THE ESSENTIAL HI-FI GUIDE

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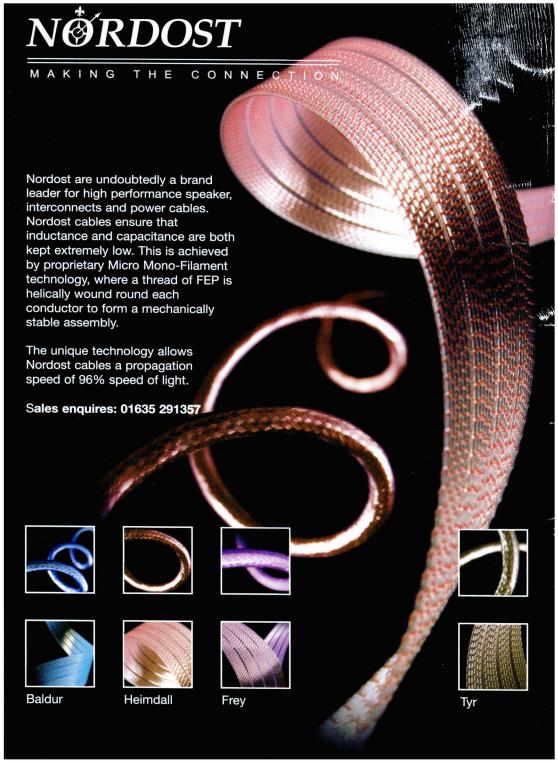
THE HI-FINDRECONFE

INTERCONNECTS • SPEAKER CABLES • EQUIPMENT SUPPORTS
SPEAKER STANDS • MAINS PRODUCTS

HOW THEY WORK WHICH TO BUY

IN ASSOCIATION WITH

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For convenience we call them 'accessories'. But in reality we know they're 'essentials' - at least for any self-respecting lover of music and owner of decent hi-fi. Take interconnects and speaker cables, for example. Your hi-fi can't work without them; and if you spend

wisely on the right wires, it'll make a tremendous difference to your sonic experience.

Then there are dedicated equipment supports, which most hi-fi aficionados will tell you are a must. And also speaker stands, for those who choose small standmount or 'bookshelf' speakers and want to get them singing at their best. Hi-fi furniture keeps your system nice and tidy, but it also has a part to play in the way it sounds.

Finally, there's the raft of products that claim to improve the quality of mains electricity supplied to your system, with subsequent sonic benefits. Many may find such claims incredulous, but others swear by mains treatments. Give 'em a try - there are differences to be heard.

This free guide is intended to shed some light on how these accessories work, and why they really are essential. We also recap on some of our favourite products in each category, of various types and prices. All in the name of hi-fi!



CONTENTS

FEATURE The Science of Cables

ROUND-UP Interconnect Cables **ROUND-UP** Speaker Cables

FEATURE The Science of Supports

16 ROUND-UP **Equipment Supports**

ROUND-UP Speaker Stands 20 FEATURE The Science of Mains

24 ROUND-UP Mains Products

26 CHOICE BITS The HFC Accessories Shop

The science

Every audiophile knows that cables affect a system's sound, but the reasons why they do are more difficult to pin down

here is no convincing theory of exactly what it is that cables bring to system performance. They have a measurable effect on frequency response of a system, but in all practical cases it's a very small effect, which in isolation one would not expect to be audible. And vet. often listeners find that cables affect not just the tonality of a system, but its detail resolution and stereo image precision.

There are three basic configurations for any hi-fi cable. At least two conductors are always needed to complete a 'round trip' for the electrons, the simplest and most familiar arrangement being two identical conductors, made of solid or stranded metal insulated in plastic, side by side - this is known as the 'figure-8' cable. Or, you can use the 'coaxial' arrangement, where one conductor is surrounded by another tubular one. The last

Cable types explained

FIGURE-8

The simplest form of cable, with two identical conductors of solid or stranded copper. It is easy to make and use and gives moderate inductance and capacitance, such as to present no problems to amps. There's no screening, but twisting the cores together helps reject interference without significantly affecting the cable's basic properties.

QED XT300 speaker cable (variant on figure-8)

FLAT PAIR



Squash a figure-8 sideways and you end up with two flat ribbons of conductor, face to face. The large adjacent surface area and small spacing gives very high capacitance and low inductance, making for flattest frequency response with speaker cables, but this can potentially upset a few amps that are designed for more conventional cables. Townshend Audio Isolda DCT speaker cable

SPACED PAIR



Stretch a figure-8 design sideways and capacitance decreases, while inductance increases. Interference pickup is worst with this kind of cable, but its electrical properties make it well suited to interconnect duty and many swear by the characteristic sound of such cables (typically 'fast and light') with

None (Linn cable is a real-world example)



cables

basic type is 'Litz' wire, where several separate conductors for each 'leg' are twisted or woven together.

