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ST3491 Family:
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ST3250A, ST3291A
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ST3391A, ST3491A
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AT Interface Drives
.....
Installation Guide
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Read before you begin...

Application. Your Seagate® drive is designed for IBM AT and compatible personal computers. It uses the ATA interface.

Warning. Turn off the computer before you open the case, touch any internal components or install the drive.

Static discharge. Observe these precautions to avoid static electricity, which can damage a drive or computer. Static electricity can be generated by wool or synthetic clothing, carpets and plastics of any kind including most bags.

- Keep the drive in its static-shielded bag until you are ready to install it. Do not attach any cables to the drive while it is in its static-shielded bag.
- Before you handle the drive, put on a grounded wrist strap, or ground yourself frequently by touching the metal chassis of a computer that is plugged into a grounded outlet. Wear a grounded wrist strap throughout the installation procedure.
- Handle the drive gently and only by its edges or frame. Until you are ready to install it, place it only on an antistatic surface.
- Do not touch the drive's connector pins or its printed 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.

Warranty. See your authorized Seagate distributor or dealer.

Maintenance and repair. Seagate drives do not require maintenance. The head/disc assembly is sealed; a broken seal voids the warranty. Seagate customer service centers are the only facilities authorized to repair Seagate drives. Seagate does not sanction any third-party repair facilities.

Configuring the drive

1. **Turn the computer off.**
2. **Remove your computer's cover.**

Caution. Special training or tools may be needed to service laptop computers. Removing the cover may void your warranty. Review the terms and conditions of your warranty before removing the cover.

3. **Ground yourself.** Wear a grounded wrist strap throughout this procedure, or frequently touch the metal chassis of a computer that is plugged into a grounded outlet.
4. **Remove the drive from its antistatic bag.**
5. **Install master/slave jumpers.** The master/slave jumper block, shown in Figure 1 on page 4, accepts 2-mm connectors and jumpers. Use Seagate part number 13211-001 or equivalent.

One-drive system: Configure the drive for a one-drive system as shown in Figure 1.

Two-drive system: With two ATA interface drives, you must designate one drive as the master, or drive 0, and the other drive as the slave, or drive 1. This can be done in either of two ways:

- When using a standard ATA interface cable (that is, you are not using cable select): configure the drive as a master or a slave using the options jumper block as shown in Figure 1 on page 4.
- When using cable select (that is, you have a special cable supporting this drive selection method, and your computer and both drives all support cable select): first install a jumper on pins 3-4 of the options jumper block as shown in Figure 1; then use a drive-select cable as described in step 5 of "Attaching cables" on page 3 to designate master and slave drives.

Attaching cables

Refer to Figure 1 on page 4 for the locations of the connectors.

1. **Make sure the computer is off.**
2. **Put on a grounded wrist strap.**
3. **Connect the remote LED (optional).**
4. **Attach the power cable.** Attach one of the computer power cables from the power supply of your computer to the 4-pin power connector on the drive.
5. **Attach the interface cable.** (Interface ribbon cable length must be 18 inches or less.)

Caution. Connector misalignment can damage the computer and the drive. Ribbon cables are delicate—be careful not to crimp or strain them.

One-drive system using a standard ATA 40-pin interface cable:

Connect one end of the cable to the computer's host adapter card or to the hard drive connector located on the motherboard; connect the other end to the 40-pin interface connector. Align pin 1 on each cable connector with pin 1 on its matching equipment connector. (Cable lead 1 going to connector pin 1 is often denoted by a colored edge-stripe on the cable; the stripe will lie adjacent to the 4-pin power connector.)

Two-drive system with a standard ATA 40-pin interface cable:

If you are using a standard 40-pin two-drive ribbon cable, plug one connector into J1 on each drive and attach the remaining connector to the host adapter. Align pin 1 on connectors as described above for a one-drive system.

