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A Contester's Guide to Maintaining Computer Hardware

A computer is an integral part of any modern contest station. It is used for logging, spotting, decoding, and many other critical functions. How can we minimize computer problems during a contest? While most problems occur because of software issues — a subject outside the scope of this article — computer hardware and peripherals can also fail. There are some precautions that you can take, however, to minimize hardware failures and keep your computer operating properly. Most of these suggestions are common sense, but they are worth reviewing for computers used in a critical application such as contesting.

Desktop and Towers

We all have experienced power glitches and power failures while contesting. When this happens, we lose valuable time rebooting our computers and re-starting the software. It can be a real disaster, because we can also lose all or part of our contest log file. To eliminate power failures, I recommend using an uninterruptible power supply (UPS) that protects a computer from power surges and other ac line disturbances. A UPS keeps ac power flowing long enough that you can conduct an orderly shutdown of your PC if the power fails. Most UPSs use a battery and an inverter to provide power when the ac mains fail. They require almost no maintenance except when the battery wears out, and that can be easily be replaced. A UPS can be tested periodically by disconnecting the power cord and placing it under a load for about 10 minutes. With this test, there will be no surprises in the event of an actual power failure.

UPSs are rated in volt-amperes (VA) or in watts (W). A desktop PC draws about 250 W, and an LCD monitor uses from 20 – 50 W, depending on its size. For a single PC with one or two monitors, I would recommend at least a 500-W UPS. This provides some headroom and allows you to add peripherals, such as an external hard drive. For two PCs, use a 1,000-W UPS or add another 500-W unit.

A UPS also has a "runtime" rating, which varies according to load, such as 9 minutes @ 50% or 2 minutes @ 100%. This is a good reason to oversize the UPS in your shack. I also recommend using the UPS as a backup for an internet router/modem.

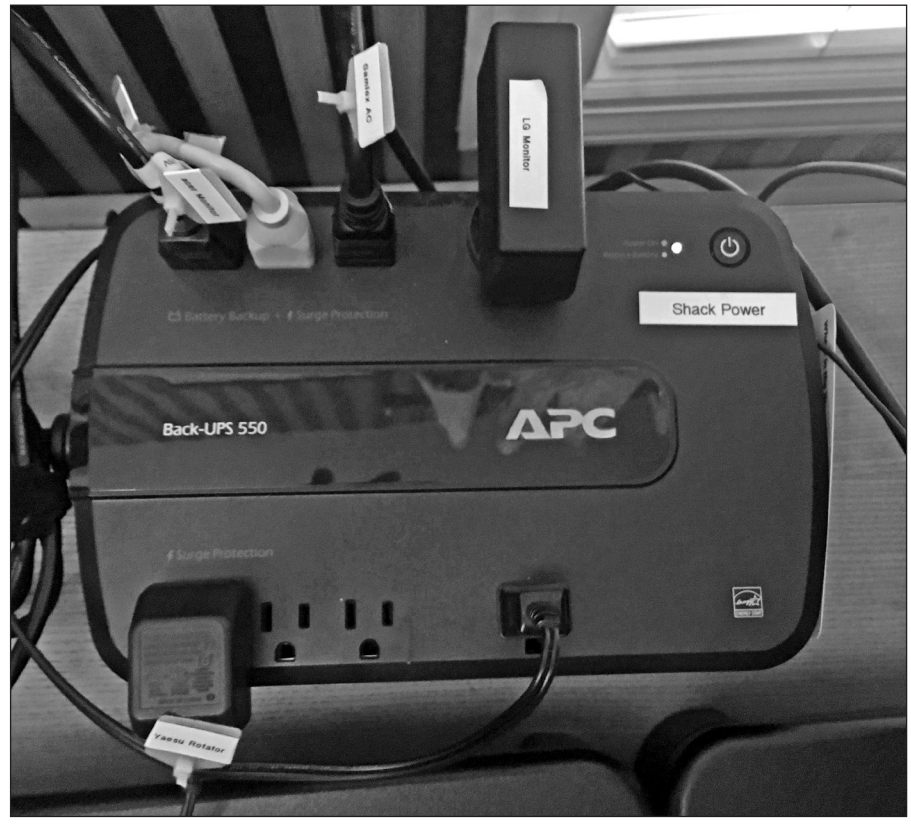
One drawback of a UPS is that they are heavy and difficult to transport, making them unsuitable for portable use. When I am unable to use a UPS, I use an ac power strip with a quality surge protector that provides protection for power line fluctuations.

