

# Hard Drive: MINISCRIBE: M3425 20MB 5.25"/HH MFM ST506

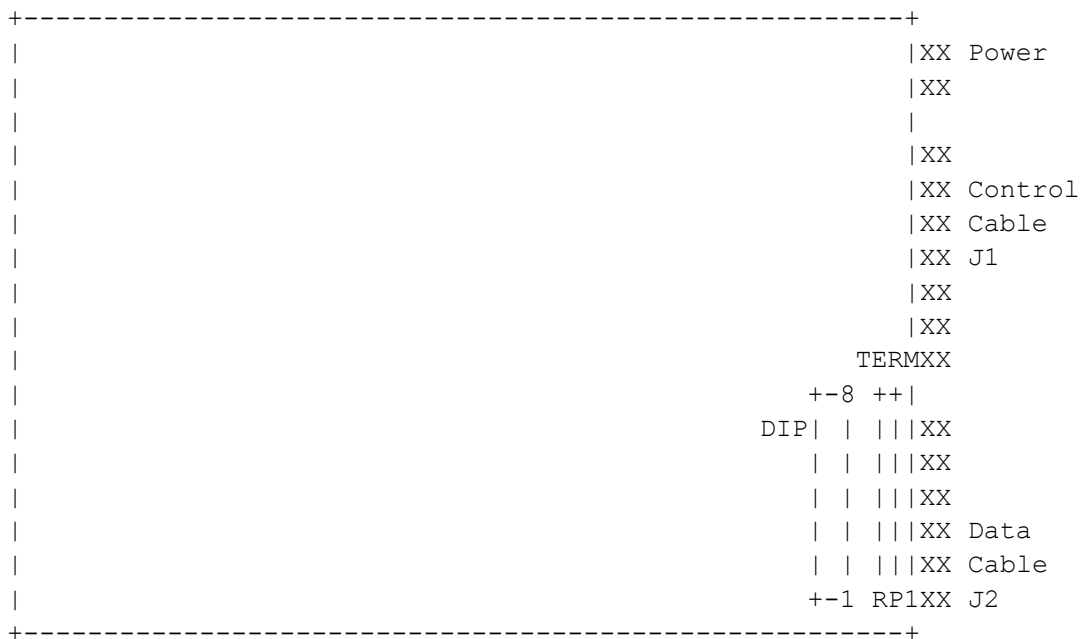
M 3 4 2 5 MINISCRIBE

NO MORE PRODUCED

		Native   Translation	
		-----+-----+-----+-----	
Form	5.25"/HH	Cylinders	615
Capacity form/uniform	20/ 25 MB	Heads	4
Seek time / track	85.0/15.0 ms	Sector/track	17
Controller	MFM / ST506	Precompensation	128
Cache/Buffer	KB	Landing Zone	
Data transfer rate	0.625 MB/S int	Bytes/Sector	512
	0.625 MB/S ext		
Recording method	MFM	operating   non-operating	
		-----+-----	
Supply voltage	5/12 V	Temperature *C	4 50   -40 57
Power: sleep	W	Humidity %	8 80   8 80
standby	W	Altitude km	-0.061 3.048   12.192
idle	14.5 W	Shock g	4   40
seek	W	Rotation RPM	3600
read/write	W	Acoustic dBA	50
spin-up	W	ECC Bit	
		MTBF h	20000
		Warranty Month	
Lift/Lock/Park	NO	Certificates	CSA, FCC, UL478

## Layout

MINISC. 3425/3212PLUS PRODUCT MANUAL P/N 1008 REV. H, MAY 6, 1987



## Jumpers

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### Jumper Setting

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### Drive Selection Configuration

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Drive Select No.				1	2	3	4	5	6	7	8	
	1	2	3	4	+-----+							
					ON	x	x	x	x	x	x	x
SW8	CLOSED	OPEN	OPEN	OPEN	OFF	+-----+						
SW7	OPEN	CLOSED	OPEN	OPEN	xxxxxxxxxxxxxxxxx RP1							
SW6	OPEN	OPEN	CLOSED	OPEN	Terminator							
SW5	OPEN	OPEN	OPEN	CLOSED								

As shipped, the DIP switch has Drive 1 selected (SW8 CLOSED).

