The service life of any piece of electronically controlled equipment is, to a large degree, determined by the quality of the electrical service that it receives power from. The number one complaint from electronics (commercial and residential) owners is downtime. The number one cause of downtime (other than user error, neglect, or abuse) is poor power quality. According to Utility Industry information, power quality is at an all time low, and with deregulation rolling along, it's getting worse.

A low impedance ground is imperative to both surge protection designs and power quality. A regular check and upgrade (as needed) of grounding systems will reduce interference and line noise, improve power factors, reduce the risk of accidental electrocution, help decrease potentially damaging harmonics and improve the efficiency and durability of surge protection equipment. Since many electricians use the terms "bonding" and "grounding" interchangeably, for the purpose of this paper they will be defined in short, as follows:

Ground/Grounding – Any direct conducting connection between an electrical circuit or equipment and earth.

Bond/Bonding – The permanent connection of metallic parts to form an electrically conductive

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Another issue with the Megger is that they come in three and four terminal configurations. To test the actual resistivity of the soil itself, a four terminal model is required. The advantage of this method is that you are not connected to the electrical system during testing. An electrical line fault during testing can send high current to the grounding system. This could result in high current and voltage at the test leads and meter. Safety is a primary concern working on "live" electrical systems. Always use proper protection equipment. Remember, if you are in contact with the grounding system (particularly if the ground rod is disconnected) YOU are the ground for the system.

Once an accurate measurement of resistance to ground has been calculated, we can perform a few tasks to help reduce resistance even further. Since DITEK is in Florida, and geological features can vary greatly in other parts of the country, it will fall to the installing contractor to make the determination of how best to lower resistance to ground in his region. The recommended grounding conductor at the service entrance is specified by NEC based on the ampacity of the service.

> Drive a new service entrance ground rod. Since it is impossible to know the exact length or current condition of the original ground rod, it may be prudent to install a new rod of suitable length and composition at the service entrance. Solid copper is the preferred material however, galvanized or

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A key element to the creation of a complete grounding system may involve making some fundamental adjustments to the routing of the grounding conductor if more than one ground can be referenced (campus environments, etc.). This will not be difficult or time consuming, but is very important in the system's ability to reference the original equipment ground back at the service entrance utility service meter. The normal routing would be to bring the HOTS, the NEUTRAL and the GROUND [illegible]