SeaTools *Enterprise Edition*: Complete Drive Protection

User's Manual/Reference Guide

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SEATOOLS ENTERPRISE EDITION

Users Manual / Reference Guide

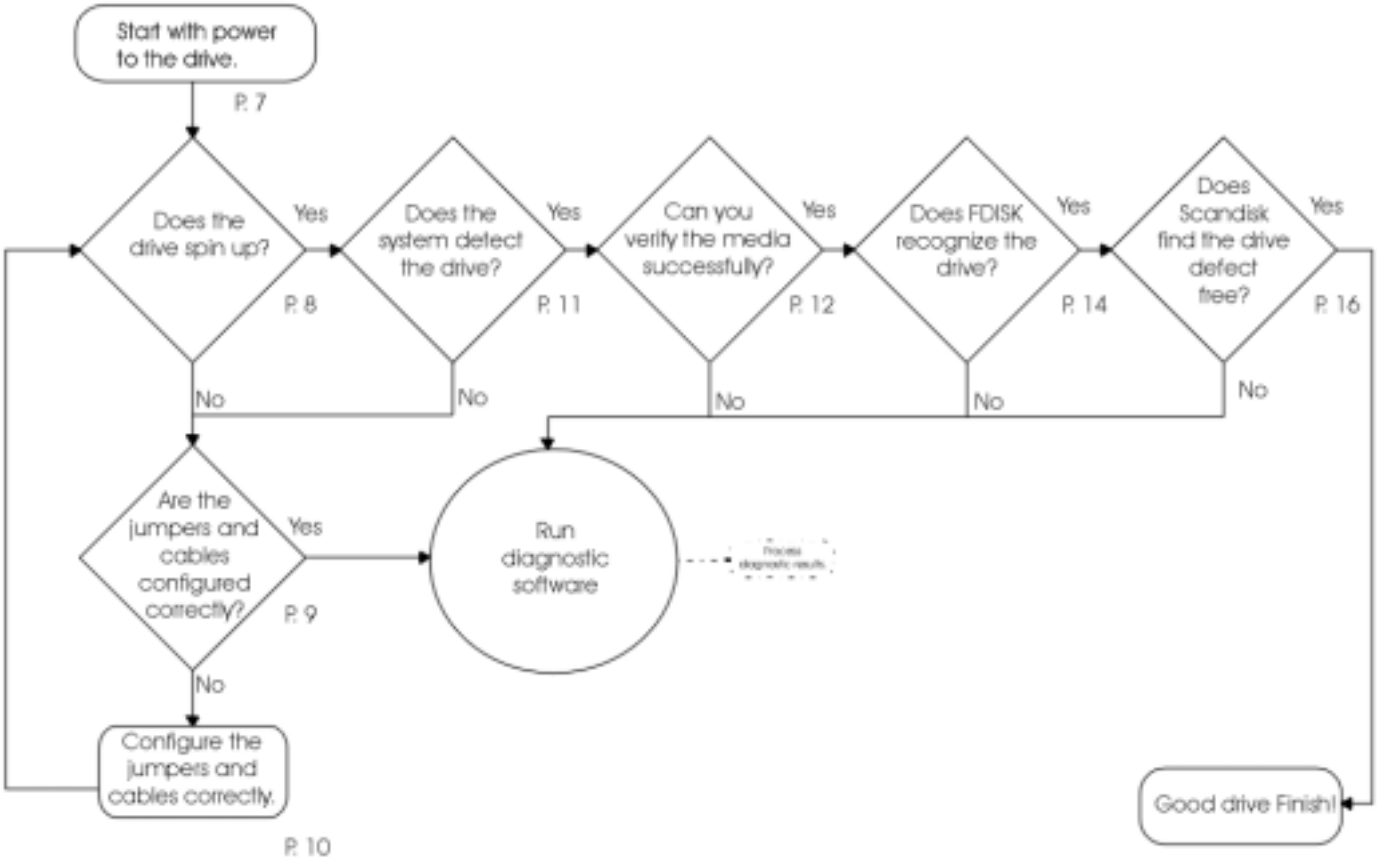
NOTE

This manual is intended to be used either as a traditional training text or as an "interactive" document. You can take a very methodical approach and go through the defined processes step-by-step. You can also take the "I feel lucky today" approach and drill down to a specific part of a process. The table of contents, located on the following two pages, supports both of these approaches.

Table of Contents (TRADITIONAL)

SeaTools

Table of Contents (INTERACTIVE)



SeaTools Disc Diagnostic Process

SeaTools Disc Diagnostic Process Defined:

The SeaTools Disc Diagnostic Process is another unique element in Seagate Technology's 3D Defense System. It defines a process that allows computer users to quickly and easily determine the health of a drive and, if necessary, diagnose any problem.

The SeaTools Disc Diagnostic Process empowers customers and end-users to positively identify the source of system issues often mistakenly attributed to the disc drive. This helps the customer to protect their data and avoid the expense and hassle of returning a healthy disc drive.

The SeaTools Disc Diagnostic Process is the industry's first process to provide diagnostic guidance beyond disc drive-related issues, helping users to protect information at risk due to file system or other computer system issues.

The SeaTools Disc Diagnostic Process is a warranty screening process, designed to dramatically reduce costs to channel partners related to service calls and drive returns. In many cases, the first recourse to system problems is to remove and return the drive. However, the disc drive is generally not the problem. Returned drives that have No Problem Found (NPF), cause unnecessary expense to resellers and distributors and potentially result in lost data for end-users. Returning a healthy drive just doesn't make sense. By using the SeaTools disc diagnostic process, helpdesk personnel, PC makers and resellers will decrease the time it takes to pinpoint and diagnose a system issue, reducing downtime and the risk to a customer's valuable data.

The SeaTools *Enterprise Edition* software is simple and speedy to operate. When a user suspects a problem with a PC system or hard drive, the customer simply runs SeaTools *Enterprise Edition* from the hard drive. The SeaTools interface is intuitive, requiring just a few keystrokes from the user and no special technical knowledge. SeaTools will immediately help the consumer, support technician or PC maker understand whether the disc drive is having problems or if a problem lies elsewhere in the computer system.

The SeaTools *Enterprise Edition* software runs a full array of tests, checking for data compiled by Seagate's Self-Monitoring and Reporting Technology (SMART) and Drive Self-Test (DST) systems. Then it reports the results to the user, pointing out the source of any problems. If the disc drive proves to be functioning normally, SeaTools suggests how to work through many OS, file system, partitioning and other system issues. If data was lost, SeaTools provides helpful tips for recovering that information.

The SeaTools *Enterprise Edition* software is unique because it works with all current Seagate SCSI and Fibre Channel drives, older legacy drives and the drives of other manufacturers. SeaTools *Enterprise Edition* is available at no cost to customers and end users.

3D Defense System

SeaTools *Enterprise Edition* is a vital part of Seagate's exclusive 3D Defense System which offers the industry's most comprehensive protection for the world's highest performing and most robust disc drives.

- **Drive Defense** – G-Force Protection, SeaShell packaging protection against ESD and handling damage.
- **Data Defense** – Temperature Sensor, SAMS protection against multi-drive rotational vibration.
- **Diagnostic Defense** – SeaTools Diagnostic Software supporting ATA, SCSI and Fibre Channel products.

SeaTools Benefits:

SeaTools *Enterprise Edition* saves money, saves customer data and saves time.

Money

The SeaTools disc diagnostic process saves money by reducing NPF returns. Initial statistics indicate that the use of SeaTools reduces NPF returns by 80%. Since NPF drives never need to be removed from the computer, service teams avoid the costs associated with spending unnecessary time working on a healthy drive. Additionally, returning NPF drives creates unnecessary administrative and shipping burdens on your staff – costs that come directly out of your bottom line.

Customer Data

The SeaTools disc diagnostic process helps save the customer's data. Customers lose their data if the drive is not backed up before removal. Many end-user customers believe that their drive will be repaired and returned to them. In fact, a different drive is always given to the customer. If they fail to back up their data, as they often do, it is permanently lost. SeaTools prevents customers from returning discs containing valuable data as well as prompting them to utilize data recovery services if so indicated.

Time

The SeaTools disc diagnostic process saves time by cutting out the time technicians spend diagnosing, removing and shipping drives that are in perfect working order. Prior to the release of version 1 of SeaTools, 50% of drives returned to Seagate tested NPF. SeaTools allows technicians to more efficiently utilize their time and increase their productivity by focusing their efforts on actual problem areas.

Additional Benefits

The SeaTools *Enterprise Edition* software comes at no additional charge to customers and end-users and is available via the Seagate website, www.seagate.com.

SeaTools is the only disc diagnostic tool to support both Seagate drives and our competitors' drives, making SeaTools the only drive diagnostic tool you'll need.

SeaTools is very easy to use for the PC novice, yet is powerful enough for the IT professional.

SeaTools provides on-the-spot Seagate Technical Support contact options and Return Materials Authorization information.

SeaTools *Enterprise Edition* Software

SeaTools *Enterprise Edition* is a tool for testing and configuring SCSI and Fibre Channel devices in a safe and controlled environment. The program allows you to view details about how your devices are currently configured, run non-destructive tests on the data areas, change drive operating parameters, reconfigure the block size and capacity information and if required, download new firmware.

There is also an extensive technical support section that provides technical information as well as instructions for contacting Seagate Technical Support directly for assistance.

SeaTools *Enterprise Edition* Features

- Ability to test multiple SCSI and Fibre Channel disc drives simultaneously or sequentially.
- Ability to upload a firmware revision for SCSI and Fibre Channel drives.
- Ability to keep your server up and running while testing .
- Data safe tests.
- Drive self tests.
- Formatting options.
- Drive preferences setting.
- Logfile of results.
- Software runs under Windows 2000, NT, 9x and ME.

Note:

Disclaimer: SeaTools Enterprise Edition is not intended for use with advanced RAID systems.

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The SeaTools Diagnostic Process

The SeaTools Diagnostic Process is based on a basic troubleshooting flowchart. The actual use of the SeaTools software doesn't come into play until other operations have been performed and either passed or failed.

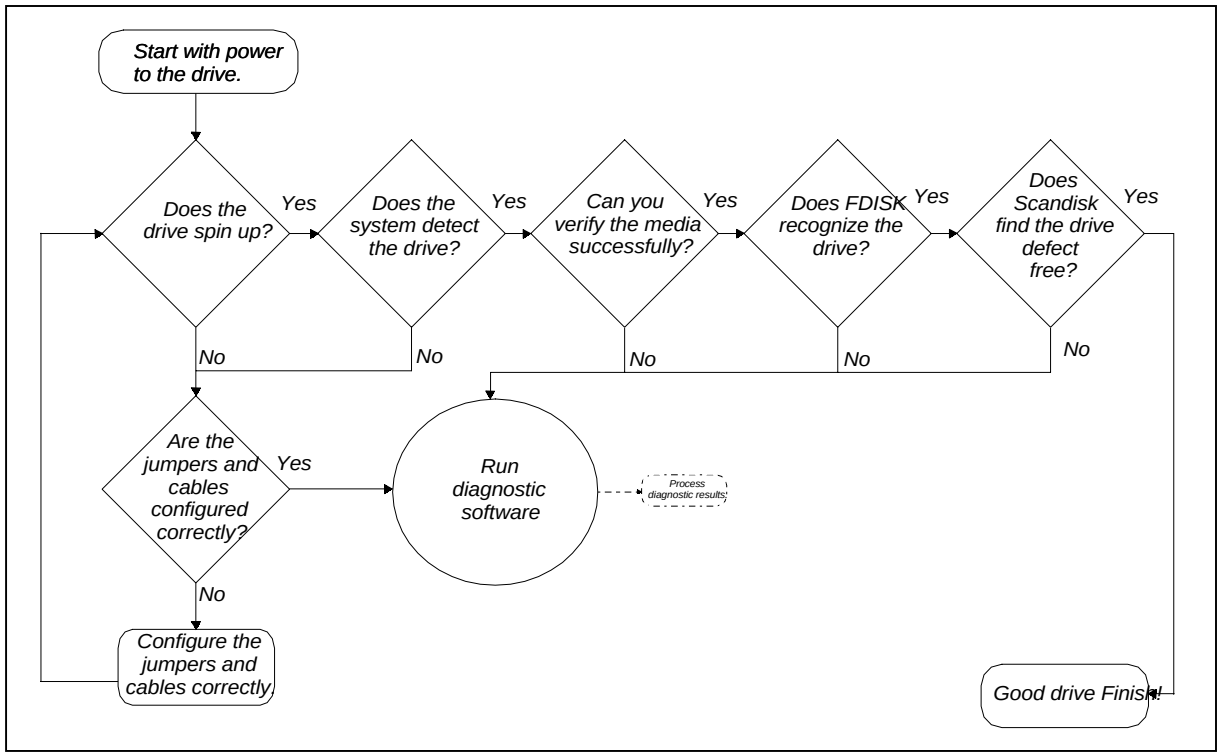
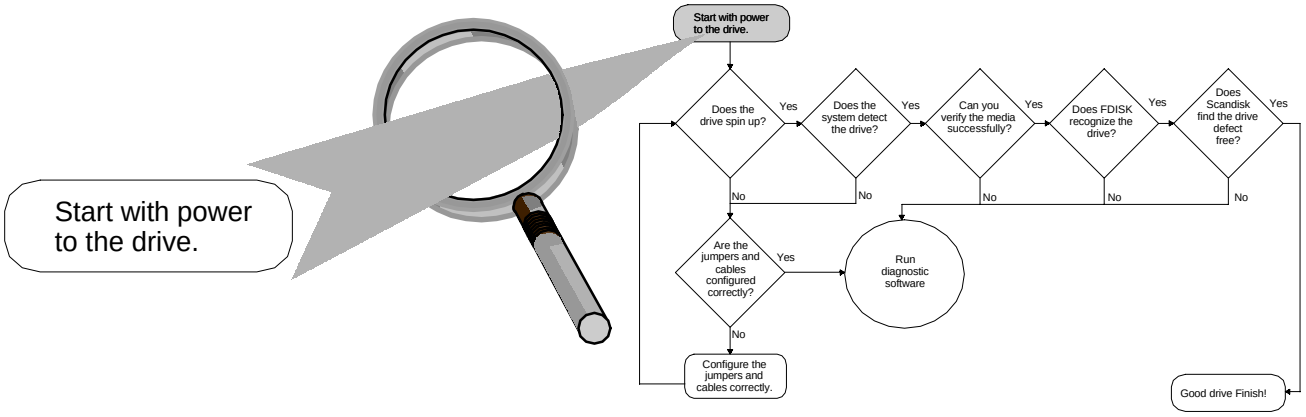


Figure 1.