VARIATIONS ON A THEME

A seemingly endless series of permutations exist for each of the three basic cable designs. For instance, in 'figure-8', the conductor size, shape and spacing can be varied - extreme examples are DNM speaker cable, where conductors 0.6mm in diameter are spaced apart by about 25mm, and Townshend's flat cable, where solid ribbon conductors are maintained a fraction of a millimetre apart. A screen can be used over the conductors, and they can be twisted together - neither of these makes much difference to how the cable 'looks' to a signal passing along it but both can reduce interference pickup.

SPACED RIBBON



This variant on the spaced pair looks like a flat pair at first but has the conductors edge-to-edge rather than face-to-face. Popularised by Nordost and others, this construction typically sounds not wholly dissimilar to a spaced pair, but also lends itself well to under-carpet laying, making it a popular choice for long speaker runs. Nordost Heimdall speaker cable (more or less!)



Litz cables in general have several individually-insulated conductors, which may be solid-core or stranded, twisted or woven together. This gives higher capacitance and lower inductance than figure-8 designs and also provides good screening against interference. Particularly well suited to loudspeaker cable duty.

Kimber 8VS speaker cable

COAXIAL



The classic design for unbalanced interconnects, providing moderate capacitance and good screening. A common variant is the 'screened pair', where the screen carries no signal current. Coaxial cables are capable of good results, though 'giveaway' cables like this, made with very cheap materials, can be terrible! Wireworld Terra 5 speaker cable

Any kinds of conductor and insulator can be used - commercial cables mostly use copper conductors but silver, gold, aluminium, nickel, mercury and carbon fibre have all been tried. Insulation tends to rely on PVC or polythene, PTFE (Teflon), polyester and a few other plastics.

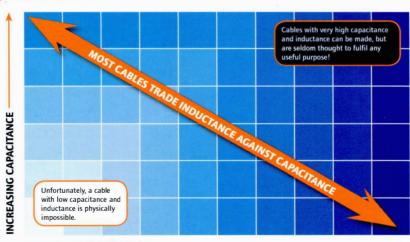
Lots of factors have been invoked to 'explain' cables. In essence, any cable has four dominant electrical characteristics: series inductance and resistance and shunt capacitance and conductance. The first two oppose the flow of current in the wires, the second two allow current to flow between

the wires. Resistance serves no useful purpose and should be minimised, while shunt conductance should be maximised. But the relationship between inductance and capacitance is interesting. At first sight one wants them both low, but they 'see-saw', one increasing as the other is reduced. At some optimal balance point, they have the least effect on the signal passing.

INTERFERENCE

In radio-frequency terms, one speaks about a cable's 'characteristic impedance', which is the impedance that 'matches' to the cable

Capacitance versus inductance



INCREASING INDUCTANCE

One of the key aims in audio cable design is to find an ideal balance between capacitance and inductance. The two share an inverse relationship - most cables trade one against the other so that inductance multiplied by capacitance is pretty much constant (per metre) for all cable types. There are no clear answers - for example, high capacitance with low inductance tends to bring about the flattest frequency response for speaker cables, but can upset some an

and allows frequency-independent signal transfer – this applies in digital cables. At audio frequencies it doesn't strictly apply but a 'matched' cable still gives the lowest frequency-response change – though a large margin for error exists before serious treble droop occurs.

Various other factors come into play. 'Skin effect', often quoted as a source of trouble, is the increase in resistance in a cable with increasing frequency - in practice, it's such a small effect as to be very hard to measure. 'Contact rectification' between strands has been cited as a weakness of stranded cables. though no-one has explained exactly how this would come into play and there's no measured support for it. Pickup of interference, at frequencies 'from DC to daylight', can be a very real problem, with both inputs and outputs susceptible to upset by unwanted signals. Even microphony can be an issue in cables carrying very low-level signals from phono cartridges.

With care, interference and microphony can be pretty much ruled out, and yet significant differences still exist between cables. None of these factors sheds much light on why cables sound so different.

DISTORTION

As mentioned above, it's easy to show small frequency response and phase differences between cables. But though there's little doubt that we can be pretty sensitive to such changes, their effects don't usually

include the significant changes in texture and detail that so often seem to go with cable swapping. Such changes imply that there is 'non-linear distortion', where the output contains frequencies other than those that went in. But to date, we have no evidence of changes in distortion spectrum due to cable changes.

Ironically, the changes wrought by digital cables are rather easier to explain. The digital signal switches rapidly between two voltage levels, and those transitions can be effectively slowed down by a poor or 'mismatched' cable. In that case, the timing accuracy of the signal arriving at the receiver is reduced and jitter results. If this jitter gets through to the audio output (and it very often does) the sound will be affected. This led us to investigate the possibility that audio-frequency signals in analogue cables are affected in like manner, though theory suggests no significant effect. And the theory seems to be right...

Few audiophiles doubt that cables are important – the differences are there to be heard – but proving why is harder than one might expect, a fair head-scratcher by any standards. That won't concern you unless you've a taste for obscure intellectual puzzles, and certainly shouldn't prevent you trying out a few cables, if only to see whether you can hear the ascribed difference yourself. Have fun – it's really quite harmless!

