4345 SERIES - SCSI

Micropolis Disk Drive Information

4.55 GB Formatted Capacity;
3.5-inch 1 Inch High Form Factor;
Ultra SCSI (SCSI-3) Interface:
- **Narrow/Single-Ended (50 pin),**
- **Wide/Single-Ended SCA (80 pin), or**
- **Wide/Single-Ended (68 pin)**

See Quick Installation Summary on back cover!

MICROPΩLIS

Dear Customer,

Congratulations! You're now the proud owner of a 4345-Series Super-Capacity Disk Drive from Micropolis, a leader in high-quality, high-capacity, high-performance hard disk drives. Micropolis offers a complete line of high-capacity 3.5-inch hard disk drive products for all of your high-capacity applications.

This document includes specifications and information for drive Models 4345NS (with Narrow/Single-Ended interface), 4345SS (SCA, Wide/Single-Ended), and 4345WS (Wide/Single-Ended). Included is information common to all three models, as well as general and drive-specific installation and configuration information for typical system integration.

After unpacking your Micropolis disk drive, please be sure to save your shipping container.

If you need service or support during installation or operation of a Micropolis disk drive, please contact your Reseller. In most cases they will be able to answer your questions and/or resolve issues over the phone.

Additional information about this and other Micropolis products is available on the Micropolis WWW site at:

http://www.micropolis.com

If you require additional assistance, contact Micropolis Technical Support (see page 24).

Contents

Drive Specifications

Formatted Capacity

Per Drive, GB	4.55
Bytes per Sector	512
Sectors per Track	Variable
Cylinders	4,811

Performance

Avg. Seek Time	7.9 msec		
Avg. Rotational Latency	4.17 msec		
Rotational Speed	7,200 rpm ± 0.5%		
Data Transfer Rate at Interface	**4345NS**	**4345SS**	**4345WS**
Ultra SCSI, MB/sec	20	40	40
Synchronous, MB/sec	10	20	20
Asynchronous, MB/sec	5	10	10
Internal Data Rate, Mbits/sec	76 - 125	76 - 125	76 - 125
MTBF (power-on hours)	650,000		
Positioner	Fully balanced rotary voice coil		
Parking	Automatic park and lock		

General Functional Specifications

Interface	Ultra SCSI (SCSI-3)
Drivers/Receivers:	
Model 4345NS	Narrow/Single-Ended (50-pin connector)
Model 4345SS	Wide/Single-Ended (80-pin SCA-2 connector)
Model 4345WS	Wide/Single-Ended (68-pin unitized connector)

Maximum Allowable Temperature

HDA Casting	60°C (140°F) see *Caution*, page 2

Power Requirements

	4345NS	**4345SS**	**4345WS**
+12V ±5% (average)	0.55 A	0.55 A	0.55 A
+12V ±5% (max during start-up)	1.75 A	1.75 A	1.75 A
+5V ±5% (average)	1.10 A	1.10 A	1.10 A
Power Dissipation, typical			
Idling	10 W	10 W	10 W
Seeking	12 W	12 W	12 W

Unpacking the Drive

Caution

A disk drive is a very precision device and may be damaged if subjected to excessive vibration or shock. Dropping or toppling the drive may result in permanent damage to the drive. Damage caused by improper handling of the drive will void the warranty.

To ensure that static-susceptible components are protected from electrostatic discharge (ESD) damage, wear a properly grounded anti-static wrist strap when handling the drive. Damage caused by improper handling of the drive will void the warranty.

The drive may be damaged if operated above the recommended temperature limit (see Maximum Allowable Temperature, page 1). A poorly ventilated enclosure may overheat the drive and void the warranty.

A Single Pack is a Shipping Carton containing one Drive. Inside the Shipping Carton is a support structure of foam blocks that provides shock isolation for the Drive sealed in an Electrostatic Protective Bag.

Use the following procedure to unpack the drive; refer to the figure on the opposite page. Be sure to *save all the packing materials* in case it is necessary to repack the drive for shipping.

a. Visually inspect the Shipping Carton for damage.

b. Set the Shipping Carton on a clean, flat surface at a static-free work station.

c. Cut the sealing tape on the carton top, then open the flaps.

d. Lift the Drive and Inserts upwards, out of the Shipping Carton.

e. Remove the Inserts, and place the Drive (sealed in the Electrostatic Protective Bag) on the work surface.

f. Cut the Warning Label that seals the Electrostatic Protective Bag, and slide the Drive out of the bag.

g. Visually inspect the Drive for damage.

h. Verify that the model number and part number on the drive label is as ordered and agrees with the shipping paperwork.

i. The Drive is ready for system installation. Refer to the appropriate section for detailed configuration and installation information.

Foam Insert (typical)

Protective Bag

Desiccant

Foam Insert (typical)

Dwg File 50051

Shipping Carton
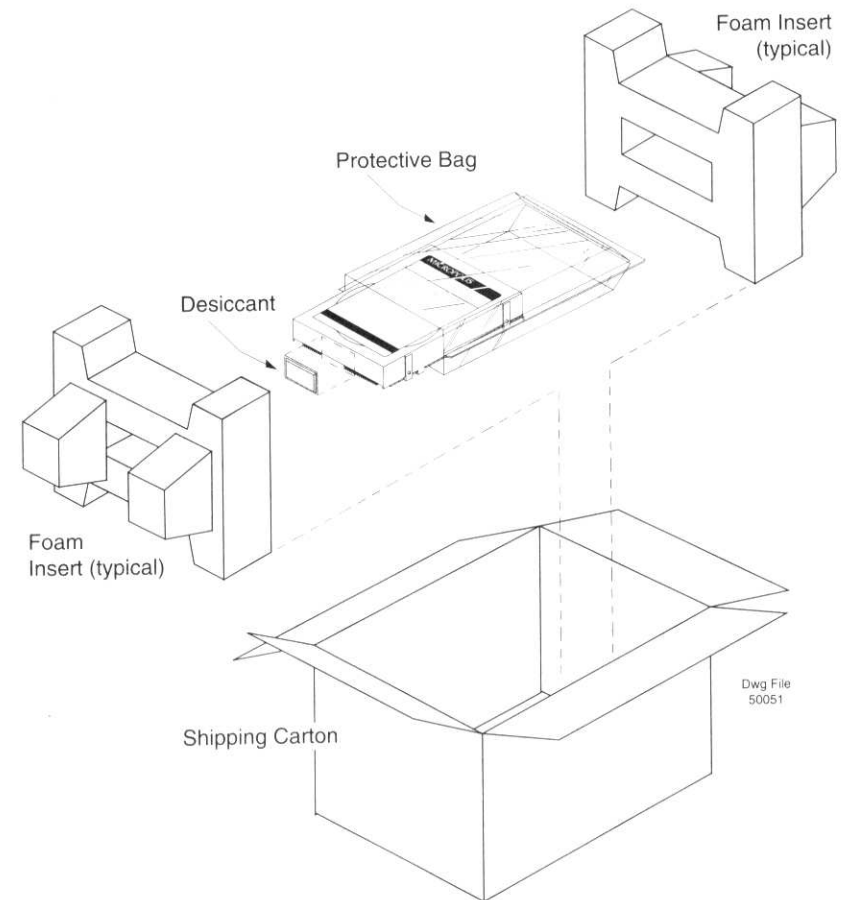
Installation Details - Model 4345NS (8-Bit/Single-Ended)

Dimensions & Mounting

The Micropolis 4345NS drive uses industry-standard mounting for 3.5-inch "1-inch high" Winchester disk drives. It is designed such that the outer frame should be hard-mounted to the host equipment; no additional/external shock mounts should be used.

