NORDOST

MAKING THE CONNECTION

Foundation Theory...

A strategy for optimizing system performance;
A road map to greater musical satisfaction;
A recipe for upping the value of upgrades;
A beginners guide to building a better system.

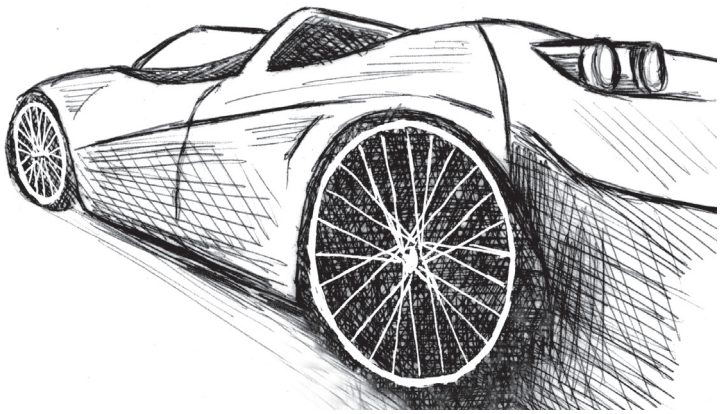
For many, many years, hi-fi has been all about the boxes: How big? How many? How powerful? How much? In a market where the prices have risen faster than an F15 interceptor with its afterburners on, performance has struggled to keep pace and increasingly, the very same magazines that promoted this over-focussed, product based approach have come to rely on the law of diminishing returns to explain the disappointing results of all too many expensive "upgrades". Instead of questioning just why the latest $20K pre-amp doesn't sound even close to twice as good as the $10K competition, they seem to think that this is the natural state of affairs.

Well, at Nordost, we don't agree. In fact, we'd go further than that and say that if you don't hear every single cent of performance that an upgrade costs then don't spend the money, because there are good products and bad products – and a good product used properly should deliver full value. Why? Because doubling the budget allows a designer far greater flexibility in how he deploys that budget, with less of it being taken by irreducible fixed costs. If our notional designer decides that it's the volume control that's going to transform the performance of his $20K pre-amp, he's got the budget to really go to town – and you've got the ears to decide if he's right or not.

There's only one rub to this tidy notion and that's those two little words, lurking innocently at the end of the basic proposition. "Used properly" might not seem like much of a qualifier but in this instance it's make or break. Let's take a look at one of those motoring analogies so beloved of the audiophile press. You know, one of those involving Ferraris, Lamborghinis or a host of other cars they've never driven.

Seeing a hi-fi system first and foremost as a collection of boxes – a source, pre-amp, power amps and speakers – concentrates on what is perceived as the sexy stuff. Partly of course, what's sexy is defined by the magazines anyway, but isn't that the stuff that's doing all the work? Well, yes and no... In motoring terms, it's a little like reviewing a car entirely on the basis of its engine and bodywork. Sure, the engine delivers a number of clearly definable parameters, performance indicators that go a long way towards defining the theoretical, potential performance of that car. Likewise, the bodywork defines what it looks like and to a large extent, what it's good for. After all, you don't try and take your wife and four kids on a touring holiday in a high performance coupe – not unless you are some kind of masochist anyway.

Which is all well and good, but the more obvious performance attributes (number of seats etc) are not what we're about. Likewise, knowing the car has a V8 engine, a turbo charger and such and such a supposed power output is all very well, but actually realizing that potential performance is quite another matter. That does rather depend on having the right tyres, the right fuel and an appropriate road surface to run it on. Have you ever watched a Ferrari trying to set a 0-60 time across a ploughed field? No, nor have I – but I don't expect that it's pretty!



What has this got to do with hi-fi? Well, when it comes to your system, if the boxes are like the engine and the bodywork, what's playing the part of the fuel, tyres and pavement? In this case, the fuel comes out of the wall, the tyres actually deliver the power and what it all sits on? That's pretty obvious. Stretching a point? I don't think so, and when you think about it, nor will you. And what that means is that while the electronics and speakers in your system define its potential performance, its actual performance envelope is strictly limited by the AC supply, interconnects, speaker cables and the support technology employed. In fact, in all too many systems the fuel is distinctly low octane, the tyres are the wrong size and each inflated to a different, incorrect pressure, while the supporting surface could be anything from the proverbial ploughed field to a sheet of ice...

Top Fuel...

