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COMPACT DISC - TWEAKING IT TO THE LIMIT  
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BITSTREAM BEGINNINGS: PHILIPS CD850 II  
HARD DISC SERVERS COMPARED  
MARANTZ ST7001 DAB TUNER

### CD PLAYER SUPERTEST:

EASTERN ELECTRIC MINIMAX  
MARANTZ CD70010SE  
CREEK DESTINY CD  
ROTEL RCD-1072

AUDIO ZONE AMP-1 AMPLIFIER  
DIY LOUDSPEAKER PROJECT  
HEATHROW HI-FI SHOW

STAX SR-007 OMEGA II  
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JUNE 2006



10 PAGES OF HI-FI QUERIES ANSWERED \* CLASSIFIED ADS

World Radio History



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# welcome

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Being analogue addicts here on Hi-Fi World, we're often derided as being anti-digital, but this couldn't be further from the truth.

Back in 1982, the world's first digital mass music carrier was launched. Compact Disc was a revelation in many ways, and did much to illustrate what was wrong with the vinyl LP.

Then things progressed, with each new generation of CD players being touted as "even better" than the last, which - as keen

students of logic will find amusing - was initially claimed by Philips to be "perfect" anyway!

Hi-Fi World has never bought into this myth, and we've taken every opportunity to be vociferous critics of digital audio. But this isn't because we hate the format and wish it would go away, it's because we wish it would get better.

Now, as we see on p39, the two glimmers of hope that digital had - namely SACD and DVD-Audio, are beginning to stumble and fall. This isn't because the formats were bad, it was down to general disorganisation, myopia and incompetence on the part of the hardware and software providers...

It's a shame, because I've heard encouraging results from both, especially the former. More's the pity SACD and DVD-A may not benefit from the years of honing and tuning that CD did. This month's group test (p17) shows that you can get a lot out of ye olde 16bit, thanks to many years of repeated tweaking and careful component selection.

Interestingly, the same process can be applied to older CD players - ones selling for next to nothing secondhand, but which were built better than the latest 'awards winners'. On p55, we show how careful substitution of passive componentry in your 'old banger' can yield massive sonic improvements.

Another let down is Digital Radio (DAB), which as anyone with a set of ears on either side of their face will know, is not the provider of 'CD quality' music that its proponents originally claimed. As our in-depth DAB feature on p47 observes, it's a great idea let down by poor attention to detail.

And finally to the best CD player in the world - well, to some peoples' ears at least! Tube Technology's Fusion 64 combines a brilliant, bespoke DAC and digital filter from digital guru Robert Watts with a valve output stage. As our review on p60 says, it's sheer joy to hear. A happy note to end on then; digital comes in all flavours, and I hope this issue helps you find yours!

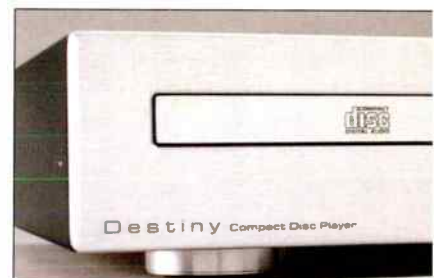
David Price, editor

## verdicts



**OUTSTANDING**  
**EXCELLENT**  
**GOOD**  
**MEDIOCRE**  
**POOR**  
**VALUE**

simply the best  
extremely capable  
worth auditioning  
unremarkable  
seriously flawed  
keenly priced



## testing

Hi-Fi World has its own advanced test laboratory and acoustically treated listening room, and a dedicated team of experienced listeners. We review thoroughly by extensive auditioning, rather than by quick-fire group listening tests. Our engineering team designs a wide range of products in-house. No other hi-fi magazine is so expert and dedicated.



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### Reference Line

The revolutionary construction of MBL speakers is capable of producing three-dimensional sound that reflects the acoustic nature of real instruments. This concept is as simple as it is brilliant.