MOUNTING HOLES
2 PER SIDE
4 ON BOTTOM
6-32 UNC-2B
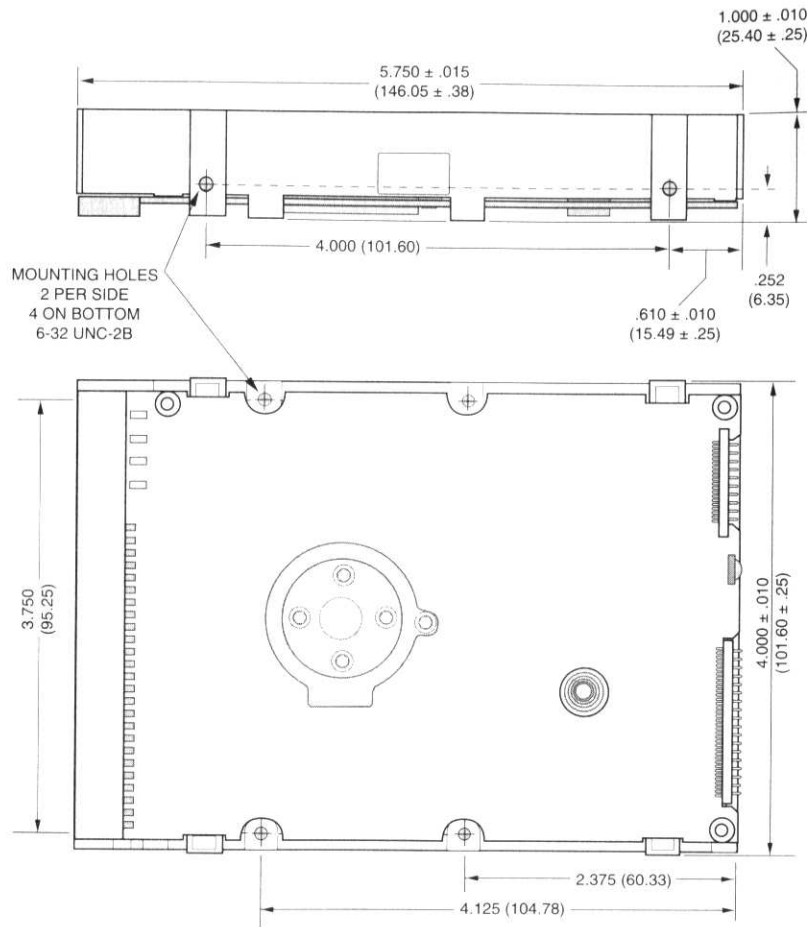
NOTE: Dimensions are in inches (millimeters); unless otherwise specified, tolerances are ± .005 (± .13).

Dwg File 12109

CAUTION: Mounting screws must not penetrate the bottom mounting holes by more than 0.20 inches or the side mounting holes by more than 0.156 inches. Screws that are too long may short-circuit PCBA components.

Installation Details - Model 4345NS (continued)

Electrical Interface

The electrical interface between the drive and the host system is accomplished via connectors as shown in the figure below and on the following page.

REAR VIEW

Dwg File 50014

Signal Connector

Power Connector
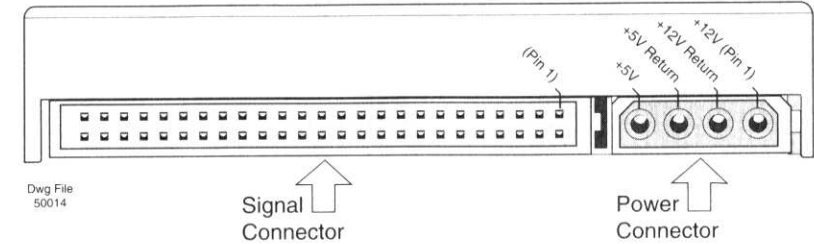
- The Signal Connector is a standard 50-pin connector.

  Mating Connector: 3M 3425-3000 or equivalent
  Cable: 3M Scotchflex 3801 or equivalent

  Single-ended drivers and receivers allow a maximum cable length of 3 meters for up to four devices and a maximum cable length of 1.5 meters for greater than four devices. Signal transmission requires a single 50-conductor (flat or twisted pair) cable. A characteristic impedance of 90 ($\pm$6) ohms is recommended.

- The Power Connector is used to supply +5V and +12V to the drive.

  Mating Connector: AMP 1-480424-0 or equivalent
  Pins: AMP 350078-4
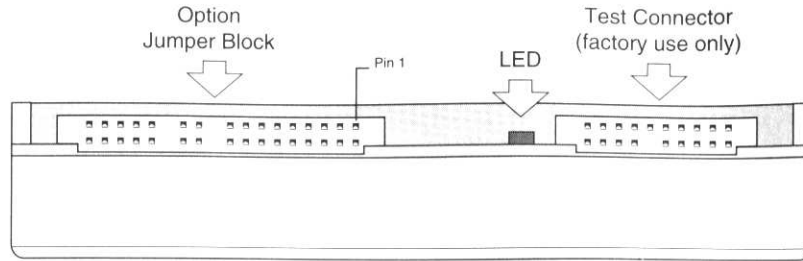 Suggested Wire Size: 18 AWG (minimum) for all pins

- The Option Jumper Block is used for device addressing and various other options (see pages 6 and 7).

  Jumper (2 mm, low-profile): Augat CN-BX007A5A02 or equivalent
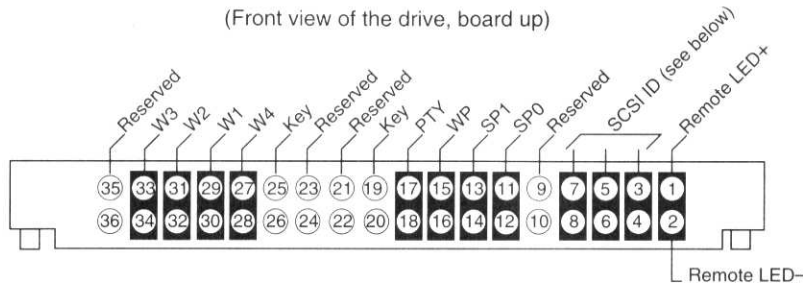
Installation Details - Model 4345NS (continued)

Option Jumper Block J2

FRONT VIEW

Option Jumper Block

Test Connector (factory use only)

Pin 1

LED

Dwg File 50048

OPTION JUMPER BLOCK J2
(Front view of the drive, board up)

Reserved, W3, W2, W1, W4, Key, Reserved, Reserved, Key, PTY, WP, SP1, SP0, Reserved, SCSI ID (see below), Remote LED+

(35) (33) (31) (29) (27) (25) (23) (21) (19) (17) (15) (13) (11) (9) (7) (5) (3) (1)
(36) (34) (32) (30) (28) (26) (24) (22) (20) (18) (16) (14) (12) (10) (8) (6) (4) (2)

Remote LED−

NOTE: Pins 4, 6, 8, 10, 12, 14, 16, 18, 22, and 24 are tied to Ground.