It's been said many times before but it's worth repeating: when you listen to a hi-fi system, what you are actually listening to is the AC power that comes out of your wall. The system takes that "material" and converts it into music. But rather like a sculptor who starts with a block of rock and produces a statue, the artistic and surface value of the finished piece (not to mention its longevity) depends on the quality of that initial chunk of rock: does it have fine, even texture or faults that will crack; is it consistent in colour and composition; does it carry foreign bodies or colour contaminants? All those characteristics will

be reflected in the finished item. In hi-fi terms, that means that any pollution on your AC line will affect what you hear out of your speakers. Yes, internal power supply technology, multiple stages of regulation and even in extreme cases, power line regeneration all play their part – but they all have their negatives too. There's no escaping the fact that the better the quality of the incoming power the better the outgoing results will be. Hi-fi journalists are fond of quoting the "garbage in, garbage out" maxim, generally applying it to the issue of signal quality supplied by front-end components. But they seldom apply it to the AC supply – the first and most important link in the chain.

Supporting Cast...

The analogy of the car running on a variable road surface is closer to reality than you might at first think. For years, the hi-fi industry has insisted on viewing racks and platforms designed to support equipment as "isolation devices". Actually, this nomenclature, with its suggestion of isolating equipment from the outside world and structure or airborne acoustic feedback, couldn't be more misleading. In fact, the mechanical energy that needs dealing with most urgently is that generated within the equipment itself. Every single component that passes electricity will also vibrate. The larger that component, the greater the power involved, the worse the problem, which makes power transformers, optical disc transports and large power supply caps musical enemies numbers one, two and three. But in many ways just as damaging are the much smaller components that actually carry the signal, simply because of that physical proximity. Finally, there are the biggest sources of mechanical vibration of all – the loudspeaker drive units. You might think that these are relatively remote from your electronics, separated by distance and air, but you'd be forgetting that in fact, they're strapped directly to your amplifier's output stage by strips of metal (your speaker cables) and nothing transmits vibrational energy quite like metal.

With all the parts in your electronics shaking, rattling and rolling in time (or worse, slightly out of time) with the music, and adding their own flavours and distortions to the signal as it passes, it soon becomes apparent that rather than isolating your hi-fi from the outside world (although laudable in itself) it's actually much more important to deal with the energy that it's generating internally – and that means offering it a route out of the chassis and somewhere to go. Which is why metal cones under equipment work after a fashion, and soft interfaces such as Sorbothane pucks don't, slurring the timing, compressing the dynamics and confusing the music's energy spectrum. Any sort of mechanical earth path is going to be an improvement over none at all. Petrol heads talk about getting the power down, but in the world of hi-fi, whilst it's just as critical to performance, the concept takes on a whole different meaning.

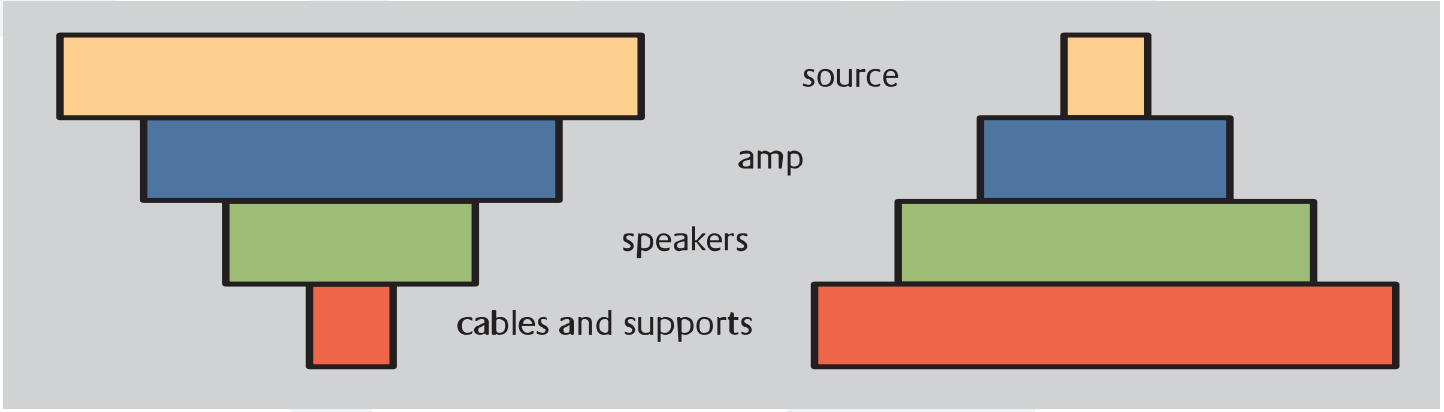
Fluid Transmission...