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MBL 101 Speakers, 9008 Power Amps, 6010 Pre Amp, 1621CD Transport and 1611 DA Converter

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# news

## SIXTH SENSE

Rotel's new 06 Series is "a new chapter in Rotel's long history of bringing audiophile design features and solid engineering to real-world prices", says the company. The 06 Series comprises a CD player, DAB tuner, three integrated amplifiers and a pre/power amplifier combination - all available in a smart silver or black finish. Building on the design and success of the popular 02 Series which it replaces, the 06 Series has been exhaustively revised to include new instrument-grade components, as well as additional features and functionality. It's an international effort,

designed with the collective input of development teams in Japan and the United Kingdom. Parts are selected from all over the world: resistors are sourced from the UK, Germany and America; semi-conductors from Japan and the transformers are manufactured in-house.

The £349 RCD-06 CD player is said to extract huge amounts of detail from a CD. To ensure signal purity, it incorporates four independent power supplies, UK-designed metal film resistors and a new enhanced 24bit/96kHz sampling multi-level DAC. The three integrated amplifiers, RA-06, RA-05 and RA-04 (70W, 50W and 40W - £499, £349, £249 - respectively), are all designed around Rotel's impressive amplifier circuits, powered by "ultra-stable" power supplies, the cores of which are Rotel-manufactured toroidal transformers. Ground paths for signal routing and power supplies are separated and symmetrical, with copper bus bars being used for all high current sections.

The £399 RT-06 DAB tuner offers Digital Radio plus RDS FM and AM analogue wavebands. It features independent signal paths and power supplies for both the digital and analogue sections, therefore maximising all broadcast performances. The RC-06 pre-amplifier is a purist design based on a symmetrical circuit board layout and short signal path routing. The £299 RB-06 power amplifier (70w) is the ideal partner for the RC-06 offering a high performance, high-power combination. For complete flexibility two RB-06's can be bridged for a system powerhouse in excess of 180 watts/channel or bi-amped for the ultimate in refinement. An 06 Series system allows for the RB-06 to be added to any of the 06 Series integrated amplifiers both as an upgrade option or when more control of the loudspeakers is necessary. All 06 Series amplifier systems feature "excellent phono inputs" as well as a front panel Media Player input allowing for quick and easy connection and playback of MP3 and iPod devices. For more information, click on [www.rotel.co.uk](http://www.rotel.co.uk).



## NEW ECLIPSE

The Eclipse TD508II is the Japanese brand's new 'Time Domain' loudspeaker. It follows in the footsteps of the larger Eclipse TD510, replaces the TD508 and delivers "unparalleled clarity and signal accuracy for smaller scale applications", says the company. Musicians like Brian Eno, Randy Brecker and John Williams use Eclipse, and Eclipse are the reference speaker at many studios and at London's Royal Academy of Music. *Hi-Fi World* is also a big fan of the brand, so we await a review with interest. The company claims a 10% improvement in transient/ impulse response, with efficiency increased by 2dB and treble extension is increased up to 20kHz. There's a new spiked energy earth path, a new more efficient magnet structure and new high density zinc internal components to improve dynamics.

Options include the D3II floor stand at £300 per pair, or the CB1 wall/ceiling mounting bracket at £30 each. Eclipse loudspeakers are egg-shaped for a reason, says the manufacturer, as box loudspeaker colour the sound by flapping panels and internal resonances, which the egg shape largely avoids. The Eclipse egg-shaped mineral-loaded resin cabinet, provides the most rigid form known to nature and the internal construction and design inhibits resonances, they claim. A single full-range drive unit is employed in order to maximise time, phase and impulse characteristic. The 10cm driver in the TD508II provides a useable frequency response of 50Hz - 20kHz (-10dB). For more information, click on [www.eclipse-td.com](http://www.eclipse-td.com).





## AURA-SOME

This month sees the launch of a new high-end hi-fi brand – AURACOUSTIC. Designed and manufactured here in England, the loudspeakers are claimed to sound “holographic, due to their amazing imaging”. Available in black spatter finish as standard, they can be custom painted any colour the client desires (Aura 3T in red shown). For more information, contact Auracoustic on 01702 613321 or click on [www.auracoustic.co.uk](http://www.auracoustic.co.uk).

