

Audio cable Design Philosophy

The aim is to convey the signal message 100% unchanged.

Concentrate on eliminating energy losses rather than trying to involve unnecessary design ideas and concepts dictated by others.

Ask if the electric current is running easily forward in the wire and without obstacles similar to the way that cars are running forward on a highway.

This philosophy can be expressed in guidelines and rules as follows. Design the cables and wires on basis of the rules for electronic circuits. The electrons are the same.

1. Minimize the quantity of insulation material close to the wires. (Use PTFE, if possible. Air is better).
2. Minimize the capacitance between the wires. (The aim is to direct electrons forward. Not towards the adjacent wire).
3. Use only conductor materials with one electron in the outer orbit far away from the atom nucleus. (These electrons are easy to move away from the atom. Silver is good. Gold is better).
4. Never twist or turn the conducting material or the wire direction unnecessarily. (This will only increase the energy losses).
5. Make sure that the electrical fields cannot force the electrical current to flow between two or more pieces of conducting material in close contact. (These transverse currents can contribute to energy loss and non-linearity because the electrical contact between the pieces of conducting material is undefined).
6. The conductor material surface must be smooth and resistant to corrosion. (This applies for high frequency conductors, and this will benefit the conductivity and linearity at all signal frequencies. Skin effect will force the current to flow near the conductor material surface)
7. Each wire must be designed with an even number of metal conductors with the rolling direction equally distributed in opposite directions. (This configuration will equalize effects caused by metal conductor rolling etc. and therefore eliminate an audible non-preferred signal direction on cables).
8. The signal wire and the common/ground return wire must be designed identically. (Different wire designs do not perform equally well. Choose the best wire design and use it for both the signal and the common/ground return).

As an illustration we can compare the properties of a highway with the rules for cables and wires referred to in (): The highway surroundings have no objects so that the driving is not disturbed (1). The two opposite directions are separated to avoid traffic interference (2). Highways and fast cars work well together (3). Highways have a minimum of curves because they slow down the traffic flow (4). Each direction has two or more lanes. Cars crossing between the lanes slow down the traffic flow. (5). The highway surface is smooth and durable to enable any kind of driving unchanged over a long period of time (6). The highway lane properties are the same regardless of traffic direction (7). Opposite directions are designed identically (8).

Cars and electrons are very different, but the idea of providing a path to direct them uninterrupted is the same. We can learn from the simple highway philosophy and try to convey the signal message 100% unchanged in cables and wires.

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