

When Lightning Strikes: Protecting all things electronic in the event of a natural or man-made disaster

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Lightning, on average, strikes the earth 100 times a second. Here in the United States, approximately 100,000 thunderstorms form each storm season. This is not good news for all of us living in the electronic age. Lightning and computers are like oil and water; they don't mix.

Enemies of your power supply

Most of us think that lightning is the biggest threat to our electronic property. There are actually a variety of occurrences that can adversely affect power supplies. Other natural causes, for example, include heavy rains and winds, snow, ice, decayed tree limbs, and extreme warm weather. Animals, especially squirrels, have been known to chew through wiring. There are human-incurred causes: people sometimes dig up power lines by mistake, drive their vehicles into electric poles, and send kites and metallic balloons into overhead wires. Your own electrical utility company also can affect your power supply. They must perform routine maintenance to keep the system running at maximum efficiency. Plus there are the occasional unplanned outages due to equipment failures.

Does your office have an elevator, a photocopier machine, a window unit air conditioner, an air compressor, or some other piece of mechanical equipment? Chances are the answer is "yes." When one of these devices is turned on or begins to operate, a power fluctuation will occur. But internal fluctuations are not the only problem. External fluctuations lurk just outside your office; a car strikes a utility pole, a tree branch on a neighbor's property is rubbing against a primary wire, a contractor digs in the wrong location, and many more scenarios can result in power fluctuations or a complete black-out. Many times these fluctuations go unnoticed. Maybe you think you saw the light dim but now it appears to be bright. In most circumstances, voltage fluctuations and variances do



not affect standard household appliances, but computers, telecommunication systems and other electronics are different. Even small spikes or dips can work to disable these important devices.

Surge protectors: your first line of defense

How do we protect our important electronic equipment and systems? The first line of defense is to use surge protectors. When purchasing a surge protector, remember the old adage, "You get what you pay for." When purchasing a surge protector, look to see if the surge protector manufacturer offers the following specifications:

- An indicator light
- Be UL 1449 listed
- Protection against lightning strikes
- Some form of insurance coverage for devices plugged into the surge protector
- A R-11 telephone jack if you are using a regular dial-up modem
- A cable connection if you are using a cable modem

Because a computer is linked or networked to other computers, an electrical surge can affect all of them. You will need to protect each computer that shares the same network by purchasing individual surge protectors. Don't forget about protecting individual components like the telephone system, computer monitor, modems, portable external drives, and speaker system.

Manufacturers warn against plugging the printer into the same surge protector as the computer. Printers typically use more electricity than other parts of the computer system, and when they are used, internal fluctuations may result which can then affect the computer hard drive. This could lead to problems with the hard drive and the potential risk of data failure. Another important point here is the need to back up your data. Can you operate the office without access to your scheduling calendar or billing records? Undoubtedly, data is the lifeblood of your

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office practice. As such, you must conduct a data back up no less than every other day - daily being the best practice. If you don't conduct a daily back up, consider how much time and labor will be required to re-enter the data. A good practice is to have the data back up take place just before the office manager shuts off the lights, programs the security systems and locks the doors. Remember too, that the back-up data needs to be kept at the office in a fire-proof safe, and a daily copy should be kept off-site as well. This way, should a disaster strike the office after normal business hours; the loss to your data would be minimal.

Uninterruptible power supply (UPS)

In the previous paragraphs, we discussed situations where the power supply can be lost or, at a minimum, endure voltage fluctuations. Today's office electronic equipment operates well within certain design tolerances, but throw a power spike or a voltage sag to the system, and data can be lost. Think of a UPS as similar to a car's cruise control. The car maintains a steady and continuous speed without your intervention, and the UPS maintains a steady and continuous flow of electricity even when power is lost.

There are two basic types of UPS: a standby off-line unit and an interactive on-line unit. The typical standby off-line unit is essentially a battery back-up system that is constantly charging. If power is lost, the system alerts you, the user, that you are now running on battery power. You will have enough time to shut down the system without losing your important data. This is both an efficient and inexpensive method for protecting your data.