Determine if power is getting to the drive.



Assuming the system as a whole is getting power (the system is plugged in and turned on, lights come on, and so on), there are two things that determine if a drive is getting power.

1. Verify the 4-pin power connector is securely connected to the drive.

2. Verify the 4-pin power connector is good.

Possible ways to do this include checking it with a voltage meter or plugging in another known working drive to see if it will spin up. (If the drive spins, it has power.)

If the drive is not getting power, you must correct this problem as described above before it can be determined if the drive is good or bad. If the 4-pin power connector is plugged in but you are uncertain if the power connector is good, proceed to the next step . If the drive spins, it has power. If the drive will not spin, it may or may not have power.

Note:

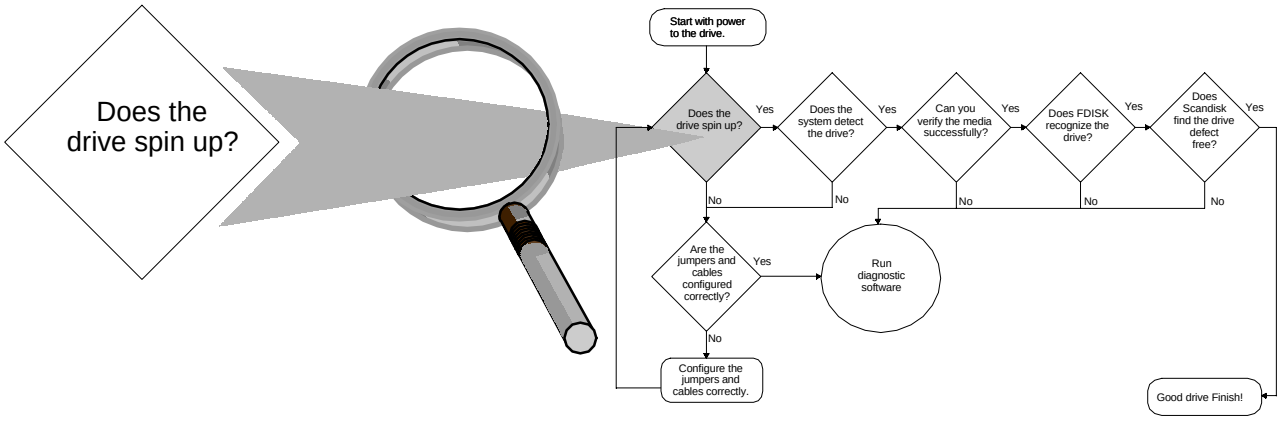
Anytime you remove the case from your system (as instructed below), you expose the internal components to Electrostatic Discharge (ESD). All drive electronic assemblies are sensitive to static electricity and may be severely damaged by electrostatic discharges too small to be felt by a human. ALWAYS take ESD precautions when opening the case of your system. Refer to the product manual for standard electrostatic discharge protection procedures.

For a refresher on the basics of Electrostatic Discharge, access the URL below:

http://www.seagate.com/support/tutorials/handling/handling_tutorial_overview_page_2.html

SCSI Disk Diagnostic Process continued on next page.- - - -

Determine if the drive is spinning up.



There are two common ways to tell if a drive is spinning:

1. A spinning drive produces a whining sound that is generally audible to the human ear, though you may have to listen very carefully to hear it. This sound is most noticeable as the drive first begins to spin, so listen for it when first turning on the power. Some normal clicking sounds may also be heard during the spinup phase.

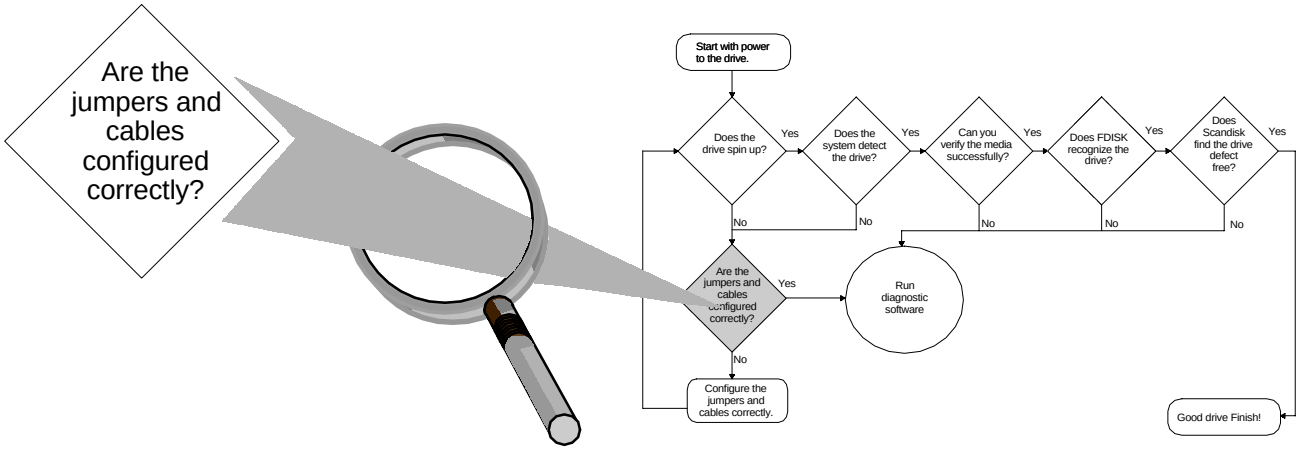
2. If you are unable to hear the drive spinning, you may be able to feel it vibrating. Do the following to check for vibration:

   - Power off the computer, but leave it plugged in to provide electrical grounding.
   - Remove the cover from the computer (adhere to ESD protocol.)
   - Put on an ESD wrist strap and attach it to the metal frame of the computer. (If you do not have an ESD wrist strap, keep one hand on the metal frame of the computer to provide electrical grounding.)
   - Touch the top of the drive where the label is and turn the power on. Do not touch the circuit board or any of its components. If you feel a vibration, the drive is spinning.

If the drive does not spin up, continue the diagnostic process:

SCSI Disk Diagnostic Process continued on next page.- - - -

Determine if the cables are configured correctly.



- Your ribbon cable should have either light red lettering or a red line running down the length of the cable. This red coloring indicates Pin 1 on the cable. Pin 1 on the disc drive is on the side of the 50 or 68-pin connector closest to the 4-pin power connector. For proper installation, the Pin 1s must be aligned.

- Using a single SCSI drive, you must use the last connector on the cable.

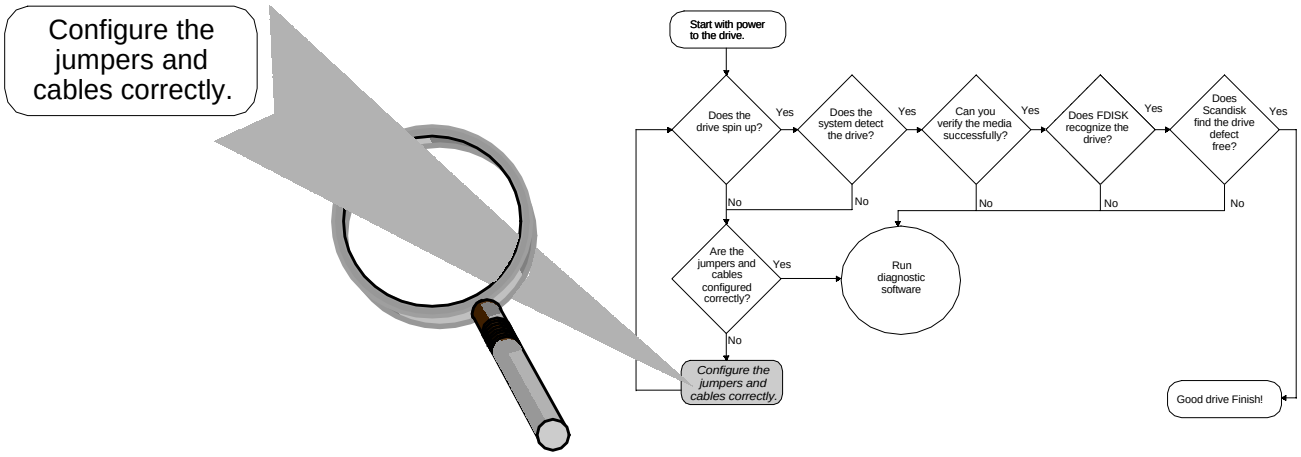
- Be sure the interface cable is certified as compatible with the SCSI interface transfer rate.

- Verify that the SCSI bus is properly terminated at both ends with termination power. For further termination information, access the URL listed below.

http://www.seagate.com/support/npf/disc_scsi/flow_jumpers_cables.html#Termination.

SCSI Disk Diagnostic Process continued on next page.- - - -

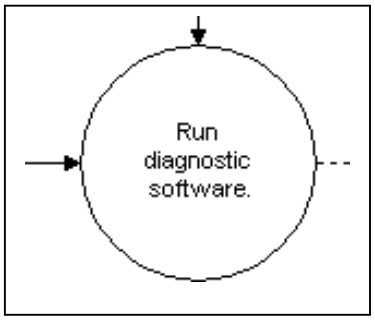
Determine if the jumpers are configured correctly.



- The correct jumper settings are very important to a successful drive installation. Jumper settings for all Seagate disc drives are available in both graphical and text-only formats. Additionally, all new Seagate disc drives now have the jumper settings printed on the outer casing of the drive. Jumper settings for all drives are also available at www.seagate.com on the Support page under Disc.

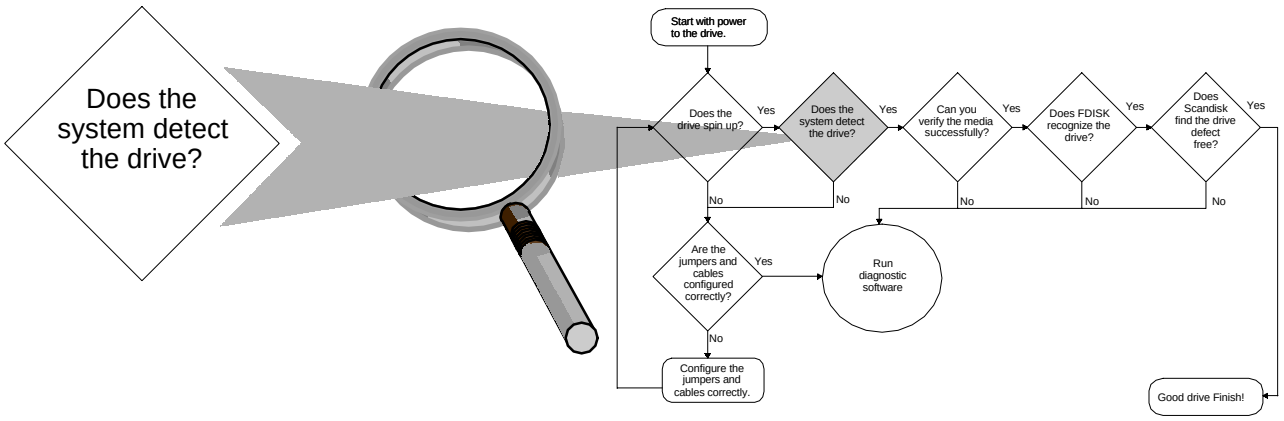
- It is very important that each SCSI device have a unique ID. For a single drive, the traditional default is ID0.

