



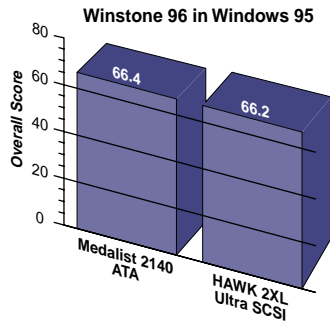
Which *is* the Right Interface?

Choosing between ATA and SCSI depends on your computing needs, balanced with the cost of implementing the interface. If you are using a desktop PC and the Windows 95 operating system, then the most likely solution based on a balance of performance and cost is the ATA interface. Upgrades such as this are usually needed to increase storage capacity and the ATA interface easily supports today's high-capacity needs. ATA systems usually support up to four peripherals. SCSI provides a much better balance of performance and cost when the operating system is Windows NT or if you are looking for additional storage in a server environment. SCSI works very well in applications using four or more peripherals, such as a CD-ROM, a printer, a scanner and disc drives. Although capacity points of ATA and SCSI disc drives are somewhat similar today, the highest-performance drives use the SCSI interface. An example of this is the Seagate Cheetah™ drive. At 10,000 RPM, this is the fastest disc drive available today. The Cheetah is only available with the SCSI or Fibre Channel interface. The interface choice depends on your specific computer environment and performance/cost needs.

Desktop and mobile PCs. ATA is the interface of choice for most desktop PCs because it is the least expensive to implement. Almost all desktop and mobile

more ►

PCs come equipped with an ATA interface. There is typically no performance advantage in using SCSI in this environment.



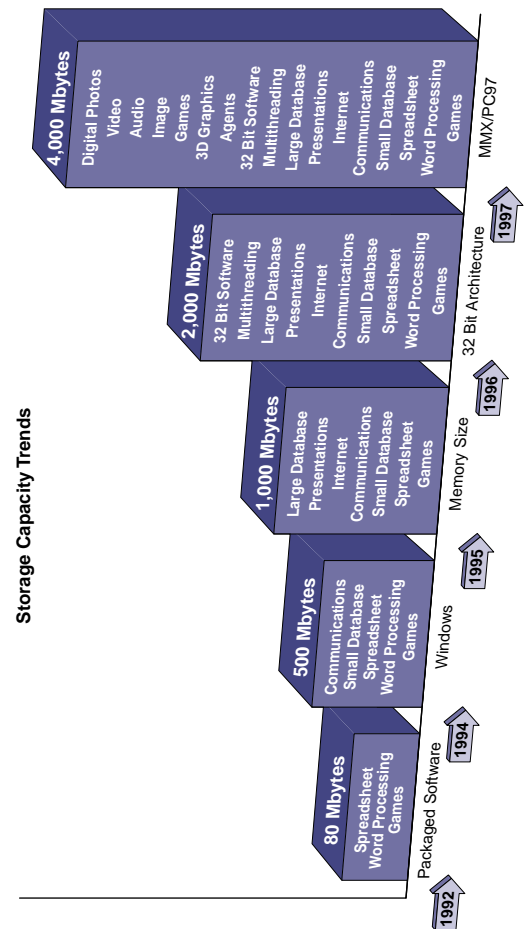
Multuser system or server. SCSI is the best I/O choice for the server environment because of features such as multisegmented cache, command queuing and bus connect/disconnect. With bus data rates as fast as 80 Mbytes per second, Ultra2 SCSI provides the rapid response required in a multuser environment. Ultra2 also provides increased data integrity over cable lengths as long as 12 meters, allowing easy integration of up to 15 peripherals on a single wide SCSI bus. If you require very large amounts of storage, up to 126 devices, hot pluggability and 200 Mbytes per second, then Fibre Channel-Arbitrated Loop is the best solution for a high-performance system.

Workstations or high-end PCs. In this environment, the operating system and the number of drives on the system are the main performance considerations. While ATA works very well when using Windows 95, if you are running Windows NT and have four or more peripherals attached to your system, SCSI will provide the best cost/performance solution.

How much capacity is enough?

The cost per Mbyte is at an all-time low, which is good news because operating systems and applications are requiring more and more disc capacity.

Keep in mind that many graphics, video and voice data files can take up storage space at 90 Mbytes per minute, which can far outreach storage demands of the original application.



What may seem like storage capacity overkill today can be the life-saver of tomorrow. For examples of how much storage is used by some common applications and how this storage dictates capacity, please refer to the capacity chart on the previous page.