When it comes to delivering the signal you've done so much to create and protect, the final link in the jigsaw is the cabling that passes that signal from one box to the next. No matter how good the boxes are at doing their jobs, it's no good if you lose it all in the wire that joins them together. And whilst an audio cable's job might appear simple in theory, in the real world things are rarely that cut and dried. Just as cables play a much larger part than you probably realized in the vibrational life of your system, they can also contain a whole host of hidden losses and distortions that effect the coherence and energy spectrum of the musical signal. Far from expecting cables to improve the sound of your system, a decent set of cables should concentrate on doing as little damage as possible – and that's not as easy as it sounds.

Establish A Solid Base...

Take these three things together – the quality of the AC supply reaching your electronics, the ability to remove damaging mechanical vibration from them and the capacity to pass the signals they produce without loss – and it soon becomes clear that far from ancillaries or afterthoughts, these aspects of your system absolutely control the performance possible from it, irrespective of how good your electronics are. In fact, unless you've got them properly sorted, you can't even hear what your electronics are doing – or what they're capable of. These three, key contributors are critical to a properly balanced and musically coherent performance, one that can mirror the rhythmic demands, dynamic and tonal contrasts of real music. It's all about getting the right amount of the right energy in the right place, and just like a high-jumper clearing the bar, it all depends on a firm footing for take off.

These often overlooked elements actually form the base on which your system's performance rests – the better and more balanced their



quality, the broader that base; the broader that base the more stable the foundation. Think of the system as a column and it soon becomes apparent that the taller you try to build that column (the better you try to make your system) the wider the base needs to be to maintain a stable structure.

But even if you've got a stable set-up, what happens when you try to upgrade? Increase the height of your tower and unless you have sufficient width in the foundation, you start to teeter on the brink of instability again. Given that we've consistently underestimated the importance of building the system's foundation, it's no surprise to discover that almost all systems possess insufficient stability or investment in this area. As a result, attempted upgrades become a complete lottery, any increase in quality merely exposing the inadequacy of the underpinnings, possibly offering short term improvements in one performance area or another, but rarely improving overall musical coherence, communication or satisfaction. After all, if you can't hear what your existing equipment is capable of, how can you accurately assess the benefits of any potential upgrade. In fact, and somewhat ironically, the longest lasting "upgrades" often represent sideways steps, different rather than any better, because building any higher depends absolutely on the quality of your foundation. Before spending any more money on the latest, greatest electronics or speakers, it's the base on which you are building that needs checking out. So, the question then becomes, how good is that foundation – and how good is good enough?

Sounds Expensive...

Well, whilst there's no denying that you can spend pretty much unlimited funds on cables and supports, that's not what's being proposed. Remember, Foundation Theory is a strategy rather than a spending plan. In the first instance, it's more about what you do than what you use: making the most of what you've already got rather than replacing it en masse. And that extends to your electronics and speakers. You might be surprised just what you can get out of the system you already own – which makes the proper application of Foundation Theory by far the most cost effective upgrade path you can follow. Once you have that firm foundation it's something that you can build on, both in terms of the quality of the electronics and the quality of that foundation itself. Yes, of course better cabling will make a difference, but it will make much more of a difference once the rest of the foundation is firmly in place.

Sounds Good...

But how do I go about it

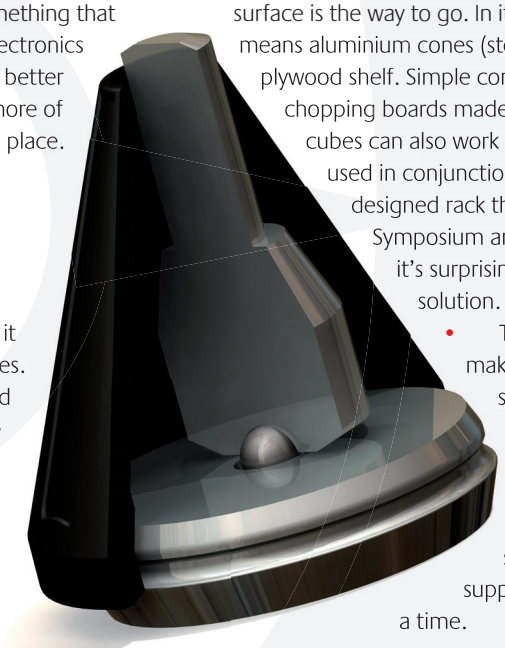
Once you realize just how important your system's foundation is, you are over the highest hurdle. Getting it sorted out should be a simple case of following the rules. Most of us have a selection of different cables, acquired over the years, often as new pieces of equipment have come and gone. And if our signal loom looks exotic, it's often a model of organization compared to the mix and match selection of power cords, filters, distribution units and other paraphernalia that lurks down the back of our rack. Ahhh... yes, the rack. More often than not it has been chosen as much for aesthetics as anything else, and there's yet another range of different products propping up the equipment that lives in it. Don't feel bad, that's just the status quo... SNAFU. Time then, to do something about it.

