

## Equipment Performance

### **Is hardware damage preventable?**

Yes, you bet! Your system is designed with lots of solid-state components in it. These don't have any moving parts and should last a lifetime. However, the moment you plug your system into the wall, you are stressing your system with raw, contaminated utility grade electricity. This always-present frequency and voltage contamination stresses your system causing excess heat and premature component failure. By installing the Digital QC, you can eliminate virtually all these disturbances, which will effectively extend the life of your system and protecting your investment.

### **Why do I need special protection now when I never needed it before?**

Customers often ask, "If these types of conducted interference are quite common, why have I never had transient disruption or damage?" and "I have never had EMI problems in the past, so why does my latest equipment continually need EMI related service?" The first question is probably coming from a customer that is not plagued at the moment by disruptive levels of interference or the customer is not using very sophisticated electronic equipment.

The second question, on the other hand, is coming from a customer whose electrical or communication grids have recently been contaminated with disruptive/damaging interference levels or he/she has recently purchased more sophisticated office equipment that is more susceptible to the existing levels of interference.

The trend in the electronics industry since its inception has been towards the miniaturization of circuitry to achieve smaller, more efficient products. In the more recent age of data processing equipment, the trend has also been to develop circuits that perform functions or operations in a much shorter period of time than their predecessors.

While this trend has produced smaller, more efficient and much more inexpensive products than their closely related predecessors, it has also resulted in products that are much more susceptible to disruption or damage from EMI. With the higher microprocessor clock speeds, this new age of equipment is much more susceptible to disruption from the fast rising short duration transients and very high frequency interference that was not a problem for the designs of the past. The more compact surface mount technology designs are also much more prone to transient damage than the bulkier less susceptible products of the past.

While the new age of equipment has become much more susceptible to EMI disruption and damage, the much lower costs of all types of electronic equipment has resulted in an exponential increase in the numbers of electronic equipment units that utilize the AC power grid and various communication networks such as the telecommunication grid. Because each one of these electronic units is a possible source for power/communication line conducted EMI, the amount of interference contamination has risen dramatically from that of the past.

While the increasingly sophisticated electronic equipment has and will continue to become more susceptible to EMI disruption and damage, the electrical grids that are used with this equipment for power and data communication are becoming more and more polluted with EMI in the form of normal and common mode RFI and transient interference. These two trends have resulted in an office equipment electromagnetic compatibility problem that will grow to epidemic proportions. The computer components of your system must be properly protected against power disturbances to ensure optimum performance and reliability. An ESP power filter is an investment in both your equipment and your business.

**Can a surge harm my equipment if I am not using it or if it is turned off?**

Yes, the neutral wire and the ground wire are still directly connected to your sensitive microprocessor circuits. Disturbances can still charge right into your equipment. When you turn off the power switch, this only disconnects the hot wire, and not by a significant distance. The safe bet is to unplug your equipment from all connections and move those connections at least 6 inches away from its mate. However, this is a problem for lots of office equipment as they often have internal memory, clocks and timers that remain in operation even when they are turned off; they still need to be plugged in.

**Why is voltage on ground a problem with digital equipment?**

High frequency voltage (noise) appearing between neutral and ground can upset the ground reference, causing errors in microprocessor-controlled circuits. This “noise” is frequently the cause of much equipment operational problems.

**Why do spikes and noise negatively impact digital electronic equipment?**

**Electric utilities admit:** “The electric utility system was designed to provide reliable bulk power that is suitable for running lights, motors, and other traditional equipment. In recent years, highly sensitive electronic devices such as computer, copiers and other microprocessor-based office systems have been developed and widely adopted by end-users. These devices are very susceptible to power line disturbances and may require special power conditioning to operate efficiently.”

**It is a fundamental problem of incompatibility. Copiers, fax machines and other computer-based office systems require high quality power protection to operate with optimum reliability and a minimum of downtime.**