Configuration/Options
— Jumpers are 2 mm, low-profile; Augat CN-BX007A5A02 or equivalent

- **SCSI ID**. Jumpers at Pin 3-4, Pin 5-6, and Pin 7-8 select the SCSI ID. Each device on one Host Adapter must have a unique SCSI ID.

SCSI ID	Pin 3-4	Pin 5-6	Pin 7-8	SCSI ID	Pin 3-4	Pin 5-6	Pin 7-8
0	out	out	out (Default)	4	out	out	in
1	in	out	out	5	in	out	in
2	out	in	out	6	out	in	in
3	in	in	out	7	in	in	in

Installation Details - Model 4345NS (continued)

- **Interface Termination**. W4 enables/disables interface termination.

  | Jumper | Drive provides termination for the SCSI interface; i.e., onboard termination is electrically *enabled*. (Default) |
  | No Jumper | Drive does not provide interface termination; i.e., onboard termination is electrically *disabled*. |

- **Terminator Power**. W1 or W2 select the source of power (+5V) for the local terminators; W3 controls the drive supplying +5V to the SCSI Bus.

W1	W2	W3	
out	out	out	Local terminator power and +5V to the SCSI Bus disabled.
out	out	in	Drive supplies +5V to the SCSI Bus via J1.
out	in	out	Host provides local terminator power via J1.
out	in	in	Not valid - do not use.
in	out	out	Drive provides local terminator power. (Default)
in	out	in	Drive provides local terminator power and supplies +5V to the SCSI Bus via J1.
in	in	out	Not valid - do not use.
in	in	in	Not valid - do not use.

- **Spindle Control**. Jumpers at SP0 and SP1 control the spindle options.

SP0	SP1	
out	out	The drive starts the spindle motor at power-on. (Default)
in	out	The drive waits for a Start Unit SCSI command to start the spindle motor.
out	in	Spindle start-up is delayed based on SCSI ID address (12 seconds per ID).
in	in	Not valid - do not use.

- **Write Protect**. A jumper at WP selects the write protect option.

  | Jumper | The drive is write protected. |
  | No Jumper | The drive is *not* write protected. (Default) |

- **Parity**. A jumper at PTY selects the bus parity check option. Note that the drive always **generates** parity regardless of this option.

  | Jumper | SCSI interface parity checking *disabled*. |
  | No Jumper | SCSI interface parity checking *enabled*. (Default) |

- **Remote LED**. A user-supplied LED may be connected to Remote LED (Pins 1 and 2).

Installation Details - Model 4345SS (SCA, Wide/Single-Ended)

Dimensions & Mounting

The Micropolis 4345SS drive uses industry-standard mounting for 3.5-inch "1-inch high" Winchester disk drives. It is designed such that the outer frame should be hard-mounted to the host equipment; no additional/external shock mounts should be used.

MOUNTING HOLES
2 PER SIDE
4 ON BOTTOM
6-32 UNC-2B

1.000 ± .010
(25.40 ± .25)

5.750 ± .015
(146.05 ± .38)

4.000 (101.60)

.252
(6.35)

.610 ± .010
(15.49 ± .25)

3.750
(95.25)

4.000 ± .010
(101.60 ± .25)

2.375 (60.33)

4.125 (104.78)

NOTE: Dimensions are in inches (millimeters); unless otherwise specified, tolerances are ± .005 (± .13).

Dwg File
50047
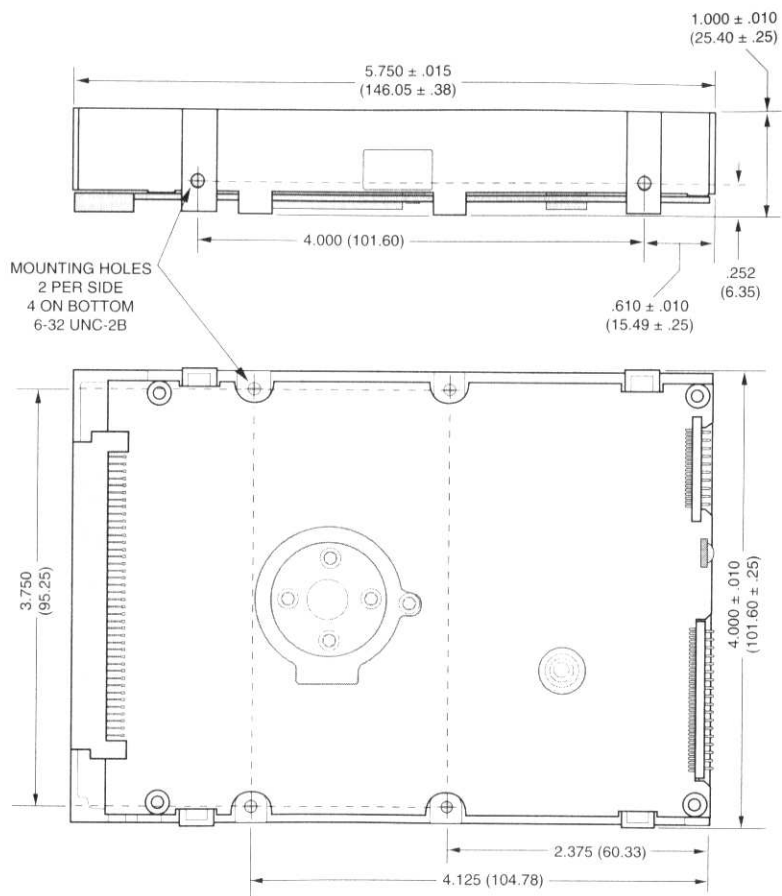
CAUTION: Mounting screws must not penetrate the bottom mounting holes by more than 0.20 inches or the side mounting holes by more than 0.156 inches. Screws that are too long may short-circuit PCBA components.

Installation Details - Model 4345SS (continued)

Electrical Interface

The electrical interface between the drive and the host system is accomplished via connectors as shown in the figure below and on the following page.

REAR VIEW

Dwg File
50023

Pin 1

SCA
Connector
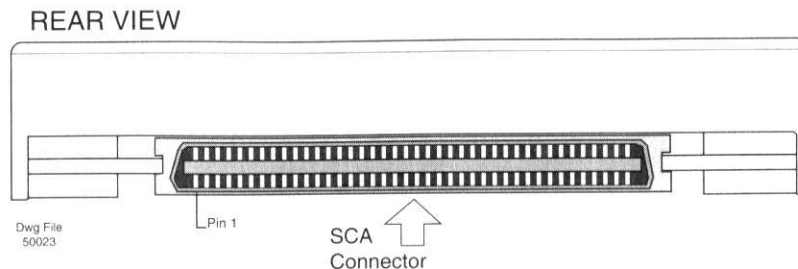
- The Signal Connector is a standard 80-pin SCA-2 connector.

  Mating Connector: AMP Champ 2-557103-1 (vertical receptacle) or equivalent

  AMP Champ 2-557101-1 (right-angle receptacle) or equivalent

  Single-ended drivers and receivers allow a maximum cable length of 3 meters for up to four devices and a maximum cable length of 1.5 meters for greater than four devices. Signal transmission requires a single 80-conductor (flat or twisted pair) cable. A characteristic impedance of 90 (±6) ohms is recommended.

- The Option Jumper Block is used for device addressing and various other options (see pages 10 and 11).