The AC Supply

- Run the entire system from its own dedicated AC spur, equipped with good quality sockets.
- Use a star-earthed distribution block to feed the system, with a clean earth feed, either to an earth post in the garden/yard or to a cold water pipe. <Image Of Qbase>
- The most important single cable in the system is the one coming out of the wall. If you use only one audiophile power cord, use it here.
- Use the same power cords to feed all the key components in the system. Once you have an audiophile cord between the wall and your distribution block, make sure that any further cords are of the same type or, at the very least use the same technology and materials. This usually means employing AC cords from a single manufacturer.
- Within the system, power cord priorities are easy to establish by trial and error. If in doubt, start at the pre-amp, then the power amp(s) and then the source components. This doesn't always work, and sometimes your primary source will precede your power amp(s) in the pecking order, but if you follow this rule you won't go far wrong. However, bear in mind that in most cases you'll be better off using five $200 leads than one $1000 lead and four standard ones.
- Don't mix and match different audiophile leads. What you are after here is consistency and in musical terms, four or five leads the same will always trump a mix and match set of "better quality" cables. If you already own a selection of different audiophile leads, work with the one that's best or the one you have most of.

Equipment Supports

- Achieving an effective mechanical earth for an equipment chassis involves two steps: an exit path and a dissipation mechanism.
- Quite often, the soft rubber feet fitted to equipment are the very worst solution, making matters worse. These should almost always be bypassed or, if necessary, removed.
- Using rigid couplers between the equipment and a lossy supporting surface is the way to go. In its cheapest and simplest form, that means aluminium cones (steel or brass are generally better) and a plywood shelf. Simple constrained layers are easy to construct and chopping boards made from a multitude of small hardwood cubes can also work well. All of these solutions can be used in conjunction with an existing rack. Yes, a purpose designed rack that incorporates this thinking (Stillpoints, Symposium and HRS all qualify) will be superior, but it's surprising just how far you can get with a DIY solution.
- The precise placement of your couplers makes a difference to the sound. Always start by placing them under the power transformer and transport (if there is one). After that, go for stability. Once you have your equipment properly supported, it is easy to experiment with small adjustments in the position of the supports. Just remember to only move one at a time.



- Once again, consistency is king. Using the same shelf materials and couplers under all of your equipment will deliver a surprising performance dividend. Isn't that going to mean buying lots of new couplers? Not necessarily. A lot of equipment will perform really well with a single mechanical grounding point. Use a single example of the best couplers you have, placed in the most critical position, and combine it with two wine corks (or similar) trimmed to the correct height to provide a tripod support. This mimics the excellent Vertex AQ approach and no, it doesn't sound as good as the purpose built Vertex coupler/decouplers used in conjunction with their Kinibalu platform, but it definitely does work! What's more, it allows you to support a system with the minimum number of identical devices. You haven't got a dozen wine corks lying around? I'm sure you can do something about that – and if you are tea-total there's always the hardware store.

Interconnects and Speaker Cables

- Once again, consistency is the key. You should aim to have as near identical cable technology as possible, through out the system. That means that in all probability, all your signal and speaker cables will be drawn from the same manufacturer's range.
- That consistency should ideally extend to embrace the power cords too. You will always get a more musically coherent result in a system where both the signal and AC cables employ identical materials and technology.

