

The Hard Facts...of Hard Drives

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It's really not that hard. If you have been following my articles lately, you know that every couple of months I like to center on a particular PC component and explain it in simple English. There are two components inside your PC I consider most vulnerable to failure from a mechanical origin. Those two components are your hard drive (HD) and your power supply. Translation: Your computer will probably die as a result of a hard drive malfunction, or a nondescript power supply breakdown. I liken this to the human brain and heart. You can absorb other minor injuries, but any concerning these two and both you and your computer will result in a blackout. Before I explain the fundamentals of HDs, you should be aware that most computer manufacturers use inexpensive models of both these critical parts. When it comes time to upgrade your HD or select your new computer, make sure you consider these facts. In this article I will explain how to interpret the most common HD specifications.

Just the facts, please. Because this article is intended for home consumers, I will forgo any dialogue relating to SCSI and RAID technologies, and focus on the ubiquitous internal 3.5-inch ATA EIDE hard drives (a hard drive is also known as a hard disk). The two acronyms you will hear most are ATA (Advanced Technology Attachment) and EIDE (Enhanced Integrated Drive Electronics). Don't be confused if you also see Ultra ATA or Ultra DMA (Direct Memory Access) because they all essentially refer to the same thing: ATA EIDE interface. And guess what? All that mumbo jumbo refers to is the rate of the hard drive interface and connection speed. Today, the most prevalent EIDE drives are the ATA/66 and ATA/100. The numbers mean that an ATA/66 drive's maximum rated speed is 66MBps. Don't get hung up on these numbers considering the real world performance difference between ATA/66 and ATA/100 is very negligible. By the way, the next generation in the ATA interface (we may see this by next year) is what's called Serial ATA. Serial ATA uses only two wires, to and from the hard drive at 1.5 Gbps. This will be a vast step forward, as 1.5 Gbps is significantly faster than ATA/100! One last thing to note about ATA EIDE hard drives is that if your Mother Board/Controller is not rated at the same speed as the hard drive (ATA/100 for example), it will not take of advantage of the hard drive's peak rate anyway.

Performance does matter when it comes to the platter. The platter is a rigid disk inside the hard drive that is covered with magnetic material that stores your data. Depending on the capacity, there may be several platters in your HD. A key specification that tells you about the drive's performance quality is what's known as "rotational speed". Rotational speed (also called spindle speed) is measured in rpm's (revolutions per minute), thus the 5,400 or 7,200rpm specification you read about. Normally, the higher the rpm's the better the performance. It's generally accepted that a 7,200rpm drive outperforms a 5,400rpm drive by 33% because of its ability to read and transfer data more quickly. The next specification to determine a drive's performance is the "Cache Buffer". Cache Buffer, more commonly just called cache, can be thought of as the HD's temporary RAM storage. The cache of a HD plays a very important role; hence the larger the cache's buffer the better. A 2MB cache buffer would be considered very adequate for a home PC. The final indicator of a HD's performance is called "Seek Time". In short, the seek time is how long it takes the hard drive to find a particular track on the disk. Seek time is measured in ms (milliseconds) and on average is 7 to 13ms with the lower numbers being preferred. One last tidbit—if you read anything about a drive's "shock tolerance" it will be measured in G's. This may sound crude, but this measurement relates to how hard a wallop it will take before the drive suffers damage. The average is about 200 to 300G's. Installing a replacement Seagate drive about a year ago, my German Shepherd couldn't resist the anti-static bag the drive was in, proudly running around while chomping down on the drive. After installing

the drive and re-booting, nothing happened, but I digress. The last two points to consider are related to the HD's reliability—the manufacturer's warranty and MTBF (Mean Time Between Failure). The MTBF is usually listed in hours and indicates the manufacturer's expected life span of the HD. A nicely performing HD by today's standards would be an ATA/100, 7200rpm, 2MB cache, 40Gig, 8.5ms seek time, and offer a 3-year warranty. I personally prefer the IBM Deskstar GXP and Seagate Barracuda models. Happy Driving...um, make that Hard Driving!