



The "Boombbox" Demo

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In recent years AudioQuest has often done dealer education (and many consumer seminars) by using an inexpensive “boombox” which has detachable speakers,

usually at less than US\$250. We put little tails with double banana jacks on the main electronic unit, and the same on the speakers. We carry this into a store, I usually put the head unit on the floor and speakers on a couple of chairs, and lay out a whole collection of cables which can then be plugged in-between the head unit and the speakers.

“I usually set up the Boom Box with the speakers on chairs spread nice and wide, like you would set up a normal speaker system. The chairs (usually the padded banquet/meeting room type) ensure that it is low tech and not really designed to sound good. Then once it does begin to sound “better” and eventually quite good... it adds that much more. If done properly, you will get an increasingly larger soundstage as you switch.

50 seconds or so of a nicely recorded track (that isn't too busy) does the trick for me. Make sure you start the track over after each switch (pause and left arrow to stop, then play once switched). The current track I am using off of Jacintha's “Here's to Ben” CD... titled ‘Our Love is Here to Stay’. The voice is good, nice and clear, and there is a piano that comes in at about 20 seconds, and then a sax that comes in at 40 seconds or so. Both are very muddy and hard to discern with the Monster MC-500... yet keep getting clearer and more fleshed out as you move through the kit. Of course, a lot of your favorite music will usually work, but make sure you test it out beforehand!

Steve Shade, Int'l Sales Manager

The boombox does a couple of very important things: It is a catalyst for an open mind, for turning the normal work of the evaluation process into something intriguing and fun. The only time several key Stereophile people took the time to listen to cables with me was several hours spent listening to a boombox... former Stereophile owner Larry Archibald then wrote about his discoveries in the magazine, and Bob Harley used it as the basis for his cable discussion in his Guide to High End Audio.

The other very significant attribute of the boombox demo is

that no one says afterwards “that's all very nice, but I won't be able to hear the difference on my system.” I have been fighting what I call the “biggest lie in hi-fi” most of my life. The expression “a chain is only as strong as its weakest link” seems to exist in every culture ... it is an absolute truth. However, it is an absolute lie when applied to a hifi, and yet it pervades the industry, and is the primary obstacle to consumers being interested in our products. If one goes out on the street to ask normal people why they don't have a better hifi, some will certainly say it is for lack of more money, but the great majority will say it's because they couldn't hear/appreciate the difference. You should see how impolitic I got with a room full of Thai reviewers, all very cozy in their professional positions, meeting each other every time a distributor calls a press conference. They describe how their golden-ears are needed to tell the consumer about important differences that the customer could

not hear for themselves (even when given the opportunity). What an industry! Telling its customers that they should pay for things they can't appreciate! Everyone can hear differences. Anyone in retail knows that the consumers, who are most selective, most aware and least likely to be tricked by the attention-grabbing aspects of bad hifi, are the people who take out their hearing aid before listening. It's not about physiological sensitivity.

So, the boombox attacks this lie head-on, proving that there isn't just one weak link in a system and that changing anything else will make no difference. To apply the chain analogy any less rigorously is like a "partially pregnant" sort of logic ... no logic at all.

When using the boombox, we start with Monster's 259 strand per side 12 awg cable. A product which is actually fairly high in Monster's current line-up, but which can be considered a baseline of sorts for the whole industry. Monster has very clearly earned their (US) position as

the Kleenex, FedEx, Xerox of cables. Monster is the brand name that stands for the very idea of cables one pays for. Other countries might not have a particular cable as symbolic of all cables as Monster, but any big parallel stranded cable will do for a starting point.

After playing a little over a minute of music on the Monster, I unplug it and then plug in one of the poorest cables AudioQuest ever made, the no longer available F-40. The F-40 is also stranded and also parallel, 2 of the worst sins in cable design. I play the music again from the beginning on the F-40. Then I switch back to the Monster, explaining that a simple A/B comparison is never fair as the B product will always seem to have made obvious something which was not noticed when listening to A ... the "novelty effect." Then, after playing the Monster a second time with the exact same music, I play the F-40 again before saying anything about the sound. 99 out of 100 times, the audience has caught it and is eager to declare a winner, and to try to describe the differences. I have more fun with audiences that don't have any prior audio language, because they use far more relevant terms.