### Drive Exercise Options

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As shipped, the DIP switch has SW2, SW3, and SW4 closed. These switches are for factory test modes and must remain closed for normal operation.

### Actuator Exerciser Modes

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The microprocessor performs "wake up" diagnostics upon application of power. If an error is detected, the processor will flash a warning by blinking the Activity LED. Some errors are fatal that they do not return to the program until power is cycled.

If no errors are detected, the processor tests the shunt block to determine the state of SW2, SW3, and SW4 (Drive Exercise Options).

### Actuator Exerciser Modes:

SW2 SW3 SW4  
 CLOSED CLOSED X Normal Operation  
 CLOSED OPEN X Factory Use Only  
 OPEN CLOSED OPEN Random Seek (burn-in mode)  
 OPEN CLOSED CLOSED Random Seek  
 OPEN OPEN OPEN Cresendo Seek (burn-in mode)  
 OPEN OPEN CLOSED Cresendo Seek

### Terminators

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Each drive is shipped with a terminator pack providing the 220/330 ohm termination for the Control Input Signals. If multiple drives are configured in a daisy chain configuration, the terminator pack must be removed from all drives except the last unit on the daisy chain.



Four side mounting and four base mounting points are provided to the customer. Each mounting point is mechanically isolated from the drive. Additionally, four side mounting points are provided that are compatible with a half height floppy disk drive.

#### Cabling

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Connect interface cables with connectors P1, P2, P3, and P4 to J1, J2, J3, and J4 respectively. Insure that connectors P1 and P2 have keys installed. If multiple drives are be interconnected, remove the terminator packs in all but the last drive in the daisy chain.

#### Magnetic Field

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The externally induced magnetic flux density may not exceed 3 Gauss as measured at the disk surface.

#### Drive Mechanism

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A brushless DC direct drive motor rotates the spindle at 3600 rpm. The motor/spindle assembly is dynamically balanced to provide minimal mechanical runout to the disks. A dynamic brake is used to provide a fast stop to the spindle motor when power is removed.

#### Air Filtration System

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Within the sealed enclosure, a 0.3 micron filter coupled with a breather filter provides over the drive life a clean environment to the heads and disks.

#### Head Positioning Mechanism

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Two or four read/write heads are supported by a carriage mechaism coupled to the stepper motor through a rack-and-pinion motion translator. The rack-and-pinion translator allows for the increased number of data tracks while retaining the full step holding torque and positioning repeatability characteristics of the stepper motor.

#### Power Sequencing

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+5 volts DC and +12 volts DC may be applied in any order.

+12 VDC powers the spindle drive motor. The microprocessor verifies that the disks are spinning at 3600 rpm and then activates the automatic Track Zero positioning. -TRACK ZERO, -SEEK COMPLETE, and -READY will beome true upon completion of the Track Zero positioning sequence.

## Electrical Interface

The interface to the MiniScribe 3425/3212P can be divided into three categories, each of which are physically separated: Control Signals, Data Signals and DC Power.