## OFF ON A TANGENT

Tangent has just released its new Hi-fi 100 system, comprising the AMP-100 amplifier, the CDP-100 CD player and the DAB-100 tuner. It is built with aluminium front panels and a rigid cabinet, “which gives an impression of a high quality product even before listening to it”, says Tangent. The products are individually available, but Tangent has made sure that just one remote will control all the units – when selecting CD on the remote, for example, the system will switch on the amplifier and the CD player, then, if selecting tuner, the CD player will switch off and the tuner will switch on. This feature provides easy operation to the user and more efficient power consumption ensuring that no power is wasted whilst a component is idle. For more information, click on [www.richersounds.com](http://www.richersounds.com).



## OPUS DAY

Olive Media Products, Inc. is the company behind OPUS, a high-end CD Player with integrated 400GB hard drive. Designed and custom-built in the USA the OPUS is targeted at the audiophile market. At the heart of its digital-to-analogue conversion section are four Burr-Brown 24bit/192 kHz DACs with 8x oversampling. A separate temperature-compensated crystal oscillator provides the DACs with an ideal clock reference, and virtually eliminates jitter. The OPUS allows users to record, tag and archive CDs with a simple button, using an ultra-quiet hard drive that holds up to 1,100 CDs in lossless quality. Once in the digital domain, users can conveniently access their music and create playlists across their entire collection. For more information, click on [www.olive.us](http://www.olive.us).



## HORN BLOWING

The Transhorn loudspeaker range is claimed to feature “a new type of folded exponential horn” with open siting of the midrange unit in a cone and treble unit in free air; the two mid/bass units in cabinet mounting, one in the transmission line the second in a horn configuration. Essentially, it’s an extended transmission line fed into an expansion chamber and into Active Innovations version of a folded exponential horn with a 4 or 5 way speaker system. The range comprises the Trans / Horn Monitor 1-2s-3s-, to be followed by the 4s and 5s in due course. A frequency response of 20Hz to 25kHz is claimed for the biggest, 5 driver version, with a power handling of 125W into 8 ohms. The Trans / Horn monitor loudspeakers are not available through dealers but direct from Active Innovation on 023 8036 1088.

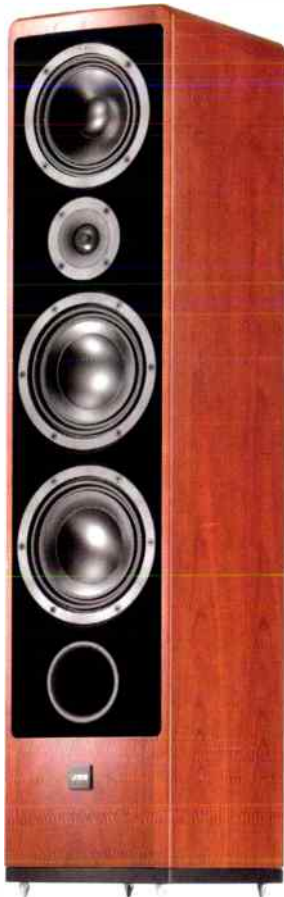
## ROUND AND ROUND

There’s no shortage of iPod speaker systems these days, but IXOS claims its XM1518 is something special. The princely sum of £49.99 buys you a fully functional dock for your iPod. The company claims “great vibrant sound for the kitchen, bedroom, study”, from four 1.25” custom-designed neodymium micro drivers putting out a claimed 8 watts, with an electronic volume control on front panel. It charges the iPod whether it is playing music or not, via the bundled power supply. The dock allows for synchronisation with PC/Mac (via Apple 30 pin iPod cables), and the dock adaptor accommodates iPod Mini, iPod 15/20Gb and iPod 30/40Gb, Nano and 5G Video, plus future Apple dock inserts. There’s also a 3.5mm stereo jack input for use with other audio devices. Finished in white with a Gunmetal Grey centre panel. For more information, call 01844 219 000 or click on [www.ixos.co.uk](http://www.ixos.co.uk).