Whether located on an operating desk or the floor, keep any fans and vents on a PC clean and clear of obstructions to assure proper air flow. Maintain a reasonable temperature range in the room with your computer and other electronic equipment. If your shack is consistently too cold or too hot, it will decrease the computer's life. Also pay attention to condensation. That's bad for all electronics. Don't let gear get colder than the dew point. Control the humidity, if possible, or make sure equipment stays warm.

A tower PC should not be placed directly on the floor, because the fans and vents will suck in dust and dirt. My tower PC is about 6 inches above the floor on an elevated PC tower stand that has flexible metal sides that keep the PC from tipping over. The tower stand has wheels, so I can easily move it to reach the connectors in the rear. With desktop computers, be careful when placing equipment on top the case. If the case bends, even slightly, don't put that piece of gear on it.

No matter the type of flooring in the shack, vacuum the floor regularly to keep dust and dirt away from the computer. Vacuum the exterior of a computer at least once a year, or more often if there is a lot of dirt in you work area. Vacuuming inside your computer is not recommended, since a vacuum can damage the electronics due to static electricity. Use compressed air from a can or small blower instead. Consult the manufacturer's recommendations before proceeding.

Avoid spills! These are the most frequent cause of hardware problems, and they are difficult to clean and may cause permanent damage. If I need a cup of coffee in the shack, I use a tip proof coffee mug and an absorbent coaster. Snack crumbs also create problems, particularly with keyboards, so be careful with those munchies.



An example of a UPS.

Laptops

Power failures are less of a problem with a laptop computer, because a laptop operates on a battery that essentially acts as a UPS — assuming the laptop battery is serviceable. The rest of the station may be in the dark, but if the battery is charged, the laptop will continue to operate.

While researching this article, I learned that newer laptops have smart lithium-ion batteries and smart charging systems that can be left charging for a long time without problems.

During prolonged use, laptops heat up more than PCs. They are more sensitive to temperature variations, because they are compact and have less surface area through which to dissipate heat. Modern laptops with fast processors generate a lot of heat, especially if they are running CPU-intensive software like some SDR programs. Temperature-monitoring apps such as *CoreTemp* or *SpeedFan* can keep an eye on a laptop's temperature. I use *Speccy*, which monitors many aspects of my computer's hardware.

A smooth, flat surface that allows your laptop's air flow system to operate properly is a good idea. Laptop vents can also get clogged with dirt, and they should be checked and cleaned, if your laptop is overheating. Cleaning procedures vary, so check the instruction manual.

Laptop cooling accessories such as fans, ventilated stands, and cooling pads can also help keep a laptop from overheating, but they vary in terms of effectiveness, since laptops have different cooling requirements depending on operating conditions. Do some research and choose a cooling accessory that suits your specific needs.

When using a laptop at a home station, you can use it essentially as a desktop computer by adding an external keyboard, mouse, and monitor. This makes the laptop easier to use and will cause less wear and tear on its internal components. Keeping the lid closed in this configuration reduces the possibility of spills and other damage, too.

A laptop battery should be replaced when it will only charge to 25% or less. I would replace it long before that point, particularly when using the laptop in contest operations. Windows will show a red "X" on the battery indicator, when the battery runs low. Windows also has a hidden laptop-battery report tool called POWERCFG that runs from the command prompt. It can generate a battery report to determine the battery's condition. Utility programs are available that monitor battery life, too.

