

MG: A Guide To CD-ROM Drives

by Gary Le

Multimedia. It seems everybody everywhere is becoming familiar with this new buzzword. Although the term "multimedia" can have many interpretations depending on the context that it is used in, people generally think of the CD-ROM drive as the centerpiece. From the point of view of gamers, the drive is the only piece of equipment they need concern themselves with (and the game titles of course).

Not until a couple years ago did Reactor release Spaceship Warlock, the first commercial CD-ROM game title with beef enough to draw the eyes of the gaming community. Since then, many other titles have made their way into the CD-ROM gaming world, including The Journeyman Project by Presto Studios and MYST by Cyan. With the recent surge of CD-ROM drive purchases the last year, game developers are becoming increasingly inclined to develop games on CD-ROM. Thus, 1995 promises to be laden with spectacular CD-ROM game releases. So, if you're in search of a new CD-ROM drive, now is the time to buy, especially with the recent drop in prices. And if you do decide to buy, but are a little miffed about all the numbers and specs salespeople are prone to throw at you, here are some explanations to guide you in your search.

Data Transfer. 2X. 3X. 4X. If you've ever laid eyes on a CD-ROM drive ad, you should be able to recognize these labels. 2X, 3X, and 4X translates into "double-speed," "triple-speed," and "quad-speed," respectively. That's all and fine you say, but what is it "double the speed" of? Good question. Back in the 80's, practically all CD-ROM drives (now commonly known as single-speed drives) were reading data from a CD-ROM at the same rate. The rate at which a drive reads data is called its "data transfer rate." For single speed drives, the data transfer rate is 150 kilobytes per second (kb/sec). Coincidentally, audio CD's (the ones you buy at a music store) are played back at this speed. Basically, the higher the transfer rate, the better. A high transfer rate is beneficial for reading big files from disc, such as graphic files, because the more data your drive can read in a second, the faster the graphic will travel from disc to your screen for viewing. So, if a drive is advertised as being "double-speed," it means the drive is able to transfer twice as much data in the same amount of time as a single-speed drive; or, in other words, the double-speed drive has a transfer rate of 300 kb/sec. For a triple-speed drive, the data transfer rate is 450 kb/sec., and so on.

Average Seek Time. How fast a CD-ROM drive is able to locate a specific piece of data on a

CD is called its "seek time." But a drive doesn't always locate data in the same amount of time every time, so instead of "seek time," ads usually list the drive's "average seek time." Try to get your hands on a drive with an average seek time of less than 300 milliseconds (ms) — the lower the better. The speed at which a game is played from disc depends on several factors, with the average seek time of the drive probably being the most important. As you interact with and progress through each new element within a game (such as moving to a new level or visiting a new location for the first time), your drive has to constantly jump to various locations on disc to access the appropriate data. How fast the drive can jump to the locations determines how long you have to wait before something happens. Translation: the lower the seek time, the faster a drive can locate the necessary data and get you moving along in a game.

Note that speed is relative. A CD-ROM drive is slow, when compared to something more common, like a hard drive. The poor performance is inherent in CD-ROM technology. In exchange for the capacity to store large amounts of data (a CD-ROM can hold about 600 megabytes of data), the technology sacrifices speed. For comparison purposes, a typical triple-speed drive has an average seek time of about 200 ms, while a typical hard drive has a seek time of around 13 ms. Big disparity. So if you've never owned a CD-ROM drive before, don't be alarmed at having to wait longer than usual for something to happen. Your drive isn't broken (unless, of course, you witness the next iteration of Haley's comet while you're waiting), that's just the way it is.

Cache Size and CPU Speed. Several factors come into play when buying a CD-ROM drive, but the speed and average seek time aspects should be your two main points of interest. Other factors, while not as crucial, can also affect the overall performance of a drive. They include cache or buffer size and the speed of your CPU. A cache or buffer is where data can be stored beforehand by the CD-ROM drive. Since this data is already pre-stored, it is readily available without having the drive access the data on disc. Thus, the larger the cache or buffer, the larger the capacity to pre-load data from disc. If you can, try to get a drive with at least a 64 kilobyte cache or buffer.

The performance of a CD-ROM drive can also be affected by the speed of your CPU. How you ask? Well, as data is fetched from the disc by your drive, the data has to be processed — how fast this data is processed depends upon the speed of the CPU. So, if you go out and buy a quad-speed drive, but end up using it with an old Mac LC, don't be surprised to find your drive's performance isn't overwhelmingly better than your neighbor's double-speed drive running on a Quadra 800.

Gaming Terms. So how does speed, seek time, cache, and CPU speed come into play in terms of games? For beginners, the majority of CD game titles out now are optimized for play on double-speed drives. Titles taking full advantage of triple-speed drives probably won't show up for several months yet. Besides, no use making a game optimized for quad-speed drives when the majority of users have double-speed and single-speed drives. Also, many CD titles contain QuickTime movies and soundtracks. QuickTime movies have been optimized for playback on double-speed drives and so should run fairly smoothly (when used in conjunction with a decent CPU). As for audio, every drive, no matter what speed it operates at, must process audio data at single-speed (150 kb/sec.). Any drive operating faster than single-speed and made by a reputable manufacturer (Toshiba, NEC, Sony, etc.) should be able to "step-down" automatically to single-speed when it needs to process audio.

So What Should I Get? Single-speed drives are old news. Ignore anyone trying to sell you one, unless you're new to the world of computing and are on a really tight budget. Double-speed drives are pretty mainstream now and come with a lot of backing because of double-speed optimization of many CD titles. But with a price tag as low as \$199 (for just the drive

and cable), triple-speed drives seem the way to go. Besides the attractive price, these drives will be able to take advantage of future optimization of titles at triple-speed, as well as running current optimized titles for double-speed. Just look for one with a decent seek time and cache. Of course, if you have the money, you could get a quad-speed drive (\$299 and above) or check out PLI's new 15X speed drive (with a price up around earth's stratosphere), with a cool transfer rate of 2250 kilobytes of raw data per second and 40 ms seek time! The key point to keep in mind is that every four to six months or so, prices will go down. And in the case of CD-ROM drives, this is especially true, as faster drives are already on the horizon.