- It should also extend to include digital interconnects and tonearm cable (internal and external) as well as bi-wire jumpers or speaker umbilicals.
- Again, start with what you have most of – taking into account the power cords and the absolute quality of the available cables as well – and then expand that to give you sufficient to wire up the primary signal chain. Once again, don't assume that the most expensive cable you own is the best or most suitable. Look for a product that's backed up by an extensive range of purpose designed and built cables that is based on a common approach and materials and that can meet all of your requirements. It is surprising just how good a properly organised set of even fairly modest cabling can sound when compared to the mish-mash of different types employed in so many systems.
- And finally, a few basic cable dos and don'ts:

1. Always use a single run of the best cable you can afford, even with bi-wired speakers. Replace bi-wire jumpers with purpose built jumpers that match the speaker cable.
2. When you do bi-wire a speaker, always use identical cables for each leg of the crossover.
3. Don't assume that balanced connection is always better than single-ended. In fact, unless your electronics employ fully complementary circuitry (which is quite rare) then often the reverse is true, with single-ended connections delivering a crisper, more dynamic sound with a greater sense of presence.
4. Don't use standard interconnects for either tonearms or digital transmission. Both these functions are quite specific and demand their own electrical characteristics from the cables employed.

Sounds Better...
But that's only the first step

Carry out all of the steps outlined above and you will be on the receiving end of a huge step up in system performance. It's one of those "I remember why I got into hi-fi" moments. Of course, if you are one of the lucky few who already owns a coherent cable loom and a really well sorted support solution, you have every right to look smug, while those starting from scratch and applying Foundation Theory to a brand new system might well feel a little bemused; after all, isn't this what hi-fi is supposed to do? Exactly! But the really good news is that there's more, much, much more to come. Look at the accompanying XXXX download and you'll see measured results that both underline this approach and start to explain just why it is so effective. And these reflect the impact on just a CD player. Think about extending that treatment to a whole system and you can begin to see the possibilities.

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What we've outlined above constitutes the bare bones, the absolute minimum that's compatible with hi-fi performance. Upgrade the AC cabling and distribution, keeping it in step with the signal loom and supports and you'll really start to hear what your electronics can do. How far should you go? Theoretically speaking, there's no real limit. Even the most basic electronics will continue to demonstrate the benefits to be had from better cables and supports until you've exceeded their purchase price tens of times over. At hi-fi shows, Nordost regularly demonstrate Odin interconnects, speaker cables and power cords with a set of electronics and speakers that collectively cost significantly less than a single cable. And yes, you can easily hear the difference. What's more, the greater the overall coherence within the system, the more it matters. Once things are really coming together, even a single cable or poorly chosen support will have a very obvious effect on sound quality. Thankfully, the benefits of replacing it will be equally obvious. So don't just assume, because you've spent the money on expensive racks and cables, that you are home and dry. Take a long, hard look at the system you own and assess honestly just how consistent those cabling and support solutions really are – and how fit for purpose? What are they trying to achieve – and is it the job that needs doing?

In practical terms, few if any of us have paid sufficient attention to, or spent enough money on, our system's foundation – leaving us all with a fair way to go. Unless you are way ahead of the curve when it comes to the coherence of your cables, the quality of your AC supply and supports, then it makes no sense to spend more money on electronics or speakers until you sort things out and build that firm foundation; after all, you won't be able to hear what the kit is doing anyway!

This is all about actually realizing the performance benefits of the equipment you already own. Removing the barriers to that performance by feeding it properly, nurturing its operating environment and cherishing its output merely allows it to reveal its true qualities. You want to talk budgets? Always difficult, but the old "10% on your cables" rule is clearly inadequate. 50%? I'd say that's a working minimum until you start investing in really exotic equipment and speakers. Scandalous? Don't dismiss it until you've tried it. I can pretty much guarantee that you are in for a surprise. Of course, we would say that – we make cables. But consider this; we don't just say it, we go out in public, at hi-fi shows and dealer events, and demonstrate it – so that you can appreciate the benefits for yourself. And like we said, they are not difficult to hear. If we can demonstrate them in a hotel room think what they'll do to a well set up home system.

Once upon a time a weary traveler asked a rustic looking local for directions. After a considerable pause for thought the yokel replied, "Waaaallllll... if I was going to get to there, I'd not be startin' from here". As an audiophile, I'm sure you recognize the scenario.

Working with cables and supports might not seem sexy but it does deliver very tangible and cost effective musical results – not least because it's actually delivering the performance from your electronics that you've already paid for. What's more, once you can hear what your electronics are really capable of, when upgrade time does come round, it is going to be just as obvious what any new piece of equipment you put in the system is adding to the experience. Which means no more sideways steps or expensive mistakes. You'll be able to see exactly where you need to go and just how to get there. And you even get to enjoy the journey along the way.

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