§§ **Seagate**

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Marathon 420sl

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(ST9420A, ST9420AG)

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AT Interface Drives

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Installation Guide

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MARATHON

Contents

Read before you begin...

Application. This drive uses the ATA interface and is designed for IBM AT and compatible personal computers. It is intended for use with UL-listed computers or similar products.

Warning. Turn off the computer (and remove the battery if you have a notebook or laptop computer) before you open the case or touch any internal components.

Caution. Special training or tools may be needed to service laptop and notebook computers. In some cases, opening the case may void your warranty.

Static discharge. Observe the following precautions:

- Before handling any components, put on a grounded wrist strap.

- Use antistatic padding on all work surfaces.

- Avoid static-inducing carpeted areas.

- Keep the drive in its static-shielded bag until you are ready to complete the installation. Do not attach any cables to the drive while it is in its static-shielded bag.

- Handle the drive by its edges or frame.

- Do not touch the I/O connector pins or the circuit board.

Drive handling. The drive is extremely fragile—handle it with care. Do not attach labels to any part of the drive.

Inspection. After you are familiar with the handling precautions listed above, inspect the drive. If it appears to be damaged, call your distributor or dealer immediately.

Maintenance and repair. Seagate drives do not require maintenance. The head/disc assembly is sealed; if you break the seal, you void the warranty. Seagate customer service centers are the

only facilities authorized to repair Seagate drives. Seagate does not sanction any third-party repair facilities.

Warranty. See your authorized Seagate distributor or dealer.

Configuring the drive

1. **Put on a grounded wrist strap.** Wear the grounded wrist strap throughout the installation procedure.

2. **Install master/slave jumpers.** In a two-drive system, you need to designate one drive as the master, or drive 0, and the other drive as the slave, or drive 1. To do this, install the master/slave jumpers as shown in Figure 1. In a one-drive system, configure the drive as a master (no jumpers installed).

   Alternatively, you can configure the drive as a master or slave using the cable select option. Cable selection requires a special daisy-chain cable that grounds pin 28 (CSEL) on one of its two drive connectors. If you attach the drive to the grounded CSEL connector, it becomes a master. If you attach the drive to the ungrounded CSEL connector, it becomes a slave. To use this option, the host system and both drives must support cable select, and both drives must be configured for cable select. To configure a Marathon 420sl for cable select, install both master/slave jumpers, as shown in Figure 1.

Attaching cables

This drive is designed for a host computer that supplies interface signals and +5V power through a single 44-pin connector and cable. If your computer has a fixed connector that attaches directly to the drive, skip ahead to the following section, "Mounting the drive." Otherwise, attach the interface/power cable as described on page 4.

Master/slave configuration jumpers

Pin 1

Pin 20 removed for keying

Circuit board

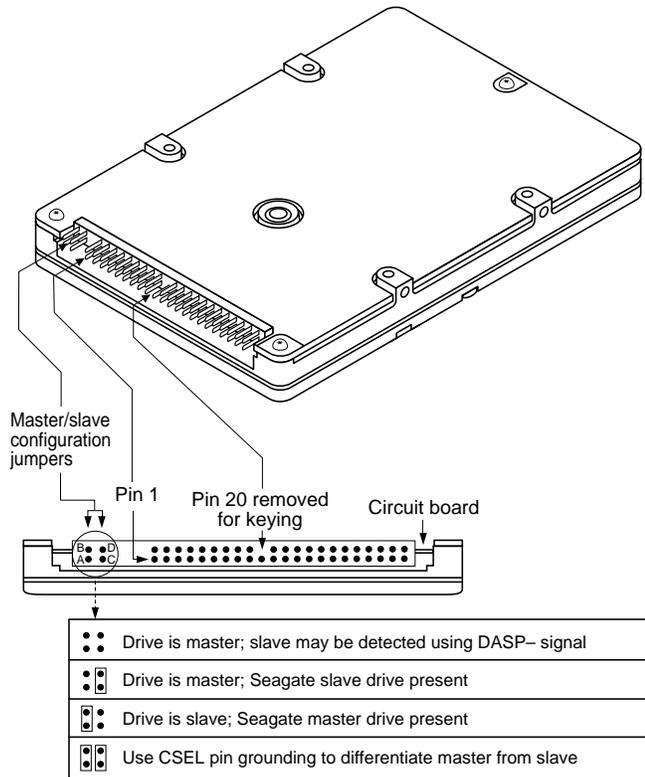|	Drive is master; slave may be detected using DASP– signal
	Drive is master; Seagate slave drive present
	Drive is slave; Seagate master drive present
	Use CSEL pin grounding to differentiate master from slave