"I like to use chairs as speaker-stands both for the low-key psychology Steve mentions, and because chairs are about the right height to give a warmer more enveloping sound than when the speakers are on speaker-stands, or even worse when they get put on top of other speakers (either floor-standing or boxes on stands). There's even a slight benefit to the acoustic damping qualities of the seat cushion.

These differences aren't necessary to show differences... they do contribute to the boombox being seductive and enabling the audience to be seduced, get high and later look some customer in the eye and tell them how even a boombox made real music when using AQ cables. Better unexpectedly good sound from a boombox causes people to think AQ is super competent ... which is of course true."

Bill Low

When it's not as good, not as involving, they say it was "boring" in comparison. Nobody likes a letdown!

Why was the F-40 so clearly superior despite being smaller and less expensive? Because the multiple (4) conductors are small enough to have a lot less skin-effect and a lot less strand interaction. I'll go back to the cable that Noel Lee sold as a rep in Northern California before he started Monster Cable. He distributed a 12 awg electrical cable, bare copper strands on one side, tinned strands on the other side. Being normal electrical cable, it had 63 strands per side, in a hard PVC jacket. When Noel created that incredible machine that is Monster Cable, he created a product with vastly better-perceived value, something much more likely to be purchased, and therefore did countless thousands of customers a favor. Thanks to him they bought better cable than they would have used if they hadn't paid for cable at all. However, from an audio quality perspective he took a big step backwards.

All bare copper is oxidized before it ever gets put into a cable. The contact between bare strands is a low-pressure lousy connection. The contact pressure is modulated by the music (magnetic interaction, rule of rights, the strands are drawn together by current running through the cable). Copper oxides are semiconductors, meaning that the conductivity of the copper-oxide to copper-oxide inter-strand connection also has its conductivity modulated by the presence of a varying current. These are a couple of the complicated and dynamic mechanisms for creating distortion in any stranded cable, clearly made worse by more strands, as in Monster Cable and most other brands of "audio" cables.

A larger conductor size increases distortion for two reasons: Almost always the strands are in either a "bunch" or "rope-lay" configuration. In both cases, the strands are constantly changing position within the overall bundle as they travel the length of the cable. This very complicated and ever changing magnetic environment is a constant source of confusion, even when the strands are individually insulated, made using magnet wire, what in English is called a "litz" wire ("litz" in German simply means "strand"). When the strands are not individually insulated, then the larger the conductor, the more "skin-effect" causes the current at higher frequencies to have to jump from strand to strand in order to follow the path of least resistance, which is a straight line near the surface of the conductor. Skin effect is not a problem at audio frequencies because of "loss" (despite major verifiable reduction of current density at higher frequencies). It is only a problem because of distortion. One of the most significant distortion mechanisms is encouraging current to jump from strand to strand, passing through the inferior and variable connection between strands. The somewhat grainy sound of stranded cables is mostly due to the strand to strand jumping, while the somewhat one-note thud bass is due to magnetic interaction problems.

Boombox Demo Tips:

- Always sit on the floor next to audience or lean in next to/behind them. (You are participating WITH them in this evaluation.)

- Make sure all speaker cable lengths and terminations are the same. Make sure the exact same connectors and method of application are being used. (Your audience could become suspicious if anything looks amiss.) Also be sure not to hold on to the remote while the music is playing. You don't want anyone thinking that you are making remote control adjustments on the sly!

- Place speakers casually on (ideally padded) chairs. It's important that the speakers are not placed with "audiophile exactitude". The whole idea is that these differences can be heard clearly with even a very casual set up.

- Music. Just because YOU like a particular track doesn't mean it's appropriate for the boom box demo. You want material that is musically appealing to the broadest range of people. You may love Nine Inch Nails but many do not. Hard rock, metal rock, rap, punk, classical and avant-garde jazz are polarizing genres that some love and many don't. Stick with material that is well recorded (meaning in the simplest terms, that it has good clarity and dynamic range) and has broad appeal. The selections we have included on our demo disk all qualify. You do not want listeners to immediately tune out with an "I hate classical, I hate hard rock" sort of attitude.

- Always present an A-B-A-B at the start of the demo. This means start with OMC, then play F-40 (or G-4), then go back to OMC, then back to F-40 (or G-4).

- This point should be obvious but DO NOT back off the volume manually! Just hit "restart" so that the audience knows that the exact same volume has been maintained.

- Always play the last cable a bit longer. This allows the audience to share the experience with you of having finally arrived at a place where you can all relax together and just enjoy the music.

