How Can Static Electricity Damage a Computer?

March 31, 2015

By: Erik Arvidson

A discharge of static electricity can cause a variety of problems to a computer, from completely destroying the integrated circuits so that the system is no longer usable to causing the computer to reboot without any additional damage. A static electricity discharge can damage a chip in ways that are not immediately evident, but may slowly cause the chip to fail over time. Most computer chips are vulnerable to even small amounts of voltage.

Background

An electrostatic discharge (ESD) occurs from a process known as triboelectrification, according to a January 2002 article by PC World. When a person’s fingertips touch a computer keyboard, they exchange electrons, with one object becoming electrically positive and the other negative. When that person’s fingertips touch another object that has an opposite charge, this causes electrons to flow back and forth. Static shocks are more prevalent in areas where there is low humidity. Humans can’t feel a static shock that is below about 3,500 volts, but static discharges as low as 400 volts can cause damage. This means that many computer users who open the case to install more memory or a video card may cause damage to their computers without knowing it.

CMOS Chips

According to PCComputerNotes.com, newer integrated computer circuits known as complimentary metal-oxide semiconductor (CMOS) chips are more susceptible to ESD than older chips. Most central processing units and system memory cards are CMOS chips.

Immediate Failure

A common result of ESD damage is that it causes an immediate failure of a chip. This may occur when the computer owner installs a new RAM card into the computer without using an anti-static strap or some other grounding method. The static discharge destroys the new RAM card and when the computer is turned on, it will not boot up properly, according to PCComputerNotes.com. This type of problem usually can be resolved only by replacing the damaged memory card.

Delayed Failure

Another common occurrence with ESD is that a chip is damaged by static discharge, but it may take weeks or sometimes months for the chip to completely fail, according to PCComputerNotes.com. In this case, the computer may experience occasional failures that can be hard to diagnose to a damaged chip.

Prevention

Computer owners who need to open their computer to install more memory, a video card, hard drive, a modem or a sound card, can take several steps to prevent ESD from damaging their system. They should always hold a new card by a part that is insulated and avoid touching any circuitry on the card. Using an anti-static wrist strap or anti-static mat can also prevent ESD. A carpet or rug can also increase static buildup, so opening up a computer on a tile floor may be a better alternative.