Figure 1. ATA interface connector and master/slave configuration jumpers

1. **Turn off the computer and remove the battery.**

2. **Put on a grounded wrist strap.**

3. **Open your computer case.** See your system manual for instructions.

Caution. Opening the case may void your computer's warranty.

4. **Connect the 44-pin interface/power cable.** Match pin 1 of the cable to pin 1 of the interface connectors on the drive and on the computer. Pin 1 is usually denoted by a stripe along one edge of the cable. The location of pin 1 on the drive interface connector is shown in Figure 1 on page 3. The cable should be no longer than 18 inches (0.457 meters).

Caution. The printed-circuit cables used in laptop computers are very delicate. Be careful not to tear them.

Mounting the drive

Mount the drive securely in the computer using M3X0.5 metric screws in the four bottom mounting holes or the four side mounting holes. You can mount the drive in any orientation. Be careful not to strain or crimp the interface/power cable.

Caution. To prevent damage to the drive:

- Be careful not to bend the drive connector pins, especially when plugging the drive into a fixed connector.

- Use mounting screws of the correct size and length.

- Gently tighten the mounting screws—do not apply more than 3 inch-pounds of torque.

- Do not insert mounting screws more than 0.15 inch.

Note. This drive meets industry-standard MCC mounting specifications. When installing this drive in a fixed-mounting

application, you must use MCC-compatible connectors and mounting hardware. If the mounting holes in your computer do not line up with the mounting holes on the drive, your computer may not be MCC-compatible.

Configuring your computer

Before your computer can recognize a new drive, you must enter basic information about the drive into the computer's long-term memory (usually a battery-powered CMOS chip). The computer's basic input/output system (BIOS) uses this information to control the flow of data to and from the drive.

Note. Some newer computers can automatically determine your drive type and configure themselves appropriately at startup. Read your system manual to determine whether this applies to your computer. If so, then skip ahead to "Formatting and partitioning the drive," on page 8.

If your computer cannot automatically determine your drive type, you must run a system setup program to specify the number of cylinders, heads and sectors for each drive in your system. This procedure is described on the following page. The table below lists cylinder, head and sector information for the Marathon 420sl.

No. cylinders	988
No. read/write heads	16
No. sectors per track	52
Total no. sectors	822,016
Bytes per sector	512
Capacity (Mbytes):	
BIOS calculated	400
Usable	420

To enter these drive specifications into your system BIOS, follow these steps:

1. **Turn on your computer.**

2. **Run the system setup program.** This program configures the system BIOS to recognize your drive. In some computers you run the system setup program by pressing special keys while the computer is booting up. In other computers, you can run the program from the DOS prompt. See your system manual for more information.

3. **Enter your drive specifications.** Within the system setup program, there are three possible ways that you can enter your drive's specifications. These are listed below in order of increasing complexity.

   - **Select a predefined drive type.** Most system setup programs provide a long list of predefined drive types. Select a drive type with specifications that match those of your drive (refer to the table on page 5).

   - **Specify a *custom* or *user-defined* drive type.** If the system setup program doesn't list a predefined drive type that matches your drive specifications, you may be able to define a custom or user-defined drive type. You can then enter your drive specifications (from the table on page 5).