If the cables and jumpers are configured correctly and the drive still does not spin up, run SeaTools.



SCSI Disk Diagnostic Process continued on next page.- - - -

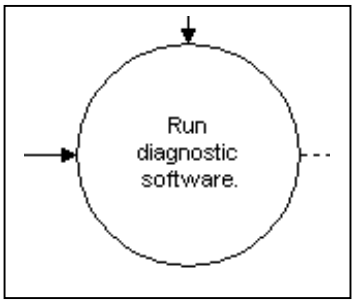
Determine if the system detects the drive.



When the SCSI host adapter (controller) identifies itself during the system boot up, it will display on the screen any SCSI devices it finds on the SCSI bus. Seagate drives will show up by model number; look for "ST" as the first two characters.

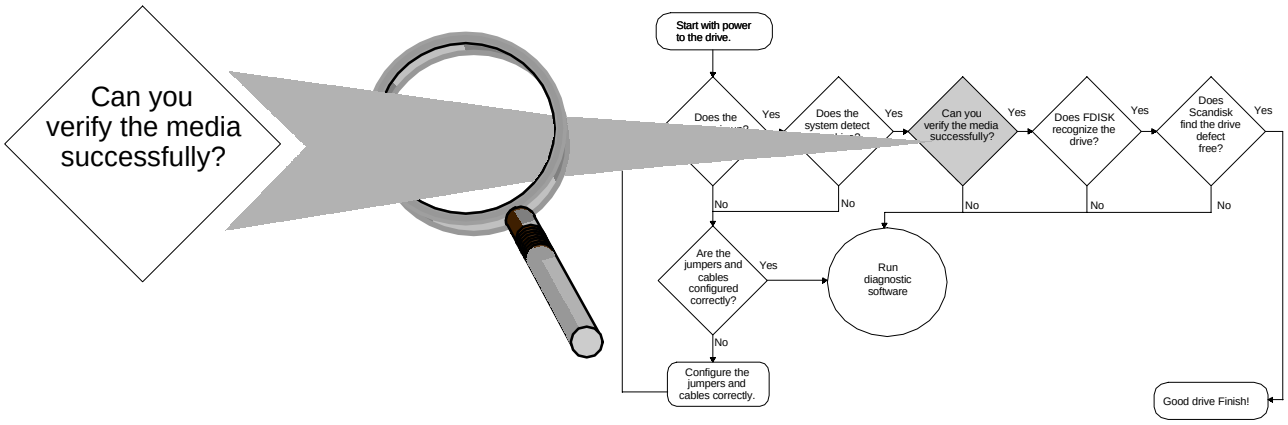
For example, Adaptec host adapters display the name of the host adapter and all the SCSI devices attached to it. The first indication of recognition is to see its name and model listed under the host adapter information. Most host adapters also give the SCSI ID number associated with each device.

If the system does not detect the drive, check jumper and cable configuration, as defined previously. If the cables and jumpers are configured correctly and the system still does not recognize the drive, run SeaTools.



SCSI Disk Diagnostic Process continued on next page.- - - -

Verify the media.



The process to verify media differs depending on the host adapter in your system.

1. Adaptec 2940 series of SCSI host adapters

   - Power on (or reboot) the computer and watch the screen for the Adaptec information.
   - When the Adaptec information displays on the screen, press **CTRL**+**A**.
   - When the Adaptec BIOS screen displays, select **Disk Utilities**.

> **Caution!!**
>
> Caution - Format Drive is an available option in most SCSI host adapter's utilities, including the Adaptec 2940 series. Choosing Format Drive will ERASE all data on the drive, making data recovery impossible. Do NOT choose Format Drive.

   - When a list of SCSI devices displays, select the SCSI device you would like to test and press ENTER.
   - Select **Verify Media**
   - When the drive's name and capacity displays, select **Yes** and press ENTER. The verification process may take several hours depending on the size of the drive. If the computer asks you to re-allocate a bad block, choose Yes and then continue with the verification.
   - If you experience media verification errors, it may be due to noise on the bus. To troubleshoot this, reduce the maximum synchronous transfer rate. See your host adapter documentation for instructions. Once done, re-run the Verify Media test.

SCSI Disk Diagnostic Process continued on next page.- - - -

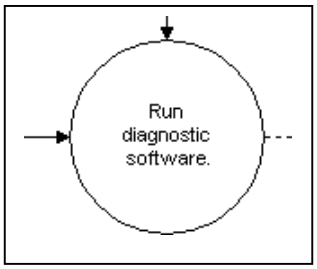
- If the verify media errors don't go away after slowing the bus speed, try these troubleshooting steps:
  - Consider using a shorter cable.
  - Reroute the cable away from the power supply.
  - Ensure that the SCSI bus is properly terminated.

  These steps are intended to reduce noise as much as possible.

Other SCSI host adapters

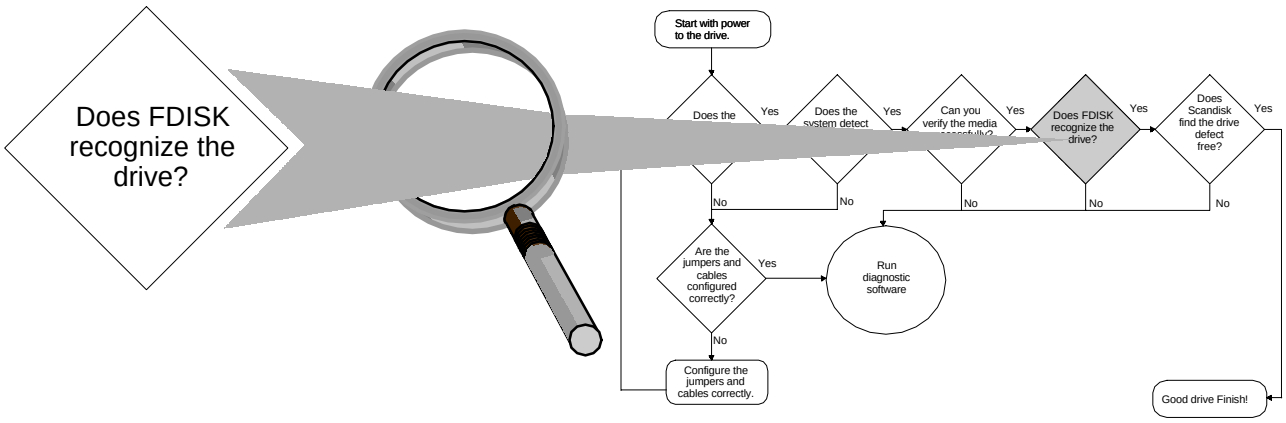
- If you have an adapter other than an Adaptec 2940 series, consult the manual, the manufacturer's website or contact the manufacturer directly.

If the media cannot be successfully verified, run SeaTools.



SCSI Disk Diagnostic Process continued on next page.- - - -

Determine if FDISK detects the drive.



FDISK is a DOS/FAT utility used to partition disc drives. The status option can be used to view the current partitions without changing them. FDISK will work with NT (FAT16) Win2000 (FAT32) and OS/2 (FAT16), but not with NTFS and HPFS. If you attempt to run FDISK with NTFS or HPFS, you will receive a non-DOS file structure error, which is beyond the scope of this checklist

FDISK can be located in several places.

- The first diskette of the DOS or Windows 95/98/Me installation diskettes or CD-ROM
- Windows 95/98/Me startup diskette
- On your disc drive in the c:\windows\command directory
- On your disc drive in the c:\dos directory

To run FDISK:

- Boot to an A: drive DOS command prompt (A:\) by inserting a DOS or Windows 95/98/Me system diskette into drive A: and turning on (or rebooting) the computer.
  - FDISK will run from a Windows 95/98/Me command line or DOS shell from within Windows. Windows NT or OS/2 will not. You must boot to an A: drive DOS command prompt (A:\).
- Type **fdisk /status** and press ENTER. This will display a list of the detected disc drives on the system.
- If you receive disc access or stack overflow messages, use the /x switch to ignore extended disc access support as follows: Type **fdisk /status /x** and press ENTER.

ATA Disk Diagnostic Process continued on next page.- - - -

Determine if FDISK is recognizing the drive.

- If FDISK recognizes no disc drives in your system, you will receive the error message "No Fixed Disks Present".

- Using the command FDISK/STATUS, the system's physical and logical drives will be displayed in a spreadsheet format. Below is an example of the readout that is displayed when FDISK/STATUS is entered in at a C:\ command prompt:

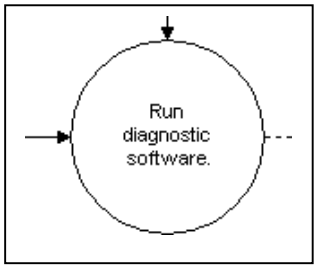
```
                Fixed Disc Drive Status
Disk    Drv     Mbytes  Free   Usage
1                9766           100%
        C:       1948
        F:       4848
2                12417          100%
        D:       12417
3                20405          0%
4                8676           100%
        E:       4000
        F:       4676
```

In this example, FDISK recognizes 4 physical drives with 5 logical drives. Further., there is 1 unformatted drive (Disk 3) and logical drive F: on Disk 1. All disk drives are recognized in this example. Even though unformatted, Disk 3 is a perfectly good, brand-new drive because FDISK recognizes physical drives.

Determine if FDISK is recognizing the drive.

- If FDISK recognizes no disc drives in your system, you will receive the error message "No Fixed Disks Present". If FDISK recognizes only one disc drive, you will see four options in the main options menu. If FDISK recognizes more than one disc drive in the system, you will see five options in the menu. The fifth option in the menu allows you to switch between drives.

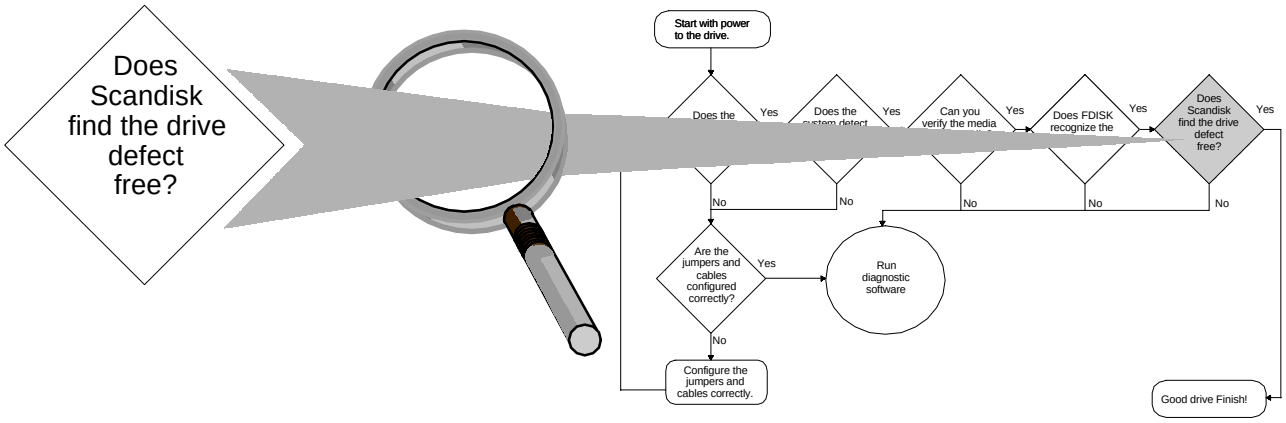
- If FDISK is not recognizing the drive, run SeaTools.



- If FDISK recognizes the drive, proceed to the next step.

SCSI Disk Diagnostic Process continued on next page.- - - -

Run ScanDisk to determine if the drive is defect free.



ScanDisk is a DOS/FAT disc analysis and repair utility included with DOS 6.x and Windows 95/98/Me. It scans for and fixes the following types of problems:

- FAT16 and FAT32 allocation tables
- Long filenames
- File system structure (lost clusters, cross-linked files)
- Directory tree structure
- Physical surface of the drive (bad sectors)
- ScanDisk will work with NT (FAT16) Win2000 (FAT32) and OS/2 (FAT16), but not with NTFS and HPFS. NTFS and HPFS are beyond the scope of this checklist.

Run ScanDisk as appropriate for the computer's operating system.

- **DOS** - To check a specific drive, type scandisk **x:** where x: is the letter of the drive you wish to scan. For example, to check drive C:, type scandisk c: and press ENTER, then follow the directions on the screen.
- **Win 3.x** - Boot to an A: drive DOS command prompt (A:/) by inserting a DOS or Windows 95/98/Me system diskette into drive A: and turning on (or rebooting) the computer and following the instructions above for DOS.