Two-drive system using interface cable supporting cable select:

If in step 5 on page 2 you followed the instructions for two drives and cable-select, you must assign master and slave status to drives by the following method: to make a drive the

master, attach it to the connector that has the CSEL signal line connected to pin 28. To make a drive the slave, attach it to the connector that has pin 28 unconnected (open). Finally,

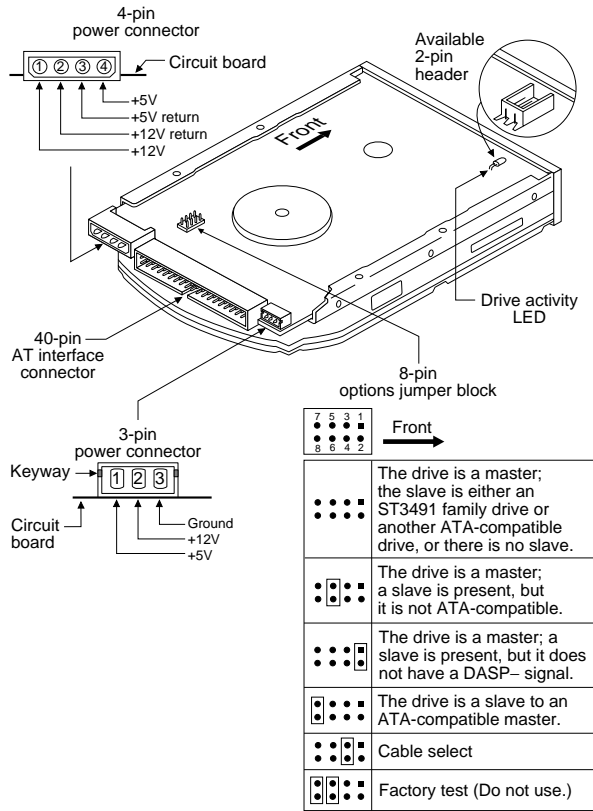


Figure 1. Jumpers and connectors

connect the remaining cable connector to the host adapter.
Note that CSEL is grounded on the host adapter.

Mounting the drive

Mount the drive securely in the computer in any orientation using either the bottom or side mounting holes, as described below. Position the drive so that you do not strain or crimp the cables.

All ST3491 family drives have the same overall dimensions. However, the positions of the mounting holes are different for metric and standard drives.

- Standard size drives have an “S” stamped on the frame runner and accept 6-32 UNC screws.
- Metric drives have an “M” stamped on the frame runner and accept M3 screws.

Caution. To prevent drive mounting hole damage, use only the appropriate type of screws as specified. Tighten them gently using no more than 6 inch-lb of torque.

Bottom mounting holes. Insert four mounting screws not more than 0.20 inches (6 full turns) into the drive frame.

Side mounting holes. Insert four mounting screws not more than 0.13 inches (4 full turns) into the drive frame.

After you have mounted the drive in the computer, disconnect your grounded wrist-strap and replace the computer cover.

Configuring the computer

1. Turn the computer on.
2. Enter the System Setup routine (also known as CMOS Setup) and define the new drive's translation geometry as follows:
 - 2A. Select the drive type according to the following guidelines:
Select a drive type matching your drive's translation geometry.

(continued)

If none of the standard drive types offered by the System Setup routine match the translation geometry shown in the following table, select the *user-defined* or *custom* drive type to enter your drive's translation geometry.

If your System Setup routine does not offer a *user-defined* drive type, select a standard drive type with a capacity that approximates, but does not exceed, your drive's capacity (shown in the last column of the table). If you do not know what drive types your System Setup routine supports, download the FindType utility from the Seagate BBS (see page 16) to assist you in choosing an appropriate drive type.