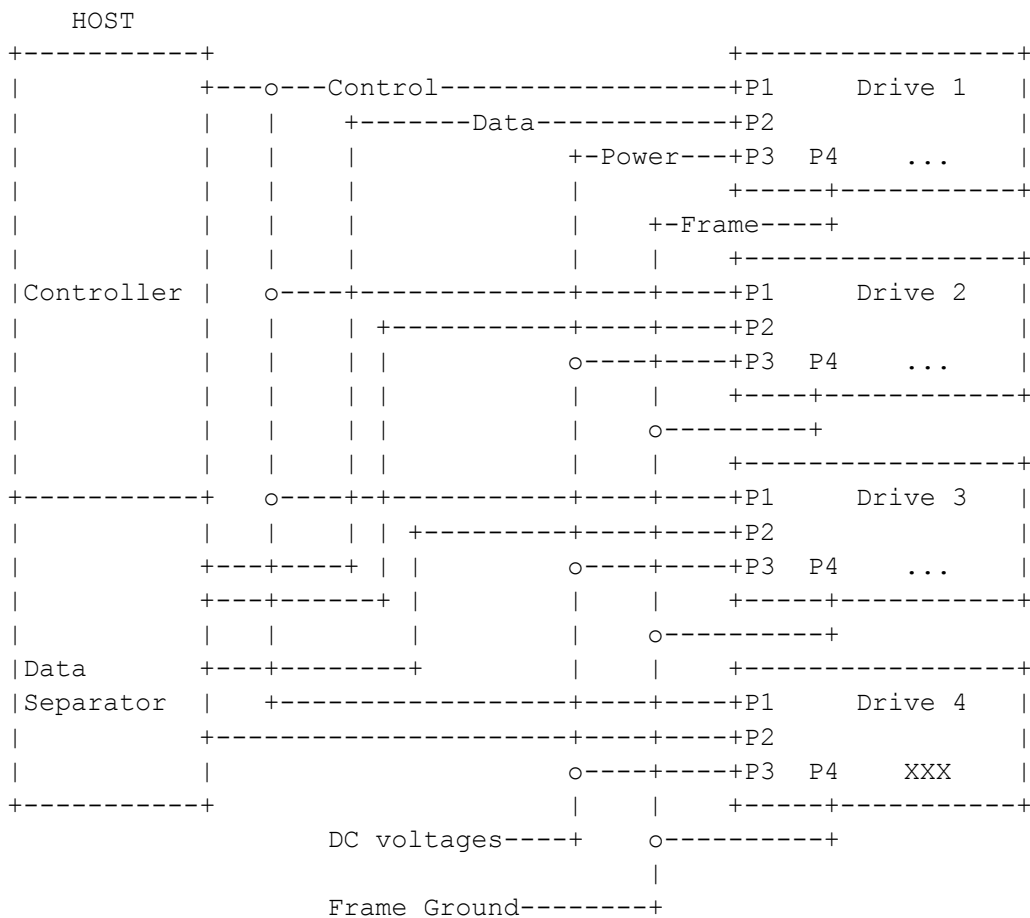
All Control Signals are digital in nature (open collector TTL) and either provide signals to the drive (input) or signals to the controller (output). The Data Signals are differential in nature and provide data either to (write) or from (read) the drive.

The interconnect cable between the drive and controller may be flat ribbon or twisted pairs of a length not to exceed 20 feet. The signal return lines and ground lines for P1 and P2 should be grounded at the controller.

The voltage return lines of P3 should only be grounded at the power supply.

Connector P4 is a spade lug connector tied to frame ground.

## Cable Interconnection - 4 Drive System



... = Terminator Pack removed

XXX = Terminator Pack installed

#### P1 Connector - Control Signals

Connection to P1 is through a 34 pin PCB edge connector. The pins are numbered 1 through 34 with the odd pins located on the component side of the printed circuit board. A key slot is provided between pins 4 and 6.

The recommended mating connector (J1) is AMP Ribbon Connector, P/N 88373-3.

#### P2 Connector - Data Signals

Connection to P2 is through a 20 pin edge connector. The pins are numbered 1 through 20 with the odd pins located on the component side of the Printed Circuit Board. A key slot is provided between pins 4 and 6.

The recommended mating connector (J2) is AMP Ribbon Connector, P/N 88373-6.

#### P3 Connector - DC Power

DC power connector (P3) is a 4 pin AMP Mate-N-Lok connector, mounted on the PCB. The P3 connector is mounted on the component side of the PCB.

The recommended mating connector (J3) is AMP P/N 1-480424-0 utilizing AMP pins P/N 350078-4.

+-----P3-----+	pin 1	+12 VDC
4 3 2 1	pin 2	+12 Ground Return
+-----+	pin 3	+ 5 Ground Return
	pin 4	+ 5 VDC

#### P4 Connector - Frame Ground

Fasten AMP P/N 61761-2.