  Jumper (2 mm, low-profile): Augat CN-BX007A5A02 or equivalent

Option Jumper Block J2

FRONT VIEW

Option
Jumper Block

Pin 1

LED

Test Connector
(factory use only)

Dwg File
50055

OPTION JUMPER BLOCK J2
(Front view of the drive, board up)
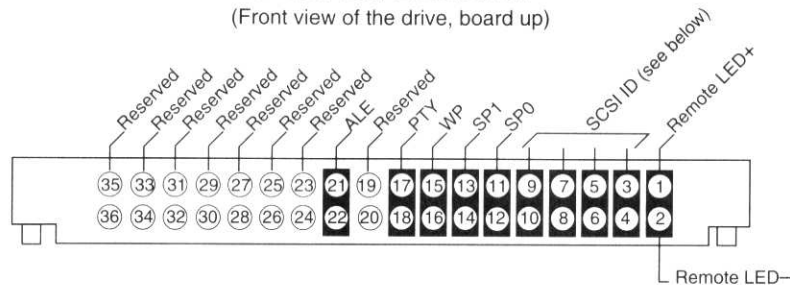
Reserved Reserved Reserved Reserved Reserved Reserved Reserved ALE Reserved PTY WP SP1 SP0 SCSI ID (see below) Remote LED+

㉟ ㉝ ㉛ ㉙ ㉗ ㉕ ㉓ ㉑ ⑲ ⑰ ⑮ ⑬ ⑪ ⑨ ⑦ ⑤ ③ ①
㊱ ㉞ ㉜ ㉚ ㉘ ㉖ ㉔ ㉒ ⑳ ⑱ ⑯ ⑭ ⑫ ⑩ ⑧ ⑥ ④ ②

Remote LED−

NOTE: Pins 4, 6, 8, 10, 12, 14, 16, 18, 22, and 24 are tied to Ground.

Configuration/Options
— Jumpers are 2 mm, low-profile;
Augat CN-BX007A5A02 or equivalent

- **SCSI ID.** Jumpers at Pin 3-4 thru Pin 9-10 select the SCSI ID. Each device on one Host Adapter must have a unique SCSI ID (0-15). Note that there are two methods of SCSI ID selection: one is via Option Jumper Block J2, the other is via the SCA-2 Connector J1. Use either method but not both at the same time.

SCSI ID	Pin 3-4	Pin 5-6	Pin 7-8	Pin 9-10	SCSI ID	Pin 3-4	Pin 5-6	Pin 7-8	Pin 9-10
0	out	out	out	out (Default)	8	out	out	out	in
1	in	out	out	out	9	in	out	out	in
2	out	in	out	out	10	out	in	out	in
3	in	in	out	out	11	in	in	out	in
4	out	out	in	out	12	out	out	in	in
5	in	out	in	out	13	in	out	in	in
6	out	in	in	out	14	out	in	in	in
7	in	in	in	out	15	in	in	in	in

- **Spindle Control**. Jumpers at SP0 and SP1 control the spindle options.

SP0	SP1	
out	out	The drive starts the spindle motor at power-on. (Default)
in	out	The drive waits for a Start Unit SCSI command to start the spindle motor.
out	in	Spindle start-up is delayed based on SCSI ID address (12 seconds per ID).
in	in	Not valid - do not use.

- **Write Protect**. A jumper at WP selects the write protect option.

  Jumper — The drive is write protected.

  No Jumper — The drive is *not* write protected. (Default)

- **BUS Parity Check**. A jumper at PTY selects the bus parity check option. Note that the drive always **generates** parity regardless of this option.

  Jumper — SCSI interface parity checking disabled.

  No Jumper — SCSI interface parity checking enabled. (Default)

- **Interface Activity LED Enable**. A jumper at ALE controls the interface ACTIVITY LED OUT signal.

  Jumper — Interface ACTIVITY LED OUT signal is *enabled*. (Default)

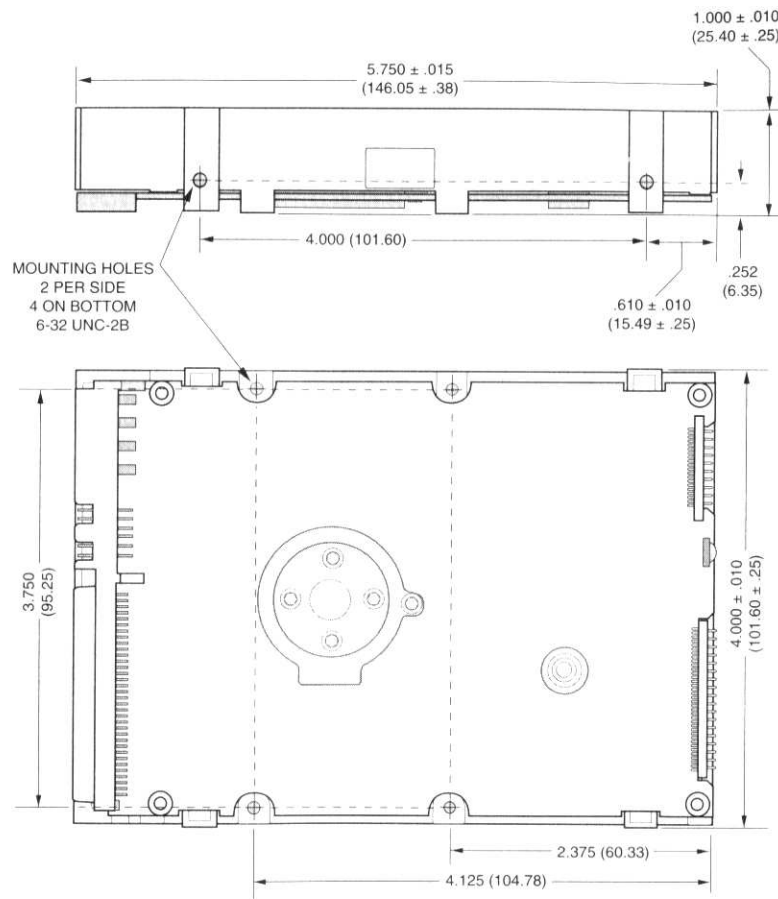 No Jumper — Interface ACTIVITY LED OUT signal is *disabled*.

- **Remote LED**. A user-supplied LED may be connected to Remote LED (Pins 1 and 2).

Dimensions & Mounting

The Micropolis 4345WS drive uses industry-standard mounting for 3.5-inch "1-inch high" Winchester disk drives. It is designed such that the outer frame should be hard-mounted to the host equipment; no additional/external shock mounts should be used.