Twelve of our favourite interconnects and speaker cables are reviewed overleaf

Interconnect cables

Monster Interlink 400 Mkll

£40 (1m analogue pair)

@ 01923 431634 @ www.monstercable.com

onster Cable was in on things at the very dawn of the audio cable revolution and has developed various proprietary technologies that claim to optimise sound – in this case, 'Bandwidth Balanced' construction and 'Time Correct' windings. The cable is substantial but easy enough to use, and its sound is bold, engaging and well detailed for the price. At times it's a touch bright, but the cable's 'fun factor' wins the day – it's great value for money.



TCI Viper SE

£70 (1m analogue pair)

2 028 9267 3024 @ www.true-colours.com

he basic cable making up Viper is a pseudo-balanced type with good quality materials, including finely stranded copper. An unusual luxury at this price is the very nice locking phonos, which keep a firm grip on any socket. Apart from the occasional hint of sibilance on HF-rich sounds, there's a very good balance overall with extended bass, open and airy rendition of acoustic space and excellent definition and separation of instruments within an image.



van den Hul The Well Hybrid

£90 (1m analogue pair)

his is one of several vdH cables that use 'linear structured carbon' conductors alongside more conventional silver-plated copper. The idea is that carbon lacks the crystal boundaries and imperfections of metal and so should pass very low-level signals better. That apart, this is a typical and practical coaxial cable. Its performance appears to suggest that LSC does justify itself, as detail, imaging and tonality are all first-class. A trace of bass coloration is the only foible.





Black Rhodium Polar Concerto DCT

£225 (1m analogue pair)

2 01332 755766 # www.blackrhodium.co.uk

espite being one of the cheaper 'Deep Cryogenically Treated' cables, Polar Concerto uses an unusual asymmetric construction. Sound is clear but, in the manner of a few BR cables we've tried over the years, slightly dark in timbre, with low subjective noise. We obtained particularly good results using this cable between a couple of phono stages and an integrated amp, and while it gave no problems with digital sources, we'd recommend it particularly for analogue.



QED Qunex SR75

£50 (1m coaxial digital)

2 01279 501111 # www.qed.co.uk

f you think that your selection of digital interconnect has no bearing on sound quality, think again. The SR75 utilises a double braid plus foil screen and low-loss dielectric over a high-purity copper conductor, resulting in clear, open midrange and treble, solid imaging and substantial, tuneful bass. This particular digital cable is a coaxial (electrical) type; if optical is your only option, try Supra's ZAC at £32, it's noticeably better than freebie cables.



Kimber Select KS2020

£629 (1m coaxial digital)

rom the outside, there is nothing more remarkable about this cable than wood-bodied phono plugs, but it has some unusual electrical characteristics. More importantly, it offered a most disconcerting improvement to the performance of several DACs with which we tried it. The old phrase about 'lifting of veils' comes to mind, with details, musical colours and imaging all revealed fresher than ever. Think of it as an integral part of a good, high-end DAC.



Speaker cables

Wireworld Terra 5

£5/m (plus termination)

2 020 8991 9200 @ www.wireworldaudio.co.uk

'ireworld builds most of its cables on the 'Symmetricoax' principle, which results in speaker cables of screened construction and high capacitance. This may limit their use with Naim and one or two other amps, but in other situations seems to produce sound of great sweetness over the full frequency range, from the extended bass to the clear treble. Most rewardingly, and notably in a cable at this price, stereo imaging is very fine with excellent depth.



QED X-Tube XT300

£10/m (plus termination)

2 01279 501111 @ www.qed.co.uk

his might look like just another speaker cable of classic 'figure-8' construction, but the conductors aren't the usual mass of copper strands. Instead, each is a hollow tube over a central core of polythene, hence the 'X-Tube' name. It performs very well for the price, with excellent bass response and strong stereo imaging. Overall, its sound is natural and well controlled, with a balance of virtues that make it a fine recommendation for a wide range of systems.



Kimber 8VS

£18/m (plus termination)

2 0845 345 1550 ⊕ www.kimber.com

'imber's various speaker cables all share a characteristic woven construction, which in this case comprises eight separately insulated stranded conductors for each phase. Conductor and insulator materials are not quite as fancy as in the upmarket variants, but even so the sound is most beguiling, with extended treble and deep, tuneful bass. Dynamics are wide, and overall there is a creamy effortlessness to the sound which belies the price.

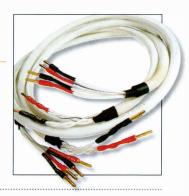




Chord Co Odyssey 4

£36/m (plus termination)

his bi-wire cable is basically two runs of regular Odyssey in a single jacket. The conductors are substantial, of silver-plated copper insulated with Teflon and twisted together. They pass a signal that emerges with great bass impact (though bass extension is not the cable's strong point) and a very 'fast' character that will please lovers of highly rhythmic music. Treble is clean and well defined, while imaging is precise and well extended laterally, with good depth.