- After playing the last cable (CV-4 w/DBS) we have an interesting fork in the road that will require YOU to take a careful read of your audience. Do you go back to the original Monster Cable to see how far you have come or do you leave well enough alone and leave everyone with the musical high experienced by allowing them to really get into the music with the extended play on CV-4 w/DBS?

Obviously if someone asks you to go back to the OMC, by all means go back and play it. The usual reaction when going back to the OMC after playing the CV-4 w/DBS is laughter! That's a perfectly great way to end the session. Even if someone does not ask you to go back to the OMC, if the audience is really engaged and "with" you, it can be fun to go back to the beginning to hear the dramatic contrast. The boom box now sounds like the crappy boom box that it is.

So, Noel Lee's early 63 strand x 2 electrical cable was better because it had significantly less strand interaction points, the thicker strands were more mechanically stable, and the hard PVC jacket held the strands more tightly, also reducing the

The music system:

OK. It's no longer really a "boom-box", per se, but a modest mini-system that has separate or detachable speakers and the ability to accept a reasonable connector. The latter requires a modification. Models change rapidly, but AQ has been making available a suitable model from Sharp by installing binding posts that enable a quick and certain connection as you change from one cable sample to the other.

magnetic effects (confusion and modulation of contact pressure). AudioQuest F-40 is significantly better again because the conductors are much smaller, greatly reducing all these distortion mechanisms, and because the strands are concentrically packed. This means that there is a strand in the center that is always in the center, and 6 strands around the 1 in the center. 6 circles exactly fit around 1 circle, meaning there is no room for movement, and no changing of

strand position. The layer of strands on the outside is always on the outside. This type of construction is always stiffer than a "bunch" construction, but more flexible than a solid. The difference is easy to hear!

Some favorite material:

Track	Artist	Album
1. Handsome Molly	Bill Morrissey	Standing Eight
2. Our Love Is Here To Stay	Jacintha	Here's To Ben
3. Beachcombing	Mark Knopfler	All the Roadrunning
4. Out of Control	Dave Alvin	Ashgrove
5. Beautiful Bluebird	Neil Young	Chrome Dreams II
6. Keith Don't Go	Nils Lofgren	Acoustic Live
7. How We Operate	Gomez	How We Operate
8. Sweet Afton	Nickel Creek	Nickel Creek

Back to the boombox ... F-40 has demonstrated that good design, even with a parallel stranded cable, makes an important difference. Then I play the AudioQuest F-14 cable, which uses the exact same quality of metal as F-40, same quantity of metal (DCR), same inductance, same capacitance. The only difference is that the conductors are solid instead of stranded. When I am asked why I use solid conductors, thousands of words are nothing compared to the knowledge gained by hearing this difference. The smooth, easy, natural flow, with so much less fatigue, speaks for itself. F-14 has mechanical memory, meaning it is slightly stiff. It's flexible enough, but it has memory.

After the F-14, the next cable in the boombox demo is a round-spiraled model called Type 2. The current version of F-14 has a little more metal than AudioQuest Type 2. During most of my boombox career the conductor sizes were identical in F-14 and Type 2, but even today, with a certain metal advantage going to the F-14, one can clearly hear the dramatic benefits of Type 2's spiraled configuration. A twisted pair has substantial advantages over a parallel pair, and a 4-conductor spiral has substantial advantages over the same conductors run as 2 separate twisted pairs. Type 2 is really 2 steps up the geometry hierarchy.

Most people hearing the 3 comparisons described here, state that they think the biggest difference was the jump from the F-14 to the Type 2. They will describe hearing the singer breathing or some other bit of information that they didn't notice before. People in the business are more likely than normal people to choose the last step as the biggest one ... we do so love to use perceived quantity (of information) as the way to judge value. I also very highly value the greater resolution and dynamic contrast preserved by the Type 2, but by my priority system, this was the smallest jump. I am most fixated on avoiding the types of distortion that cause fatigue. My ultimate value system is measured by time, how long will one enjoy listening. I find the major reduction in fatigue between F-40 and F-14 to be the biggest jump (well, maybe tied with the Monster to F-40 jump).

The cables compared above are all quite inexpensive. One can make the point that the differences heard had very little to do with money. These differences demonstrate the most fundamental building blocks of good cable design, that as strongly as I believe in the benefits of superior materials and further geometry refinements, they are worth very little if they don't sit on a foundation of understanding that can be perfectly well demonstrated with cables that are almost free.

