Anchorwave

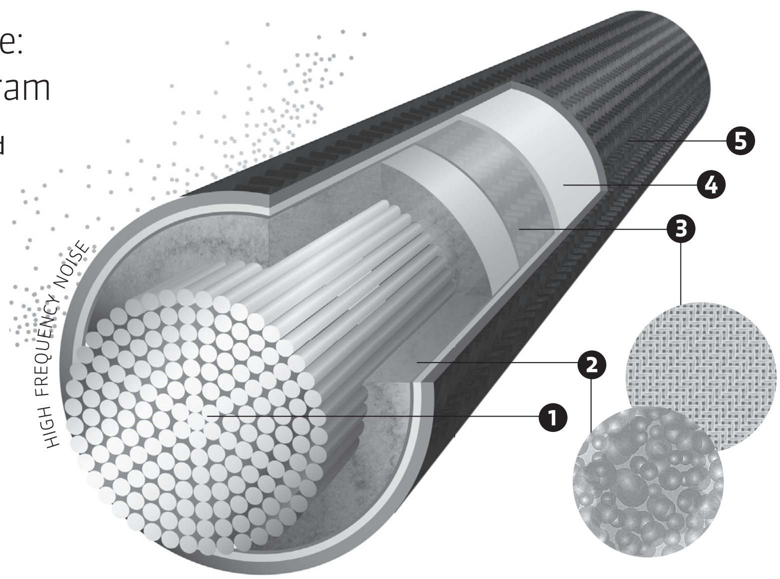
High Performance Interconnects and Loudspeaker Cables

The two main problems with signal carrying cables are that, on a low level, they can act as an antenna or a microphone. The **Anchorwave** is largely immune to both these problems. A true litz wire geometry, buried in an amorphous nanoparticle bed, coupled with a high tech conductive cloth shielding, make this assembly a dead silent and highly accurate conduit for your prized audio signal. Only when you kill and bury both acoustic and EM microvibration, while not thereby altering the signal, can the music truly come to life.

The technology Inside the Anchorwave

LessLoss Anchorwave: Cross Sectional Diagram

These technologies are shared by both the interconnect and the loudspeaker cable versions of the **Anchorwave.**



FEATURES

- very low resistance
- microvibration control
- special EMI/RFI shielding
- overall diameter: 11.65 mm
- min. bend radius: 12.7 cm (5 in.)
- available as interconnect and speaker cable
- cryogenically treated connectors

1. 196 mono crystal pure copper strands, each individually insulated to prevent diode effect through oxidation. 9 AWG (6.62 mm^2) per polarity (11.5 AWG for ICs).
2. Vibration absorbing nanoparticles, precision packed. Range: 12–44 microns. Amorphous structure prevents rigid lattice formation.
3. Finely woven composite cloth. Shielding effectiveness 10 MHz–20 GHz, 70–85 dB attenuation.
4. Water and chemical resistant polyolefin outer cover.
5. Tough, abrasion resistant polyethylene terephthalate outer shell, cross braided.

Highly suspicious Glaring evidence

Capacitance and inductance (C and L) values are sometimes mistaken as important factors that determine high performance in audiophile cables. This is likely because pro audio cables rely on these specs to maintain signal integrity over hundreds of meters. By comparison, audiophile cables are very short, and their C and L values are consequently very low. Even at the very top echelon of audiophile cables, there are plenty of fine performers featuring either low or high C and L values.

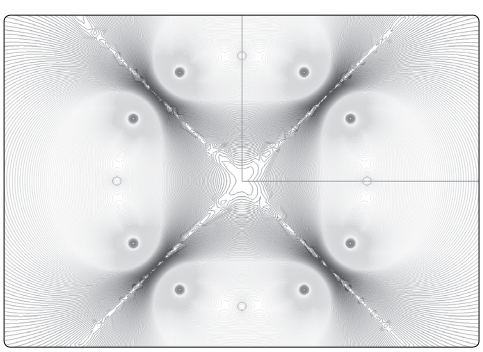
What about resistance and shielding effectiveness? Well, if you take two cables differing only in these respects, you'll notice these factors easily relate to sonic virtue. But there's one nagging problem: cables with all four of the above factors measuring the same can still sound different. So there must be another factor that determines high performance in audiophile cables: microvibration.