Townshend Audio Isolda DCT

£50/m (plus termination)

2 020 8979 2155 # www.townshendaudio.com

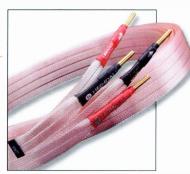
ownshend was among the first to promote ultra-low inductance loudspeaker cables that match the loudspeaker's impedance to give the lowest possible high-frequency losses, and this latest version is not only deep cryogenically treated but features terminating networks to keep twitchy amplifiers stable. The result is some of the richest bass around, always impeccably controlled, with effortless treble and a midrange that's rich in textural, timbral and spatial information.



Nordost Heimdall

£1,175 (3m terminated pair)

his flat cable has an unusually complex construction, with silver-plated conductors individually wrapped with spirals of low-loss insulation, before being covered by an extruded overall jacket. This is doubtless a major contributing factor to the cable's unusually fresh and uncoloured sound. Bass is taut with plenty of impact, while across the range there is superb definition and transparency. Use with Nordost's matching Heimdall interconnects for exceptional results.



The science of

Most hi-fi aficionados recognise that dedicated equipment supports make a difference. But why, and what should we choose?

or years now, it's been part of the hi-fi canon that your equipment will not perform to its best if it's inadequately supported. The basic rationale is intuitive enough - if the equipment is shaking at the whim of every little vibration in its surroundings, it can't perform properly. Therefore, we need to isolate the equipment from the environment in some way. To this end, there exist dozens of solutions in the form of racks and platforms that claim to provide 'optimal' support for equipment.

In one particular case, the arguments are irrefutable. Turntables rely on tiny mechanical movements to 'read' the information in the vinyl and are notoriously microphonic (or sensitive to vibration, in that they act like microphones). The very best turntables have good suspension built in, but for the most part the improvements in performance that can be obtained by isolating the deck from incoming vibration are very significant. Some valve preamplifiers are also quite microphonic (although at very different frequencies from those that affect turntables).

But a lot of modern equipment is frankly not microphonic. Whack a CD or DVD player while the system is playing and you won't hear much from the speakers, at least until you make the player skip. Modern FM and DAB tuners aren't significantly microphonic either, nor are transistor amps, cassette. HDD or MiniDisc decks.

On the other hand, the majority of equipment has casework made of metal, often not very thick and not at all well damped, which rings audibly if tapped. Indeed, simply making a loud noise near the equipment (a handclap, for instance) is enough to set up ringing which can last for a second or more. In fact, it's almost certain that in most cases there's next to no electrical microphony going on. Instead, there's simply 'sympathetic resonance', where the equipment resonates mechanically as the music (and outside influences like passing cars) excite it. An extreme case would be leaning an acoustic guitar against one of your speakers.

Now, given that supports do certainly make a difference, what's the mechanism? There are various factors. First, the support



supports

itself will to some extent resonate with the music and add its own signature to the sound. Especially in the case of steel racks, this is probably the major contribution. Second, the support will to some extent alter the amount of mechanical vibration (from floors or walls) getting to the equipment and possibly the airborne vibration (sound!) too. Third, the points of interaction between the equipment itself and the rack will alter the resonant. characteristics of both.

That last part has an ironic consequence in that putting equipment on a resonant rack will actually improve the performance of the rack - that is, it will reduce its coloration of the sound in the room.

NECESSARY EVIL?

In this light, it almost looks as if racks are little better than a 'necessary evil'. But the differences between them, and the fact that they often seem to make hi-fi sound better, warrant more detailed investigation. For a start, it's important to realise that approaches to rack design vary a lot. Some use metal, some use glass, some use

plastics, some use wood, some use spikes, some use mass - or any combination of those design elements.

The material from which a rack is made obviously has a major influence on its resonant characteristics. Regular-shaped objects made of steel, for example, are

"The majority of equipment has casework made of metal, often not very thick and not at all well damped

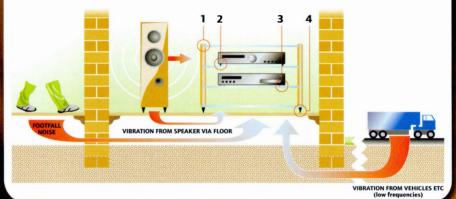
much more resonant than irregular wooden items. Steel is generally stiff and transmits low-frequency vibration very efficiently from one end of a structure to the other. while wood and plastics are less stiff and more likely to dissipate vibration as heat.

The interface between the various parts of a rack is of great importance. An acoustically 'dead' shelf (imagine one made of granite, for instance) can still

Bad vibrations

Vibrations have an effect on the sound of your system. They take two basic forms: airborne vibrations - particularly the sound emanating from your speakers – and mechanical, which include

vibrations created by traffic and footfall. Turntables are overtly affected components, but vibrations can have an influence on other equipment too - particularly through 'sympathetic resonance'.