     When you enter drive specifications for a custom or user-defined drive type, the setup program should display a drive capacity less than or equal to the *BIOS calculated capacity* in the table on page 5. This value is slightly lower than the usable drive capacity.

   - **Allow your drive to emulate or *translate* one of the predefined drive types.** If none of the predefined drive types exactly matches your drive, and your system setup

program does not allow you to specify a custom drive type, your drive may be able to emulate one of the predefined drive types. Select a predefined drive type that has a capacity as close as possible to, but not greater than, the BIOS calculated capacity of your drive (as shown in the table on page 5).

Note. If you emulate a drive type with a lower storage capacity than your drive, you limit the effective capacity of your drive. For example, a 350-Mbyte drive emulating a 300-Mbyte drive will be limited to 300 Mbytes of storage capacity.

If you are not sure which drive type to select, try running the FINDTYPE.EXE utility program. This program is available from Seagate's Technical Support services (on the SeaBOARD computer bulletin board). FindType compares your drive's geometry with all geometries supported by your computer's BIOS. FindType can also determine whether an exact match exists between the drive geometry and the system BIOS. If there is no match, FindType selects the closest drive type supported by your computer's BIOS.

The system setup program may request information on the drive's write precomp or landing zone. However, you do not need to enter any values, since your Seagate drive does not use these parameters.

Caution. Write down the drive type that you have selected and any drive specifications that you have entered. Keep this information in a safe place. You will have to re-enter this data if your CMOS battery fails.

Formatting and partitioning the drive

Caution. Formatting or partitioning a drive that contains data may destroy all data on the drive. Before repartitioning or reformatting a drive that contains data, make sure all data on that drive has been safely backed up. Seagate Technology assumes no liability for lost data.

Low-level formatting

Seagate ATA Interface drives are low-level formatted at the factory and do not require additional low-level formatting before use.

Note. If you are installing only a single drive in your computer, you can use the DOS program SETUP.EXE (supplied with MS-DOS 5.0 and above) to partition and format the drive. See your DOS manual for details. After you successfully run SETUP.EXE, your drive will be ready to use, and you can skip the partitioning and formatting steps below.

Partitioning

The partitioning process subdivides a single disc drive into partitions that behave as separate logical drives (labeled C, D, E, etc.). You can also set up the entire disc as a single partition.

1. **Restart your computer.** Boot up the computer using a diskette that contains DOS system files.

2. **Run the FDISK program.** Insert a DOS program diskette containing the FDISK program into your diskette drive. At the DOS prompt, type **fdisk** and press ENTER. Then follow the directions on the screen to create one or more partitions. See your DOS manual for details. If you are partitioning a drive that will be used to boot the computer, make sure that the primary partition is marked active.

High-level formatting

High-level formatting verifies the information written by the low-level format and creates file allocation tables used to catalog and access files.

Caution. Make sure that you know the correct drive letter for the partition you wish to format. Formatting a drive that contains data may destroy the data on that drive.

1. **Run the FORMAT program.** Insert a DOS program diskette containing the FORMAT program into your diskette drive. At the DOS prompt, type **format**, followed by the drive letter for the first drive partition you want to format (for example, **format C:**). Then, press ENTER. Repeat this procedure to format each of the new drive partitions you have created. Consult your DOS manual for FORMAT command options.

Note. If you are formatting the drive partition that will be used to boot your computer (the "C" drive), copy the DOS system files to this drive. To do this, type **/s** after the format command (for example, **format C: /s**)

2. **Verify the drive capacity.** After high-level formatting a drive, you can verify the usable drive capacity by running the DOS CHKDSK utility program.

Installation troubleshooting

Before calling Seagate Technical Support, please read and con-
sider all the possibilities discussed on the following pages. The
suggestions presented here address the vast majority of instal-
lation problems.

General troubleshooting procedures

The following is a list of general troubleshooting procedures. Solu-
tions for specific problems are provided on subsequent pages.