SCSI Disk Diagnostic Process continued on next page.- - - -

- **Win 95/98/Me**
  - Click **Start**; click **Run**; type **scandisk**; and click **OK**.
  - Select the drive you want to repair or analyze.
  - In the **Type of test** area, select **Standard** or **Thorough**. "Standard" checks the drive's files and folders for errors. "Thorough" checks the drive's files, folders, and physical surfaces for errors.
  - **Note:** If you do not want ScanDisk to prompt you before repairing each error it finds, select **Automatically Fix Errors**.
  - If you are running a **Thorough** test, click the **Options** button and select the **System** and **Data** areas of the drive to check, then click **OK**.
  - Click the **Advanced** button to set the advanced options as needed, then click **OK**.
  - To begin checking the drive, click **Start**.
- Windows NT - For Windows NT (FAT16), boot to an A: drive DOS command prompt (A:\) by inserting a DOS or Windows 95/98/Me system diskette into drive A: and turning on (or rebooting) the computer. Then follow the instructions above for DOS.
- OS2 - For OS/2 (FAT16), boot to an A: drive DOS command prompt (A:\) by inserting a DOS or Windows 95/98/Me system diskette into drive A: and turning on (or rebooting) the computer. Then follow the instructions above for DOS.

If ScanDisk finds a problem, it displays a dialog box that briefly explains the problem and what ScanDisk can do to fix it. This dialog box will usually offer a choice of Fix It, Don't Fix It or More Info. To have ScanDisk correct the problem, choose **Fix It**.

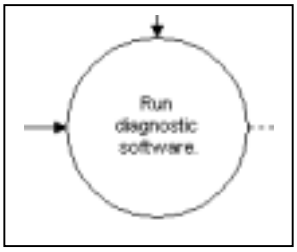
If ScanDisk finds a problem and you choose **Fix It**, ScanDisk offers to create an Undo diskette. You can use an Undo diskette to restore your disc drive to its previous state, but only if you have not used the drive since making repairs. To create an Undo diskette, insert a blank, formatted diskette in drive A or drive B, then choose the Drive A or Drive B button in the dialog box ScanDisk displays.

Remember, the emphasis of this step is the surface scan. It must be completed to check the physical surfaces for errors. This test will read every logical cluster in a volume (C:, D:, etc.) This test may take hours to complete, but is very important.

SCSI Disk Diagnostic Process continued on next page.- - - -

If ScanDisk does not find any defects on the physical surface, the drive is good, although it may have FAT or boot record problems that appear hard drive related. These would manifest themselves in symptoms like an inability to boot. If ScanDisk is unable to repair the file system problem, try other disk diagnostics or contact the appropriate technical support center.

If ScanDisk detects drive defects, run SeaTools.



Note:

If under a deadline or if you are just doing a casual test, you may choose to run SeaTools as opposed to a lengthy surface scan test in Scandisk. SeaTools has a short diagnostic that runs in approximately two minutes. See page 40 for directions.

Obtaining SeaTools *Enterprise Edition*

Seagate has a central web page dedicated to all SeaTools utilities. The page contains complete information on SeaTools *Enterprise Edition* features, benefits, etc. Select the version of SeaTools that best fits your needs, either SeaTools Desktop or SeaTools Enterprise.

Download the SeaTools Enterprise Edition self-extracting file

a) Point your browser to http://seatools.seagate.com.

b) Click the Download SeaTools Enterprise Edition link.

c) Accept the license agreement. (A copy of the End User License Agreement can be found at the end of this document.)

d) Complete all registration information. Select a directory to download to on your hard drive.

e) When the download is complete, close all other applications, then double-click the downloaded file (seatools_enterprise_install.exe.)

f) Follow the install instructions.

If you have obtained SeaTools Enterprise Edition on CD, simply double-click the setup executable.

Technical Support

There is an extensive Help file included with the software. A complete list of Seagate Technical Support contacts can be found at the end of this document. Additional Seagate Technical Support and contact information can be found at www.seagate.com.

Installing / Uninstalling SeaTools *Enterprise Edition*

SeaTools ***Enterprise Edition*** will load and run under Windows 2000, Windows NT, Windows 9x, and Windows Me. Install the software from CD or if you downloaded a copy from the SeaTools home page, double-click the downloaded file. To uninstall the program, open Control Panel – Add/Remove Programs and select SeaTools Enterprise.

Starting SeaTools Enterprise Edition

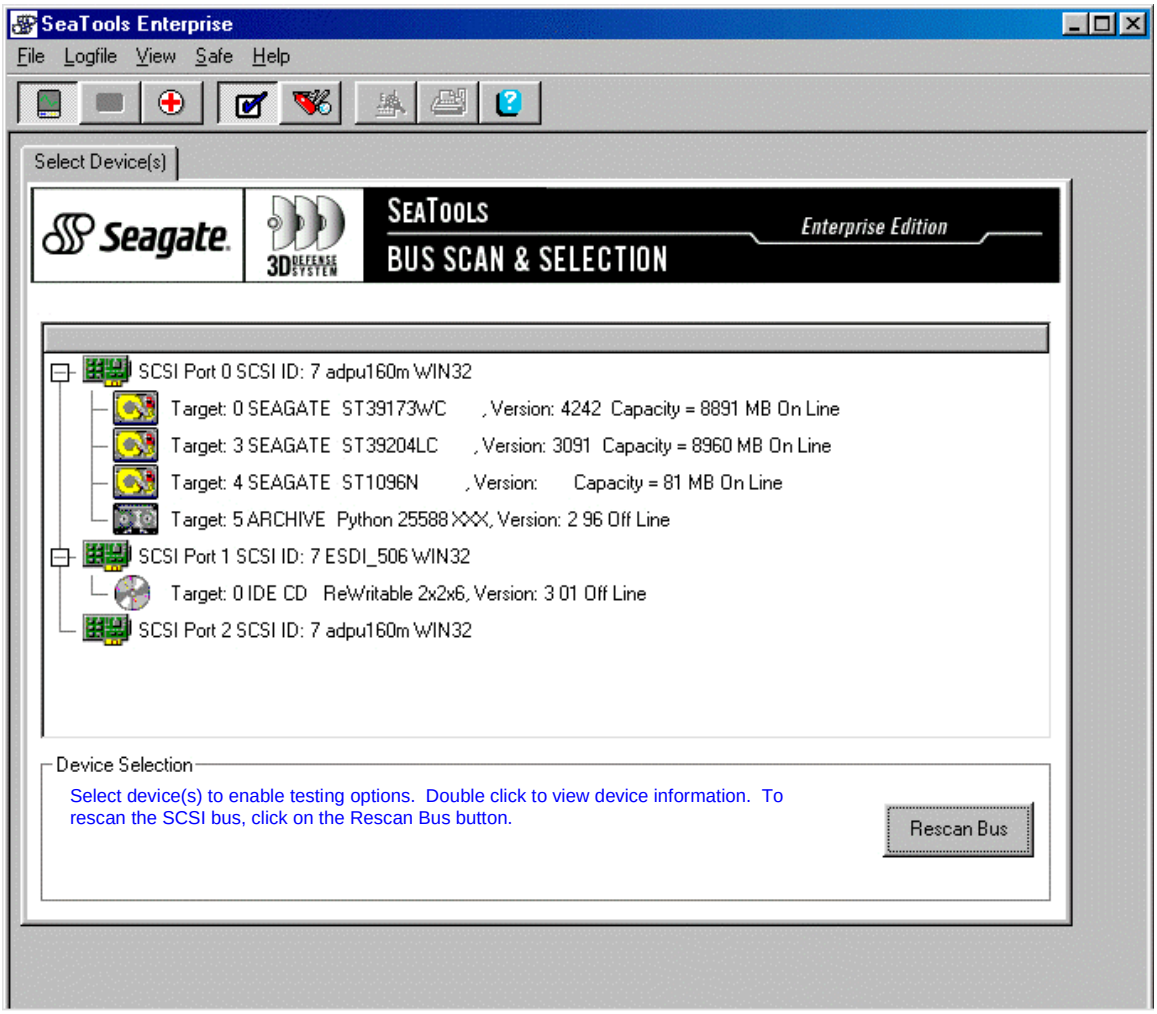
Start the application from the Start Menu, select Programs - SeaTools Enterprise. Many users find it helpful to copy a shortcut onto the desktop.

Opening Screen

At the opening screen, select the Quit button to exit or the Continue button to proceed with the program.

Bus Scan and Device Selection

After selecting the Continue button, a complete scan of the system is made to find all SCSI and Fibre Channel devices connected. All SCSI Controllers and all devices attached should be displayed. Seagate hard drives appear as gold or yellow icons. Non-Seagate hard drives appear as silver icons. Some UltraATA controllers (on-board and external) will be picked up as a SCSI device and therefore attached ATA drives will show during the bus scan. Although non-SCSI hard drives, SCSI CD-ROMs and tape devices may be shown, only SCSI hard drives can be tested or analyzed with this software. After the Bus Scan is complete, select the drive(s) to analyze or select the Rescan Bus button.



Menu Functions

The menu bar provides access to all the functions available in the program. Additionally, some functions are also available through the toolbar buttons.

File

- Logfile of results.
- Software
- Exit – Exit the program

Logfile

- New – Start a new logfile
- Open – Open an existing logfile
- Save As – Name and Save the logfile
- View – View the logfile
- Print – Print the logfile
- Clear – Clear the contents of the logfile

View

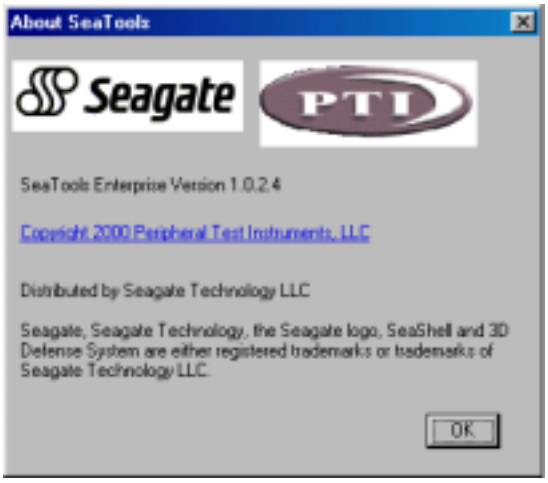
- Safe - Switch to Safe Mode
  - Select Device(s) - Open Select Device pages
  - Disc Test - Open Disc Test pages
  - Support – Open Support Pages
- Advanced - Switch to Advanced Mode
  - Firmware - Open the Firmware pages
  - Drive Preferences - Open the Drive Preferences pages
  - Format – Open the Format pages
- Show Start Screen - Display startup screen when program runs

Help

- Help Topics - Open this help document
- About - Display program version information

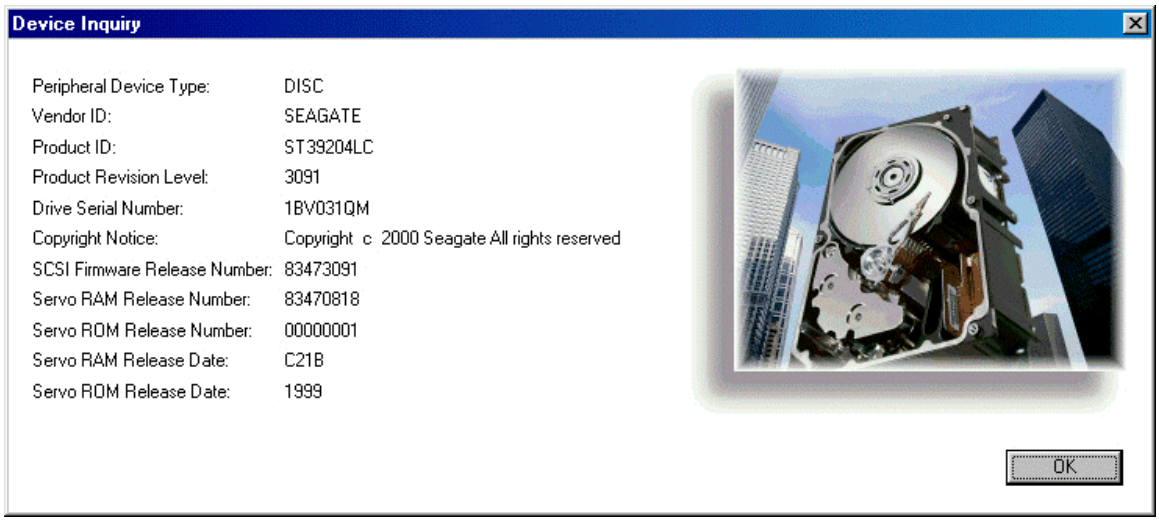
Help - About SeaTools

This dialog box displays the version of SeaTools Enterprise Edition that is running.



