

By Kris Littlejohn

Any time a computer component stops working, or just becomes unstable—as we all know will happen from time to time—we have to decide whether to replace it, have it repaired, or just get by as is with perhaps a temporary fix. Repair or just getting by will nearly always be the cheapest solution, at least in the short run. Replacement, however, will usually provide a good opportunity to upgrade. In fact, given the rate at which the various technologies behind computer hardware are advancing, unless you replace something a week after you buy it, you may almost be forced to upgrade.

Following are a few items which, if replaced (and generally upgraded), can provide excellent benefits, from an enhanced user experience to additional compatibility, greater longevity, and stability for the whole system.

1 Power supply

One of the most overlooked pieces of computer hardware is the power supply unit (PSU). Computer enthusiasts often brag about their blazing fast processors, top-of-the-line video cards, and gigs upon gigs of RAM, but rarely about their great PSUs.

The truth is, the power supply is the last thing we should skimp on when choosing components for our system. If a computer's brain is its processor, its heart is the power supply. And having one that is worn out, underpowered, unstable, or just generally cheap can be a major cause of hardware failure.

Every computer's power requirements are different, but a good minimum for a modern PC is 450 watts. Some systems, especially those with multiple high-end video cards or lots of add-on cards and peripherals may require a PSU rated at 800 watts or more. Replacing a failing or inadequate power supply can make a previously unstable system stable.

Aside from supplying enough power, that power must be supplied stably. A common cause of "unexplained" lockups and system crashes is a drop in voltage supplied to the system when under load, caused by a poorly manufactured PSU. The easiest way to find a quality PSU is to stick to the consistently top brands such as Antec, EnerMax, and PC Power & Cooling.

2 Fans

As computers have gotten more powerful over the last decades, they have also gotten hotter. Gone are the days of a passively cooled Pentium 100; now we have fans on our massive CPU heatsinks, on our monster video cards, and on intake and outtake vents to our computer cases. All of these fans are playing important roles by keeping our computers safely cooled, and we should try to ensure that they continue doing so.

Fans are one of the few parts that when replaced will not usually be replaced with something better. But they deserve mention because:

- As one of the few moving parts in our system, they are one of the most likely to actually break.
- When they break, it's likely to pass unnoticed or not cause much concern.

Also, fans are cheap and easy to replace. It generally takes about 10 dollars, 15 minutes, and a screwdriver to install a new one, so there's really no good excuse for not doing so.

3 Surge protector / UPS

This is another item that keeps our computers safe and should not be neglected. A surge protector can be a stand-alone power strip, but one is also built into virtually every uninterruptible power supply (UPS). The surge protector guards our devices against spikes in energy that occur in our circuits at the home or office, usually due to lightning or the powering up of high-powered devices, such as hair dryers or refrigerators. Repairing a surge protector would be difficult and expensive at best; replacement is almost always the best option.

It can be tricky to know when it's time to replace a surge protector, because the component inside that diverts excess power from surges to the ground simply wears out with repeated use. However, there is often no interruption of power or other indication that it's done. You may still have juice but not be protected. The cheapest protectors may wear out after fewer than 10 small surges, while the better ones can last through hundreds. The safest thing to do is to get higher quality protectors but still replace them occasionally.

4 Video card

The video card is one of the most important elements in the performance of your system and overall user experience. Even though it is also one of the priciest components, there are two good reasons to replace it should your old one bite the dust.

First, video cards are one of the components that are being improved upon seemingly every day. Just like with CPUs, a video card that's two years old simply isn't as fast as a current one and won't have the newest features (such as support for DirectX 10). Also, the video card is the number one hardware stopgap as we migrate to Vista. Manufacturers just aren't providing new Vista-compatible drivers for lots of their old video cards. This means that many of us will have to replace our video cards whether they are broken or not, if we plan to switch to Vista.

5 Flash media reader

All kinds of devices use flash cards these days: cameras, MP3 players, even cell phones. These small devices let us take our data anywhere easily. Since it seems as if every device uses a different format of flash media, most of us have all-in-one type card readers. If the reader breaks or gets lost (which seems to happen a lot), there are two excellent reasons for upgrading to a newer model instead of trying to repair the old one.

First, many old card readers are USB 1.1. The newer ones use USB 2.0 instead, which is *40 times* faster. This is more than enough reason to replace an old reader, even if it's not broken.

