

WHITE PAPER

USB AUDIO CABLES

A perfect audio cable would transfer every sonic detail from one component to the next as if they were docked directly together, a condition called a 'cable-bypass.' Wireworld is the only company that follows through on this essential concept by designing cables to provide the closest sound to a direct connection. The current Wireworld cable designs incorporate the knowledge gained from over 30 years of continuous development based on this unique objective approach.

Progress in cable design has apparently been limited by a basic misconception of how signals flow through cables. The common belief that signal energy is transferred as electron flow within the conductors is not true. Most of the energy is actually transferred in the electromagnetic field surrounding the conductors. This misconception has led to the false assumption that using thicker conductors would improve sound quality. Increasing the thickness of conductors can only reduce the amount of energy that is lost as heat (resistive loss), while it actually increases the electromagnetic (inductive) loss that causes most of the audible degradation that we hear from cables.

Inductive loss is a critical factor in USB cable performance because it rounds off the square shape of the signal waveforms, creating timing errors. This is known as jitter, which distorts the music.

There is a simple reason why USB audio connections are so critical, while USB connections to devices such as printers are not. Printers correct data losses by asking the computer to resend the file until they have a perfect copy. DACs have only one chance to receive music signals and real-time error correction is not effective. That is

why USB cable losses are so audible in comparison to a direct connection.

The standard USB cable design (bottom diagram) utilizes a group of three conductors for the data signal and one 5-volt power conductor within a single shield. In this design, electromagnetic energy is only transferred efficiently within the small area shown by the two blue lines. The black power conductor is very close to the signal conductors, so power supply noise can enter the digital audio signal. Upgrading the conductor material and the build quality of the standard design can make audible improvements, but not enough to approach the clear dynamic sound of a direct connection.

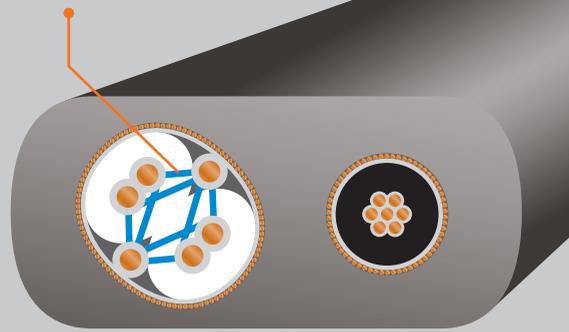
The Symmetricon design (used in Wireworld Starlight and Ultraviolet USB Audio cables) utilizes four signal conductors, effectively doubling the area where electromagnetic energy is channeled efficiently through the cable. Another special feature of Wireworld USB Audio cables is a shielded power conductor that is isolated from the signal conductors for cleaner power and improved sound quality.

The DNA Helix design (patent pending) used in Silver Starlight and Platinum Starlight USB audio cables consists of a circular array of six conductors (twice as many as other brands) to channel the electromagnetic field energy as efficiently as possible. The resulting sound quality closely approaches the purity of a direct connection.

By combining the most efficient designs with the best upgrade materials, Wireworld USB Audio cables advance the art of preserving the natural tone quality, spatiality and effortless dynamics of live music.

DNA Helix® USB Cable Design

Six signal conductors create *eight* efficient paths for electromagnetic energy.



BEST

Symmetricon™ USB Cable Design

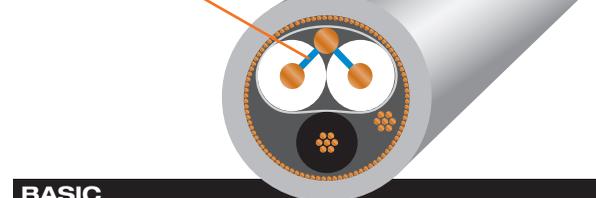
Four signal conductors create four efficient paths for electromagnetic energy.



BETTER

Standard USB Cable Design

Three signal conductors provide only two efficient paths for electromagnetic energy.



BASIC

WIREWORLD®
CABLE TECHNOLOGY

Engineered for Reality™

