UPS

Introduction

How many times has it happened to you? You're working away, and *zap*, out go the lights, and with them, your computer. Depending on where you live, this could practically be a daily experience. Most outages don't last more than 30 seconds, but anything more than a fraction of a second is long enough to bring your computer to a screeching halt, not only leaving your data in an unsaved state, but also risking myriad malfunctions and electrical damage as a result. Every time it gets hot and people turn their air conditioners on--whoops! Brownout!

An uninterruptible power supply, more commonly called just a UPS, is the key, and they are finally priced to sell in the consumer market. In this section of the buyers guide we're going to give you an introduction to power related concerns for your computer, and tell you what to look for when shopping for a UPS of your own, or, if you're strapped a bit for cash, what you should consider before buying surge protection.

I know one thing for sure: if you've been using a computer for any serious amount of time, you've experienced a power outage. We all do. You may have never had a motherboard go bad on you, and you may have never experienced a monitor CRT failure, but I would be willing to wager the farm (if I had one) that you've been bitten by the power bug. According to a study by IBM, the average computer experiences around 120 power-related abnormalities a month. Most of these, of course, aren't complete outages, but they do nevertheless pose a problem for the well-being of your little electronic friends. Statistically, power related abnormalities are the #1 reason for data loss. A good percentage of these abnormalities are flat-out outages, where your computer just runs out of juice. Let's get some definitions on the table:

You've heard all of these terms before, probably: brownouts, spikes, surges, and sags all belong in the same evil power-abnormality boat. Essentially, they are categorized as: over-voltage and under-voltage.

Over-voltage is any voltage greater than what normally should be present on any given power line. Most electronics devices, especially computers, have internal power supplies which are designed to handle the reasonable over-voltage conditions (up to a 10% increase) that are typical in most American cities. Spikes and surges are both examples of over-voltage conditions, the difference between them being that spikes are very short over-voltage conditions (billionths to millionths of a second), and surges are stronger in terms of volts and duration than spikes. Surges are the true enemy when talking about over-voltage conditions. Spikes can cause damage over long periods of time, but surges are mostly to blame for hardware destruction.

Under-voltage is the opposite of over-voltage. Sags, brownouts, and blackouts are all under-voltage conditions. Sags rarely affect electronic devices, and are quite common in places with older electrical infrastructures (say, your lights go dim when your air conditioning turns on). Brownouts are not friendly at all: these are what will cause your computer to reboot due to moderate times of under-voltage (lasting up to several seconds). Blackouts are, of course, long periods of interrupted service, and nothing but a UPS can save you here (and even a UPS isn't going to solve a serious blackout... all it

can do is help you weather it gracefully).

Certain conditions increase the chances of these events taking place: lightning strikes can cause over-voltage down your power line or under-voltage when electricity-managing devices are struck. It is best not to operate electronic devices at these times, unless they are attached to a quality surge suppressor (which will not prevent your computer from rebooting), or a UPS. But we all know that there is more to fear than lightning. In fact, if you live in a bustling city center, the biggest fear for you is probably under-powered utilities. That's certainly the case where I used to live. The utilities can't keep up with demand, and as I mentioned above, as we all start leaving computers on longer and longer, and adding more devices to our house, and plugging more and more cell phones, PDAs, and other gadgets in, we're experiencing power consumption increases on two levels: the number of people using power, and the amount of power per person being used.

Protection and Suppression-Power Backup versus Power Conditioning

Power line conditioners called surge protectors or suppressors seem cheap at first, but don't be fooled. The things that are selling for $20 at the local store are just glorified extension bars. Stay away unless you know what you're getting is really good. Although I would recommend that everyone forgo a surge protector and head straight for a UPS.

First of all, don't ever buy something just because it claims to guarantee up to $100,000 of your equipment. Some companies make those claims because they make it difficult for you to comply, not because they're sure of their products. Additionally, when you read the fine print, you'll sometimes find that such guarantees don't necessarily include so-called "Acts of God." Considering just how much damage is caused by lightning in-and-of-itself, such a guarantee is basically an insult to your intelligence.

There's a difference between a surge suppressor and a surge protector, even if marketers don't want to make that clear. Surge protectors, are just extension bars that have a fuse or two in them. Sure, they protect your equipment more than nothing at all, but they're more likely to fail in the event of something really dangerous than any other product. See, what matters most is the voltage level at which preventative action takes place. This is why the surge suppressor is typically a better class of product. Quality surge suppressors sport impressive clamping voltages, that is, voltage-level detection features that begin to suppress over-voltage conditions at finer levels. But as I hinted at above, buying protection based off the name of a product is a bad idea. Marketers and other such responsible people often call everything in this category a "protector." It's not uncommon to find something in a box labeled: "ACME Surge Protector: surge suppression device."

Clamping voltage is also often called "Let-Through Voltage," but the two are not actually the same thing. "Let-Through Voltage" is the total allowed voltage across the whole unit and the main power line during a time of over-voltage. Clamping voltage is the voltage level at which the device will begin to take preventative measures.

It's an important concept to grasp because the appropriateness of one clamping voltage to another is really determined by the type of equipment you're plugging in. See, most surge suppressors out on the market are not designed for computer equipment. You may not know this, but your computer is much more sensitive to over-voltage conditions than, say, your TV. That is to say that your TV can be

protected well by a suppression unit with a relatively higher clamping voltage than your computer needs. The end result is that many stores carry protectors and suppressors that are probably OK or your TV or stereo, but definitely not OK for your computer.