1.000 ± .010
(25.40 ± .25)

5.750 ± .015
(146.05 ± .38)

4.000 (101.60)

.252
(6.35)

.610 ± .010
(15.49 ± .25)

MOUNTING HOLES
2 PER SIDE
4 ON BOTTOM
6-32 UNC-2B

3.750
(95.25)

4.000 ± .010
(101.60 ± .25)

2.375 (60.33)

4.125 (104.78)

NOTE: Dimensions are in inches (millimeters); unless otherwise specified, tolerances are ± .005 (± .13).
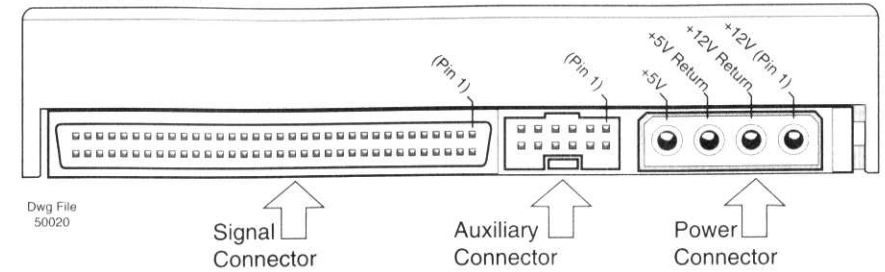
Dwg File
50019

CAUTION: Mounting screws must not penetrate the bottom mounting holes by more than 0.20 inches or the side mounting holes by more than 0.156 inches. Screws that are too long may short-circuit PCBA components.

Electrical Interface

The electrical interface between the drive and the host system is accomplished via connectors as shown in the figure below and on the following page.

REAR VIEW

+5V Return
+12V Return
+12V (Pin 1)
+5V
(Pin 1)
(Pin 1)

Dwg File
50020

Signal
Connector

Auxiliary
Connector

Power
Connector

- The Signal Connector is a standard 68-pin connector.

  Mating Connector: AMP 786090-7 or equivalent
  Recommended Cable: AMP 2-57013-1 or equivalent

  Single-ended drivers and receivers allow a maximum cable length of 3 meters for up to four devices and a maximum cable length of 1.5 meters for greater than four devices. Signal transmission requires a single 68-conductor (flat or twisted pair) cable. A characteristic impedance of 90 (±6) ohms is recommended.

- The Auxiliary Connector is a 12-pin option connector; see page 16 for details.

  Mating Connector: Berg 69307-012 or equivalent
  Pins: Berg 77138-001
  Suggested Wire Size: 26 - 30 AWG for all pins

- The Power Connector is used to supply +5V and +12V to the drive.

  Mating Connector: AMP 1-480424-0 or equivalent
  Pins: AMP 350078-4
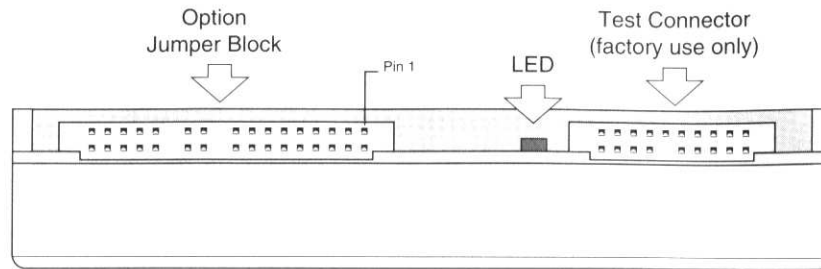 Suggested Wire Size: 18 AWG (minimum) for all pins

- The Option Jumper Block is used for device addressing and various other options (see pages 14 and 15).

  Jumper (2 mm, low-profile): Augat CN-BX007A5A02 or equivalent
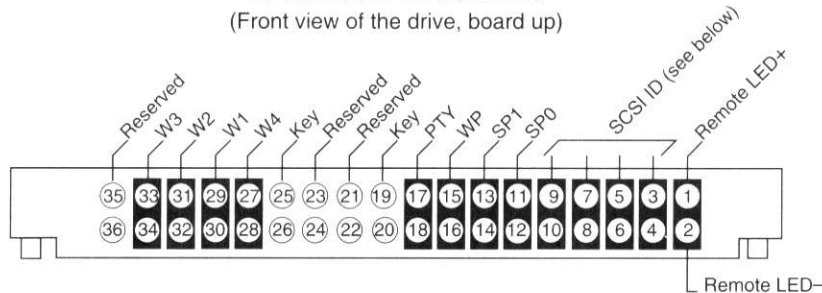
Installation Details - Model 4345WS (continued)

Option Jumper Block J2

FRONT VIEW

Option
Jumper Block

Pin 1   LED

Test Connector
(factory use only)

Dwg File
50050

OPTION JUMPER BLOCK J2
(Front view of the drive, board up)

Reserved W3 W2 W1 W4 Key Reserved Reserved Key PTY WP SP1 SP0 SCSI ID (see below) Remote LED+

Remote LED−

NOTE: Pins 4, 6, 8, 10, 12, 14, 16, 18, 22, and 24 are tied to Ground.

Configuration/Options — Jumpers are 2 mm, low-profile; Augat CN-BX007A5A02 or equivalent

- **SCSI ID.** Jumpers at Pin 3-4 thru Pin 9-10 select the SCSI ID. Each device on one Host Adapter must have a unique SCSI ID (0-15). Note that there are two methods of SCSI ID selection: one method is via Option Jumper Block J2 (see above), the other is via the Auxiliary Connector (see page 16). Use either method but not both at the same time.

SCSI ID	Pin 3-4	Pin 5-6	Pin 7-8	Pin 9-10	SCSI ID	Pin 3-4	Pin 5-6	Pin 7-8	Pin 9-10
0	out	out	out	out (Default)	8	out	out	out	in
1	in	out	out	out	9	in	out	out	in
2	out	in	out	out	10	out	in	out	in
3	in	in	out	out	11	in	in	out	in
4	out	out	in	out	12	out	out	in	in
5	in	out	in	out	13	in	out	in	in
6	out	in	in	out	14	out	in	in	in
7	in	in	in	out	15	in	in	in	in

Installation Details - Model 4345WS (continued)

- **Interface Termination.** W4 enables/disables interface termination.

Jumper	Drive provides termination for the SCSI interface; i.e., onboard termination is electrically *enabled*. (Default)
No Jumper	Drive does not provide interface termination; i.e., onboard termination is electrically *disabled*.

- **Terminator Power.** W1 or W2 select the source of power (+5V) for the local terminators; W3 controls the drive supplying +5V to the SCSI Bus.

W1	W2	W3	
out	out	out	Local terminator power and +5V to the SCSI Bus disabled.
out	out	in	Drive supplies +5V to the SCSI Bus via J1.
out	in	out	Host provides local terminator power via J1.
out	in	in	Not valid - do not use.
in	out	out	Drive provides local terminator power. (Default)
in	out	in	Drive provides local terminator power and supplies +5V to the SCSI Bus via J1.
in	in	out	Not valid - do not use.
in	in	in	Not valid - do not use.

- **Spindle Control.** Jumpers at SP0 and SP1 control the spindle options.

SP0	SP1	
out	out	The drive starts the spindle motor at power-on. (Default)
in	out	The drive waits for a Start Unit SCSI command to start the spindle motor.
out	in	Spindle start-up is delayed based on SCSI ID address (12 seconds per ID).
in	in	Not valid - do not use.

- **Write Protect.** A jumper at WP selects the write protect option.

Jumper	The drive is write protected.
No Jumper	The drive is *not* write protected. (Default)

- **Parity.** A jumper at PTY selects the bus parity check option. Note that the drive always **generates** parity regardless of this option.

|	
Jumper	SCSI interface parity checking *disabled*.
No Jumper	SCSI interface parity checking *enabled*. (Default)

- **Remote LED.** A user-supplied LED may be connected to Remote LED (Pins 1 and 2).