This is the foundation for Type 4, which uses four conductors in 2 different sizes, just like Type 2. In a bypass test the Type 2 can be heard to be a little "light." The amplitude response is flat in most any cable (barring extreme capacitance problems), but audio is so married to the analogies of tonal impression. "Bright" is used as being "as if" the treble were turned up. Far too often the "as if" gets dropped and people think bright is an amplitude variation when it's most always an irritating type of distortion in the upper midrange.

Anyway, the tonal impression of Type 2 is a little light. Having much more metal to work with in Type 4, I feel that a bypass test quite clearly shows Type 4 to be less than perfect (because all cables are bad) but that the damage caused by Type 4 is very neutral with less grit or perceived tonal aberrations than is usually true.

The SST (Spread Spectrum Technology) technique can't be fully played out in a 4 conductor cable, but the benefits are every bit as great as in my far more expensive Counter-Spiraling models with their 16 conductors in 4 different sizes.

Any single size conductor has a distortion signature, but sizes larger than 20 awg (0.8 mm) are “wrong” (compromised ambience information and perceived dullness, lack of information, and depending on size, subjective upper midrange prominence) due to skin-effect, but sizes smaller than 20 awg all are simply different and not really better or worse.

I discovered by accident many years ago that combining multiple conductors sizes which are very close in size was an effective way to reduce the awareness of any size related distortion signature. This is something very different in effect or in theory from what Cardas or Kimber or others do with different size strands in a multi-strand conductor.

When conductor sizes are too different, one simply gets the ill effects of both distortion profiles added together... it's worse. However, when they are close... the visual analogy I use is that if you imagine a video picture providing a correct edge plus an undesirable artifact ... that's a particular size conductor. A different size conductor would be represented by a correct edge plus a slightly shifted artifact. When the conductors are too far apart in size, it's like a correct edge plus 2 undesirable artifacts. However, if the conductor sizes are close enough, the artifacts are very close together and the net effect is one slightly soft edge instead of a correct edge plus artifacts.

Cables Required: (in order of appearance...)	
1. OMC (Original Monster Cable)	
2. F-40	
3. F-14	
4. Type-2	
5. Type-4	
6. CV-4 no DBS	
7. CV-4 DBS	

I do not consider this as a way to reduce distortion, but as a way to reduce awareness of distortion. Sometimes this is an even more important consideration as our perception systems are usually much more sensitive to the existence of a particular distortion than to the quantity. The unexpected effect when I first used 2 sizes was very obvious. Now I use 2, 3 or 4 different sizes depending on the number of conductors available for each polarity. When there are 3 or more conductors, they are never more than 2 awg sizes apart, but Type 2 and Type 4 only have 2 conductors per polarity.

Another analogy ... when setting up an audio system, I like an immersive experience. I usually set up the speakers almost as far apart as they can be without losing the center focus. In its extreme, one moves them farther and farther apart until the image is broken, and then moves them together just enough to allow a seamless panorama. The conductor sizes in Type 4 are just that close ... or far apart. The reason is to stuff as much metal into the cable as possible while avoiding the harmful coloration of skin effect.

Since a 20 awg conductor is the largest that's above the skin-effect line, that's the size of the smaller conductors in Type 4. The larger conductors are as large as is possible before the image falls apart, before the separate artifacts are heard as 2 problems instead of 1 solution.

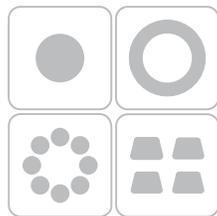
The skin-effect distortion profile of the larger 17 awg conductors is not heard thanks to the "bypass-effect." This effect is commonly used in loudspeaker crossovers where the capacitance values can be quite high. A very small and very high quality 0.01 cap is put in parallel with a large value less expensive lower quality cap. The effect is most of the economics of the large cap and much of the sound quality of the little bypass cap. Different size conductors and different metal quality conductors can be used in a similar fashion.

As Steve Shade has said from his experiences over the past several years, "Either way you get to be the king!!! Have fun with this WEL-designed incredibly useful selling tool! The more times you perform, the more mindshare you get. It really is that simple!"

NOTE:

When the new "FT-4" (Flat Type-4) speaker cable becomes available (very shortly) the demo will consist of the following cables:

1. OMC
2. G-4
3. FT-4
4. Type-4
5. CV-4 no DBS
6. CV-4 DBS



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