Inquiry Details

Select a device and double click to show the Device Inquiry panel for the drive. Important information such as Model Number, Manufacturer, and Firmware version are shown for Seagate manufactured drives. Drives of other manufacturers and certain Seagate drives shown as "non-Seagate" configurations are also supported but may not display all information.



Logfile Functions

In both Safe and Advanced Modes, **SeaTools *Enterprise Edition*** creates a detailed logfile as it runs. This file contains the results of the system scan as a list of devices and logs each and every operation that is performed on a device as well as the results of that operation. Seagate technical support personnel may request this file as they work with you to resolve issues with your devices. The logfile may also be used by system administrators to document system configurations and diagnostics performed on devices. The logfile is a simple ASCII file for easy email attachment, printing or other uses.

- New - Creates a new, empty log file with the specified name
- Open - Opens an existing file into which the log entries are written
- Save As - Saves the existing file with a new file name
- View - Opens a snapshot of the current log file in a simple file viewer. Note this is a static display of the contents at that point in time and does not display ongoing activity.
- Print - Prints the currently open log file to the selected printer
- Clear - Clears the current log file. Note this will delete all information from the file and it cannot be recovered.

SeaTools *Enterprise Edition* Modes

Safe Mode includes diagnostics and functions which are data safe. Advanced Mode provides access to Advanced diagnostic functions. Some of these functions, such as Format, cause loss of data. Advanced Mode functions should be used with caution and only after all important data has been backed up. Many program functions are available to both Safe and Advanced Mode (e.g., Logfiles, Drive Tests, Support, Help).

Safe Mode

Select Safe Mode on the View Menu (Checkmark button on the toolbar) to enter Safe Mode. The Safe Mode toolbar provides access to test functions that are not destructive to data on your device. Note: Some of the toolbar buttons may be disabled depending on program status or other selections.

The Safe Mode Toolbar functions

Safe Mode Toolbar functions are as follow, from left to right:

- Select Device(s) - This displays a list of devices physically connected to your system and allows you to select one or more devices for testing.
- Disc Test - Provides access to the Test selection and execution functions
- Support - Provides access to help text and web pages with additional support information
- Safe Mode - Switches program into "Safe Test Mode"
- Advanced Mode - Switches program into "Advanced Test Mode"
- View Log File - Opens the log file for viewing
- Print Log File - Prints the log file to the selected printer
- Help - Displays the help file

Select Device(s) Function

The Select Device(s) toolbar button provides access to the device selection screen. The screen consists of three sections, Drive Selection, Storage Explorer, and Selected Drive.

Device Selection (bottom panel) provides some basic instructions and the Rescan Bus button. Pressing the Rescan Bus button will cause the program to rescan all the SCSI adapters on the system and rebuild the device tree.

Storage Explorer displays all devices connected to the systems host bus adapter(s). You may select one or more devices by highlighting them on the tree. NOTICE that selecting devices enables the Disc Test toolbar button, and deselecting device(s) disables the Disc Test toolbar button. After making device selection select an active diagnostic toolbar button. In Safe Mode, Disc Test is the only option. In Advanced Mode, Firmware Download, Drive Preferences, and Formatting are also available.

If you double click on a selected device, the system will display detailed information about that device including, standard inquiry data, drive serial number, as well as firmware and servo revision information.

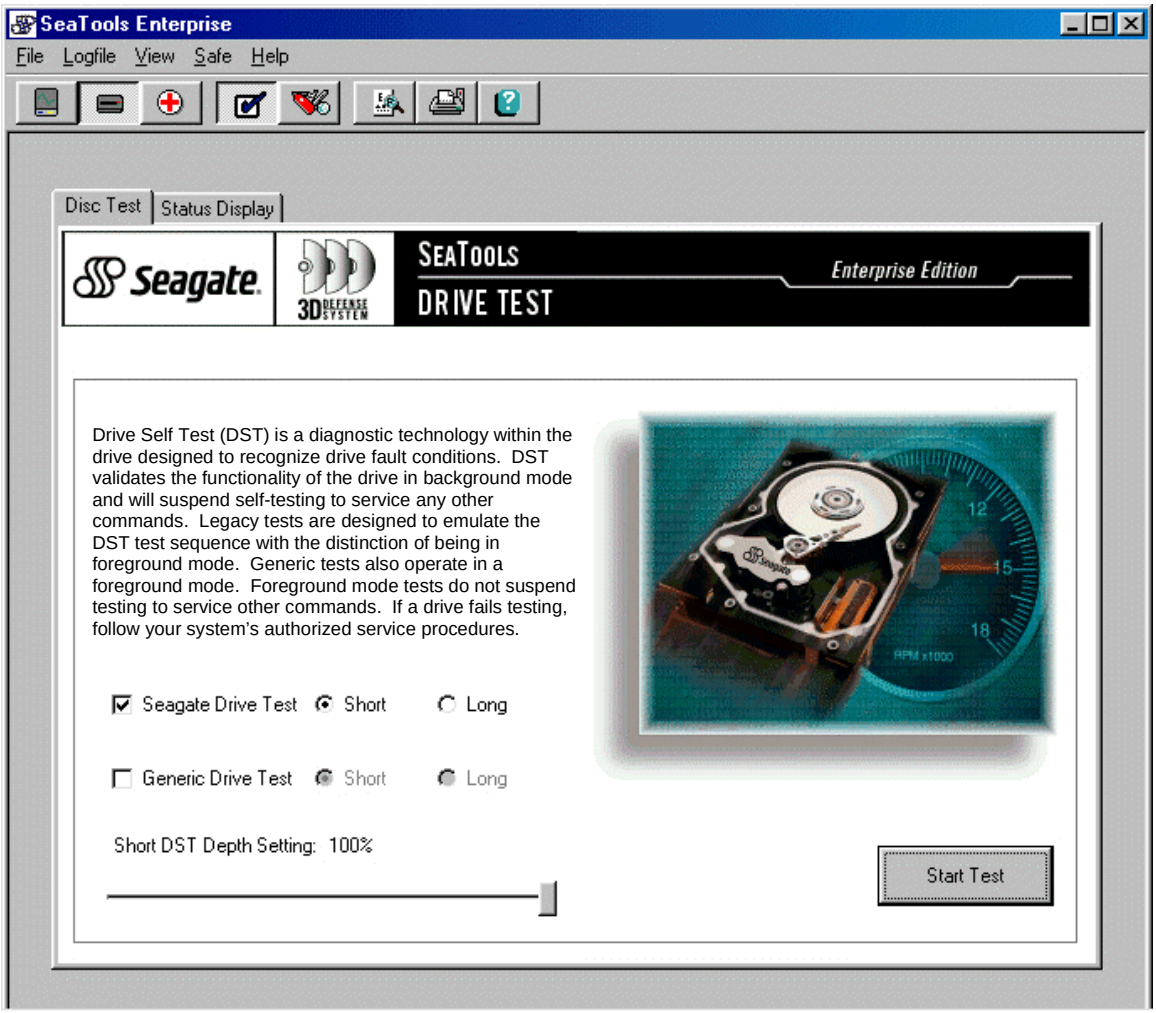
Disc Test Function

This function allows the user to perform non-destructive diagnostics on the selected devices. The test choices are determined by the drives that are selected. Seagate drives support Drive Self Test (DST) and Generic tests. Non-Seagate drives are limited to Generic Drive Tests. The only difference between DST and Generic tests are the level of details given in the results messages.

You may select either a short or a long duration test.

If you have selected a short Seagate test you may select the percent of that test to be performed by use of the slide control. Setting the slide bar to 10% (approximately 12 seconds) will give the shortest and lowest impact testing. The slide control is not available with non-Seagate drives.

If you have selected more than one drive you may select whether to test all drives simultaneously or one at a time. Only Seagate drives can perform simultaneous or sequential testing, non-Seagate drives are limited to sequential testing only. If you are testing drives on an active system you may want to select the Sequential option so as to minimize the load on the storage system.



Disc Test Tab

Drive Self Test (DST) is allowed only on Seagate drives. Both Seagate and Generic tests offer short and Test depth settings. Short DST depth setting option allows unique quick test roll call when confidence is not a problem and reduced IO impact is required. Seagate drives may be tested either simultaneously or sequentially. This is done by selecting "Simultaneous Test Mode" or "Sequential Test Mode". If a drive fails testing, follow your system's authorized service procedures. Choose your test criteria and select the Start Test button.

Legacy tests are designed to emulate the DST (Drive Self Test) test sequence with the distinction of running in foreground mode. When "Seagate Drive Test" is selected this test is performed for any Seagate drive which does not support DST functionality. Foreground mode tests do not suspend testing to service other commands. If a drive fails testing, follow your system's authorized service procedures.

Generic tests are provided for non-Seagate drives. The Generic tests are nondestructive. They performs reads and seeks to verify basic device functionality. The Generic test also operates in a foreground mode. Foreground mode tests do not suspend testing to service other commands. If a drive fails testing, follow your system's authorized service procedures.

Status Display Tab (Single and Multiple Targets)

A current job indicator and progress bar will be displayed.

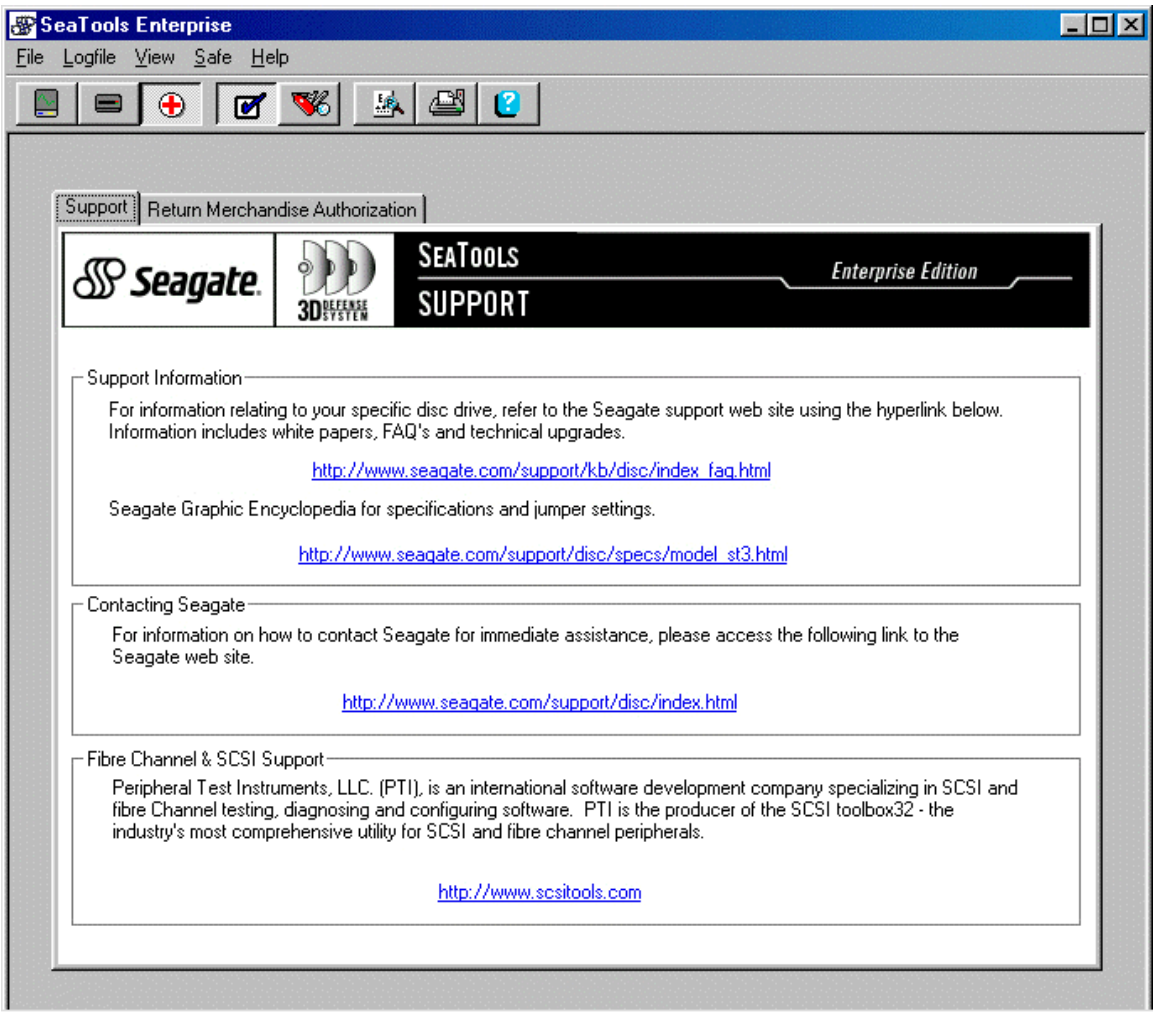
Support Function

This function provides links and contact information as well as Return Merchandise Authorization (RMA) instructions.