What are some common bottlenecks?

Operating System

An operating system is only as fast as its slowest component. Operating systems such as Windows 95 and Windows NT facilitate different performance rates from ATA and SCSI drives.

bus

A slow ISA bus can present a bottleneck to a fast drive. PCI and VESA buses are optimal.

BIOS

Ultra ATA—Ultra ATA is somewhat similar to Ultra SCSI in the sense that it bridges the gap between the current standard (ATA-3) and the next generation, which is not yet completed. Ultra ATA adds a new, high-performance mode: DMA/33 with 33 Mbytes per second bandwidth, twice that of DMA mode 2.

SCSI—Today's Ultra2 SCSI bus provides data rates as fast as 80 Mbytes per second.

Just *how fast*
fast is fast enough?

The answer is simple if you look at the right specifications. However, not all specs are created equal. Our experts have scaled down the seemingly infinite number of technical performance possibilities to a few critical details.

Look for higher spindle speeds or RPMs.

A fast-spinning disc increases your ability to access data. Seagate continues to lead the storage industry by continually pushing for faster spindle speeds. The faster the spindle speed, the quicker the data arrives under the head. Rapid spindle speeds also facilitate faster transfer off of the disc. Seagate's accomplishments include shipping the industry's first 10,000-RPM, 7,200-RPM and 5,400-RPM disc drives.

It is important to look for lower access times. Access time is more critical than seek time because seek time simply refers to the time it takes for the head to move back and forth over the appropriate disc or track. Access = seek + latency. Access time involves finding the track *and* accessing the data. A fast spindle is critical for moving large graphic or video files, and a rapid access time is best for performing many small transactions, such as database work, where continuous random seeks are in order. Low latency rates tells you how many milliseconds it takes for the spinning disc to bring around the desired sector to where read/write heads can access it.

Look for higher transfer rates, paying particular attention to the internal transfer rate. Higher transfer rates are critical for large transactions that involve graphics and multimedia. The internal transfer rate is

usually the bottleneck in getting information from the disc drive to the buffer. Transfer rate is measured in megabits (Mbits or Mb) per second, 8 Mbits equal 1 megabyte (Mbyte or MB). External transfer rate is the rate at which information moves out of the drive buffer and into the system. External transfer rate is important when selecting hardware to work effectively with the disc drive.

Look for efficient cache memory, which allows the system to load bytes of data from the hard disc to memory.

What *makes* a **drive** reliable?

By looking at mean time between failures (MTBF), you can understand the design criteria of the drive. These numbers should not be taken literally, but point to an overall statistical average of reliability. Seagate disc drives typically have a lifetime expectancy of five years, which is an eternity in the ever-changing high-tech world. Seagate disc drives all come with limited warranties* of either three or five years.

You should also look for features that aid reliability. These features include:

SAFE-WRITE™ PROTECTED SafeRite™ offers 2.5-inch disc drives the ability to protect data from the normal bumps and jolts that notebook computers frequently receive. A sensor detects a shock and prevents the overwriting of data when the drive is jarred suddenly during write operations.

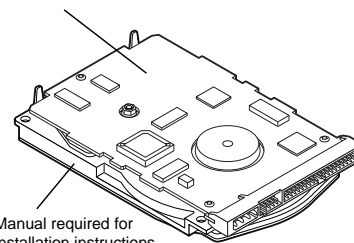
* For a full warranty statement, call 1-800-468-3472.

Environmental specifications. The noise that the disc drive makes may affect your purchasing decision, depending on where the drive will be located in the home or office. The audible noise tends to double with every 3 dBA.

SeaShield™ SeaShield™ is a protective cover for the drive's printed circuit board. It helps improve reliability and makes installation easier. The cover prevents you from touching sensitive electronics, which reduces the possibility of damage due to electrostatic discharge. SeaShield provides a surface where installation instructions, important drive parameters and jumper settings are printed. The pictures and arrows make installation easy, even for the novice.

Before SeaShield (Medalist 2132)

Printed circuit board exposed to electrostatic and impact damage

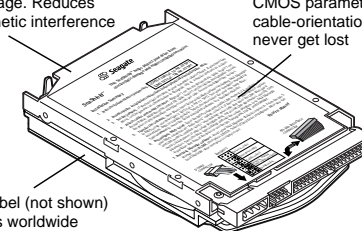


Manual required for installation instructions and technical support numbers

After SeaShield

SeaShield™ helps protect PCB from electrostatic and minor impact damage. Reduces electromagnetic interference

Installation instructions, jumper settings, CMOS parameters and cable-orientation pictures never get lost



Top cover label (not shown) now displays worldwide technical support numbers

How can you *choose* to upgrade an ATA drive?

