

How Lightning Damages Your Computer

Each year, during the summer season, lightning damage is a common occurrence. This short article will help you take the necessary steps to minimize the disruption caused by these events.

Lightning can enter your building through three paths:

- 1) Electrical wiring from the power lines that feed your building
- 2) Data wiring from the service providers that feed your building, such as telephone, DSL, and Cable
- 3) Directly through the atmosphere, in what is called an EMP event.

Electrical Wiring

Power surges that originate from the feeder lines of your electrical provider occur frequently. If lightning strikes a power source in your local vicinity, the excess electrical surge will spread-out from the source and dissipate throughout the grid. Because electricity tends to flow in the path of least resistance, it may flow through the electrical wires and enter your building. From there, the surge will dissipate throughout the wiring and eventually reach your electrical devices. If you do not have a good surge suppressor installed between your computer equipment and the wall outlet, then the computer will absorb a large portion of this surge and will likely become damaged.

The amount of damage will depend on the strength of the surge. In rare cases, a fire may result, or the computer equipment may appear to operate just fine. In any case, if you suspect lightning damage, the equipment should be taken out of service permanently. To protect the integrity of your data, never attempt to use a computer that absorbed a lightning surge. It may appear to operate fine for the moment, but eventually it will fail, usually within 3-6 months of operation. Check with your insurance policy to see if you are covered for lightning damage. If you purchased a computer from Genesys Micro LLC you may contact us to see if we may be able to provide recovery services, and in some cases we will be glad to talk to your insurance company and explain our guidelines.

All computer equipment should have adequate surge suppression and/or battery backup power. Please see our "Guide to Power Protection" for more information about how to select the best surge suppression devices.

Data Wiring

Most people may not be aware that lightning can enter your building through the TV cable and telephone lines including your DSL or telephone line connected to your computer modem. Cable modem lines (Cable TV coax line) are also vulnerable if they are attached to your computer. These lines should also be protected with special surge suppressors designed for these devices.

Atmospheric EMP

EMP or **E**lectro **M**agnetic **P**ulse is the phenomena that occurs with any large discharge of energy, including lightning. Basically, the electrical discharge of the lightning bolt induces an electrical current that travels through the atmosphere and is picked-up by the wires in your building, and to some extent the wires in your electronic devices. Acting as an antenna, the wires then induce an electrical current that flows into your equipment and eventually to the buildings electrical ground. The longer the wire, the greater the possibility of

inducing electrical current and the greater the possibility of electrical surge damaging. This is the exact way that common radios work, although on a much weaker EMP scale.

You can protect your valuable electronic devices *from EMP that originates in your buildings wires* by using a standard surge suppressor. Network LAN wires can be protected using special surges designed for data lines, as well as DSL, telephone, and Cable (TV and Cable Modem). However, EMP that originates in other wires, such as USB or printer cables, are usually un-protected. Damage from this kind of EMP is not very common because the cables are relatively short. Lightning would have to strike very close to your computer for these wires to carry enough current to damage your system – it is possible, however unlikely. There is little that you can do to protect from these kinds of nearby events (within practical reason; for example you could build a Faraday Cage). This is also the reason that most electrical devices can be destroyed by a nuclear explosion – they create large EMP events.

Protecting Valuable Equipment

Surge Suppressors

These devices are the most common form of power protection. Surge suppressors are designed to provide a degree of protection against dangerous overvoltages that occur during storms and line recharges. They do not protect against all types of line problems. Also, be aware that some devices look like surge suppressors, but are only power strips- they provide no power protection. To be effective, surge suppressors must be grounded (3-prong electrical outlets). If your building does not have ground lines, then surge suppressors will not provide any protection.

Power Conditioners

Power conditioners are surge suppressors plus undervoltage step-up transformers. These units will automatically correct the voltage during temporary sags and brownouts (within certain limits). When a low in-line voltage is detected, built-in transformers convert line current into extra voltage. As a result, the output current is temporarily reduced. This technique is not recommended for devices that draw a lot of current. Most desktop computers do not draw more than 8 Amps. Devices such as power saws, air conditioners, and copying machines should not be used with these devices unless specifically rated for high current use (greater than 15 Amps).

Battery Backup Units

Quality battery backup units incorporate a surge suppressor, power conditioner, plus standby battery power supplies. Commonly known as uninterruptible power supplies (UPS's) these units provide AC electrical power in the event of total power failure. This is extremely important for critical computing such as servers and database processing. However, because small UPS's are very affordable, many companies use them in place of standard surge suppressors. This helps to keep the computer running (and error free) in the event of a short power failure. Look for units with all of the ratings of surge suppressors plus power conditioning. Different brands refer to power conditioning by various trade names. American Power Conversion (www.apcc.com) calls this "smart boost" and works by switching to battery power (while sounding an audible alarm) when the voltage goes below a minimum threshold. If the alarm sounds frequently, you may want to contact an electrician to find the cause of your under-voltage problems.

Need more Information? Contact the technical support representatives at Genesys Micro LLC, at (304) 267-0433

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