

# INTRODUCTION TO THE ULTRA-K

## General

Present day electronics are far more sophisticated than ever imagined. Today's equipment use switch-mode power supplies and high frequency digital processing. Yesterday's equipment used linear circuits and lower frequency digital processing. The proliferation of today's technology has forced us to rethink our approach to power, power supplies and high frequency operation.

The power supplies we use today are of the non-linear switch-mode topology. By the nature of their design, switch-mode power supplies are moderately immune to voltage variations. On the other hand, they are quite susceptible to damage or limited life resulting from voltage excursions and long duration transients that occur in

periods longer than the switching frequency of the switch-mode power supplies.

It is imperative to protect the sensitive electronic equipment from harsh electrical environments; especially when time and production is at stake. The proper way of accomplishing the necessary protection is by resorting to the fundamentals of power conditioning (isolation and single point grounding). This sounds simple, an isolation transformer, but that is only partially correct. It must be a transformer designed for the special needs of the switch-mode power supply in order to obtain the maximum effectiveness.

The correct transformer must be designed well below its saturation level for quick recovery and the high crest factor demand of the switch-mode power supply. It is also mandatory that the ratio of inductance ( $X_L$ ) to resistance (R) is higher than a standard linear load designs to prevent over voltage stress on the solid state switching devices at the moment of a transient. The transformer must exhibit an exceptionally low inner winding capacitance (typically .001pf) to eliminate coupling of high frequency common mode noise generated by the load. Transient filter networks are also necessary to effectively enhance the transverse mode rejection and the efficiency of the transformer should be 98% or better.

## Ultra-K

Controlled Power Company makes just this type of transformer. Designed specifically for the microprocessor-based world, the Ultra-K is a triple shielded isolation transformer designed with the load and the

requirements of the customer in mind. The Ultra-K is manufactured with K-factor ratings of K-4, K-7, K-13, and K-20 to deal with the high harmonic contents produced by many non-linear loads. The Ultra-K also has the

option of a 6 mode 40,000 amp Transient Voltage Surge Suppressor (TVSS), and high frequency noise filter to further enhance its noise and spike attenuation capability.

## Summary

Due to the advent of switch-mode power supplies and other non-linear loads, transformers that provide excellent power conditioning capabilities and can handle

high harmonic currents are a necessity to ensure that your equipment operates smoothly and without any upsets. The *Ultra-K* is designed to handle harmonics,

and reduce transients and noise to safe levels for the protection of your mission critical equipment.



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