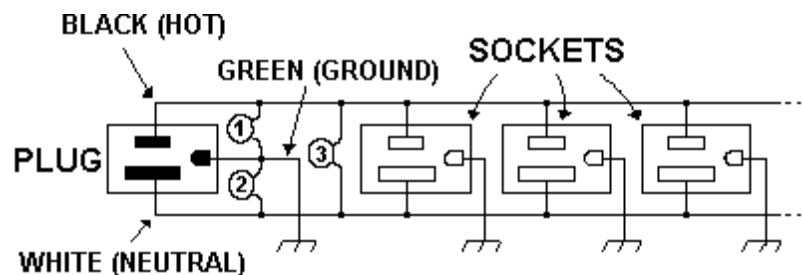


Surge Protectors (revisited)

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Surge protectors are an absolute necessity, as I pointed out in this column back in January 1996. They can save you money, and more important, grief. Electrical storms occur both summer and winter, and they can send high voltage spikes down the power or telephone lines, which can destroy components in your computer. If a spike hits your modem, it can toast it. If it reaches your hard drive, it can toast it. It can even do irreversible damage to the motherboard. All of these horrors are preventable by putting a surge protector between the computer and any possible external electrical path.

The surge protector is a simple device. The basic protector is nothing more than a power strip – a plug on the end of a cord which connects to the AC power coming out of the wall, and a box containing several sockets so that you can plug your computer and other devices into it. The heart of the protection, though, is inside the box as shown here.



There are three Metal Oxide Varistors (MOVs) inside (labeled 1-3 in the diagram). They are made of a zinc oxide mixture, sandwiched between two connecting electrodes and packaged physically just like a disc capacitor. The only thing that gives them away other than markings is that they are usually colored red, blue or black. One connects the black (hot) wire to the green (ground) wire (1 in the diagram). Another connects the white (neutral) wire to the green (2). The third connects the black wire to the white (3).

Under normal conditions, the MOVs do nothing. They act just like a very high value resistor. Therefore, they draw an insignificant amount of power and there is essentially no path for current between the three wires through the MOVs. When a high voltage spike appears on one of the three wires, they go into action. Typically, when the voltage rises to above 130 on one of the wires, the MOV changes to a low resistance and safely shorts out the surge, before it gets to your computer.

You can build one of these units. Indeed, I used to at work before they were commercially available. After having installed a few in my department, electrical storms took out several computers, but not the ones protected by my homebrew devices. You should have seen the lineup of colleagues at my office door wanting one after that! Today, however, it hardly pays to build one yourself, because they can be purchased at local hardware stores for as little as \$5 on sale, nearly the cost of the 3 MOVs if you were to purchase them separately. This is a wise investment to protect your VCR, television set, or any electronic device that uses the 110-volt AC mains.

Be aware, however, that the MOVs don't last forever. A series of small spikes over the years can cause the device to build a low resistance path between the electrodes. When this resistance goes low enough – poof! The smoke comes out and the household fuse blows. Another possible scenario is that, instead of shorting internally, the device simply opens electrically. There may be no physical evidence that this has happened, but if it has, the MOV will no longer protect your equipment. Therefore, it is a good idea to replace the whole power strip every few years. Record the date you put it in service with a marking pen, and replace it without fail five years later. Open the old case, clip out the MOVs, close the case and obliterate any markings indicating it is a surge protector. Then you can safely use it as a power strip for other purposes.

Well, that is only half the story. Recall that telephone wires are another way that surges can reach your computer. A friend of mine bought a new computer and carefully took my advice to add a surge protector. A few months later, she bought and installed a modem. Within a week, a nearby lightning strike sent a surge down her power and phone lines. The power strip surge protector saved most of her equipment. However, the modem was toast.

The answer? Don't just buy a power line protector. Get the type of surge protector that has two telephone jacks built into the case. One jack takes a cable whose other end plugs into the telephone jack in the wall. The other takes a cable that goes directly into your modem. Now, your modem will be protected, too.

Yet another thought. Be sure to plug your monitor into the surge protector. And the printer. And the "wall-wort" (transformer) that supplies power to your audio board's speakers. Everything that sucks power from the mains and connects directly or by wires to your computer must be plugged into the surge protector. Not enough room? Well, throw a 3-wire cube-tap into the shopping basket at the hardware store. That will raise the "wall-wort" high enough off the power strip so that you can use that other free socket. Happy computing!