It's all in the join



1. Materials in shelves and pillars, and the method of joining them, all affect resonance levels.



3. Squidgy feet give some damping of resonances trouble is, we often like resonances!



2. Spikes between equipment and shelf give the bare minimum damping of resonances in both components.



4. Spiked feet pierce carpet and aid stability, but they do transmit vibration through the floor.

resonate as a bulk item - the whole darnn thing moves up and down - if it is supported by a slightly compliant (springy) vertical support. This may be at such a low frequency it hardly matters, but in many racks it's at a few tens of Hz. which is a serious problem if there's a turntable on the top, muddying bass like anything. There's some evidence that CD players can suffer slightly worse jitter when vibrated in this manner, too.

The interface can also have more or less effect in damping resonances within the shelf. Spikes have the least effect, incidentally - if you want to illustrate this, borrow a violin, guitar or ukulele and try plucking a string while pressing it to the fingerboard with the other hand. It rings for longest when held down tightly with a fingernail rather than softly with the ball of the finger.

At the other extreme, squidgy feet made of Sorbothane and similar materials can be guite effective in damping shelf and equipment. Naturally, the positioning of feet/spikes of any kind is quite critical, with placement near (but not quite at) the centre of a panel being typically very effective in damping resonance.

Basically, a lot of equipment supports are based on a false premise. Most equipment is not significantly microphonic and most racks do little to reduce incoming vibration anyway. What they do, to a varying extent, is add some resonance and

coloration to the system, which is not necessarily unpleasant to hear. What they also do, in fairness, is keep the hi-fi neat and tidy in a way general-purpose furniture doesn't, and at a cost mostly in keeping

"Basically, a lot of equipment supports are based on a false oremise.

with any reasonably smart-looking and decently made furniture.

In other words, the majority of hi-fi racks are a perfectly fair purchase judged solely as furniture, and if you like the effect they have on the sound then so much better.

Some do actually offer real isolation. however - the Townshend Seismic Sink concept, for example. In addition, most have some kind of small effect on the mechanical and airborne vibrations reaching the equipment.

All the same, the usual caveat applies, because supports really do have an effect on the sound - if possible, listen (ideally, at home, using your own electronics and speakers) before buying - and certainly don't discount tweaks like replacement equipment feet, which can make a big difference.

> Twelve of our favourite equipment supports and speaker stands are reviewed overleaf

Equipment supports

Atacama Equinox

£300 (4 shelves)

ne of the most striking-looking metal and glass racks around, this modular marvel is triangular for stability and welded for rigidity. Each level is spiked to the one below and the front edge is tastefully curved. The sound, despite a slight residual glassiness, is notably musical and possesses strong bass definition. Dynamics are wide and rhythm and timing are unusually well maintained, making this a great choice for those who like their music loud and lively.



Partington Minim

£420 (4 shelves)

2 01474 709299 # www.partingtonandco.co.uk

Ithough at first sight this is yet another metal and glass rack, it is unusual in offering adjustable positions for the middle shelves. These slide up and down subsidiary support pillars and are simply locked in place with grub screws. That alone will endear it to many, but it's also very smart. While the sound has a degree of coloration to it, the mild added 'speed' this contributes is not at all unpleasant and will be actively welcomed by many, while bass is solid and clear.



Custom Design Icon Signature Acoustic

£600 (4 shelves)

2 0191 262 4646 # www.customdesign.co.uk

his rack is every bit as classy as it looks. The support pillars are solid hardwood, the whole assembly weighs about 33kg and it's as solid as the proverbial. To damp resonances in the glass shelves, Custom Design has provided an 'Acoustic Steel' super-shelf for each, which is most effective placed direct on the glass and held in place with double-sided sticky tape or similar. It's worth the trouble, because this stand has very little sound of its own and is a worthy partner to the finest hi-fi separates.





Clearlight Audio RDC Aspekt

£725 (4 shelves)

2 01635 291357 # www.clearlight-audio.de

DC is 'Resonance Damping Compound', a mixture of materials that is non-resonant but will transmit vibration in a linear fashion. This is used as a filler material in each shelf, occupying a routed-out helix in the base MDF material so as to give greatest effect in damping any would-be resonance. The frame is MDF too, trimmed with wood. Sound is laid-back and relaxed but at the same time full of detail and insight, and the end result is a highly involving musical experience.



Townshend Audio Versatile Seismic Sink Stand

£1,400 (4 shelves)

2 020 8979 2155 @ www.townshendaudio.com

Ithough the detailed implementation of Seismic Sink products has varied over the years, the idea has always been to isolate audio components from low-frequency vibrations in the floor and surroundings. This stand does so elegantly and surprisingly stably, with sonic results that are little short of astonishing. Bass is tighter and deeper, yet still fast and controlled, while the soundstage is broader, deeper and more precise. Adjustable shelves can handle up to 70kg each.