The following table shows the recommended translation geometry for the drive.

| Model | CHKDSK Mbytes | Translation geometry | | | CMOS (Setup) Mbytes |
|---------|------------------|----------------------|-------|----------------------|---------------------------|
| | | Cyl | Heads | Sectors per track | |
| ST3250A | 213.9 | 1,024 | 12 | 34 | 204.0 |
| ST3291A | 272.7 | 761 | 14 | 50 | 260.1 |
| ST3391A | 341.3 | 768 | 14 | 62 | 325.5 |
| ST3491A | 427.8 | 899 | 15 | 62 | 408.2 |

- 2B.** The drive does not use the *write precomp* and *landing zone* parameters. For each parameter, enter the number of cylinders plus 1. Example for ST3491A: 899+1, or 900.
- 2C.** Save your entered values into CMOS memory, then exit System Setup. On some systems this is one step.

Low-level formatting

AT drives are low-level formatted at the factory to 512 bytes per sector. You do not need to low-level format AT drives.

Partitioning

You must partition a drive into one or more logical drives before you can use it. If you are using DOS Version 3.3 or earlier, disc partitions are limited to about 33 Mbytes. Beginning with DOS Version 4.0, you can put the entire drive on one partition.

Caution. Partitioning or formatting a drive at any level erases all data on it. Before you repartition or reformat your drive, save all existing files to backup files. Seagate assumes no liability if you erase your data.

You can partition a drive as follows:

1. Put a bootable DOS diskette in the A drive and boot the computer. This loads DOS from the floppy and runs it.
2. At the DOS prompt, type **FDISK** and then press ENTER to run the FDISK utility.
3. Select *create DOS partition or logical DOS drive* and press ENTER.
4. Select *create primary DOS partition*. Use the maximum available size for your primary partition and make the partition active. This puts the entire drive on one partition and allows the computer to boot (load DOS) from the partition. Press ENTER after every selection.
5. After you make all the appropriate selections, the computer automatically reboots itself.

Many Unix-based operating systems allow you to partition the drive for DOS applications. See your operating system manual for details.

High-level formatting

High-level formatting verifies the information written by the low-level format and builds the file allocation table (FAT) used by DOS to access files on the drive. Use the DOS FORMAT utility to high-level format the drive as follows:

1. Type the following command line at the DOS prompt:

format *drive*: /V /S

drive: designates the drive you are formatting. Use *c*: if you are formatting the boot drive or if your system contains only one hard drive. To format a non-boot drive, type *d*: instead.

/V tells the computer you want to label the drive after it is formatted. Labeling the drive can prevent someone from accidentally deleting the partition and losing your data.

/S tells the computer to make the drive bootable and copy the necessary system files to the drive.

2. When the computer prompts you for a volume label, type any valid name you want to designate the drive.

In Unix, high-level formatting creates the i-node used for file access information. Drive formatting and partitioning are both performed by a single operating system utility. Refer to your Unix operating system documentation for instructions.

Using the MIRROR utility

If a virus or a faulty computer program destroys your drive's file allocation table (FAT) or its partition information, you can usually recover your data if you save copies of these important files. To do this, add the MIRROR command to your autoexec.bat file.

1. Using an ASCII text editor, open the autoexec.bat file, which is located in the boot drive's root directory.
2. At the end of the autoexec.bat file, add the following command line to back up the C: drive's FAT:

c:\DOSMIRROR c:

If you have many partitions (logical drives), you can add additional drive letters (for example, d: e: f:) to the command line to represent these drives.

Note. If the mirror utility on your computer is not in the DOS directory under the root directory, you must specify the pathname leading to the utility's location.

3. Save your changes, exit the editor and reboot your computer. After every reboot, the computer automatically executes the autoexec.bat file. Verify that the MIRROR command runs successfully; the MIRROR command copies the FAT and makes a partition record named mirror.fil in the drive's root directory. If a virus or a faulty program destroys the FAT, recovery utilities use this file to recover the FAT.

Now, back up the boot drive's partition record to a diskette:

1. Insert a blank, formatted diskette in the floppy drive and type the following command line at the DOS prompt:

c:\DOS\mirror /partn

The computer copies the file mirror.fil to the floppy diskette.