Although microvibration has no assigned measurable value, and though there's no standardized nomenclature or protocol used by the industry to measure it, something as simple as amplification can reveal the affect it has on cable performance. Take an open-ended cable, for example, (one with no microphone attached), and connect the other end to a mic preamp. Connect the preamp to recording equipment. If you drop the cable against the floor, from the impact alone, an audio engineer could easily amplify, record, and play back the signal generated within the cable itself. The cable itself has acted as microphone in this case. The difference is that it wasn't the air moving the microphone's membrane, but the acoustic vibration in the material of the cable, turning itself into a signal that travels along the wires of the cable into the next piece of gear in the chain.

Similarly, and just as importantly, all signals pass through the cable in the form of moving charged particles; this electromotive force introduces microvibrations in the cable, much like a microscopic loudspeaker. Since, for practicality's sake, a cable's function is to be loose and flexible, the wires within the cable are somewhat free to move relative to one another. To a small extent they'll therefore transduce electrical energy to mechanical energy and back again. Because of this, it is inevitable that an electro-acoustical low-level feedback results. This alters the passing signal and influences its purity.

The weighty parameter: microvibration control

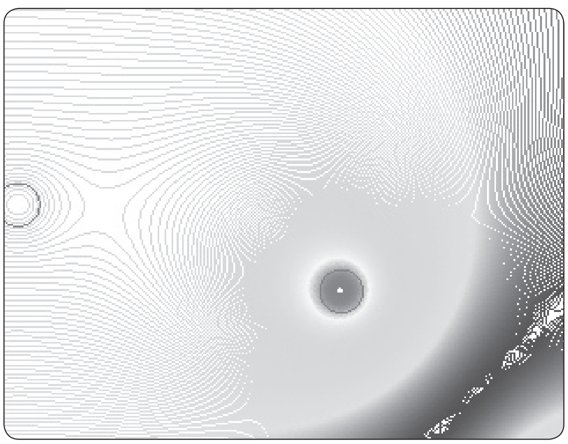
Consider this fact: there are myriad of cables on the market, each made of different materials and having different geometries. As would be expected, they all sound different. Now, the remarkable thing is that from this huge assortment, a group of cables can be assembled, all of whose capacitance, inductance, and resistance values measure largely the same, yet they continue to sound different from one another. But if capacitance, inductance, and resistance values are sufficient to describe the resulting sound quality, the cables in the aforementioned group would have to sound the same. We tried them—they don't. We knew, therefore, that standardized measuring protocol of these parameters, and the parameters themselves, were insufficient to explain all aspects of performance. So, for several years we looked for answers which would satisfy our curiosity in this matter.



Not unlike forensic detective work, LessLoss has been actively on the heels of what has been mysteriously eluding our mathematical models and theoretical reasoning. With the help of cutting-edge technology, highly sophisticated cable modeling techniques allow a microscopic real-time glimpse at field interactions within differing cable models.

To discover what other parameter might explain this mystery, we spent years researching different geometrical cable solutions. Eventually, after scrupulously examining these with simulation software and numerous listening tests, a pattern began to emerge. We found that eddy currents, caused by the natural flow of electricity, were giving rise to microvibrations of the materials in the cable. By altering the geometry of the test cables, we were only slightly altering the nature of these microvibrations, indirectly. After countless subsequent tests, we finally found agreement between what electromagnetic simulation software was showing us and our audible perception. We knew then that we were on the right track, and equipped with this new knowledge, needed only to refine the physical solution.

We discovered that, in comparison to the manipulation of cable geometry, material changes make a far greater impact over the influence of microvibration. This is because microvibration is ultimately caused by the signal itself. So, our using various signal wire geometries represented only a roundabout and imperfect way to change electromagnetic (EM) field interaction. Like a dog chasing its own tail, various geometries of a cable’s EM field dispersion represented little more than a new step in the dog’s old dance, unable to address the more fundamental issue of electro-acoustic interaction inside the cable. Consequently, we discovered that acoustic realm microvibration is most effectively controlled by totally immersing the signal carrying wires into a nanoparticle bed. As solutions go, this is far more elegant and direct.



We have found that micro-events smaller than than those readily analized by electromagnetic simulation software lie at the base of a cable geometry's influence on sound quality. These miniscule microphonic effects have more profound influence on sound quality than typically assumed, although their low levels would seem to indicate otherwise.

At this point, we had made much progress to experimentally identify microvibration as another parameter affecting cable performance. Once we could successfully control it using the nanoparticle bed, we were able to directly reveal the sonic role of resistance.