Auxiliary Connector

The signals on the Auxiliary Connector are used for drive configuration (stand-alone operation), for connecting the drive to a configuration control board (remote operation), or for common backplane configuration (rack-mounted operation).

(Rear view of the drive, board up)
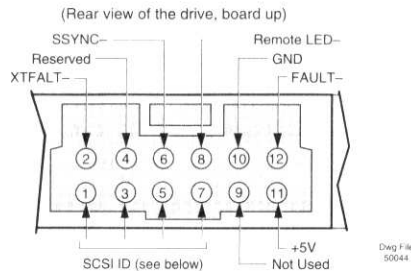
• **SCSI ID**. The Auxiliary Connector is sampled at initialization for jumpers on pins 1-2, 3-4, 5-6, and 7-8; these connections (if not jumpered for SCSI ID) are then released for use. Note that there are two methods of SCSI ID selection: one is via Option Jumper Block J2, and the other is via the Auxiliary Connector. Use either method but not both at the same time.

SCSI ID	Pin 1-2	Pin 3-4	Pin 5-6	Pin 7-8	SCSI ID	Pin 1-2	Pin 3-4	Pin 5-6	Pin 7-8
0	out	out	out	out (Default)	8	out	out	out	in
1	in	out	out	out	9	in	out	out	in
2	out	in	out	out	10	out	in	out	in
3	in	in	out	out	11	in	in	out	in
4	out	out	in	out	12	out	out	in	in
5	in	out	in	out	13	in	out	in	in
6	out	in	in	out	14	out	in	in	in
7	in	in	in	out	15	in	in	in	in

• **Drive Fault** (XTFALT–)
  Output signal negated (Default): Indicates no drive fault.
  Output signal asserted: Indicates a drive fault condition.

• **Slave Sync** (SSYNC–). Not implemented.

• **Remote LED** (REMOTE LED–). Open-drain output: Used to drive a user-supplied LED to indicate the drive is active.

• **Ground** (GND). Logic ground: Provides signal ground.

• **+5 Volts** (+5V). 5V DC, 1A maximum: Used to drive external LEDs.

• **Write Protect** (FAULT–)
  Input signal negated (Default): Drive is *not* write protected.
  Input signal asserted: Drive is write protected.

Mounting Brackets

In some cases, installation of a Micropolis drive will require use of special brackets or cable adapters. Several sources exist for these brackets/adapters, including:

DataStor
1815 E. Carnegie Avenue
Santa Ana, CA 92705
(415) 461-2227
Internet WWW site:
  http://www.dstor.com

DTI
8750 Main Street
Eden Prairie, MN 55344
(612) 942-7474

Proline Distribution
148 Bon Air Center
Greenbrae, CA 94904
(612) 942-7474

PC Integration

When installing a Micropolis SCSI drive in a PC, the most common method is to run your CMOS SETUP program and define *No Drives Present*. The SCSI Host Adapter driver will automatically self-configure on power-up. To install the drive, follow the computer or Host Adapter manufacturer's instructions to use the on-board BIOS routine or software that was supplied with the Host Adapter.

Remember that the drive is shipped with a SCSI Address of ID0. If your system requires that the drive be set to a different SCSI Address, see the appropriate *Configuration/Options* section of this document. Extra jumpers are provided in a poly bag for this purpose.

UNIX Workstation Integration

Installing a Micropolis drive on most UNIX workstations is easy. In most cases, the DISKTAB (FORMAT.DAT on SUN systems) file must be modified to include an entry describing the drive's geometry. The DISKTAB (or FORMAT.DAT for SUN) is usually contained in the /etc directory, and can be edited using VI or any appropriate text editor. Other systems require no modifications and will auto-configure the drive.

Since each system's requirement is unique, the Micropolis Technical Support Department maintains continually updated listings of the various parameters required for the most popular workstations. These lists are maintained on the Micropolis Internet WWW site, FAXBACK, the Technical Support Bulletin Board (BBS), and the Micropolis Forum on CompuServe®.

Feel free to contact any of the above listed sources for assistance in installing your Micropolis drive (see Technical Support, page 24).

Macintosh Integration

All Macintosh models created since and including the MacPlus are compatible with Micropolis SCSI drives. Obviously, space requirements mean that certain drive models will have to be external to certain Macintosh models.

Macintosh Software Installation

To make a Micropolis drive usable on the the Macintosh platform:

1. Install the Macintosh Operating System. *
2. Install a Macintosh device driver. *
3. Create a Macintosh partition map.

* For boot drives only.

There are many third-party software products commercially available to perform these functions. Some of these products will identify the three functions referenced above as "partition," others as "initialize," and still others as "install disk drive."

There is generally no need to "format" the drive. If the drive is "factory fresh" (i.e., unused since it was shipped from the factory), low-level formatting of the drive was already performed at the factory. Most of these software products will automatically set the drive interleave to the proper value; for those that do not, an interleave value of "1" or "1:1" is most often the correct setting.

Recommended third-party software products include, but are not limited to, current versions of:

- Anubis by CHARISMAC Engineering
- FWB Hard Disk Toolkit
- SCSI Director by Transoft

Micropolis drives conform to the termination requirements detailed in the ANSI SCSI specification governing the appropriate class of Micropolis drive models. The user should be aware of whether the Macintosh model does or does not supply terminator power (TERMPWR) to the SCSI bus, and should be prepared to change the drive's TERMPWR jumper accordingly if the internal drive terminator is used.

If the drive is used in an external enclosure and is terminated externally, the user may have to place a jumper on the drive's "+5V to Bus" pins if the Macintosh model does not supply TERMPWR to the SCSI bus.

SCSI Host Adapter Info

Numerous manufacturers produce SCSI Host Adapters compatible with Micropolis SCSI disk drives. Among them are the following:

Adaptec
(800) 959-7274
(408) 945-2550
BBS: (408) 945-7727
Internet WWW site:
   http://www.adaptec.com

American Megatrends
(404) 246-8645

ATTO
(716) 691-1999
BBS: 716-691-9403
Internet Email:
   atto@localnet.com

Bustek/Buslogic
(800) 707-7274
(408) 492-9090
BBS: (408) 492-1984
Internet WWW site:
   http://www.buslogic.com

Compaq
(800) 652-6672
(800) 345-1518
Internet WWW site:
   http://www.compaq.com

Dist. Processing Tech. (DPT)
(800) 322-4378
(407) 830-5532
BBS: (407) 831-6432

Data Technology Corp. (DTC)
(408) 262-7700
BBS: (408) 942-4010

FWB Jackhammer
(415) 325-4392

Mylex
(510) 796-6100
(510) 793-3491
Internet WWW site:
   http://www.mylex.com

qLogic Corporation
(800) 737-6524 (US only)
(714) 668-5037

Problems/Solutions from Micropolis Technical Support

(More detail is available on the Micropolis Internet WWW site)

1. **Either 2 drives or 7 drives (15 drives for wide) are seen when only one drive is installed**

   Your drive is incorrectly set to SCSI ID 7, which is what most controllers or SCSI Host Adapters are set to. Change your drive's SCSI ID to anything other than 7. (For multiple drives, each drive must have its own unique SCSI ID.)

2. **The drive does not appear to spin-up or power-on or the SCSI Host does not "see" the drive**

   Check for correctness of termination, and verify that the the power cable is connected and that power is on.