The standby off-line unit is depicted Figure 1. In this diagram, the transfer switch is in position to receive normal AC power (from your wall outlet) as its primary power supply (solid line). If the normal power is lost (from your wall outlet), the transfer switch operates using the battery supply. The battery supplies DC current (dotted line) to the inverter, which converts power back to AC current. The computer then operates off of the battery power supply for a limited period of time.

The second type, or most effective method, is the interactive on-line unit. With this unit, your normal office current feeds a charge/rectifier that then feeds the inverter and battery. If power is disrupted or lost, the battery then feeds the inverter and the system doesn't even recognize the failure.

The interactive on-line UPS is depicted in Figure 2. In this diagram, the transfer switch is in position to receive normal AC power (from your wall outlet) as its primary power supply (solid line). Power doesn't go immediately to the computer but is routed to the inverter, charging the battery supply, which powers the computer. If the normal power is lost (from your wall outlet), the transfer switch operates. The battery then continuously supplies DC current back to the inverter, which converts power back to AC current. The computer doesn't recognize any change in power supply. It will operate on the battery power supply for a limited period of time. Some interactive on-line UPS units can be purchased that, should the inverter fail, will allow for normal AC power to still flow to the computer.

As illustrated, each of these devices can and do provide protection against electronic and computer failures. But before you purchase any surge

protector or UPS unit, check with a sales person at your local computer or electronics store, and consult with the equipment manufacturers for their input as well. Read products reviews and check consumer reports. Talk with other colleagues about their experiences and their suggestions. They can assist you with purchasing the correct equipment for your individual situation.

Do not ever forget to consult a qualified licensed electrician when you need to protect your office electrical systems. Remember— prevention of computer failures and data loss is possible through the use of a surge protector and UPS. ❖

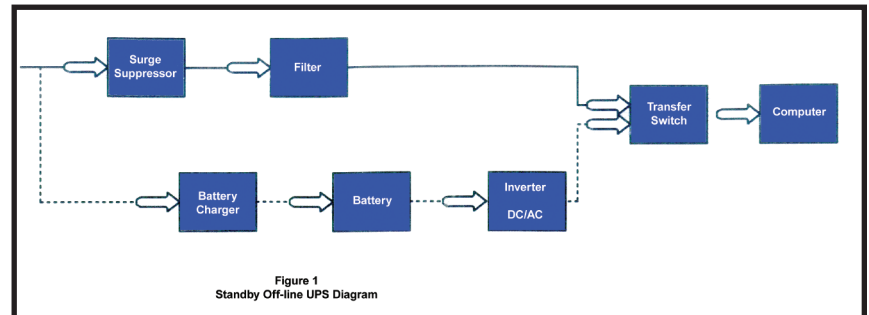


Figure 1
Standby Off-line UPS Diagram

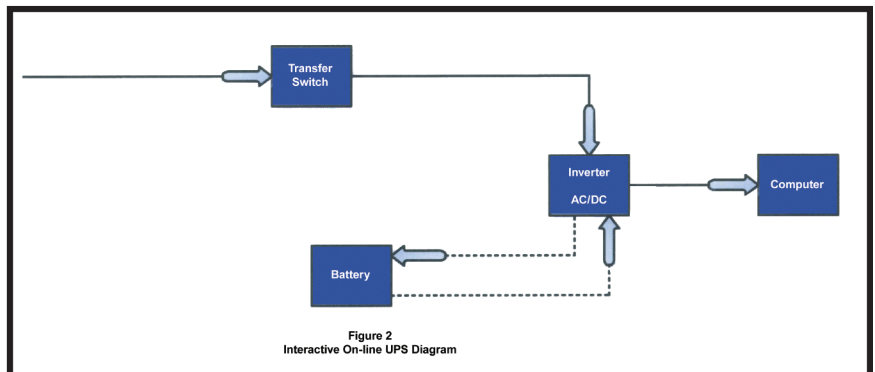


Figure 2
Interactive On-line UPS Diagram