## ERGO IS...

A new range of Canton Ergo floorstanders from Germany hits the UK this summer, comprising the Ergo 611 DC at £1,600 a pair, the Ergo 609 DC at £1,300 a pair and the Ergo 607 DC at £1,000 a pair. It is claimed to have a fast, dynamic and extremely clean sound thanks to Canton designed and built drive units, a brand new cabinet design, and superb manufacturing quality totally designed and built in Europe. The bespoke driver complement comprises an aluminium-manganese dome tweeter, aluminium midrange driver and black aluminium long-throw woofers. Canton is a £30 million company, the largest manufacturer and best-selling brand of loudspeakers in Germany. For more information, click on [www.canton.de](http://www.canton.de) or call 023 9250 1888.



## NUT JOB

Issued in mid-1968, The Small Faces' 'Ogdens' Nut Gone Flake' was a truly groundbreaking album, not least because it was one of the first 'concept albums' and broke new ground in packaging terms, housed in a lavish foldout circular LP sleeve, inspired by an old tobacco tin. Now Sanctuary pays homage to this seminal album by releasing a new 3-CD Deluxe Edition; featuring the stereo mix, a companion mono version (previously unavailable on CD) plus a further CD of BBC Radio 1's 'Classic Albums' documentary on the making of the band. The album knocked The Beatles off the number one spot, remaining there for five weeks. Across the Atlantic, the album had a similar impact in the US. From the perennial hit single 'Lazy Sunday' to rockers like 'Song Of A Baker' and 'Rollin' Over' and the ambitious instrumental title track, Ogdens' is a masterpiece. The new, special, reissue CD is in the shops now. For more information, see [www.sanctuary.co.uk](http://www.sanctuary.co.uk).



## CORRECTION

Apologies to Ixos for getting the price wrong in our review of the IX1 interconnect in *Hi-Fi World* May 06. We can confirm that the correct price is £200/m (and not £280 as stated), making it even better value for money than we'd already thought. For more information, contact the Path Group PLC on 01844 219000.



## EAR CANDY

Koss announces The Plug, a custom fit stereo earbud said to be "the first of its kind; it delivers accurate acoustical reproduction and unbelievable isolation typically found in more expensive, closed-style stereo-phones for a reasonable price." The Plug

features a dynamic element that is positioned just outside the ear and connected to a tubular port structure inserted on a soft expandable cushion into the ear canal. The soft foam cushion expands for a custom fit to improve isolation and enhance deep bass and treble clarity. Plug features special ear cushions made of hydrophilic, formed urethane, for a custom fit each and every time it is inserted into the listener's ear. For more information, click on [www.koss.com](http://www.koss.com) or call Channel Dynamics on +44 (0) 870 6070540.

## PURE GLASS

Crystal Audio's new T3 loudspeakers are claimed to offer superb value for money at £600 per pair. The most distinctive aspect of the T3s is the original 'free air' tweeter, sitting in its own ultra-rigid, spherical, aluminium enclosure atop the 113cm tall cabinets, the 25mm, silk-dome, Neodymium tweeter can be rotated to face ear axis, making room integration far easier. Lower down the frequency range, the three and a half-way T3s employ 165mm 'Crystal fibre' mid/bass drivers set around a phase plug. These drivers comprise tightly woven fibreglass whose mechanical properties – light yet extremely stiff – deliver a linear and fast response, which the phase plug enhances. The form works with the surround to damp unwanted standing waves, so coloration is reduced to a minimum. The magnetically shielded drivers are backed by heavy duty, powerful magnets, delivering exceptional claimed efficiency levels of 92dB/W/m. Each driver is housed in its own damped and sealed chamber, with the two woofers having smooth airflow ports. The cabinets are heavily braced at critical points to offer as acoustically dead an enclosure as possible. Such extensive strengthening of the cabinet panels maximises the dynamic capability of the designs and makes for a 21kg weight. For more information, call Crystal Audio Ltd. on 01892 870913 or click on [www.crystalaudiovideo.com](http://www.crystalaudiovideo.com).



## SPOTTED:

*Hi-Fi World's* very own production editor, David Noble, caught 'between medication', pointing at the little green men living on the ceiling of our photographic studio. Nurse, the screens!





