

## Solid-State Drives (SSDs)

Volume 7, Number 2

### What are solid-state drives, and why should I care?

Solid-state drives (SSDs) use memory chips instead of spinning magnetic disks to store data. They are increasingly becoming standard equipment on notebook computers and high-performance home computers, as they offer a number of advantages over magnetic drives.

### What are the advantages of SSDs?

- **Increased speed.** Because there are no moving parts in SSDs, they can operate more efficiently than traditional disk drives. Many users report faster startup, application launch and shutdown times as compared to magnetic drives. Solid-state drives can improve overall performance on computers to a significant degree. Once you transition to an SSD, you may find it hard to go back to a regular drive.

- **Silent operation.** The first time you start up an SSD-based computer, you may wonder whether your power button is broken; these drives are completely silent. The absence of chirps, brapps and whirrs is welcome.



- **Decreased heat.** When it comes to computers and electronic devices, heat is the enemy. SSDs generate less heat than their hard drive counterparts.

Solid-state drives, like this model from Kingston Technology ([Kingston.com](http://Kingston.com)), can give your laptop and desktop computers a speed boost.

This is particularly welcome news to anyone whose notebook acts like a tiny furnace during use.



Some laptops are notorious for generating heat during use. SSDs can mitigate this problem.

- **Impact resistance.** Because no magnetic platters are rotating thousands of times per second in an SSD, the consequences of a sharp rap or a drop from a modest height are much less likely to be serious than with a traditional drive.
- **Magnetic field resistance.** Data on traditional hard drives can be lost when it comes in close proximity to a powerful magnet. This issue is eliminated in SSDs, which are essentially immune to magnetic interference.

### Are there any drawbacks?

As with most technology choices, there are both pros and cons to consider. Here are a couple of the downsides to take into account before making a change to SSD technology:

- **Cost.** Though solid-state drives are dropping in price every year, they are still quite expensive as compared to standard drives. For less than the price you'd pay for a 64GB SSD (about \$150), you could buy a 750GB hard drive; this works out to about \$0.20 per gigabyte for magnetic drives vs. \$2.34 per GB for SSDs. Over time this tenfold cost difference is likely to decrease, but it is substantial at present.

### The jury is still out on a couple of issues:

- **Power consumption** is typically thought to be a major benefit of SSDs versus magnetic drives. This makes intuitive sense, as there are no motors which have to come up to speed in an SSD and no need to constantly move the drive heads into place over the rotating disk surface. However, an article on Tom's Hardware (a respected computer enthusiast site) entitled *The SSD Power Consumption Hoax* calls this conclusion into question ([tomshardware.com/reviews/ssd-hdd-battery,1955.html](http://tomshardware.com/reviews/ssd-hdd-battery,1955.html)). Some SSDs

are better than others at conserving power – check drive specifications, as they typically provide the amount of power consumed when idle and in use. This information can help you to identify the most energy-efficient SSDs.

- **Drive life** is something of a concern because the memory chips inside these drives can be written and erased a finite (though very large) number of times before they wear out. Fortunately, technological improvements have nearly eliminated the problem for typical business or home use.

To be safe, users who elect to buy SSDs should **not** use disk defragmentation programs or routinely run benchmark tests, as these activities can cause premature wear to SSDs.

### **I have hundreds of gigabytes of digital snapshots, vacation movies and music files on my home computer. How could I possibly switch to an SSD without emptying my bank account?**

As a practical matter, it is not currently cost effective to convert all of your desktop computer's storage space to SSD. Instead, consider a hybrid approach to disk storage. Simply install your operating system (OS) and applications on a modestly sized SSD (perhaps 64 to 128GB in size) and store your documents and media files on a traditional hard drive (perhaps the one which formerly held your operating system). That way, your applications and OS will benefit greatly from the increased speed of SSD technology, while photos, videos and word processing files will live happily on a separate and capacious hard drive.

Most laptop computers have space for just one storage drive, so you'll probably be putting all of your eggs in the SSD basket. This isn't usually a problem, as laptop drives tend to be smaller than their desktop computer counterparts. Just don't expect to take your entire media collection with you if you switch to a solid-state drive.

### **I have an five-year-old computer. Can I upgrade it with an SSD?**

Many computers older than a few years use a computer interface known as PATA (Parallel ATA), and storage drives using the PATA interface are called IDE drives. Solid-state drives made for this older interface are somewhat rare and don't perform spectacularly well, so you might wish to forego an SSD if you have an IDE drive. In contrast, if you have a drive with the newer SATA (Serial ATA) interface, you'll have many fast options from which to choose.

## Does my OS matter?

Yes, your operating system version can make a difference with these drives. Computers running Windows 7 OS will automatically recognize SSDs and provide optimal performance. If your computer is running Windows XP, Macintosh or Linux, you can use an SSD, though your relative performance may not be quite as high as with the Windows 7 operating system.

## I'm seeing abbreviations for MLC and SLC in SSD specifications. What do they mean?

Solid-state drives based on single-level cell (SLC) memory perform better and have a longer life than multi-level cell (MLC) drives. They are much more expensive, though. As a result, most consumer SSDs are of the MLC variety. If you need the very fastest performance, an SLC drive is the way to go. The Intel X-25E is a popular drive series based upon SLC memory.



Intel's X-25E SSD is based on the speedy and reliable SLC memory.

## Conclusion

A solid-state drive can really boost the performance of your laptop or desktop computer, though you'll be paying a sizeable premium for the privilege. Magnetic hard drives will likely enjoy their price advantage for some time to come, but prices on SSDs are bound to continue to drop as memory chips become cheaper to manufacture.

If you have questions, comments or suggestions, you can visit me at the Reference Desk, contact me via email ([moetting@hinsdalelibrary.info](mailto:moetting@hinsdalelibrary.info)), or call me at 630.986.1976 ext. 225.

An archive of Tech Talk issues can be found at: [tinyurl.com/HPL-techtalk](http://tinyurl.com/HPL-techtalk).

Mike Oetting, Reference Librarian  
2/28/2011



20 East Maple St.  
Hinsdale IL 60521  
630-986-1976  
[www.hinsdalelibrary.info](http://www.hinsdalelibrary.info)  
[reference@hinsdalelibrary.info](mailto:reference@hinsdalelibrary.info)