We learned that resistance affects the speed and control of the lowest frequencies and the meatiness of the sonic depiction. All else equal, and using our new microvibration control solution, two cables differing only in conductive cross section audibly confirmed this. Very low resistance ensures the amplifier’s control parameters are applied to the speaker without change. This includes its damping factor. To help understand this, imagine pushing and pulling a weight with your hand. You’re the amp; the weight is the speaker driver. A higher resistance speaker cable would place a spring between you and the weight, making control more difficult. The lower the resistance, the tighter and more direct the “grip” is, making control easier and more accurate. The **Anchorwave’s** grip is unprecedented. The speaker cable’s two 9 AWG polarities could be used safely at a whopping 40A constant current.

Construction Of the Anchorwave

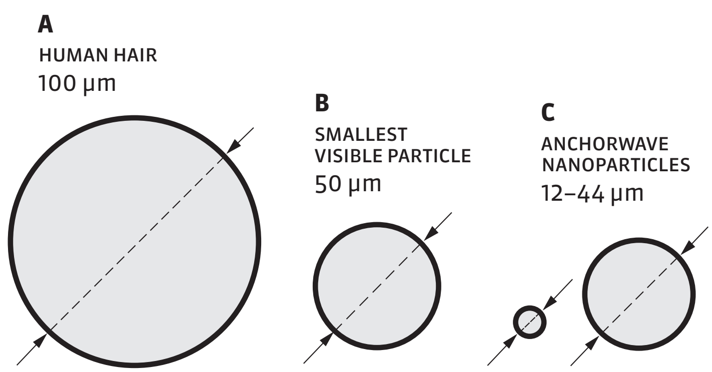
At the core: isolated litz

At the core of each polarity are 196 mono-crystal, pure-copper strands in litz configuration (i.e., their electrical contacts are mutually made only at the ends of the cable). Each strand is individually insulated with an extremely thin layer of lacquer to prevent diode effects. The use of a true isolated litz structure guarantees stable high performance as the cable ages. The loudspeaker cable's cross section is 9 AWG per polarity. The interconnects feature 11.5 AWG per polarity.

Between core and shield: nanoparticles

Around the core conductors are an incalculable number of vibration absorbing nanoparticles. Most of these are so small that you can't individually distinguish them with the naked eye. Because they differ in size, these tiny particles maintain an overall amorphous structure, preventing them from making the cable overly rigid. Their differing sizes prevent them from assuming a rigid lattice structure. If they did form this rigid structure, it'd defeat their intended purpose (to disperse microvibration). Thus, the cable remains entirely flexible with its signal carrying wires deeply submerged in an environment which yields enhanced microvibration damping.

If **A** is the size of a human hair (100 microns), then **B** is the smallest particle visible to the human eye (50 microns), and **C** is the range of sizes (12–44 microns) of the vibration control nanoparticles inside the Anchorwave.



Nanoparticles provide this advanced microvibration control. To appreciate it on a larger scale, imagine going to the beach. Sand granules, although much larger, behave in a similar way to nanoparticles. By lowering your head into a deep hole in the sand, you perceive extreme and instant attenuation of acoustic energy. Descend only one meter and almost all the sound from waves crashing above are gone. And this is with the hole open to the sky. This shows the effectiveness of acoustic absorption through multitudinous small granules. On a nano scale, countless more granules can fit in a given volume, compounding the effect.

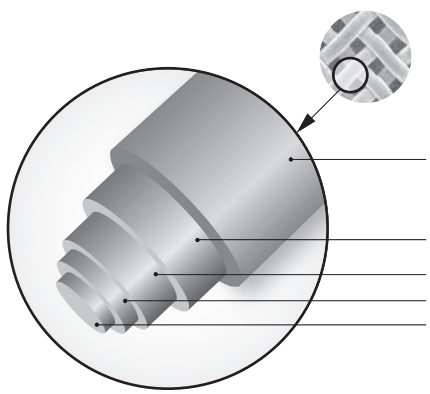
Shielding: high tech conductive cloth

That closed in, muted, or claustrophobic sound has been the achilles heel of traditional shielding solutions made of aluminum, copper or silver films, as well as tightly-braided wire and spiral conduit designs. To solve this, the **Anchorwave** contains a finely woven high-tech cloth whose shielding effectiveness ensues only at extremely high frequencies (10MHz - 20GHz). This keeps the cable from acting as an antenna, dramatically lowering the noise floor. And because shielding effectiveness ensues only high above the audio frequency range, the shielding is largely transparent to our prized audio frequencies. This allows it never to influence the audio's natural timbre, preventing that electronic, artificial sound.