Support Tab

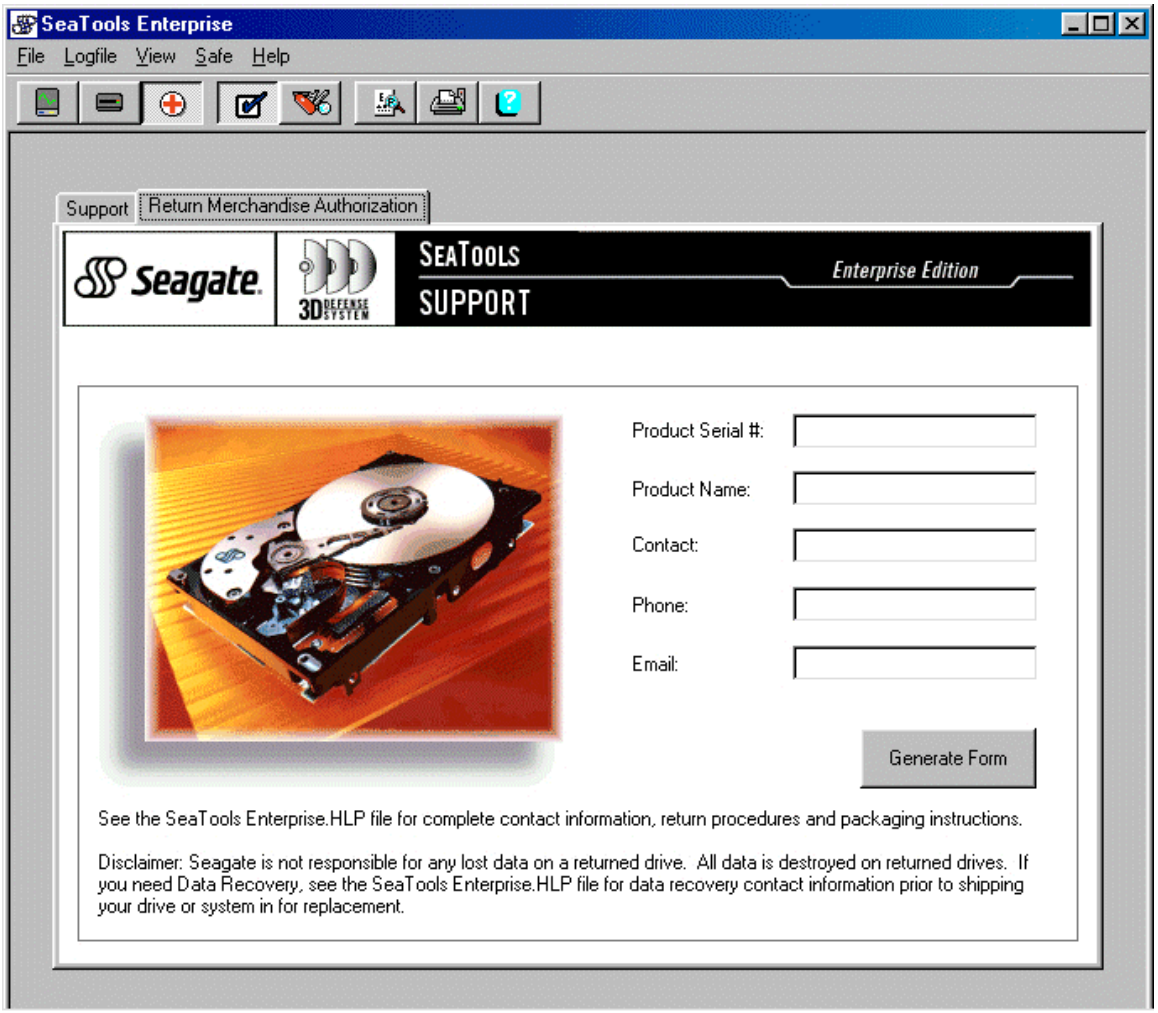
The Support tab provides several links to web sites with useful information about your Seagate peripherals. There are links to web sites with FAQ's and technical papers as well as a site containing Seagate contact information.

There is also a link to the home page of Peripheral Test Instruments, the authors of this program. PTI develops standard and customized software for peripheral diagnostics.



Return Merchandise Authorization Tab

This tab allows you to generate a Seagate standard RMA form for the selected drive. The program automatically retrieves drive Model and Serial number information. Fill in the additional information then press the Generate Form button to create the RMA form.



VIEW LOGFILE BUTTON

Log file options include Open, Save As, Clear.

Print Logfile Button

Print the logfile.

SeaTools Help Button

Select this button on the toolbar to access a searchable help file.

Advanced Mode

Advanced mode provides access to Advanced diagnostic functions. Some of these functions, such as Format and Drive Preferences, can cause loss of data and may render a hard drive useless if improperly used. Advanced Mode functions should be used with caution and only after all important data has been backed up. Be sure to read and follow all program instructions and cautions strictly.

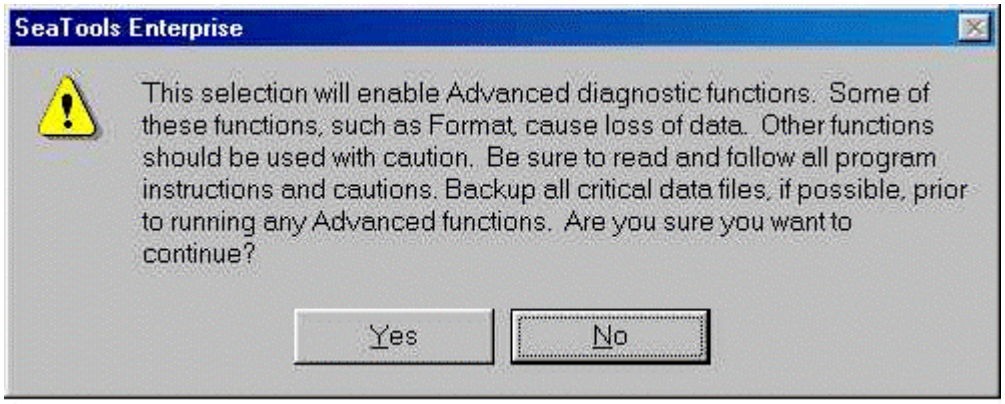
The Advanced Mode Toolbar functions

Advanced Mode Toolbar functions are as follow, from left to right:

- Select Device(s) - This displays a list of devices physically connected to your system and allows you to select one or more devices for testing. (Same as Safe Mode)
- Disc Test - Provides access to the Test selection and execution functions. (Same as Safe Mode)
- Firmware - Provides access to firmware download functions.
- Drive Preferences - Provides access to functions for setting operational modes of the device.
- Format - Provides access to Low Level Formatting functions.
- Support - Provides access to help text and web pages with additional support information. (Same as Safe Mode)
- View Log File - Opens the log file for viewing. (Same as Safe Mode)
- Print Log File - Prints the log file to the selected printer. (Same as Safe Mode)
- Help – Displays the Help file. (Same as Safe Mode)

Starting Advanced Options

Selecting the Jack-Knife button opens Advanced Options (firmware, mode select, format). Note that some of these options can cause loss of data.



Select Device(s) Function

The Select Device(s) toolbar button provides access to the device selection screen. The screen consists of three sections, Device Selection, Storage Explorer, and Selected Drive.

Disc Test Function

Drive Self Test (DST) is allowed only on Seagate drives. Both Seagate and Generic tests have different result messages.

Firmware Function

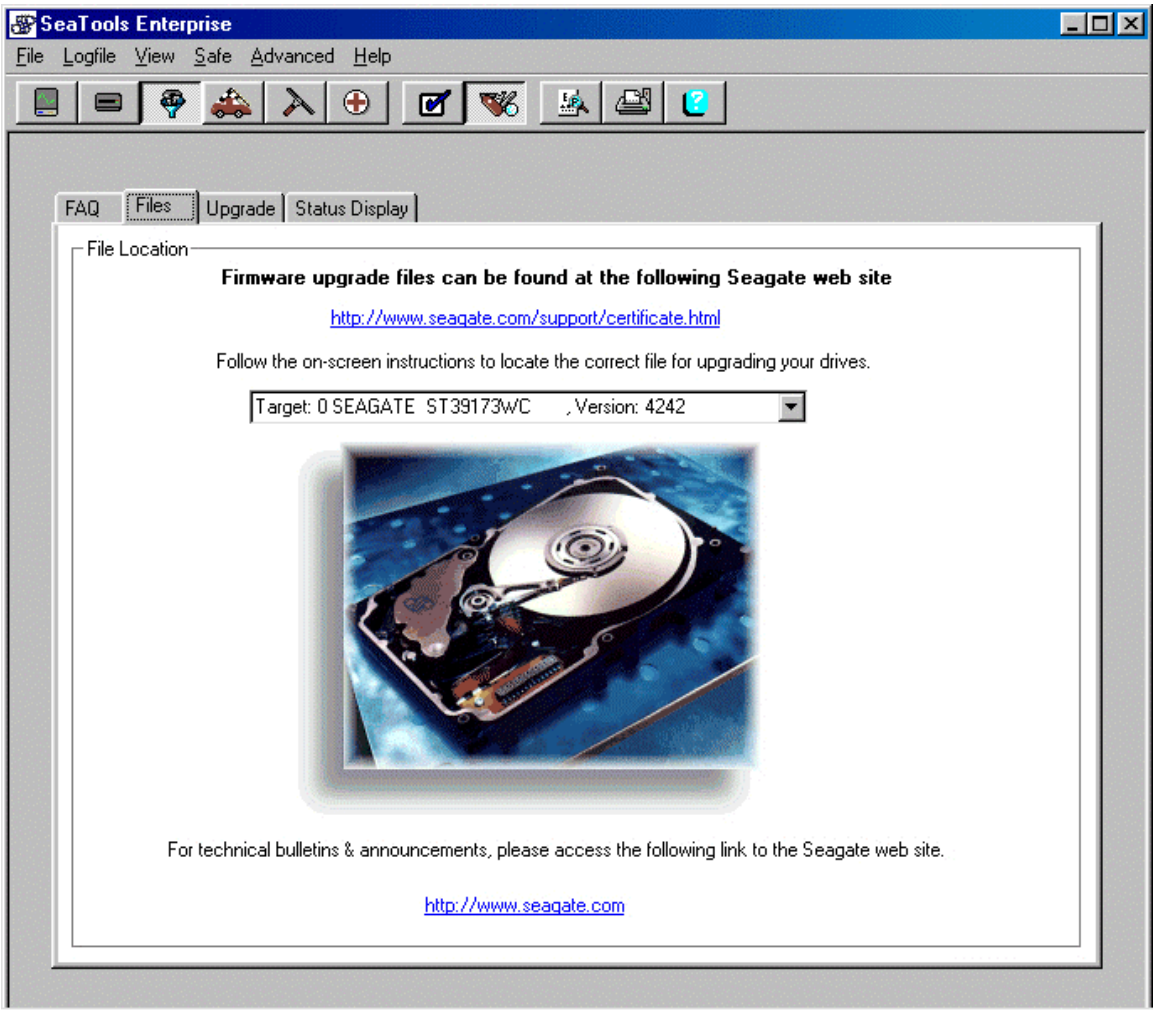
Provides access to firmware download functions.

FAQ Tab

Frequently asked questions and answers. This tab has descriptive information about firmware downloading. It is intended to help you understand what downloading new firmware to your drive(s) will accomplish and how to go about doing it.

Files Tab

This tab displays the current firmware revision level running on the selected drive. If you have any questions about the availability of firmware upgrades, contact Seagate Technical Support. If you have received a firmware upgrade from Seagate, use the Upgrade Tab to upload the new revision.