# Alien Form

Is this the most amazing loudspeaker yet made? Noel Keywood gets acquainted with mbl's out-of-this-world 101E Radialstrahler...



**H**aving spent hours looking at some of the most ornately engineered and lavishly finished hi-fi, much of it gold plated, at a Berlin hi-fi show, I felt like Blunter, stuffed to the eyeballs and ready to take a break from excess. Then my eyes alighted on the most amazing loudspeakers I had ever seen; other-worldly and reminiscent of the plants in Alien. Inspecting another German engineering extravaganza seemed like a cream cake too far though - and I was keen to see the Brandenburg Gate and Unter Den Linden again, this time without a wall passing through it, so I carried no longer. The alien loudspeakers were left behind. I felt sure I would encounter them again, somewhere, sometime...

I did, recently, at the Manchester Show 2006, more than ten years later. I believe German mbl's astonishing Radialstrahler (radial emitter) loudspeakers have been around for a long time, but not in the UK where, I was told by an importer recently, German brands have little success. Now they have a dedicated import agent, Sound Venture, who demo'd them for the first time at Manchester, driven by a pair of the largest power amplifiers I have ever seen. Going very loud and sounding mightily impressive, I had to learn more about this alien form; after some determined haggling we managed to persuade the importers to send us their top model, the £28,000 (per pair of course!) model 101E, which is what you see here.

The 101E doesn't look so big in the flesh, but each one comes in a wooden crate that measures 5ft square and is meant to be handled by a fork lift. Once unbolted from the packing and manhandled out, a 101E stands 125cm high (4ft 1in approx) is 46cm wide and 50cm deep. The lower bass cabinet is the heavy bit though. This is the large, floorstanding silver cabinet; it has a 12in cone drive unit inside, venting out through two front firing ports (which are not reflex ports).



The prominent feature of this loudspeaker is its shiny, spherical "lower mid driver", as mbl call it – the bit that looks like an alien pod. How does it work, everyone wants to know? Think of it as a pulsating sphere. Our diagram shows that the sphere is comprised of many curved, flexible aluminium sections, or lamella, fixed at the top and driven upward from below by a normal loudspeaker motor. By this I mean a voice coil working within a magnetic field. As it moves up and down in sympathy with the music signal, it forces the lamella to flex in and out, so generating sound.

Mad idea? Funnily no. This is an idea with a history. Many tortured souls have lain in bed thinking about how they could make such a thing, whilst others all around them were having a whole range of other thoughts, best not covered here. Only mbl took the dream further; now we know why Sigmund Freud found work in Berlin!

Whilst others managed to come up with the dual concentric drive unit, and the Quail ESL-63, both of which supposedly produce a hemispherical wave front, only Wolfgang Mletzky at mbl went so far as to make an actual sphere – a literal interpretation of an illustrative notion. At least I think he was the only one. There was talk that Peter Walker of Quad was experimenting with a pulsating sphere mounted high in the corner of a room, but it never saw the light of day. Not surprising either, because it is one thing to dream about pulsating spheres, quite another to make them. After five minutes or so, considering the latter, most people would decide it was time to take the dog for a walk.

Obviously, the structure of the drive unit is quite different from the usual cone. It doesn't have the focusing effect of a cone, nor its break up modes, nor its irregular polar response. A pulsating sphere doesn't have a front and back, it gives the same results wherever you stand, being symmetrical about a vertical axis. As a result, it sounds the same all-round, and measures it too. As far as I am aware, this is unique.

Quite apart from getting aluminium lamella to behave themselves, and not go ping-pong around the room at the first loud passage, decapitating the cat, there are other more subtle difficulties. All the sound being generated outside the sphere is also being generated inside by walls facing each other, setting up some complex internal wave patterns I imagine.

In that pulsing sphere model, one

sphere does the job. Mbl use three, losing the benefit of a single point source – a notion the single pulsating sphere is meant to illustrate. Because there are three spheres, the radiating centres are not coaxial as they are, in any, a Tannoy Dual Concentric drive unit, or a KEF Uni-Q.

