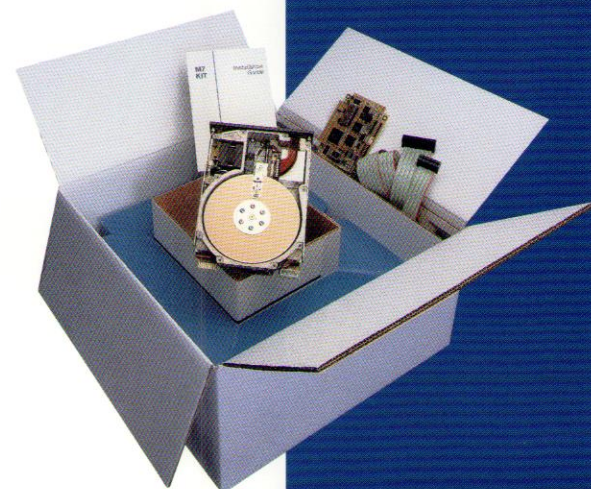
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 **MiniScribe**

50.5 MBytes 5 1/4" Half-Height Disk Drive

3650

Responding to the demand for a higher capacity, cost-effective, 5 1/4-inch half-height disk drive with increased performance, MiniScribe has met the challenge with its new model 3650. Based on MiniScribe's rugged 3000 family of 5 1/4-inch half-height Winchester disk drives, the 3650 is an innovative three disk, six head, 50.5 MByte configuration with an average access time of 61 milliseconds.

The 3650 features a tri-colored LED which allows the operator to view various operational phases of the disk drive by displaying a green light during normal operation, a blinking red light for error codes and an amber light while the heads are parked at the landing zone.

Like other MiniScribe products, the 3650 incorporates the company's high standards of quality and innovation. The 3650 utilizes MiniScribe's field-proven rack and pinion linear actuator system which provides positioning accuracy throughout temperature

extremes as well as rugged resistance to shock and vibration. In addition, the drive incorporates the industry standard ST412/506 interface.

With planned enhancements to higher storage capacities, the 3650 demonstrates MiniScribe's technical leadership by delivering one of the most favorable cost per megabyte solutions for your current and future storage requirements.

In addition to the 3650, MiniScribe produces a complete line of 3 1/2-inch and 5 1/4-inch Winchester disk drives which begins at 12.75 MBytes, extends to high capacity, high performance models, and includes a variety of standard, intelligent and custom interfaces.

- Based on MiniScribe's 3000 family of 5 1/4-inch half-height disk drives.
 - Field-proven rack and pinion actuator provides positioning accuracy throughout temperature extremes
- 50.5 MByte (unformatted)
- 61 msec. average access time
- Tri-colored LED
- 25,000 hours MTBF
- Product family growth to higher capacities
- Industry standard ST412 interface

3650 Specifications

Capacity Unformatted

Per Drive (MBytes)	50.5
Per Track (Bytes)	10,416

Capacity Formatted

Per Drive (MBytes)	42.25
Per Track (Bytes)	8,704
Per Sector (Bytes)	512
Sectors per Track	17

Functional

Disks	3
R/W Heads	6
Cylinders	809
Total Data Tracks	4,854
Track Density (tpi)	763
Recording Density (bpi)	10,124
Areal Density (Mbits/sq.in.)	7.72
Rotational Speed (RPM)	3,600

Data Transfer Rate

(Mbits per Second)	5.0
Recording Method	MFM

Access Time (incl. settling)

Average (msec.)	61
Track-to-track (msec.)	15
Maximum (msec.)	132
Latency (average, msec.)	8.33

Interface ST412

Reliability

MTBF	25,000 hours.
PM	None
MTTR	30 minutes
Component Design Life	5 years

Error Rates

Soft Read Errors	1 in 10^{10} bits transferred
Hard Read Errors	1 in 10^{12} bits transferred
Seek Errors	1 per 10^6 seeks

DC Power Requirements

+5V DC +/-5%	0.5 amps typical
+12V DC +/-5%	1.3 amps typical
Max. Starting (22 sec.)	3.5 amps

Power Dissipation 18.1 watts

Environmental Limits

Ambient Temp.	40°F - 122°F (4°C to 50°C)
Relative Humidity	8% - 80%
Maximum Wet Bulb	78°F (26°C)

Physical

Height	1.625 in. (41.3 mm)
Width	5.75 in. (146 mm)
Depth	8.00 in. (203 mm)
Weight	3.1 lbs. (1.4 kg.)