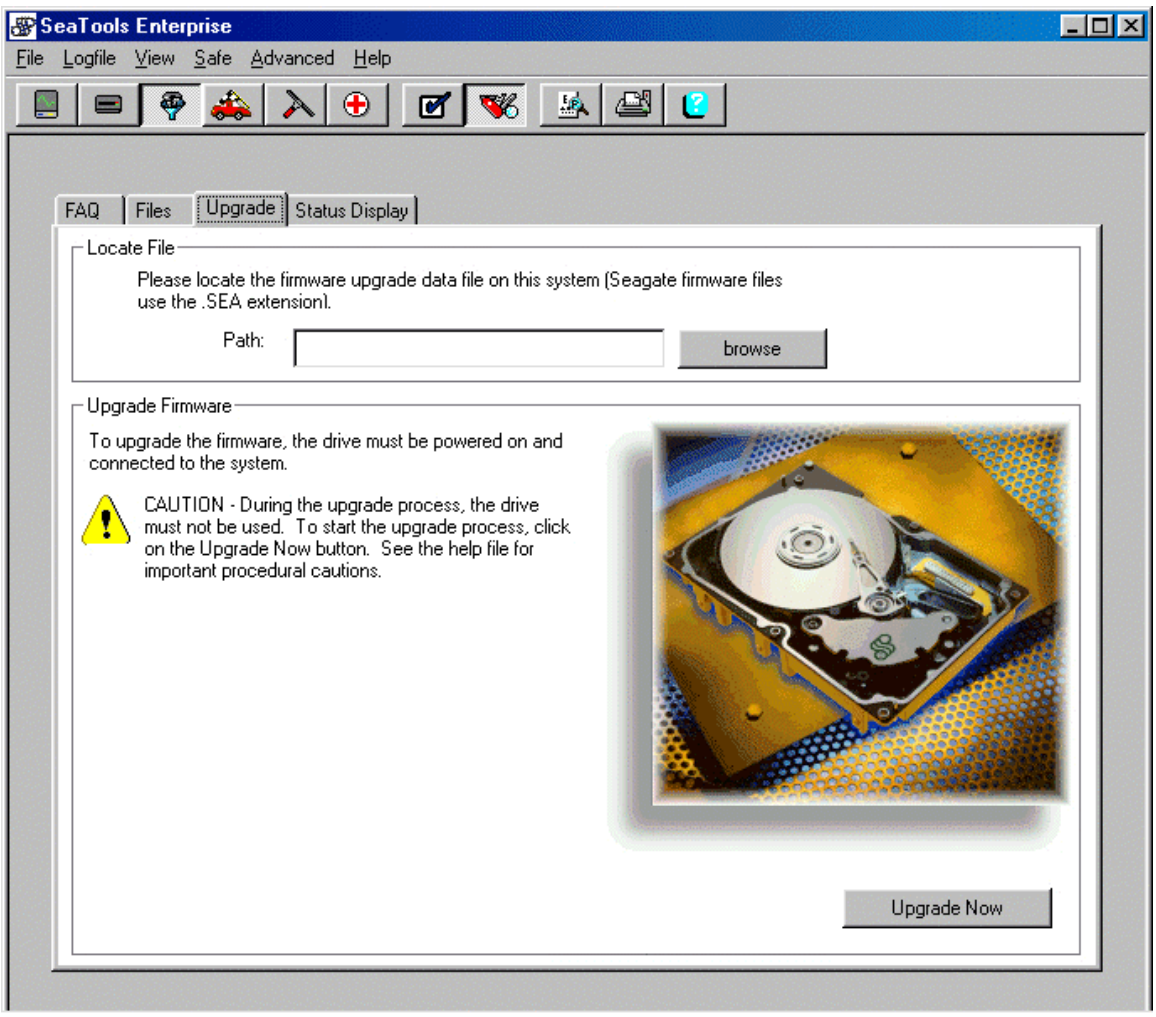


Upgrade Tab

Firmware download application defaults to .SEA wrapped firmware files. These file types include a verification header to force a match-up on the model number. Support for multiple target downloads is built in (.lod or .sea extension.)

This tab allows you to select a firmware file from your local disc drive or floppy drive to upgrade the firmware on the currently selected drive(s). Use the "Browse" button to select the desired file then press the “Upgrade Now" button to begin the upgrade process. When the upgrade starts, the Status Display screen will display automatically to track the progress of the upgrade.

DO NOT power down the server or the drive during this upgrade process. If drive power is lost during a firmware upgrade, the drive could be destroyed. Wait until all drive / LED activity has ceased before powering off the drive. The upgrade process should not take more than 3 minutes per drive.



Status Display Tab (Single and Multiple Targets)

Current job and progress bar will show drive(s) highlighted by user from list.

Drive Preferences Function

Standard Drive Preferences Tab

The Drive Preferences function supports numerous drive configuration settings. Cache settings, Performance settings, and Acoustics settings are offered on the Standard Drive Preferences tab. Advanced Cache settings, SMART settings, and certain Fibre Channel settings are found on the Additional Drive Preferences tab. After selecting the desired settings, click the Save Settings button.

Configurable Settings

- Write Cache Enabled (WCE)
  - On, SCSI Write command will return command complete status as soon as the final block of data has been received into the drive buffer from the host.
  - Off, SCSI Write command will return command complete status only after the data has been completely written to the media.
- Read Cache Disabled (RCD)
  - On, SCSI Read command must access the media. Data cannot come from the cache.
  - Off, SCSI Read command may access the cache or the media.

- Performance Mode (PM)
    - On (Desktop Mode), PM indicates that the number of cache segments is fixed to the value set in Caching Page.
    - Off (Server Mode), PM indicates that the drive will optimize the number of segments depending on the command activity observed by the drive.
    - completely written to the media.
- On Just In Time (JIT). JIT bits allow you to enable and disable certain seek speeds on the drive.
    - Performance Oriented Seek. This is the factory default which utilizes all seek speeds and the fastest performance.
    - Power and Acoustics Level 1. This setting reduces power and acoustics levels with a slight impact on performance.
    - Power and Acoustics Level 2. This setting has the lowest power and acoustics level and the largest impact on performance.

When drive does not support a feature, the option is grayed out.

Special/Additional Drive Preferences

Some of the following options require a Seagate Fibre Channel drive to be attached.

- Automatic Write Reallocation Enable
  - On: Drive automatically relocates bad blocks during write operations.
  - Off: Drive creates Check Condition status with sense key of Medium Error if bad blocks are detected during write operations.
- Automatic Read Reallocation Enable
  - On: Drive automatically relocates bad blocks during read operations.
  - Off: Drive creates Check Condition status with sense key of Medium Error if bad blocks
- Default Number of Cache Segments – Set the Default Number of Cache segments or set another Number of Cache Segments.
- SMART Logging in Effect – Sets operating mode of Self-Monitoring Analysis and Reporting Technology (SMART).
  - On. Disables monitoring of SMART failure prediction thresholds.
  - Off. Enables monitoring of SMART failure prediction thresholds.
- Disable Loop Master (Fibre Channel only)
  - On. Target does not become loop master.
  - Off. Target must wait to receive an Address or Port Discovery ELS.
- Disable Target Oriented Loop Initialization (Fibre Channel only)
  - On. Target does not originate the initializing LIP following insertion into the loop.
  - Off. Target originates the initializing LIP.

Status Display tab

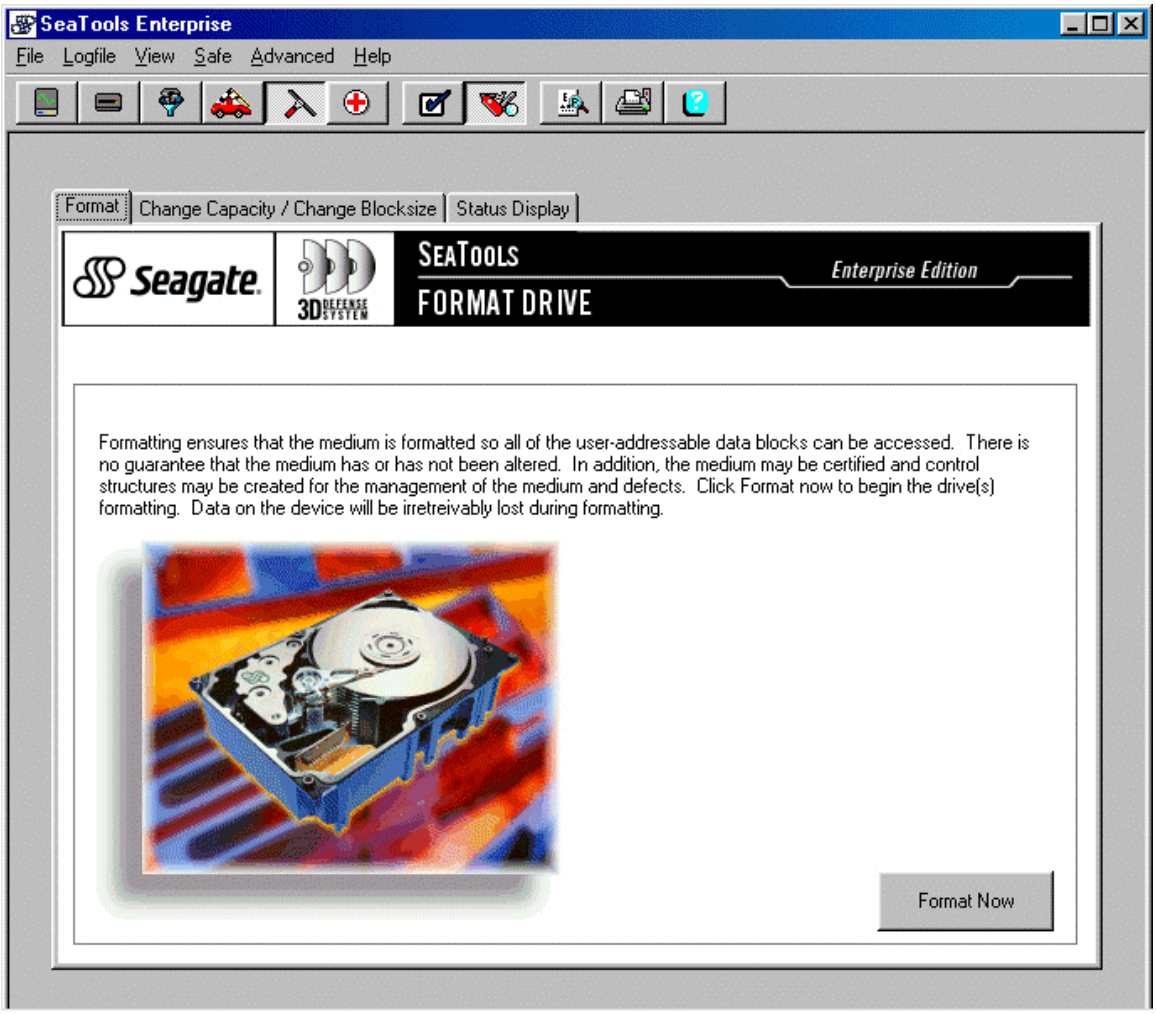
This tab shows the current status of the selected operation.

Format Function

Formatting ensures that the medium is formatted so all user-addressable data blocks can be accessed. There is no guarantee that the medium has not been altered or damaged since delivery. In addition, the format function verifies the medium and creates control structures for the management of the medium and defects. Data on the device will be irretrievably lost during formatting. A standard SCSI format command is issued. Multiple targets can be simultaneously formatted. Most corrupted format errors can be recovered.

Format Tab

Click Format Now to start the format process. Note: An interrupted format can cause a medium error and format failed sense keys (i.e., 03 31). If you receive these errors, reattempt a low level format.



Change Blocksize / Change Capacity Tab

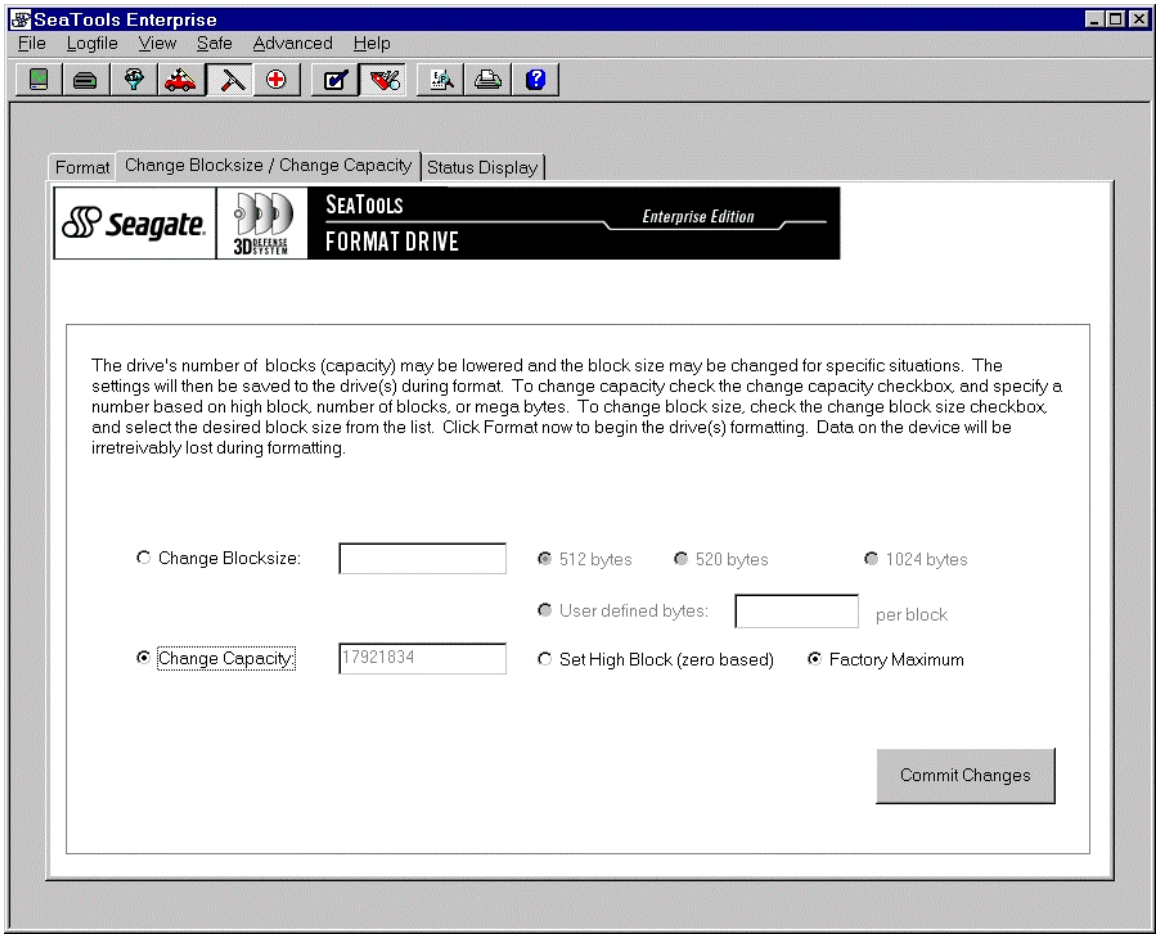
The drive's number of blocks (capacity) may need to be changed for specific situations. The settings will then be saved to the drive(s) during format.

