

Protecting your Electronics from Lightning

Most of us own electronic appliances such as TVs, sound systems and computers. The components of these appliances are sensitive to excess voltage. The appliances themselves have limited protection, so it is a good idea to add a relatively inexpensive device to protect them. So, a \$30 device can save a \$1000 TV.

The most common method to use is a 'surge suppressor', often in the form of a power strip. Surge suppressors ensure that the line voltage reaching the appliance is limited to a level that is safe for the electronics.

The two main causes of line voltage swings and spikes are:

- 1) Voltage variations in the line, controlled by the provider. In North America, the 115 volt supply can vary between around 110 and 125 volts at the outlet. This is very acceptable to the products it feeds – however, in some developing countries, it can swing greatly. This applies equally to the 220V line in many parts of the world. The problem is declining as these regions modernize.
- 2) Localized transients in the power grid caused by lightning strikes. A lightning bolt may hit a power, phone or cable-TV line. The line carries the high voltage and dissipates through everything that leads to the earth.

Lightning in North Carolina



Lightning is a concern to residents of NC. We typically encounter 500,000 strikes per year.

Lightning is static electricity generated in the atmosphere that discharges to the earth. Allow me to give two "striking" facts about lightning:

- Bolts commonly generate 100 million volts - close to a million times the standard household voltage of 115 volts.
- The average lightning storm generates enough energy to power the USA for 20 minutes.

Surge Suppressors or Arrestors

It is important to note that the power of lightning is so great that there is no guarantee that we can protect from every strike. It can hit the house directly, cross an air gap from a nearby tree, or through the various utility lines: electrical, cable-TV, telephone or exposed gas lines. The quantity that reaches the house depends on the distance of the strike and how much is absorbed along the route to the house. The damage may be as little as a single unit, but last summer, lightning affected every appliance Kevin's Cary house, including the stove and fridge. Cardinal had installed Kevin's alarm system. Every connected component needed replacement.

The Solution: Total Isolation

The best way to prevent damage to electronics is to unplug the equipment from all the lines. This completely isolates it from the source. I saw relatives in Europe plug and unplug their TV every time they used it.

It is good practice to disconnect your units before leaving the house vacant for an extended period. I also do this if I'm at home during a severe thunderstorm. Laptops are safe except when they are

charging or wired to the internet. For any units which get little use, your guest room's TV for example, disconnect both the outlet and TV-cable. Include the Ethernet cable on a PC.

What Protection is Available?

Progress Energy offers a two-stage system for great protection with a monthly charge.

<https://www.progress-energy.com/carolinas/home/products-services/surge-protection/index.page?>

However, choosing a commercially available product will make a big difference.

This is a device that is connected between the line and the device to protect. Most models will short to ground any unwanted voltages above a safe threshold. They vary in size and power from a single outlet to the whole house.

This Belkin model E112234-10 power strip also protects the Ethernet, phone and cable-TV lines.



Rating Values:

Clamping Voltage is what the protector will allow through. It will short any voltage above that value. For 120 VAC, the general value is 330 VAC.

Energy Absorption, in Joules, is the most important value. The intention is to deflect that energy to the ground. The minimum acceptable rating is 200 Joules. For better protection, look for 600 or more.

Time Response. Be sure that the surge is absorbed as soon as it appears on the line. A one nanosecond (0.000,000,001 second) response is common.

The Indicator Lamp tells you that the unit is still protecting. If the light goes out and the strip still produces power, the absorbing components have been destroyed while doing their job.

Small Money Well Spent

A model below \$25 may not be worthwhile. Study the specs. Some insurance policies cover lightning damage, but why not reduce the risk significantly.

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