Compatibility

With the operating system. Seagate drives are compatible with all major operating systems, including Windows 95, Windows NT, OS/2, UNIX and Macintosh.

With BIOS. Older BIOS may limit the capacity of some drives to 525 Mbytes or 2.1 Gbytes. Most Seagate ATA drives ship with software that recognizes and overcomes these limitations.

With other drives. Seagate drives are compatible with almost all ATA (IDE) drives including Western Digital, Maxtor and Quantum. When setting up master/slave configurations, you will find the necessary settings clearly printed on Seagate drives. DiscWizard™ software assists in the setup procedure and includes utilities to transfer data from the existing drive to the new one, and to rename data volumes that prevent the PC from being confused.

Ease of installation



Seagate provides desktop users with DiscWizard, a Windows and Windows 95 software program bundled with select Medalist® hard drives. DiscWizard facilitates installation by analyzing your existing system configuration, by asking several questions about how you want to use your new drive and by offering customized-installation tips. DiscWizard also determines whether your BIOS has limitations in handling large-capacity drives and provides step-by-step instructions that make installation a snap.

SeaShield™ SeaShield helps improve reliability and makes installation easier for desktop users. Acting as a protective cover for the printed circuit board, SeaShield prevents you from touching sensitive electronics and includes written instructions about drive installation.

Environment

Mounting. Most PCs accommodate 3.5-inch hard drives because more than 90 percent of desktop drives are shipped with this form-factor. You should check to see if you need mounting rails to install a 3.5-inch drive in a 5.25-inch bay, and ribbon and power cables. Seagate provides essential rails, cables and screws in retail kits.

Acoustics. The more drives, the greater the noise. Every 3 dBA means double the amount of noise. With this in mind, you should consider drives with low dBA ratings.

Power. An increased number of peripherals makes greater demands on the power supply. Although this is usually not a problem, you may want to look at the maximum drive power ratings, especially with mobile products.

Space for cooling. Increased airflow means better cooling. The smaller the drive, the easier it is for air to circulate within the PC. Seagate's unique 3.5-inch slim-line drives are only 19 mm high, compared to 25 mm on most 3.5-inch low-profile drive.

How *do i* achieve optimal ATA performance?

Full-motion video, audio, multimedia, networking, graphical-user interfaces and the Internet require planning when setting up a drive.

Here are several tips:

Use the fastest drive as the master. The master disc drive, with a 5,400-RPM capability, should run the slave drive if it is only rotating at 3,600 RPM. The same logic holds true for all critical specifications.

Partition drives for larger capacity and better performance. Partitioning is the method of dividing an area on a disc drive into smaller portions of lesser capacities that can be recognized by the operating system. Partitioning enables you to achieve greater efficiency and functionality from high-capacity disc (2.1-Gbyte or greater) drives.

Drives can be partitioned by size, use or application. Partitioning by size means forming partitions of equal size. Seagate makes partitioning easy on larger Medalist products by bundling DiscWizard, which automatically partitions the drive. A use-based plan typically features one separate partition for user data and another partition for system applications. Partitioning by application offers advantages because the customer can then size each application-based partition based on the expected rate of growth. A networking partition, for example, may contain the application and data associated with over-the-phoneline data and may also include extra virus protection to create a firewall.

Eliminate performance bottlenecks. This means paying close attention to interface selection and performance specifications before purchasing a disc drive. Make sure that you are aware of what types of demands will be made on the disc drive. Will the drive be used primarily for moving large blocks of graphics and video-editing or for random data retrieval? Will it be in a single-user or multiuser environment? These subjects are addressed extensively in other chapters of this booklet.

What Lies Ahead for Desktop Products?

Seagate is currently working with industry leaders to incorporate an interface known as 1394-1995. Once adopted, this interface will be incorporated across all desktop products. The 1394-1995 serial interface is a versatile, high-speed, low-cost, bidirectional communication system designed to simplify and improve connection of digital products. The 1394 interface, used principally with audio-visual applications, supports data rates of 100, 200 and 400 Mbits per second.