Change Block Size:

To change block size, check the Change Block Size checkbox and select the desired block size from the list. Note: Windows NT can use block sizes larger or smaller than 512, Windows 9x and Windows 2000 can only use a block size of 512. Click Commit Changes button to initiate any changes.

Change Capacity:

To change capacity, check the Change Capacity checkbox and specify a number indicating the highest block desired. If the drive has previously been programmed to less than its full native capacity, checking the factory maximum will return it to its full capacity. Click Commit Changes button to initiate any changes. NOTE: Although a low-level format is not required after changing capacity, access to any previously stored data may be affected as the change in total capacity may affect the translation used by the controller or drivers. Backup the data if necessary. Repartitioning is suggested.



Status Display tab

This tab shows the current status and elapsed time of the format operation.

Support Function

This function provides links and contact information as well as Return Merchandise Authorization (RMA) instructions.

Support Resource Tab

The support tab provides several links to web sites with useful information about your Seagate peripherals. There are links to web sites with FAQ's and technical papers as well as a site from which to contact Seagate support directly.

There is also a link to the home page of Peripheral Test Instruments, the authors of this program. PTI develops standard and customized software for peripheral diagnostics.

Return Merchandise Authorization Tab

This page allows you to generate a Seagate standard RMA form for the selected drive. The program automatically retrieves drive Model and Serial number information. Fill in the additional information then press the Generate Form button to create the RMA form.

View Logfile Button

Log file options include Open, Save As, Clear.

Print Logfile Button

Print the logfile.

SeaTools Help Button

Select this button on the toolbar to access a searchable help file.

Exiting the Program

Exit the program by selecting Exit on the File menu. The Window Title Bar X button can also be used to close and exit the program.

SeaTools *Enterprise Edition* End User License Agreement

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Miscellaneous. This is the entire Agreement between you and Seagate, and supersedes any prior agreement, whether written or oral, relating to the subject matter of this Agreement. The parties disclaim the application of the United Nations Convention on the International Sale of Goods. The parties agree that the law of California, USA, excluding its conflict of law rules, shall govern. Any lawsuit involving this Agreement must be brought in a court in California, and you hereby consent to jurisdiction in California. If any provision of this Agreement is ruled invalid, such invalidity shall not affect the validity of the remaining portions of this Agreement.

Seagate is a Delaware Limited Liability Company with its primary place of business located at 920 Disc Drive, Scotts Valley, CA 95066. Peripheral Test Instruments is a Colorado corporation with its primary place of business located at 3345 South Wadsworth Blvd. Ste. 220, Lakewood, CO 80227.

Tech Support/Data Recovery Information

Online Services

Internet

www.seagate.com for information about Seagate products and services. Worldwide support is available 24 hours daily by e-mail for your disc or tape questions.

Presales Support:

Disc: www.seagate.com/support/email/email_presales.html or DiscPresales@Seagate.com.
Tape: www.seagate.com/support/email/email_tape_presales.html or Tape_Sales_Support@Seagate.com.

Technical Support:

Disc: www.seagate.com/support/email/email_disc_support.html or DiscSupport@Seagate.com.
Tape: www.seagate.com/support/email/email_tape_support.html or TapeSupport@Seagate.com.
Server Appliance: www.seagate.com/support/email/email_nas_support.html or NAS_Support@Seagate.com.Reseller.

Marketplace Reseller

Marketplace is the storage industry's first collaborative, e-commerce marketplace offering resellers the fastest, most efficient online purchasing process for Seagate storage solutions. The Reseller Marketplace at http://marketplace.seagate.com, an exclusive service for US resellers participating in the Seagate Partner Program (SPP), is designed to streamline the purchasing process of Seagate solutions and provide unprecedented value to Seagate's resellers through real-time pricing and availability, fast and easy comparison shopping, and seamless integration with key distributors for a one-stop shopping experience. For support, questions and comments: http://reseller.seagate.com/benefits/T1.html or 1-877-271-3285 (toll-free) 9 A.M. to 7 P.M. (eastern time) Monday through Friday.

Tape Purchases

US customers can purchase Seagate data cartridges, tape supplies, accessories and select Seagate tape drive products 24 hours daily at buytape.seagate.com.

SeaBOARD® is a computer bulletin board system that contains information about Seagate disc and tape drive products and is available 24 hours daily. Set your communications software to eight data bits, no parity and one stop bit (8-N-1).Automated Services

SeaFONE® (1-800-SEAGATE) is Seagate's toll-free number (1-800-732-4283) to access our automated self-help services. Using a touch-tone phone, you can find answers to service phone numbers, commonly asked questions, troubleshooting tips and specifications for disc drives and tape drives 24 hours daily. International callers can reach this service by dialing +1-405-936-1234.

SeaFAX® is Seagate's automated FAX delivery system. Using a touch-tone phone, you can obtain technical support information by return FAX 24 hours daily. This service is available worldwide.

Presales Support

Our Presales Support staff can help you determine which Seagate products are best suited for your specific application or computer system.

Technical Support

If you need help installing your drive, consult your dealer. Dealers are familiar with their unique system configurations and can help you with system conflicts and other technical issues. If you need additional help, you can talk to a Seagate technical support specialist. Before calling, note your system configuration and drive model number (ST####).

SeaTDD™ (+1-405-936-1687) is a telecommunications device for the deaf (TDD). You can send questions or comments 24 hours daily and exchange messages with a technical support specialist from 8:00 A.M. to 11:45 A.M. and 1:00 P.M. to 6:00 P.M. (central time) Monday through Friday.

Warranty Service

Seagate offers worldwide customer support for Seagate drives. Seagate direct OEM, Distribution and System Integrator customers should contact their Seagate service center representative for warranty information. Other customers should contact their place of purchase.

Authorized Service Centers

If you live outside the US, you can contact an Authorized Service Center for service.

USA/Canada/Latin America Support Services

Presales Support

Call Center	Toll-free	Direct dial	FAX
Disc:	1-877-271-3285	+1-405-936-1210	+1-405-936-1683
Tape:	1-800-626-6637	+1-714-641-2500	+1-714-641-2410
Server Appliance:	1-800-732-4283	+1-405-936-1234	+1-405-936-1683

Technical Support

(SeaFONE) 1-800-SEAGATE or +1-405-936-1234 (for specific product phone number)
FAX: Disc: +1-405-936-1685; Tape and Server Appliance: +1-405-936-1683
SeaFAX 1-800-SEAGATE
SeaTDD +1-405-936-1687
SeaBOARD Disc: +1-405-936-1600; Tape: +1-405-936-1630

European Support Services

For European customer support, dial the toll-free number for your specific country for presales support, technical support, SeaFAX and warranty service. If your country is not listed here, dial our European call center at +31-20-316-7222 from 8:30 A.M. to 5:00 P.M. (European central time) Monday through Friday. The European call center is located in Amsterdam, The Netherlands.

Call Center	
Austria	0 800-20 12 90
Belgium	0 800-74 876
Denmark	80 88 12 66
France	0 800-90 90 52

Germany	0 800-182 6831
Ireland	1 800-55 21 22
Italy	800-790695
Netherlands	0 800-732 4283
Norway	800-113 91
Poland	00 800-311 12 38
Spain	900-98 31 24
Sweden	0 207 90 073
Switzerland	0 800-83 84 11
Turkey	00 800-31 92 91 40
United Kingdom	0 800-783 5177

SeaBOARD

Germany +49-89-1409331

Fax Services—All European Countries
Presales/Technical Support/ +31-20-653-3513

Asia/Pacific Support Services

For Asia/Pacific presales and technical support, dial the toll-free number for your specific country. The Asia/Pacific toll-free numbers are available from 6:00 A.M. to 10:45 A.M. and 12:00 P.M. to 6:00 P.M. (Australian eastern time) Monday through Friday. If your country is not listed here, direct dial one of our technical support locations.

Call Center	Toll-free	Direct dial	FAX
Australia	1800-14-7201	+61-2-9725-3366	+61-2-9725-4052
Hong Kong	800-90-0474	—	+852-2368 7173
Indonesia	001-803-1-003-2165	—	—
Japan	—	—	+81-3-5462-2979
Malaysia	1-800-80-2335	—	—
New Zealand	0800-443988	—	—
Singapore	800-1101-150	+65-488-7584	+65-488-7528
Taiwan	—	+886-2-2514-2237	+886-2-2715-2923
Thailand	001-800-11-0032165	—	—

♦

Glossary

3D Defense System
Seagate's exclusive, most comprehensive drive protection system in the industry, consisting of Drive Defense, Data Defense, and Diagnostic Defense. 3D allows effortless and safe installation, enhances drive reliability, and protects user's data. The 3D Defense System leads the industry as the most robust drive-protection system that ensures customers receive the high-quality, high-reliability disc drives they expect from Seagate.

ASPI - Advanced SCSI Programming Interface.
ASPI is a protocol developed by Adaptec and supported by the host adapter. ASPI is used by some SCSI application programs to communicate with SCSI adapters.

ATA
Advanced Technology Attachment. ATA is the most common interface used in consumer and corporate PCs today because of its lower cost and very favorable performance. ATA is also known as IDE (Integrated Drive Electronics) in the disc drive industry.

BIOS
Basic Input/Output System. A program permanently stored in the memory of the computer and available without an operating system disc. It performs the internal power-on self-test (POST) of the computer and searches for the operating system on disc drives.

CMOS
Complementary Metal Oxide Semiconductor. A kind of integrated circuit used in processors and memories.

Command prompt
The MS-DOS prompt C:/> which appears on the screen to indicate the operating system is ready to accept an instruction.

DOS- Disk Operating System
A computer program that continuously runs and mediates between the computer user and the application program, and allows access to disc data by disc file names.

DST
Disc Self-Test

ESD - Electrostatic Discharge
An integrated circuit (chip) failure mechanism. Since the circuitry of chips is microscopic in size, they can be damaged or destroyed by small static discharges. People handling electronic equipment should always ground themselves before touching the equipment. Electronic equipment should always be handled by the chassis or frame. Components, printed circuit board edge connectors, should never be touched.

FAT- File Allocation Table
The operating systems use FAT to keep track of which clusters are allocated to which files and which are available for use. FAT is usually stored on Track 0.

GUI - Graphical User Interface
An interface that has pictures as well as words on the screen. Originally invented by Xerox, the idea was expanded and popularized by Apple Computers. With windows, icons, pull-down menus, and the mouse, the graphical user interface is easier to learn and work with.

HPFS - High Performance File System
The file system for IBM OS/2.

IDE
Integrated Drive Electronics. IDE is used to describe a device with built in ATA protocol electronics.

Legacy drives
Older drives; drives which were built and sold many years ago.

NPF
No Problem Found, used to denote a product that has been returned as defective, yet is fully operational.

NTFS - New Technology File System
The file system used by Windows NT. It supports multiple file systems, has file recovery for hard disk crashes, uses the Unicode character set, and provides for file names up to 255 characters long.

RMA
Return Merchandise Authorization

SCSI
Small Computer Systems Interface. The current high end CPU-to-drive interface.

S.M.A.R.T
Self-Monitoring, Analysis, and Reporting Technology. Helps prevent data loss and unscheduled computer downtime and provides advanced warning of certain types of drive failures, allowing the user of data management software to backup the data. Although Seagate offers this technology, it is not supported by all system manufacturers and usually requires third party software.

URL
Uniform Resource Locator (formerly Universal Resource Locator).An Internet address that tells a browser where to find an Internet resource.

SeaTools Disc Diagnostic Process - SCSI