SHUNYATA RESEARCH

ΞTRON® Patented Technology

The ΞTRON® technology is applied in both PowerSnakes Signal Cables and the reference range of PowerSnakes Power Cords.

Even one SIGMA model power cord will do more than earn its place, they will elevate the entire system to performance levels you may not have though possible.
Vance Hiner, The Audio Beat: August 2015

Shunyata Research scientist Caelin Gabriel's extensive technical background and years of research deliver a truly ground-breaking technology that literally brings down the price of state-of-the-art performance from power and signal cable systems to a realistic number. The ΞTRON® technology is applied in both PowerSnakes Signal Cables and the reference range of PowerSnakes Power Cords. All of the Shunyata Research cable products that incorporate the ΞTRON® technology will out-perform cables costing five, ten and twenty-times their price. The engineering and detailed process involved in developing this new patent-pending, protected technology is described in detail below. No cable manufacturer has any product, at any price, that will compete with a ΞTRON® treated Shunyata PowerSnakes model power and signal cable. The ΞTRON® technology is applied in both PowerSnakes Signal Cables and the reference range of PowerSnakes Power Cords. All of the Shunyata Research cable products that incorporate the technology will out-perform cables costing five, ten and twenty-times their price. The engineering and detailed process involved in developing this new patent-pending, protected technology is described in detail below. No cable manufacturer has any product, at any price, that will compete with a ΞTRON® treated Shunyata PowerSnakes model power and signal cable.

ΞTRON® Technology

An electrical conductor that has an alternating signal that propagates across its length will generate an electromagnetic field that surrounds and interpenetrates the conductor. A dielectric is a material that is not electrically conductive and is used to insulate conductive surfaces and wires. Dielectric materials are sensitive to electric fields and demonstrate an effect called dielectric polarization and dielectric relaxation. In essence, a dielectric may store and release electric field energy when exposed to an alternating electric field. Dielectric materials are used to insulate conductors (wires) and are also used in the construction of capacitors. Fig. 3 is a cross-sectional view of a simple, single wire. 301 is the signal conductor. 302 is the insulating dielectric material. 303 is a conductive shield. When a signal is transmitted through the wire, it generates an electric field around the conductor as represented by the arrows. The electric field from the conductor causes a polar movement of the molecules within the dielectric as represented by the positive and negative symbols. The dielectric stores an electric charge by way of this molecular polarization. When the signal is removed or changes direction, the electric charge reverses and the stored charge within the dielectric will be released. The electric field generated by the dielectric induces a current within the conductor, which distorts the original intended signal.

A Summary

The technology reduces dielectric distortion within a signal wire by neutralizing the electric charge differential between the signal conductor and the insulating dielectric material. This is accomplished with the use of a conductive shield that surrounds the signal wire's dielectric material. The electric signal carried by the conductor is also imposed upon the shield through an electric field compensation circuit. The electric field of the conductor and the electric field of the shield oppose one another and create a near zero equivalent electric force within the dielectric material. This effectively neutralizes the charge/discharge distortions created by the dielectric material in the presence of an alternating signal. Since the conductor and shield both carry the signal electric field, they dynamically track the varying alternating signal to create a continuous net zero charge differential within the insulating dielectric. The ΞTRON® electric field compensation circuit allows the signal's electric field to be imposed upon the shield, while at the same time limiting current flow and eddy currents within the shield. While the invention uses a conductive shield around the signal conductor, it is not used in a conventional manner. A cable shield is conventionally used to shield RFI/EMI by connecting the shield to a ground pin, ground wire or grounding surface. The shield as used in the ΞTRON® technology cable is not connected to any other wire, grounding wire, or grounding surface or any other conductive surface. The shield is used exclusively to create an opposing electric field within the wire's insulating dielectric material.

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Date: December 2014

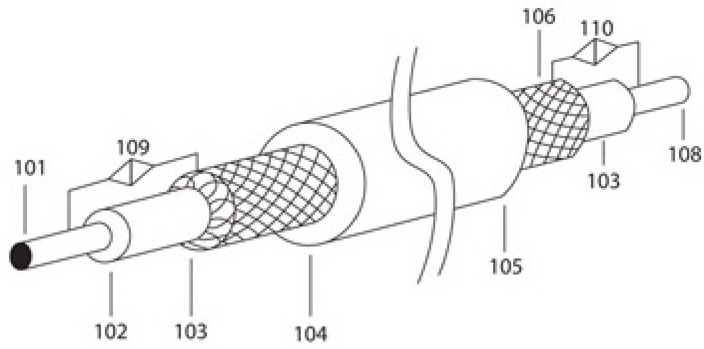

Fig.2

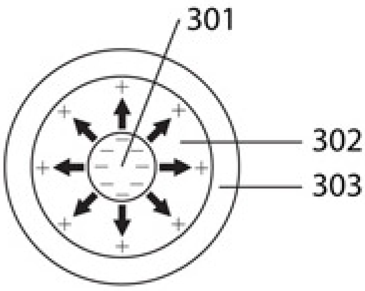

Fig.3

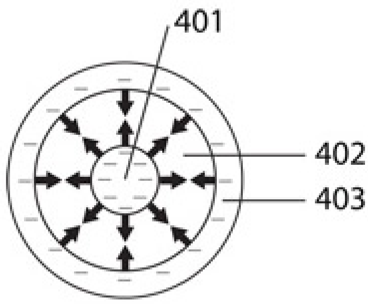

Fig.4

Description of the Drawings

In Fig. 3 only the signal conductor carries the transmitted signal. This creates a dielectric polarization of the insulating materials that surrounds the conductor. In Fig. 4 the signal is carried by both the signal conductor and by the conductive shield. The signal on the shield creates an electric field that opposes the field generated by the center conductor. These two electric forces oppose on another and prevent a net polarization of the dielectric material. Fig. 2 illustrates a simple shielded wire that demonstrates an implementation of the invention. The electric field compensation circuit (EFCC) is connected to the signal conductor 101 with other end of the EFCC connected to the conductive shield 103. At the other end of the wire, the signal wire 108 is connected to the EFCC 110 with the other end of the EFCC connected to the shield 106.