A Underwriter's Laboratories (UL) 1499 330V let-through benchmark is the absolute minimum I would put on any computer equipment -- you will probably not get this level of protection from a suppressor you buy in the Audio/Video section of your local tech-store. But this is where it gets tricky. When you head into some shops, salespeople will tell you that 330V is not good enough, and that you need a unit with even lower let-through. Buyer beware: a unit with a very low let-through rating may die an early death from being over-worked. And if the price is too good to be true, it is.

If you thought it was getting complex already, now absorb the fact that a good clamping voltage is absolutely worthless if your suppressor has a poor clamping speed, that is, the speed at which the suppressor can take action. The situation is made even more difficult by the fact that very few manufacturers even disclose the clamping speed of their products.

What can you do? I personally recommend picking up an APC or TrippLite product. You can pick up a decent unit online and rest assured that you're better off than most people.

But even at that, you're only protected from half the danger. This is why I encourage you, even if you find a good surge protector (like those made by APC and TrippLite), to go for the UPS solution. A surge protector only guards your equipment from over-voltage conditions, but it's only a matter of time until you get bitten by the brownout beast.

The Uninterruptible Power Supply (UPS)

A UPS, in its simplest form, is a battery backup that takes over supplying electricity to your systems in the event of a power loss.

Usually, a UPS is a separate box that sits in the power chain between the source of power (eg, a standard power point) and the rest of your systems. The UPS protects every other piece of equipment that is plugged into it. It is designed to prevent spikes, surges, sags and blackouts from reaching your valuable equipment (See "Power Problems" below).

Being first in line, the UPS receives electrical current directly from the power outlet. When mains power is present, the UPS provides filtering (frequency regulation) of small fluctuations to ensure that a continuous supply of "clean" power is fed through to your equipment. When AC power fails, the unit uses its internal battery to supply back-up power without interruption.

A typical UPS will power your system for 15-30 minutes, depending on its size (capacity) and the amount of equipment connected to it.

Many, if not most, outages last for under one hour and while a good UPS will give you enough power to gracefully shut of your equipment during the first few minutes of the blackout, a more powerful unit can give you a "run time" long enough to ride through the entire outage. This will cost you more, of course, and you will have to plan your battery capacity appropriately. Some larger units can take extra battery packs to increase their run time.

Thankfully UPS solutions aren't all that complex on the consumer level. Most people don't need

amazingly complex matrix power units that are capable pf paging you when a system is running on battery. Feature-wise, prosumer-level UPS systems are almost all within earshot of each other. Quality-wise, that's not the case. The important things to determine are: how much power do you need, how long do you need it, and for what kinds of devices.

You've go two important figures here, the VA (Volt-Amps) and overall wattage. These numbers are inter-related by a power factor, and when talking about computers, power factors are almost always equivalent. So, I suggest comparing the output of these boxes by VA, since you can usually find out this information by just looking at a box. This information is always available on the manufacturer's web site

Of course, this information doesn't mean anything to you until you know how much you need. A fully loaded modern computer system with a 17" CRT monitor will probably tip 250 VA. If you want something that will stay up for more than just a few minutes, you'll want more. I wouldn't consider buying anything less than 450 VA for such a system, personally, and I would suggest that people who can afford a 600+ VA model go for it. I should point out that while being under the VA rating is a good thing for extended life and expandability, being over it is disastrous. Don't think that a 250VA unit that runs for 20 minutes will even begin to function when the power dies and you've plugged 300VA worth of stuff in.

To find out how much you need, you have a few options. First off, you can go the handy-man route and figure it out yourself. Your equipment should have rating printed on it somewhere. Add it up. Or, if you want a conservative estimate, you can use either APC's on-line sizing guide, or download TrippLite's Win32 app. These tools, unsurprisingly, tend to over-estimate your needs, so keep that in mind.

Don't forget power receptacles. My UPS system has 8. But this can be deceiving. On the unit I have, 3 are used for power backup only, 2 on extensions of my wall power receptacle and 3 are for power conditioning (limiting spikes and power line noise).

One question that arises often, is how long will the UPS supply power? This decision depends on a lot of factors. Whether or not you have automated shut-down capabilities, and how long the power outage last and the load on the UPS. Five minutes is going to get you through 90% of the problems you encounter, but longer is always better and more expensive.

With regards to a laser printer, I should also mention that hooking one up to your UPS does, in some ways, cripple it's ability to condition your line. Although a UPS can clean up the power coming in, it can't do much with a laser printer. Laser printers draw a considerable amount of power on startup & and can cause a “sag” on the power line. Most manufacturers of low end consumer UPS devices, recommend that you plug your laser printer into the wall receptacle directly.

One of the most comforting features available for people who tend to be away from their computer while it's powered on has to be power management software. Some products allow you to setup your UPS so that it actually shuts your computer down properly in the event of a blackout. Most of these can be timed to shut the computer down right before the UPS battery wears out, but for this comfort, you will pay.

Summary

You should have a power line conditioner/UPS for your computer equipment. I personally have 2. A larger unit for my PC, flat screen display & ink jet printer and a second, smaller unit for my high speed cable modem & network router.

Generally, the higher the “up-time” quoted for a UPS, the more battery power needed & larger the unitwill be and ,of course, the more expensive.

Do not confuse a “surge suppressor” with that of a UPS as to function. They are not the same.

Remember, UPS batteries deteriorate over time & may not hold a charge & should be replaced per recommendation of manufacturer.

And surge suppressors can will loose effectiveness after repeated hits and there is no way to be sure. I recommended replacing these devices every few years.

The only sure protection from a power issue during a storm, is to shut down & unplug until it passes.