Naim Fraim

£2,105 (base plus 4 shelves)

2 01722 426600 @ www.naim-audio.com

old on a modular basis, this stand can expand to accommodate new kit, thanks to the way each level simply stacks on the last. The price is justified by the complex and very smart construction, with wooden horizontals, large metal uprights, glass shelves and ball-bearing supports. The sound has a very wide dynamic range and lots of sparkling top-end detail, while bass is deep, clean and authoritative. Transients seem slightly softened, avoiding any trace of harshness or glare.



Speaker stands

Atacama Nexus 6

£70 (60cm pair)

2 01455 283251 @ www.atacama-audio.co.uk

delicate-looking stand that is, however, impressively robust and stable in practice, especially when the main column is filled with Atacama's 'Atabites' (£20 extra), Sound is natural and unforced with especially good female vocals, and stereo images extend well beyond the loudspeakers. Bass response is neutral and well detailed, though not as deep as some - but this at least prevents it swamping the mix. A great-value stand for entry-level 'bookshelf' speakers.



Partington Ansa 60

£105 (60cm pair)

2 01474 709299 @ www.partingtonandco.co.uk

nlike Partington's dearer stands, this one is supplied flat-packed. However, once assembled it's still very rigid and stable, its five pillars and profiled top plate combining to minimise resonances. It has very little sonic signature of its own, and as a result sound can seem restrained and laid back, which may not suit all tastes. Bass can sometimes be a little lightweight but notably lacks the 'thump' and colorations of some stands. Overall, unintrusive and therefore musical,



Custom Design RS300

£110 (60cm pair, including filler)

2 0191 262 4646 @ www.customdesign.co.uk

n this update of a classic, Custom Design has used its 'Acoustic Steel' to make a remarkably 'dead' top plate. With the company's own 'Inert' filler in the central column, this stand is thus one of the least prone to ringing we've ever come across at the price. Not surprisingly, the sound benefits by showing great detail and clarity, with complex textures beautifully rendered and layered. Bass can sometimes be very slightly light, but the natural midrange and treble easily compensate.



Kudos S50

£159 (60cm pair)

n its very stable triangular base, this neat but solid stand features a large-diameter single pillar which can be filled if wished. Its performance is characterised by a warm and rich tonality, without the over-projected voice band often contributed by speaker stands. Bass is particularly glorious, with real power and authority, while dynamic range is wide over the full audio bandwidth. Only in terms of presence projection does this stand lag behind the very best; at the price, it's a firm Best Buy.



Partington Dreadnought Broadside

£270 (60cm pair)

2 01474 709299 # www.partingtonandco.co.uk

his impressively chunky stand is robustly constructed with multiple pillars, of which the largest (central) one is fillable. The top and bottom plates are resin-loaded and the whole welded assembly is exceptionally sturdy and non-resonant. As a result, high-quality standmount speakers both large and small achieve great things, especially in the bass department – expect significantly greater extension and control than with weedier stands – while treble is clear and free of confusion.



hne Cableway

£395 (60cm pair, basic)

2 01777 708673 ⊕ www.hne.co.uk

vailable in a multitude of versions to suit specific speaker models, the Cableway is unusual in using non-metallic materials in its construction, notably granite and wood. This makes it both heavy and exceptionally rigid, while also very good-looking. Its performance justifies the price, with awesome dynamic range, sweet and neutral treble and highly transparent midrange. Complex textures are effortlessly separated with just a hint of midbass thickening. A class act.



The science of

Your mains electricity supply could be getting in the way of your music. Find out how, why and what you can do about it

o most people in the more prosperous nations, mains electricity is something one takes completely for granted. You turn on the switch and there it is - 230 volts (or 110 volts, or whatever your local voltage is) of reliable AC power, as much current as you care to draw within the limits of your fuses. It lights lamps, heats heaters and

operates cooking and all manner of other appliances - and kicks your hi-fi into to life instantly and without complaint.

Occasionally, one becomes aware that all is not perfect with the mains. Apart from obvious events like power cuts due to emergencies or labour strikes, many audio components suffer from the odd click and pop due to a fridge or heater switching on

What's happening to your mains supply?

GENERATING STATION

Nice, clean electricity from your friendly local supplier.

NATIONAL GRID

Open air cables can pick up a wealth of radio frequency interference from all kinds of sources.

SUBSTATION

Transformers throughout the system are run close to saturation - distortion occurs as a result.

mains

or off. Clearly, something other than pure 230 volts at 50Hz is coming down the cable to cause such interference. But can you do anything about this?

Generally yes, and what is perhaps more surprising is that even when there is no directly audible interference present, 'treating' the mains with filters of various kinds can have a consistently audible

effect on sound quality. This discovery has, over the last few years, encouraged the growth of a small but thriving industry, supplying specialist versions of mains cables, filters and even regenerators to keen audiophiles.

In fact, the mains is not simply a supply of constant frequency at a constant voltage. For one thing, there are







INDUSTRIAL LOADS

Large electric motors like those used in factory machinery induce more distortion in domestic mains supplies.