Features and specifications subject to change without notice.

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3650

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53.3 MByte 5¼" High Performance Half-Height Disk Drive

3053

- 25 msec. average access time
- Low start current-2.0 amps
- 12 watt power dissipation
- Rotary voice coil closed loop servo system
- 30,000 POH MTBF
- Light weight-3.0 lbs.
- Low acoustic noise level-under 40 dB
- Auto park on power down
- Dedicated landing shipping zone
- Single printed circuit board
- High coercivity oxide media
- Standard ST412 interface

The MiniScribe 3053 is the first in a new family of high capacity, high performance Winchester disk drives in the half-height form factor. With 53.3 Mbytes of unformatted storage capacity and a fast average access time of 25 msec., the 3053 is ideal for multi-user and small high performance desk-top systems.

High performance and high reliability are achieved by the utilization of a rotary voice coil, closed loop dedicated servo positioning system. In addition, the streamlined mechanical design, in-hub spindle motor and custom ICs result in lower start current and power consumption. The low audible noise level of the 3053 makes it ideal for quiet work areas and office environments.

The 3053's four point shock mounting system provides superior protection during rigorous shipping and operating conditions. With MiniScribe's auto park design, data zone contact at power-down is eliminated by retracting the read/write heads to a non-data shipping area.

The reliability of the 3053 is assured by its simplified mechanical design, utilizing fewer subassemblies, and its single printed circuit board. Top-down automated manufacturing assures consistently high yields and outstanding quality.

As with all MiniScribe products, superior quality of the 3053 is maintained through the use of rigorous final test and extensive burn-in processes before shipment. MiniScribe's technical support is available for any system application and integration requirements.

The 3053 offers a cost-effective alternative in half-height form factor with the same capacity and performance previously available in full height drives.

In addition to the 3053, MiniScribe produces a complete line of 3½-inch and 5¼-inch Winchester disk drives which begins at 12.75 Mbytes, extends to high capacity/high performance models, and includes a variety of standard, intelligent and custom interfaces.

5 1/4" Winchester Disk Drive Specifications

Capacity Unformatted

Per Drive (MBytes)	53.3
Per Track (Bytes)	10,416

Capacity Formatted

Per Drive (MBytes)	44.6
Per Track (Bytes)	8,704
Per Sector (Bytes)	512
Sectors Per Track	17

Functional

Disks	3
R/W Heads	5
Cylinders	1,024
Total Data Tracks	5,120
Track Density (tpi)	1,000
Recording Density (bpi)	10,200
Areal Density (Mbits/sq.in.)	10.2
Rotational Speed (RPM)	3,600

Data Transfer Rate

(Mbits per second)	5.0
--------------------	-----

Access Time

(including settling)	
Average (msec.)	25
Track-to-track (msec.)	5
Maximum (msec.)	55
Latency (average, msec.)	8.33

Interface

ST412

Reliability

MTBF	30,000 hrs.
PM	None
MTTR	30 minutes
Component Design Life	5 years

Error Rates

Soft Read Errors	1 per 10 ¹⁰ bits transferred
Hard Read Errors	1 per 10 ¹² bits transferred
Seek Errors	1 per 10 ⁶ seeks

DC Power Requirements

+ 5 VDC ±5%	0.8 amps typical
+12 VDC ±5%	0.7 amps typical
Max. Starting Current	2.0 amps

Power Dissipation

12.4 watts average

Shock

Operational	2G's, 11 msec. pulse duration, 1/2 sine wave
Non-Operational	40G's, 15 msec. pulse duration, 1/2 sine wave

Environmental Limits (Operating)

Ambient Temperatures	50°F to 122°F (10°C to 50°C)
Relative Humidity	8% to 80%
Maximum Wet Bulb	78°F (26°C)

Physical

Height	1.625 in. (41.3 mm)
Width	5.75 in. (146 mm)
Depth	8.00 in. (203 mm)
Weight	3.0 lbs. (1.4 kg.)

Features and specifications subject to change without notice.

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