2. Remove the diskette from the drive and keep it in a safe place. If your drive's partition record ever becomes corrupted, you can use recovery utilities along with this diskette to recover your data. If you ever repartition the drive, back up the partition record again.

Basic troubleshooting

Note. The Seagate drives in this family include special power-saving features. If a drive has not been accessed for a while, it will automatically go into power-saving idle mode and park the heads. This action may be audible to the user as a small mechanical sound. However, it is a normal feature and no cause for concern.

Warning. Always turn off the computer before changing jumpers or unplugging cables and cards.

In the event of problems, you should perform the following basic checks, which can resolve common installation difficulties.

- **Verify compatibility.** Verify that the host adapter and the drive are appropriately matched to each other and to your computer. Refer to relevant documentation for details.
- **Verify equipment configuration.** Using the instructions in the drive and host adapter installation guides, make sure that all appropriate jumpers are installed, or removed, to suit your application.
- **Check the power supply specifications.** If new devices are installed, your computer's power supply may not support the new total power requirement. When in doubt, consult your dealer.
- **Check all cards.** Verify that all cards are seated in their slots on the motherboard and are secured with mounting screws.
- **Verify the drive type setting stored in system CMOS memory.** The drive type stored in CMOS memory by your System Setup program must approximate, but not exceed, the physical specifications of your drive.
- **Check all cables.** Make sure all ribbon cables and power cables are securely connected. Ribbon cables are especially fragile. Verify that they are not crimped or damaged, and if in doubt, substitute cables that are new or known to be good. Verify for each cable that cable connector pin 1 aligns with

equipment-connector pin 1. Pin 1 is often denoted by a colored stripe on one edge of the ribbon cable.

Caution. Do not reverse-plug connectors. This can damage the computer and the drive.

Note. A floppy diskette cable contains a split and twisted section and cannot be used with a hard drive.

- **Check for viruses.** Before you use someone else's diskette in your system for the first time, scan the diskette for viruses.

Advanced troubleshooting

If you have performed the preceding basic checks but the problem has not been solved, follow these guidelines for troubleshooting specific cases:

The system does not recognize the presence of the drive.

- Check all cables.
- Make sure the power supply is adequate for system needs.
- Reboot the computer and make sure the drive motor runs. (If your drive is very quiet, it may be difficult to hear its discs reach operating speed.) If the drive does not appear to be running, recheck all drive cables.
- Verify the CMOS setup drive type values.
- Try a warm boot (a reboot without turning off computer power). To do this, press CTRL, ALT, and DELETE at the same time.

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 for operation before the computer's power-on self-test is complete.

One possible solution is to slow your computer's processor speed during startup. If your computer has a turbo switch, set it to slow speed before turning the computer on. If there is no turbo switch, you may be able to use keyboard commands to slow the processor speed; see your computer manual for

details. After the computer is up and running, return the processor to the fast speed. Another solution is to warm-boot your computer after every power-on.

- Check for I/O address conflicts. To isolate the conflict, first verify that the drive and host adapter are compatible with your computer by removing all the peripheral adapter cards (power must be off) except for the video card. Then reinstall the drive and host adapter card. If this is successful, reinstall the other peripherals one at a time until the conflict reoccurs.

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.

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

- Reboot the computer and make sure the drive spins up.
- Check all cables.
- Make sure the power supply is adequate for system needs.
- Use the same version of DOS within all partitions. 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. If it isn't, see your dealer.
- Verify the CMOS drive type setup value. You must install the drive using the same drive type or translation geometry that was set before initial partitioning by your computer dealer.
- Check for I/O address conflicts between peripheral cards.
- Check for viruses.

The screen goes blank when you power up the system.

- 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 are securely attached.
- While the computer is powered down, remove the drive host adapter. If the screen turns on after you reboot, the host adapter may be incompatible or defective. If so, see your dealer.

The system hangs in FDISK or fails to create or save the partition record.