TELEMETRY

Systems such as those used for remote meter reading inject high frequency data signals on to the mains.

YOUR HOME

Thermostats and other switches on domestic appliances (e.g. fridges) generate clicks.

GROUND

Can introduce more electrical disturbances that it cures.

three wires - live, neutral and earth and although in theory neutral and earth are at the same potential voltage, this is only an approximation.

In practice, in addition to the desired 50Hz at 230 volts, there exists an infinite spectrum of frequencies between any pair of those two wires. Mains current in theory is symmetrically smooth, but in reality it rarely is, and is prone to distortion from a variety of sources (see diagram, p20-21). And it's not just the low level stuff - it takes little imagination, and can in fact be

"Ironically, the power supplies in equipment are among the worst polluters of the voltage waveform.

easily shown, that the distortion frequencies extend upwards to MHz and GHz Between neutral and earth wires one finds similar signals, of course without the 230 volts, and at a slightly lower level.

CLEAN MAINS DOESN'T LAST

When the mains leaves the generating station, it is pretty clean. Unfortunately, every kind of device attached to it draws a current that is not a perfect sinusoid and which, along with the finite resistance of cables carrying current at every stage of the chain, starts to corrupt the purity of the voltage waveform. The power supplies in most hi-fi equipment are among the worst polluters, ironically. The same causes apply to the voltage between neutral and earth.

In addition, extraneous signals are deliberately added to the mains. Devices from baby alarms to electricity meters use the mains wiring as a handy communications backbone, sending out the high frequency (typically 100kHz or so) signals, which of course travel a lot further than the intended recipient, since there's little to stop them. Add to that the fact that any piece of wire will pick up radio signals from the myriad transmitters, from the signals at 60kHz to mobile phones at 1.8Ghz and beyond, and you'll soon realise that a mains outlet is a potent source of interference. Obviously, all of these noise sources vary depending on how close you live to the generator and to your local substation, local population density, nearby industries and radio masts, and so on. Many of them vary with time of day, too.

Various ways exist of dealing with all this. Noisy switches and thermostats are best dealt with at source (by a qualified electrician), but that's not always possible. In general, some kind of filtering can be



beneficial to an audio mains supply. Capacitors between live, neutral and earth, non-linear 'transient absorbers' of various kinds and inductors in one or more leads can help remove high-frequency noise, and various upmarket cables also claim to help in a similar manner. In all probability (and there's not a great deal of available experimental data on this), noise between live and neutral is less important than between either of those and ground, since shielding and grounding of equipment is never perfect and 'ground' is the most efficient way for interference to enter.

EASILY INFLUENCED

There are further reasons why mains cables and conditioners can affect audio quality. When one looks closely, one finds that a mains transformer, plus the rectifier diodes and capacitors that follow it, make a complicated electrical circuit which is significantly influenced by anything connected to either side of it, including the cable. A surprisingly large amount of interference is generated by a standard 'linear' (in reality it's anything but) power supply, not all of which is filtered out later, and it's not so surprising that altering the characteristics of a mains cable, or adding a filter, can affect this, even if only subtly.

Finally, there are claimed effects such as contact rectification, which allegedly

produces interference due to imperfect conduction at contacts between plugs and sockets, hence the use of such luxuries as rhodium-plated mains plugs. Again, there's not much hard proof around, but a very large amount of anecdotal evidence.

"Many audiophiles are delighted with their expenditure of a hundred pounds or more on a mains cable or a filter."

If you've read this far you may no longer be quite so amazed - if you weren't already a convert to the cause - to hear that many audiophiles are delighted with their expenditure of a hundred pounds or more on a mains cable or a filter.

The benefits may not be immediately obvious, but if you've got a decent system that you are familiar with, it's probable that adding decent mains cables, maybe a filter, and a good quality distribution board will lift its sound noticeably. And note that many brands offer a money-back period if you're not convinced. Do you really need any more reasons to give it a try?

Six of our favourite mains cables, conditioners and distribution blocks are reviewed overleaf

Mains products

Supra LoRAD 1.5

£40 (1m terminated)

vailable terminated, in kit form or simply off the reel, this mains cable has a unique screening mechanism which requires no separate connection. This makes it much easier to use than most screened mains cables. Sonically, it gives a distinct improvement in clarity compared to regular flex, without any discernible change in tonality unless you count a small degree of extra bass extension. An excellent first mains upgrade.



Clearer Audio Silver-line

£150 (1m terminated)

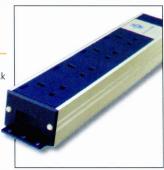
f you like your leads to look impressive, you'll love this mains cable! Its 11 mm diameter is dwarfed by huge Wattgate connectors, while Ferrite rings at both ends, thick silver-plated conductors and Caiq-treated connectors add to the list of features. Sound is dominated by what appears to be a slight lift in the presence region, bringing out female vocals and bright instruments. Rather than a true tonality shift, this seems to be a function of welcome extra midrange detail.