Warning. Always turn off the computer before changing jump-
ers, moving cables or touching any internal compo-
nents.

- **Verify hardware compatibility.** Check the documentation
for your drive, host adapter and computer to confirm that these
components are compatible.

- **Verify your hardware configuration.** Check the documen-
tation for your drive, host adapter and computer to confirm
that all jumpers are set appropriately.

- **Check all cables.** Make sure that all cables are securely
connected. Printed circuit and ribbon cables are quite fragile.
Check to see that they are not crimped or damaged. Make
sure that pin 1 of the interface cable is connected to pin 1 of
the interface connector on the drive and on the computer.
Most ribbon cables have a stripe down one side to designate
pin 1. The location of pin 1 on the drive interface connector is
shown in Figure 1 on page 3.

- **Check all cards.** If your computer has expansion cards,
check to see that they are inserted completely into their slots
on the motherboard and are secured with appropriate mount-

ing screws. Make sure that full-size (16-bit) cards are not plugged into half-size (8-bit) slots.

- **Verify the BIOS drive type.** Make sure that you entered the correct drive type or translation geometry in the BIOS setup program. The drive capacity and number of sectors specified in the BIOS must not exceed the specifications shown in the table on page 5. If the drive type is incorrect, you must rerun the system setup program. Then partition and high-level format the drive again.

- **Check for I/O address conflicts.** To isolate an address conflict, first verify that the drive and host adapter are compatible with your system by disconnecting all other peripherals except the video card. Then install the drive and host adapter, and test the system. Next, install the other peripherals, one at a time, until the conflict reappears. After you have isolated the source of the address conflicts, you can resolve the conflict by changing the I/O address of the peripheral that appears to cause the conflict.

- **Check the power supply.** The output of your power supply may not be sufficient to meet the power requirements of the new devices you have installed. If you are not sure whether your power supply meets your system requirements, consult your computer dealer or distributor.

- **Check your DOS version.** You must use the same version of DOS (we recommend MS-DOS version 5.0 or later) throughout all phases of building and configuring your computer system.

- **Check for viruses.** Use the latest version of a reliable virus-checking program to scan your computer's memory, hard discs and any suspect diskettes for viruses. Run the virus-checking program if you encounter inexplicable disc errors or

damage to disc partitions. Also, before installing any new software, scan the installation diskettes for viruses.

Specific Troubleshooting Procedures

Methods for resolving specific drive installation problems are listed on the following pages. These methods incorporate many of the general troubleshooting techniques described in the previous section.

The screen remains blank when you power up the computer.

- Make sure the monitor is plugged in and turned on.
- Check all cards. Make sure the video card is seated in its slot and secured with mounting screws.
- Check all cables. Make sure the video card cables (if any) are securely attached.
- Power down the computer and remove the drive host adapter. If the screen comes on after you reboot, the host adapter may be incompatible or defective. If so, see your dealer.

At startup, the computer does not recognize the presence of the drive.

- Check all cables.
- Check jumper settings on all drives.
- Check the power supply.
- Reboot the computer and make sure the drive spins up. If your drive is very quiet, you may not be able to hear it spin up. In this case, check the drive activity LED if your computer has one. If the drive does not spin up, check the drive cables again.
- Verify the BIOS drive type.
- Check for I/O address conflicts.

- Try a warm boot. Press CTRL, ALT and DELETE simultaneously to reboot the computer without turning off the power. If a warm boot causes a previously unrecognized drive to become recognized, there may be a timing problem in which the drive fails to become ready before the host completes its power-on self-test.

   One possible solution is to power up your computer with its processor set at low speed (see your computer manual for details on setting processor speed). After the computer is up and running, return your processor to high speed or turbo mode. Another option is to warm-boot your computer after every power-on. You may also be able to solve this problem by upgrading your system BIOS.

At startup, the message "HDD controller failure" appears.