- Check all cables.
- The DOS utilities diskette may be corrupted. Try your backup DOS diskette.
- Make the partitions smaller.
- Use another drive type or translation geometry. Sometimes the computer's BIOS does not accept a particular translation geometry for writing into the CMOS setup memory.
- Change the interrupt jumper setting on the host adapter.
- Check for media defects at the beginning of the drive. Use a third-party surface scan utility.

System error message, "Drive not Ready," appears.

- Check all cables. For each ribbon cable, verify that pin 1 of the cable is matched to pin 1 of the connector. Pin 1 is usually denoted by a stripe on the side of the ribbon cable.
- Make sure the power supply is adequate for system needs.
- Reboot the computer and make sure the drive spins up.

The FDISK error message, "No Fixed Disk Present," appears.

- Check all cables.
- Make sure the power supply is adequate for system needs.
- Reboot the computer and make sure the drive spins up.
- Verify the CMOS setup drive type values.
- Check for I/O address conflicts.

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

- Verify your computer's CMOS setup drive type values. One of the following problems may have occurred: 1) CMOS setup may be set for an incorrect drive type or translation geometry; 2) you may have entered a parameter value that exceeded the physical capacity of the drive; or 3) you selected a CMOS geometry or drive type that does not take full advantage of the drive's capacity.

If any of these cases is true, follow the instructions on pages 5 and 6 for configuring the computer.

If you reset CMOS setup drive type value, partition and high-level format the drive again. Note that DOS does not allow more than 1,024 cylinders.

- If you partitioned the drive into individual logical drives, you may need to make the partitions smaller so that the computer can use all of the drive's capacity.

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

- Check all cables.
- Use the same version of DOS throughout all partitions on your computer.
- Reinstall the DOS system files using the DOS SYS utility.
- Verify using FDISK that the primary partition is active.
- Check for viruses.

Technical support services

Always consult your computer dealer first for technical support. Dealers can offer help with unique system configurations.

Technical support is available for all Seagate products by calling the SeaFAX™, Seagate Technical Support FAX, SeaFONE™, SeaBOARD™ and SeaTDD™ services.

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 | 44-62-847-7080 |

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 the recordings 24 hours daily. Before calling, note your system configuration and drive model number (STxxxx).

SeaBOARD

Using a modem, you can:

- Access documentation, drive specifications and jumper settings for Seagate's entire product line.
- Download software for installing and analyzing your drive.
- Request a return phone call from the technical support staff.

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 |
| Canada | 416-856-5581 |
| England | 44-62-847-8011 |
| France | 33-1-40 67 10 34 |
| Germany | 49-89-140-9331 |
| Singapore | 65-292-6973 |
| Australia | 61-2-756-2359 |
| Korea | 82-2-556-7294 |

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.

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.

The following figure shows how a drive fits in an approved single-pack box, including the packing materials.

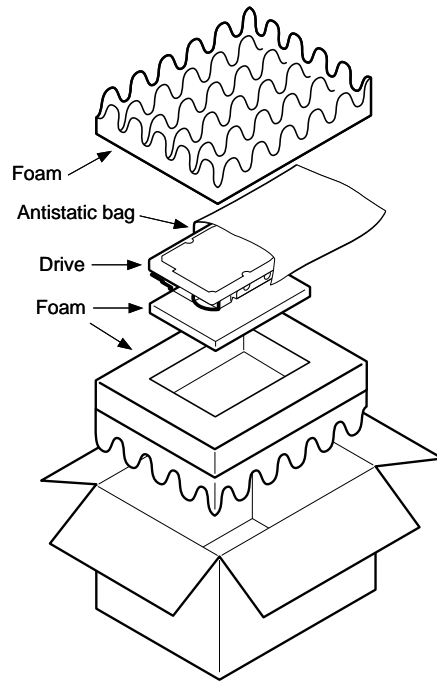


Figure 2. A drive in an approved package



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