   If the drive still fails to spin up, follow this Self Test: Disconnect the SCSI cable from the drive and terminate the drive. Observe the LED on the front of the drive as you apply power. If the drive is "healthy" there will be 3 blinks. Any other sequence of blinks or a repeating pattern may indicate a defective drive - contact Micropolis Technical Support.

3. **When booting up, the system hangs at the BIOS banner of the controller or SCSI Host Adapter**

   There are several possibilities:

   • There is a drive set to the same SCSI ID as the controller or SCSI Host Adapter. Change the drive's SCSI ID to a number that is not is use.

   • There are 2 or more drives with the same SCSI ID number. All drives must have different SCSI ID numbers.

   • There could be a BIOS conflict. Change the BIOS address of the controller or SCSI Host Adapter to a different memory location.

   • There could be a conflict with other add-in boards. Check that there are no memory conflicts, and check DMAs, IRQs, and port addresses.

4. **When you boot up, the computer gives you a message like "DRIVE C NOT FOUND" or "DRIVE 0 NOT FOUND"**

   (DOS only) Check your system CMOS. Set both DRIVE 0 and DRIVE 1 to "Not Installed" or 0. (CMOS drive settings are for ESDI or IDE drives only.)

Problems/Solutions(continued)

5. **The drive does not appear to format over 1 gigabyte**

   (DOS and Windows only, not applicable to NetWare) You need to enable the extended or "above 1 gigabyte" translation that is found with the controller's or SCSI Host Adapter's BIOS. Some SCSI Host Adapters may need a BIOS upgrade to see over 1 gigabyte.

6. **The drive will not allow you to create a primary partition over a certain size**

   DOS can only create a maximum primary partition of 2 gigabytes. In this case, you would need to create an extended partition and multiple logical partitions, with each logical partition not greater than 2 gigabytes. Other operating systems may have similar limitations.

System Information

In the unlikely event that you need technical assistance when installing your Micropolis drive, several pieces of information will be helpful.

1. What computer (include the make and model number) and operating system (include version) are you using?

2. Is the SCSI Host Adapter integrated or embedded into the system board? If not, what SCSI Host Adapter are you using (manufacturer and model number)?

3. What is the model number, part number, and serial number of the drive that you are installing? This information can be found on the drive's label.

4. How is the drive physically attached to the system? Are there any additional peripherals on the SCSI bus? Is the drive the last device on the SCSI bus? Where are the terminators located?

5. How are the option jumpers set on the drive?

6. How long is the SCSI cable from one end to the other, including any lengths of cable internal to the enclosure?

When you have assembled this information, contact Micropolis Technical Support (see page 24).

Technical Support

If you need service or support during installation or operation of a Micropolis disk drive, **contact your reseller first**. Often the reseller will be able to resolve the problem in less time.

Micropolis provides self-help services as well as telephone technical support. Data on these services is updated regularly; all contain information such as product specifications, configuration and jumpering information, and installation guidelines for various platforms. This information provides further detail which will help with most technical problems. **For drive returns, see page 25.**

24-Hour Self-Help Services

Internet WWW site **http://www.micropolis.com**

FAXBACK	With a touch-tone telephone, call **1-800-395-DRIVE** (**1-800-395-3748**); then press #1. This system will FAX material directly to your FAX machine; a current index/document list is available.
BBS	With a computer/modem, call **1-818-709-3310**. This system provides a dial-in electronic bulletin board and information file service (Parameters: 14,400 baud, 8 data bits, no parity, 1 stop bit, full duplex).
CompuServe®	Micropolis maintains a technical forum on the CompuServe® Information Service. Simply log on to CompuServe® and type GO PCVEND at any "!" prompt. The Micropolis Message Board and library of files are located in Section 5. If you are not presently a CompuServe® member but wish to join, call 1-800-524-3388 and ask for Representative #194.

Micropolis Technical Support

- North and South America
  Chatsworth, California (Note 1) Phone: 1-818-709-3325
                                   FAX: 1-818-709-3408
- Europe and Africa
  Reading, Berkshire, England (Note 2) Phone: +44 118-975 1315
                                        FAX: +44-118-986 8168
- Asia, Australia, and New Zealand
  Singapore (Note 2) Phone: +65 482-4191
                      FAX: +65 482-4193

Note 1. Hours: 7 A.M. to 5 P.M., Monday, Tuesday, Wednesday, and Friday
                7 A.M. to 4 P.M., Thursday

Note 2. Hours: 8 A.M. to 5 P.M., Monday - Friday

Drive Returns/Spare Parts

If returning a Micropolis disk drive for any reason, **contact your reseller first**. Often the reseller will be able to resolve the problem in less time.

If returning a drive directly to Micropolis, use the Internet (preferred), FAX, or call Customer Service for a Return Material Authorization (RMA) number.

Micropolis Customer Service

- Internet **http://www.micropolis.com**
  then go to the Technical Support and Customer Service area

- North and South America
  Chatsworth, California (Note 1) Phone: 1-818-709-3325
                                   FAX: 1-818-701-2837
- Europe and Africa
  Reading, Berkshire, England (Note 2) Phone: +44 118-975 1315
                                        FAX: +44 118-975 0538
- Asia, Australia, and New Zealand
  Singapore (Note 2) Phone: +65 485-9471
                      FAX: +65 485-9481

Note 1. Hours: 7 A.M. to 5 P.M., Monday, Tuesday, Wednesday, and Friday
                7 A.M. to 4 P.M., Thursday

Note 2. Hours: 8 A.M. to 5 P.M., Monday - Friday

Please have the following information available:

1. Serial number (located on the drive's label)
2. Model number (located on the drive's label)
3. Part number (located on the drive's label)
4. Date of purchase

A Micropolis disk drive being returned must be packed in an approved shipping carton or your warranty will be voided. You are encouraged to return your disk drive in the original shipping carton. If it is not available, Micropolis will provide one for a nominal fee. If you wish to use your own carton, it must be at least 1/8-inch thick cardboard, with the drive in an anti-static bag and enclosed within a 3-inch thick piece of foam.

Please print your RMA number clearly on the top of the disk drive shipping container to ensure proper handling at the factory.

Limited Disk Drive Warranty

A disk Drive is a very precision device and may be damaged if subjected to excessive vibration or shock. Dropping or toppling the Drive may result in permanent damage to the Drive. Damage caused by improper handling of the Drive will void the warranty. MICROPOLIS (S) Pte Ltd (**MICROPOLIS**) ship all our Drives in a box that is designed to protect the Drive in the most severe shipping conditions, to insure that the Drive is not damaged during shipping.

MICROPOLIS (S) Pte Ltd Warrants its new disk Drives with an unformatted capacity of 380 megabytes or greater ("Drives") to be free from defects in material and workmanship for a period of five (5) years from the date of purchase by the original end user. This warranty will not apply to Drives sold by **MICROPOLIS** pursuant to an alternative warranty arrangement with the purchasing Original Equipment Manufacturer (OEM), Authorized Distributor (Distributor) or Reseller.

Before returning a possible defective Drive, an RMA must be obtained and clearly marked on the outside of the box.

This warranty is subject to the terms and conditions outlined herein.

