Product Guide Introduction

Steward components provide the electronics industry with a high performance, cost effective tool to design out troublesome electromagnetic interference (EMI). EMI is now strictly regulated by law throughout the world. As technology evolves, Steward continues to lead the industry's need for the highest performance components.

Electronics, EMI & The Law

For over 20 years, governments around the world have required strict limitations on electromagnetic emissions and susceptability of all electronic devices. Most notably, United States Federal Communications Commission (FCC) Part 15 and Europe's CE mark have the strictest compliance requirements for all consumer and most industrial applications. For further information see EMI Testing Fundamentals in the back of the catalog.

Ferrites: The EMI Solution

As new regulations have been introduced, electronic engineers have searched for the lowest cost solutions to the EMI problem. Steward**,** drawing upon four decades of expertise in ferrite materials, has developed an extensive line of EMI suppression components to help the designer achieve their market goals.

The Simple Secret Of Ferrites

While many electronic circuits found in computers and consumer electronics may be designed to operate at a single fundamental frequency, they may actually generate significant energy, and thus potential EMI, at up to ten times their basic operating frequency (harmonics). For example, a personal computer with a processor operating at 100 MHz could produce measurable EMI up to 1,000 MHz and beyond. When used strategically, ferrites can suppress and dissipate (as minute quanities of heat) these higher frequency "noise" components while leaving the intended signals and operation of a circuit undisturbed.

EMI suppression ferrites are often used as two terminal circuit elements. Even in this simple configuration, EMI and design engineers give pause when asked to explain exactly what makes ferrites such indispensable noise eliminators. In concise terms, EMI suppression ferrites provide broadband, current operated low Q and high frequency series impedance with both reactive (inductive) and lossy (resistive) elements.

For EMI suppression above 30 MHz, Steward's high frequency/low permeability ferrites can provide lossy impedance over a bandwidth greater than 6 GHz. Due to this broadband lossy behavior, many engineers prefer to consider ferrites as frequency dependent resistors. While this view is essentially correct at higher frequencies, the inductive reactance of EMI ferrites may provide additional attenuation at lower frequencies. Finally, designers should not neglect the effects of a ferrite's differential inductance on intended signal when used in high speed broadband applications such as video or networking circuitry.

Product Line

While many potential EMI problems can be prevented through meticulous design practice, unforeseen noise issues often arise soon after a new design is built and tested. To provide EMI suppression for both initial design and retrofit applications,Steward offers a comprehensive product line:

- Common Mode Surface Mount and Thru Hole EMI Suppression Ferrites
- Differential Mode Surface Mount and Thru Hole EMI Suppression Ferrites
- Power and Signal Inductors
- EMI Suppression Ferrites for Connectors
- EMI Suppression Ferrites for Dual In-Line Intergrated Circuits
- Split and Solid Ferrites for Round Cables
- Split and Solid Ferrites for Ribbon Cables

Coatings

Steward can supply cylindrical cable beads which are polyurethane coated. The choice of coating is generally dependent upon the dimensions of the part to be coated. Coatings are applied to high resistivity ferrites to prevent chipping or to change the appearance of the part, even though the ferrite itself may have sufficiently high resistivity. Coatings are also applied to low resistivity ferrites to raise the effective resistance, thus preventing cross talk.

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