CROSS SECTION OF CONDUCTIVE CLOTH MONOFILAMENT

Tightly woven at more than 130 threads per inch, the special composite cloth shielding ❸ utilized in the **Anchorwave** is invisible to audio frequencies, allowing them to pass unchanged. At high frequencies well above 200 kHz, attenuation gradually ensues.

Sheet Resistance ~ 0.1 Ohm/sq.



Returning to our beach analogy, this composite cloth shield behaves just like UV protection sunglasses: low frequencies you need in order to see, remain unaffected, allowing you to see right through the glasses; however, the high-frequency ultraviolet range is completely blocked out to protect your eyes from its harmful effects. In the same way, audio frequencies remain unaffected by the shielding while higher bandwidths containing noise are selectively and aggressively blocked out. The result is a dead silence of operation without any impingement on the openness or natural dynamics of the original audio signal.

Outer cover: protection from the elements & abrasion

To protect the delicate strands which comprise our high-tech shielding cloth, we use a polyolefin outer cover that's resistant to moisture and chemicals. For increased robustness and longevity, it also has a very tough, abrasion-resistant polyethylene terephthalate outer shell, braided for flexibility.

Termination: Furutech spades, RCA and XLR connectors

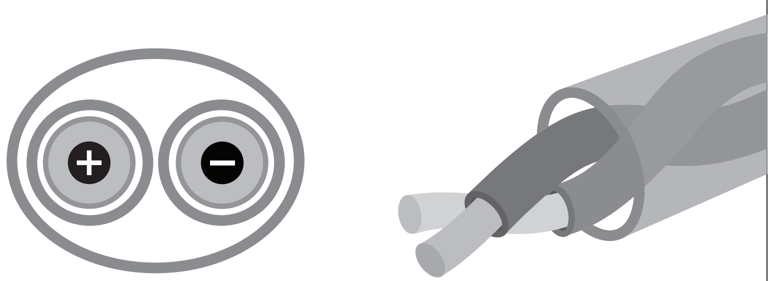
Furutech spades have been treated by Furutech's own house demagnetization and cryogenic treatment processes—features we've come to highly value. Palladium and rhodium platings are less conductive than gold plating and sound harsh and somewhat muddy. The gold-plated connectors we offer for all Anchorwave cables avoid these pitfalls and provide excellent organic sound quality. Our loudspeaker cables come with optional screw-down type spades (model number FP-201(G)). Our RCA cables use model FP-110(G). XLR cables use model FP-701M(G) / FP-702F(G).

Size Diameter and appearance

Loudspeaker cables

The **Anchorwave** speaker cable's outer diameter is 2.35 cm (0.93 in.) with a bend radius of 12.7 cm (5 inches). Both polarities are twisted rarely at approximately 2.5 twists per foot. The end of the speaker cable is separated into the two polarities for a length of 15 cm (6 inches). The two polarities are individually shielded all the way up to the terminals. A 1.8 meter length of one channel of **Anchorwave** speaker cable weighs 1.4 Kg (3 lbs).

ANCHORWAVE SPEAKER CABLE



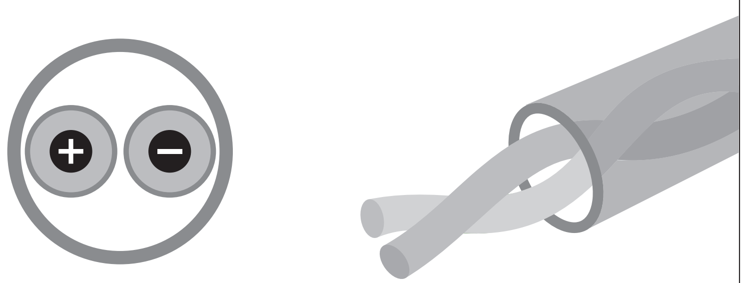
9 AWG per polarity

slow mutual twist of both shielded assemblies

RCA and XLR interconnects

Both RCA and XLR **Anchorwave** interconnects have an outer diameter of 11.65 mm. The structure is analogous to that of the **Anchorwave** speaker cable. The difference is that both send and return conductors are located within a single high-tech cloth shielding. A 1.2 meter run of one mono channel of the interconnect weighs 0.6 Kg (1.3 lbs.).