Russ Andrews Silencer Block

£205 (four-way, with 1m Classic PowerKord cable)

vailable also in 6- and 8-way versions, this mains extension block features high quality nickel-plated sockets, a 16A IEC inlet, a grounding post and internally fitted 'Silencer' filter and 'Superclamp' spike suppressor. The result is significantly reduced background 'hash' and a subjectively lower noise floor, which in turn improves resolution of details. Spike noise is reduced significantly and there is also a slight improvement in the extension and quality of bass.



Isotek Mini Sub GII

£545

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his six-outlet mains distribution box features progressive filtering, so that two sockets offer up to 10A, the rest 6A with greater noise suppression. Care has been taken to isolate sockets from each other, too. As a result, there's a remarkable improvement in clarity in almost any equipment connected via the unit, revealing extra layers of sonic information from familiar recordings. It's a great upgrade for any system and an excellent all-round solution to everyday mains problems.



Isotek Titan

£1,495

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his imposing, high-end mains conditioning unit has multiple stages of filtering, spike suppression and overload protection to provide the lowest possible mains impedance, together with low levels of high-frequency noise. It can power a complete system via a 'multi-link' output and will handle vast amounts of power. Sounds are clearer and less coloured, while lower levels of noise aid intelligibility. Stereo image focus is excellent, while bass is extended and controlled.



Nordost Valhalla

£1,750 (2m terminated)

es, that's £1,750! The Valhalla mains cable's hi-tech construction, with multiple conductors woven together with Teflon filaments, is a fitting match to high-end kit. Its contribution to such equipment is stunning, with livelier, more immediate music and much easier access to the nooks and crannies of a good recording. Particularly effective with amps, it's a truly revelatory component — team a set with Nordost's Thor mains distribution box (£1,600) for amazing results.



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Choice Bits is the official HI-FICHOICE accessories shop. We stock a wide range of hi-fi products, including many of those recommended in this supplement. To order any of the products featured below, simply call 0870 240 7228, or visit www.choicebits.co.uk to see our full selection. And if you can't find what you're looking for, just give us a ring - we may well be able to obtain it for you. (Please see p82 of the July issue of HIFICHOICE for our main advertisement.)



Van den Hul The Well Hybrid interconnect cable

Our price: £90 (1m pair)



Chord Co Odyssey 4 bi-wire speaker cable

Our price: £35.95/m (termination £50)



Black Rhodium Polar Concerto DCT interconnect cable

Our price: £225 (1m pair)



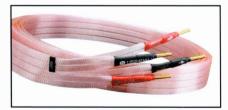
Townshend Audio Isolda DCT speaker cable

Our price: £50/m (termination £100)



QED Qunex SR75 digital interconnect cable

Our price: £50 (1m coaxial)



Nordost Heimdall speaker cable

Our price: £1,175 for 3m pair (terminated)

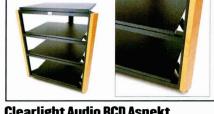






Atacama Equinox equipment support

Our price: £300 (four shelves)



Clearlight Audio RCD Aspekt equipment support

Our price: From £659.95 (four shelves)



Atacama Nexus 6 speaker stands

Our price: £70 (60cm pair)



Partington Dreadnought Broadside speaker stands

Our price: £270 (60cm pair)



Isotek Mini Sub GII mains distribution box

Our price: £545



Nordost Valhalla mains cable

Our price; £1,749.95 (2m terminated)



Subscribe to HIFICHOICE today and receive a FREE 2m pair of Monster Interlink 400 Mkll interconnects worth £55!

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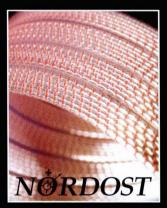
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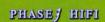
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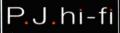
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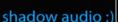
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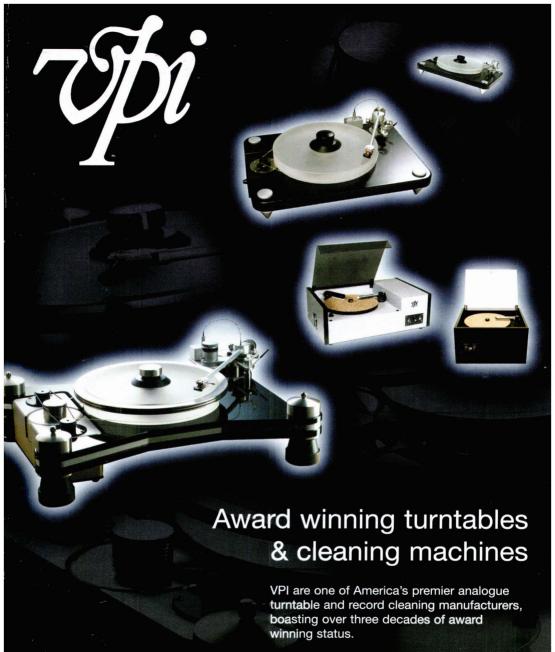
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