The recommended mating connector (J4) is AMP 62187-1.

If used, the hole in P4 will accommodate a wire size of 18 AWG maximum.

#### Caution/Warning

The Miniscribe drive is a precision product weighing 3.5 pounds. During handling the unit must not be dropped, jarred or bumped. Otherwise, damage to the heads and disks may occur. When the drive is removed from the Miniscribe shipping container and not immediately

secured within a chassis through its shock mounts, it must be stored on a soft padded surface.

Failure to comply with the above procedure will render null and void all warranties.

## Features

MINISC. 3425/3212PLUS PRODUCT MANUAL P/N 1008 REV. H, MAY 6, 1987

### Introduction

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The MiniScribe 3425/3212P is a half-height random access 5-1/4 inch rigid media disk drive employing Winchester technology. The drive utilizes a rack-and-pinion actuator, microprocessor control, and open loop stepper head positioning.

The Model 3425/3212P features power up diagnostics, buffered seek and 5 Megabit/Sec. transfer rate. D.C. voltages and physical form factor are the same as the 5-1/4 inch half height floppy disk drive.

Seek Time (including settling time)

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Track-to-Track	msec. typ.	15	
Average	msec. typ.	85	
	msec. max.	190	
Latency	msec. avg.	8.33	

### Track Zero Detector

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The Track Zero Detector resides on the stepper motor. This optical sensor consists of a light source (activated only when a seek is initiated) and a receiver which when blocked by an interrupter on the motor shaft indicates one of several logical Track Zero positions.

The microprocessor determines the physical location of Track Zero from the redundant logical Track Zeros.

Media Defect Criteria (as shipped from MiniScribe)

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Model 3425    30 defects maximum per drive  
              10 defects maximum per surface

Model 3212P    20 defects maximum per drive  
                  Defects < 2 bytes in length  
                  Defects may be contiguous  
                  Cylinder Zero Defect Free for  
                  both models.

## Error Messages

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The microprocessor performs wake up diagnostics on power up. Additionally, some operations are monitored during normal operations. If an error is detected, the microprocessor will flash a warning by blinking the activity LED.

Error codes may be generated by the microprocessor to indicate hardware failures or warnings that are detected during power-on diagnostics, burn-in mode, or normal operation. Error codes are displayed in a "morse-code" type manner. Bits may be interpreted and converted into hexadecimal error codes. "Zeros" are indicated by a short (1/2 second) flashing mode. "Ones" are indicated by a short (1/2 second) continuous ON mode. Error "Words" are separated by a one second LED off time.

Zero	= 0.5 second flashing mode
One	= 0.5 second continuous ON mode
Between Bits	= 0.5 second Off
Between Repeat Cycles	= 1.0 second Off

Listed Below are the binary to hexadecimal conversion values:

0 = 0000 4 = 0100 8 = 1000 C = 1100  
1 = 0001 5 = 0101 9 = 1001 D = 1101  
2 = 0010 6 = 0110 A = 1010 E = 1110  
3 = 0011 7 = 0111 B = 1011 F = 1111

## Message Definitions

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Code 0 - Microprocessor RAM error  
Code 1 - Microprocessor ROM checksum error  
Code 2 - Interface chip diagnostic failure  
Code 3 - Write Fault latch will not reset  
Code 4 - Index pulse not detected during spinup  
Code 5 - Unable to reach 3600 rpm in 30 seconds  
Code 6 - Unable to stabilize spin speed in 10 seconds  
Code 7 - Unable to maintain spin speed to 0.5%  
Code 8 - Unable to uncover Track Zero sensor  
Code 9 - Unable to cover Track Zero sensor  
Code A - Track Zero interrupter misadjusted  
Code B - Shipping zone error, crash stop misadjusted  
Code C - Carriage stuck during recal error  
Code D - Seek error during burn-in or recal  
Code E - Unused  
Code F - Unexpected interrupt from processor