- Check jumper settings on all drives.
- Check all cards and cables

The dealer partitioned and high-level formatted the drive for you in the store. Later, you installed the drive and it does not work.

- Reboot the computer and make sure the drive spins up.
- Check all cables.
- Check the power supply.
- Check your DOS version. Call your dealer to make sure the DOS version the dealer used to partition and high-level format the drive is the same as the version you have installed on your computer.
- Verify the BIOS drive type. When you run the system setup program on your computer, you must specify the same BIOS drive type or translation geometry that the dealer used.

- Check for memory conflicts.
- Check for viruses.

During the FDISK program, you get an error message warning of an attempt to write to track 0 or to the boot sector; the message may also suggest that a virus is present.

- This occurs in systems having a virus-protection scheme that does not allow programs to modify the boot sector of the disc. See your system manual for details. To avoid the problem, run the system setup program and turn off the virus-protection option. Then exit system setup and run the FDISK and FORMAT programs. After all drive partitions are formatted, use the system setup program to turn virus protection on again.

During the FDISK program, the computer hangs or fails to create or save the partition record.

- Check all cables.
- The FDISK program on your DOS utilities diskette may be corrupted. Try running the program from a different diskette.
- Check to see if you are using a version of MS-DOS prior to version 4.0. If so, upgrade to MS-DOS version 5.0 or later.
- Try another drive type or translation geometry. Sometimes the host BIOS does not accept a particular translation geometry even though that geometry is listed as an option during system setup.
- Make sure that the host adapter is not assigned an interrupt that is already in use by another device. Modify the interrupt jumpers if necessary.

During the FDISK program, the error message, "No Fixed Disk Present," appears.

- Check all cables.

- Check the power supply.
- Reboot the computer and make sure the drive spins up.
- Verify the BIOS drive type.
- Check for I/O address conflicts.

During high-level formatting, the drive keeps finding hard errors and reporting the following message: "Attempting to recover allocation units. . ."

- This is normal with some versions of DOS. The drive will format normally. However, after formatting the drive, you may want to run a third-party surface-scan program to check for bad sectors.

During high-level formatting, the drive does not format to full usable capacity.

- Verify the BIOS drive type. Your drive's formatted capacity is limited to the capacity of the BIOS geometry you selected. If your BIOS does not offer a geometry that takes advantage of the full capacity of the drive, and a user-defined drive type is not available, use a third-party partitioning utility.
- Run FDISK again and make the partitions smaller. Make sure you are using MS-DOS version 5.0 or later or equivalent.

At startup, the messages, "Disk Boot Failure," "Non-System Disk," or "No ROM Basic - SYSTEM HALTED," appear.

- Run the FDISK program and make sure the primary partition is marked active.
- Check all cables.
- Check your DOS version.
- Reinstall the DOS system files onto the hard disc using the SYS command (see your DOS manual).

- Check for viruses.

During operation, the system error message, "Drive not Ready," appears.

- Check all cables.
- Check the power supply.
- Reboot the computer and make sure the drive spins up.

Compatibility notes

- The Marathon 420sl conforms to the ATA interface specifica-tions. The host system BIOS must provide support for the ATA interface command set. For a detailed description of the ATA commands implemented by this drive, see the *Seagate Mara-thon 420sl Product Manual* and the *Draft Proposed ATA-2 Standard*.

- In accordance with ATA specifications, the system BIOS must reset any emulation/translation parameters after a hard reset.

- In some configurations, a Marathon 420sl may supply up to 16 bytes of error correction code (ECC) with the Read Long and Write Long commands. Depending on the drive type, your system BIOS may look for 4 bytes of ECC. If your system BIOS expects 4 bytes of ECC and the drive supplies a different number of bytes, some drive diagnostic programs may fail, typically resulting in time-out errors. Consult your computer documentation or call your computer dealer or manufacturer for information on configuring your computer to receive more than 4 bytes of ECC.