I.   General Provisions

This warranty will be honored in any of the **MICROPOLIS** repair centers worldwide,:

MICROPOLIS (USA) Inc	**MICROPOLIS (S)** Pte Ltd	**MICROPOLIS** (UK) Ltd
21211 Nordhoff Street	5, Serangoon North Ave 5	4 Worton Drive
Chatsworth, CA 91311	Singapore 554916	Worton Grange
1-818-709-3325	+65 485-9471	Reading, Berkshire
		RG2 0DW, England
		+44 118-975 1315

During the warranty period, **MICROPOLIS** will, at its option, repair or replace **MICROPOLIS** Drives that prove to be defective. This will be done at no charge provided that the **MICROPOLIS** Drives are, in fact, defective and are returned to **MICROPOLIS** or an authorized service center in compliance with the following conditions. For the names and locations of authorized service centers contact :

MICROPOLIS (USA) Inc	**MICROPOLIS (S)** Pte Ltd	**MICROPOLIS** (UK) Ltd
21211 Nordhoff Street	5, Serangoon North Ave 5	4 Worton Drive
Chatsworth, CA 91311	Singapore 554916	Worton Grange
1-818-709-3325	+65 485-9471	Reading, Berkshire
		RG2 0DW, England
		+44 118-975 1315

A warranted **MICROPOLIS** Drive is to be returned to **MICROPOLIS** at the purchaser's expense and must be shipped in **MICROPOLIS** approved packaging. The original carton in which the **MICROPOLIS** Drive was received is the preferred shipping container. If the original carton is not available, **MICROPOLIS** will provide the purchaser with a carton specially designed for shipment of a **MICROPOLIS** Drive for a nominal fee. No other container is acceptable to **MICROPOLIS.**

This warranty will not cover the cost of lost data or its recovery. This is the sole responsibility of the purchaser or original end user.

The warranty will not apply to defects resulting from any of the following:

- Improper or inadequate handling by the purchaser or original end user;
- Unauthorized modification or misuse of the Drive;
- Removal or tampering with any labels on the Drives;
- Operation outside of the environmental specifications for the Drive; or
- Operation outside of the electrical specification for the Drive.

Limited Disk Drive Warranty (continued)

THE PURCHASER'S EXCLUSIVE REMEDY AND **MICROPOLIS'** SOLE OBLIGATION IS TO REPAIR OR REPLACE THE DRIVE AS STATED IN THIS WARRANTY. IN NO EVENT WILL **MICROPOLIS** BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, ECONOMIC, OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE DRIVE, OR FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, EXCEPT TO THE EXTENT SUCH LIMITATION OF LIABILITY IS PROHIBITED BY APPLICABLE LAW, IN NO EVENT WILL **MICROPOLIS'** LIABILITY EXCEED THE AMOUNT PAID BY THE PURCHASER FOR THE DRIVE.

After repair by **MICROPOLIS** or an authorized service center, **MICROPOLIS** Drives are warranted for an additional six months or the balance of the original warranty (whichever is greater).

II.   Specifics for Raw Drives Purchased by Original End Users or Dealers

This **MICROPOLIS** warranty applies only to new **MICROPOLIS** Drives purchased from Authorized **MICROPOLIS** Distributors and Resellers. This warranty applies only to Drives in use by their original end users, and is not transferable to subsequent owners/users.

If a Drive fails within ninety (90) days of shipment through a Distributor to a Reseller or original end user, **MICROPOLIS** will issue a credit to the Distributor. Original end users must deal directly with the Distributor from which they purchased the Drive in order to receive a replacement Drive or credit, during this period. **MICROPOLIS** will not issue credit to Resellers and end users. Original end users or Reseller must return the defective Drive back through to the Distributor in order to receive a replacement, and the Distributor may return the Drive to **MICROPOLIS** for credit.

III.   Advanced Exchange Program

MICROPOLIS offers an Advanced Exchange Program for original end users of raw Drives which fail beyond the initial replacement period, whereby **MICROPOLIS** will, within twenty four (24) hours of receiving notice from an end user, advance ship a replacement Drive to the original end user, provided the product is available in the customer service repair stock. Such original end user must provide a security deposit to insure the return of a replacement Drive and pay a shipping and handling expedite fee to **MICROPOLIS**. The defective Drive must be returned to **MICROPOLIS,** using the shipping label included, in the same carton in which the replacement Drive was received, and must be received by **MICROPOLIS** within ten (10) working days for the Drive to be credited. If not received within this period, **MICROPOLIS** can, at its option, refuse the credit. The Advance Exchange Program is NOT available to end users in Europe.

IV.   Specifics for Drives Integrated by OEM and Reseller Purchasers

This **MICROPOLIS** warranty applies only to new Drives incorporated in systems or products by authorized OEMs or Resellers, and in use by their original end users.

Defective Drives which have been integrated into products or systems by an OEM or Reseller must be returned to **MICROPOLIS** by that OEM or Reseller. Although an original end user may have purchased the Drive as part of a product or system, **MICROPOLIS** will not honor a warranty claim by that end user. Original end users of such Drives must deal directly with the OEM or Reseller which manufactured its product or system.

If a Drive fails within thirty (30) days after shipment to an OEM or Reseller by **MICROPOLIS,** **MICROPOLIS** will issue credit to the OEM or Reseller upon return of the defective Drive. **MICROPOLIS** will not issue credit to original end users. Original end users must deal directly with their OEM or Reseller in order to receive a replacement Drive or credit.

Quick Installation Summary

1. **Drive Handling**
   (For more information, all models - pages 2 and 3)
   Your Micropolis drive is a precision piece of equipment; careful handling will avoid the risk of damage. Minimize handling of the drive's circuit board. Do not subject the drive to electrostatic discharge (ESD).

2. **Set/Confirm the SCSI ID Number**
   (4345NS - page 6; 4345SS - page 10; 4345WS - page 14)
   If this is the only drive, the SCSI ID should usually be set to 0 (all the SCSI ID jumpers removed). For multiple drives, each must have a unique SCSI ID number; do not use the last SCSI ID number (this is usually used by the controller or SCSI Host Adapter). Drives are shipped set to ID 0; extra jumpers are provided in a poly bag in case you need to change the ID.

3. **Check the Interface Terminator(s)**
   (4345NS - page 7; 4345SS - page 11; 4345WS - page 15)
   SCSI Terminator(s) should be installed or enabled only in the end devices on the SCSI cable (usually the controller or SCSI Host Adapter is terminated). The drive is shipped with active terminator(s) enabled. If the drive is not at the physical end of the cable, disable the terminator(s). If external terminators are used, they should be active terminators.

4. **Physical Installation**
   (4345NS - page 4; 4345SS - page 8; 4345WS - page 12)
   Micropolis uses industry-standard dimensions and mounting hole locations for each class of drives. Mounting screws must not penetrate bottom mounting holes by more than 0.20 inches or side mounting holes by more than 0.156 inches (they might short-circuit components or interfere with the shock mount system).

5. **Connect the SCSI Interface Cable and Power Cable**
   (4345NS - page 5; 4345SS - page 9; 4345WS - page 13)
   Micropolis uses industry-standard connector sizes and pin assignments. Cables are available locally at computer stores if needed.

6. **Controller or SCSI Host Adapter Configuration/Software Installation**
   Follow the instructions that came with your controller or SCSI Host Adapter (or with your system). Your controller or SCSI Host Adapter may have capacity limitations which will require special setup.

7. **Low-level Formatting**
   Low-level Formatting is not required for Micropolis drives (they are shipped low-level formatted). Your computer's operating system may put limitations on partition size.