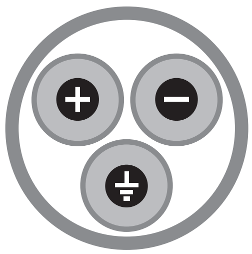
ANCHORWAVE RCA UNBALANCED INTERCONNECT



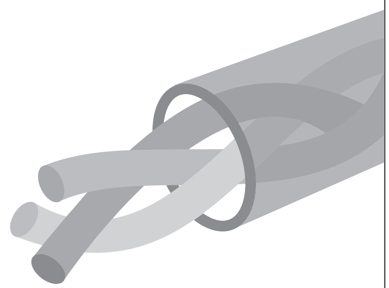
11.5 AWG per polarity

slow mutual twist of both polarities within one mutual shield

ANCHORWAVE XLR BALANCED INTERCONNECT



11.5 AWG per polarity



ground and two polarities are braided within one mutual shield

Crucial emphasis On directionality

We can't emphasize enough how important, absolutely vital, it is to heed the proper cable directionality with all versions of **Anchorwave** cables. Take care to install them properly or the sound quality will be significantly degraded.

We've clearly marked each cable's directionality with an arrow symbol on each of the leather tags. The arrow's pointed end must point toward the signal's destination—away from the signal's source. If the cable is not connected correctly, it should be remedied immediately.

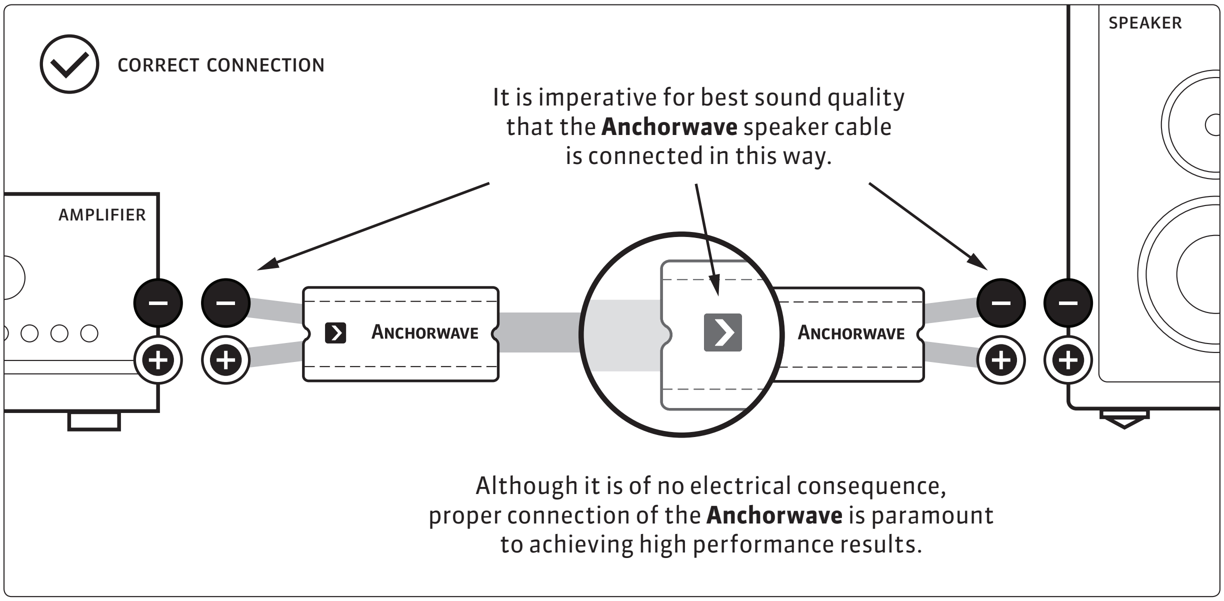
All **Anchorwave** cables contain arrows denoting proper cable directionality. Care should be taken to install them properly:

Source › Destination

ARROW SYMBOL

The XLR cable cannot possibly be connected incorrectly because both ends are different.
The RCA cable has a directionality that must be adhered to.

Beware: there are two mistakes one can make installing Anchorwave speaker cables. First, make sure the red ends of the Anchorwave speaker cable connect to the red phase positive terminals on your amp and loudspeaker. Second, and just as importantly, make sure the arrow's pointed end on the leather tag points toward the loudspeaker, with the open part of the arrow pointing toward the amplifier. Only when connected in this way can one enjoy top possible performance.


CORRECT CONNECTION
It is imperative for best sound quality that the **Anchorwave** speaker cable is connected in this way.
AMPLIFIER
SPEAKER
ANCHORWAVE
ANCHORWAVE
Although it is of no electrical consequence, proper connection of the **Anchorwave** is paramount to achieving high performance results.