In addition, new formats are constantly coming out for flash cards, and when they do, you need a new reader to use them. For example, Secure Digital High Capacity (SDHC) and xD from Fujifilm are not supported by older readers.

6 CD/DVD drives

Considering that it has moving, spinning parts, the average CD/DVD drive is actually fairly robust. Because of that, however, many people are still using old read-only (or CD RW) drives instead of amazingly cheap (and handy) DVD writers. If you're still using an old drive and it finally gives up the ghost, you'll probably be glad it did when you replace it with a DVD/CD RW combo drive for less than 50 dollars.

7 Hard drives

The computer component we all least want to fail is the hard drive. It's easier to cope with the loss of the much more expensive processor or video card as long as we still have our precious data, so your first instinct is to try to repair it. But if you've been practicing good backup habits, you can actually come out of the situation better off when you replace the old drive with something bigger and faster.

The "giant" 100-GB hard drive of a few years ago is no longer so large. Today, you can get 750 GB for less than 200 bucks. In addition to being much, much larger, newer hard drives will generally be Serial ATA II (SATA II), which has a maximum data transfer rate of about 300 MB/s as opposed to SATA I's 150 MB/s and the older Parallel ATA (PATA) rate of 133 MB/s. SATA II is fairly new, so many motherboards don't support it. But even if yours doesn't, the SATA II drives generally have a jumper that can put them in SATA I mode.

TIP: Right now, most SATA II hard drives ship with this limiting jumper in place by default, so if your board does support SATA II, be sure to change the jumper before you install the drive.

8 Monitor

With the exception of servers, a computer isn't much good without a monitor. Monitors rarely make it all the way to the stage of completely not working, because we replace them when they start to fade. If you replace a monitor that's more than a few years old, the new will likely not much resemble the old.

Any reluctance you may have had to switch from the giant 50-pound cathode ray tube (CRT) monitor to a slim and featherweight liquid crystal display (LCD) should be gone by now. The gap in performance in terms of color rendering and refresh rates between CRTs and LCDs is very small. Unless you're a graphics designer who needs a multi-thousand dollar large screen CRT, the benefits of size, weight, power consumption, and less eye fatigue that LCDs enjoy will far outweigh any small performance advantages of a CRT. With the exception of the extremely high and extremely low end markets, it's quite hard to find a new CRT monitor anyway.

If you were already using an LCD that's a few years old, when you replace it you'll enjoy those leaps in performance that the LCDs have made in the last few years.

9 Keyboard

Since so many of us spend hours every day banging away at them, it's important to have a keyboard that's comfortable and efficient. And since we use them so much and often so brutally, it is no wonder that they break often. Keys come off, get stuck, or just get really dirty. When these things happen, you should usually go ahead and replace the keyboard rather than live with the hassle.

Today's keyboards have new, handy features. Some have built in user-defined macro keys for often-repeated commands; some can fold up for easy transportability; some have built-in ports so they can double as USB hubs. There is a keyboard with some unique feature to suit nearly anyone's needs.

10 Motherboard and processor


Replacing the motherboard is always the most involved upgrade. Since it usually means "starting over" with a clean installation of the operating system, lots of people are reluctant to change to a newer board even when the old one gives up the ghost, preferring instead to replace it with the exact same model, thus avoiding having to wipe the OS. However, since a motherboard upgrade is the most involved, it also can give the widest range of benefits.

First and foremost, replacing the motherboard usually gives us the chance to upgrade to the latest processor technology. Today, you can get the benefits of a dual or even quad CPU setup with only one processor, thanks to multi-core technology, in which more than one processing core is placed on a single wafer. In a multitasking or multithreaded environment, this effectively increases your computer's performance by a factor of two or four.

Additionally, upgrading the motherboard gives you access to new technologies for other components. PATA and SATA I hard drives (and optical drives) can be upgraded to SATA II. AGP video cards can be upgraded to PCI-E. USB 1.1 ports become USB 2.0. The list goes on for virtually every component. Sometimes, even though it can be a pain, starting over can be the best thing.

Kris Littlejohn is a graduate of the University of Texas at Dallas, distinguished by its large population of nerds and lack of a football team (almost unheard of in Texas). He builds computer systems, does network consulting for small businesses, and teaches chess. He grew up in a home that had four times as many computers as people and has been trying to tame the beasts for most of his life.

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