A laptop screen is its most fragile and at-risk component and should be cleaned carefully. Hewlett Packard (HP) recommends avoiding liquids, since any liquid spilled in the laptop's hardware can be disastrous. They recommend using a microfiber cloth to clean the screen. When in doubt, use the manufacturer's monitor cleaning procedure.

When transporting a laptop, store it in a cushioned and padded laptop case that protects the laptop from bumps, drops, or other physical damage. It's helpful to have a TSA-approved case to avoid taking out the laptop every time you go through a TSA checkpoint.

Peripherals

During a contest, you need to enter every QSO into the log, and it is important for the keyboard to operate properly with no jammed or nonfunctioning keys. Dirt between the keys causes most keyboard problems. The easiest way to clean a keyboard is turn it over and shake out the dirt. If that does not do the trick, use a can of compressed air to blow out the rest. I clean my keyboard using the soft brush accessory on the vacuum. But be careful! Some keyboards have removable keys that can be sucked into the vacuum cleaner. Keyboards that use "chiclet" keys are not as prone to having dirt between the keys. They can be cleaned by gently wiping down the keys with a lightly moistened, soft, lint-free cloth. An illuminated keyboard is helpful during a power failure, if your computer is backed up by a UPS. Keep a spare set of batteries on hand for wireless keyboards. Generally, it's a good idea to have a backup keyboard and mouse on hand. They're cheap enough.

Modern computers use the CMOS battery on the motherboard to keep the computer's date/time clock accurate. The CMOS battery no longer controls any BIOS functions, and there is no set interval to change this battery because they last a long time, particularly if ac power is connected to the computer most of the time. To avoid any failures during a contest, replace the battery every 5 years regardless. If the computer's time and date are consistently incorrect, then definitely change this battery.

Placing a tower computer on a stand helps to avoid any floor issues and enhances air flow for cooling.

LCD and LED monitors require little maintenance except for cleaning the screen. While each manufacturer has different cleaning recommendations, and all recommend never spraying commercial window or glass cleaners on the monitor screen and using only approved solutions or monitor wipes. To prolong a monitor's life, don't poke or touch the screen with a pen, pencil or other pointer since that can crack the surface.

I've been in stations where the monitor is precariously balanced on a piece of equipment. I strongly recommend that you to use a sturdy and supportive monitor stand or shelf, so that the monitor does not tip over if it is accidentally bumped. For a monitor with screw in VGA connectors, make sure that these are tight before the contest begins, since they tend to loosen up.

Logitech, a major supplier of computer peripherals, recommends the following method to clean a computer mouse. First, unplug it from the computer and then make sure that the mouse is turned off. If it is a wireless mouse, remove the batteries. Use isopropyl alcohol (rubbing alcohol) or anti-bacterial wipes to clean it. Before using rubbing alcohol or a wipe, test it in an inconspicuous area to make sure it doesn't cause discoloration.

I don't use a wireless mouse during contesting. I worry that the batteries will fail and find it time consuming to pry open the case to change the batteries. At least keep a spare set of fresh batteries close at hand.

If the mouse is working erratically, first check the surface that it is rolling on to make sure that there are no obstructions. On an older track ball mouse, loose particles can get stuck beneath the ball. To fix this, turn the mouse upside down and roll the wheel to help dislodge anything that may be stuck inside. An optical mouse can accumulate gunk on its bottom surface. It can be cleaned with a slightly dampened microfiber cloth. Be careful not to get any liquid in the mouse's electronics. When cleaning any mouse, always disconnect it from the computer before proceeding.

By taking these simple precautions and performing some straightforward routine maintenance, we can minimize computer hardware failures during contests. When in doubt about a maintenance or cleaning procedure, check the manufacturer's recommendations. A special thanks to Martin, AA6E, for his assistance with this article.