- Some older drive diagnostic programs may incorrectly report an ECC-detection failure when analyzing a Marathon 420sl. This occurs because the drive hardware corrects the data automatically, avoiding the error rather than reporting it. Such a report does not indicate a drive malfunction.

Technical support services

If you need assistance installing your drive, consult your dealer. Your dealer is familiar with system configurations and can help you with system conflicts and other technical issues.

If you need additional assistance with your Seagate drive or other Seagate products, you can call SeaBOARD™, SeaFAX™, Seagate Technical Support FAX, SeaFONE™, or SeaTDD™. Seagate technical support is also available on CompuServe and through the internet.

SeaBOARD

Using a modem, you can access documentation, drive specifications and jumper settings for Seagate's entire product line. You can also download software for installing and analyzing your drive.

SeaBOARD is available 24 hours daily. It supports communications up to 9,600 baud. Set your communications software to eight data bits, no parity and one stop bit (8-N-1). SeaBOARD phone numbers are listed in the following table.

Location	Modem number
United States	408-438-8771
England	44-1-62-847-8011
France	(+33 1) 48 25 35 95
Germany	49-89-140-9331
Singapore	65-292-6973
Thailand	662-531-8111
Australia	61-2-756-2359
Korea	82-2-556-7294

SeaFAX

You can use a touch-tone telephone to access Seagate's automated FAX system to receive technical support information by return FAX. This service is available 24 hours daily.

Location	Telephone number
United States	408-438-2620
England	44-1-62-847-7080

Seagate Technical Support FAX. 408/438-8137

You can FAX questions or comments to technical support specialists 24 hours daily. Responses are sent between 8:00 A.M. and 5:00 P.M. (Pacific time), Monday through Friday.

SeaFONE. 408/438-8222

You can talk to a technical support specialist between 8:00 A.M. and 5:00 P.M. (Pacific time), Monday through Friday. SeaFONE provides recorded technical information on selected Seagate products while you are on hold. You can access these recordings 24 hours daily. Before calling, note your computer configuration and drive model number (ST*xxxx*).

SeaTDD. 408/438-5382

Using a telecommunications device for the deaf (TDD), you can send questions or comments 24 hours daily and exchange messages with a technical support specialist between 8:00 A.M. and 5:00 P.M. (Pacific time), Monday through Friday.

Seagate CompuServe forum

Online technical support for Seagate products is available on CompuServe. To access our technical support forum, type **go Seagate.** This forum provides information similar to that found on SeaBOARD.

Seagate's internet connections

Technical information for Seagate drives is available through the internet from Seagate's World Wide Web home page (http://www.seagate.com) or Seagate's ftp server (ftp://ftp.seagate.com). The ftp server contains information similar to that found on SeaBOARD.

Storing and shipping your drive

Keep your original box and packing materials for storing or shipping your drive. The box has a *Seagate Approved Package* label. Shipping a drive in an unapproved container voids the warranty. Call your authorized Seagate distributor to purchase additional boxes. Figure 2 shows a drive in an approved single-pack box with all necessary packing materials.
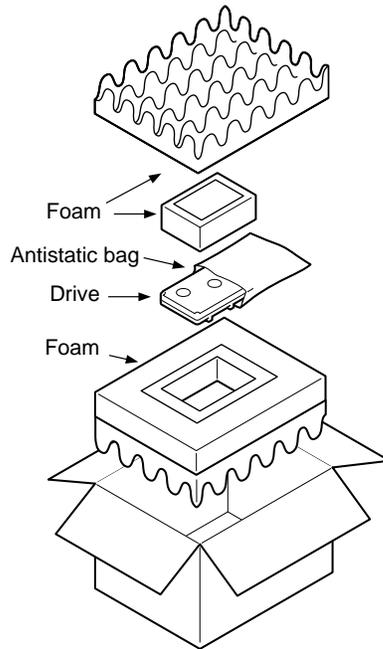
Foam

Antistatic bag

Drive

Foam

Figure 2.   Seagate 2.5-inch drive and approved packing materials