Does it matter? Not necessarily. All loudspeakers have drawbacks and no one can even agree on whether

"we ended up with a beautifully open sound stage, across which instruments and singers were convincingly placed...."

an omnidirectional loudspeaker like the mbl is a better option than one that focuses sound at the listener, keeping it away from side walls, like horns and vertical line arrays, for example. They provide different experiences and it's just about impossible to say which is correct or best. Generalising, I would say directed sound is a more intense experience, but you must be in one spot to best appreciate it.

An omni provides a more open, natural and accessible presentation of music. Because it fires sound in all directions, listeners get the direct sound, plus a lot of reflected sound from walls and ceiling. This gives an open, spacious air to music, with what seems like a wide open sound stage with a great feeling of depth to it. However, critics note that sound stage images are commonly more diffuse and what passes for stage depth is a fairly shallow illusion. It isn't easy to place images precisely; they have ethereal position perhaps, but not earthly location. So there are benefits and drawbacks.

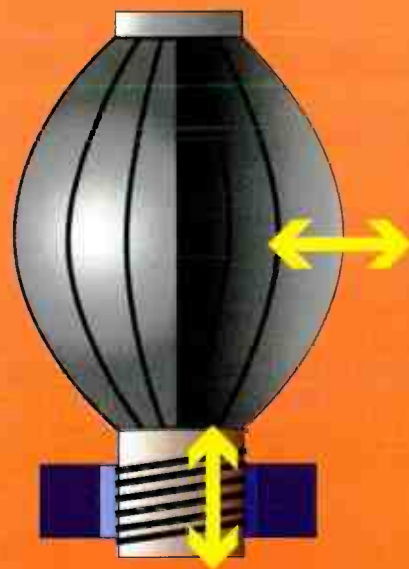
The engineering in this loudspeaker is nothing other than impressive. It's obviously a labour of love, one that has occupied mbl for over twenty years to date. They say the top tweeter "is built of 24 segments using unidirectional carbon fiber. We coated their surface with a thin anti-resonance film. To close the power loop between magnet, voice coil and pulsator group, we use a solid one-piece carbon fiber block. In combination with its pure 4N copper wiring, the performance of the Radialstrahler tweeter is outstandingly good".

Then there's the midrange unit: "a group of crosswired carbon fiber segments was the perfect design. These segments were carefully damped by a special rubber material

applied on the inside, and also with an anti-resonance coating used on the outside. To close the power loop, we connected the solid AlMg bearing with 4 super-refined steel rods with a magnet. The bearing is single side-coated with a heavy tin plate to remove resonance. To get maximum "speed", we don't use a spider for centering the voice coil.

In the lower midrange unit, the

lamellae produce the least coloration when made of an aluminium/magnesium alloy. But that's not all. To have the woofer sound nothing but neutral, we had to coat the inside of the lamellae with special material to get a sandwich construction, take acoustic measures with each segment, and interconnect the strips with special Y-shaped, die-pressed beads of Subronyl!



**A conventional loudspeaker motor, comprising voice coil and magnet, works vertically, forcing the lamella to expand in and out, radiating sound all-round.**

In the sub-bass chamber lies a large 12in woofer, loaded by a sealed rear chamber. This is a bandpass enclosure, designed to cut off below 20Hz, in order to improve power handling. Mbl quote the woofer as working from 24Hz-105Hz, the lower mid from 105Hz-600Hz, the midrange from 600-3.5kHz and the tweeter from 3.5kHz upward.

The rear panel carries an unusual adjustment panel. The tweeter can



be set to 'Smooth', 'Natural' or 'Fast'; the midrange to 'Natural' or 'Rich' and the lower midrange to 'Smooth' or 'Attack'. Mbl say these settings don't affect the electrical behaviour of the crossover at all, and measurement confirmed this: there was no measurable change in the loudspeaker's performance. Only material properties in the crossover (i.e. wire type) change. I found differences more than subtle compared with much else and was happy to leave these set as mbl prefer, to 'Natural', 'Natural' and 'Smooth'.



**The tweeter and midrange assemblies, with voice coils visible at top.**

As you might hope and expect, the 101Es were revealing of partnering equipment and sensitive to it. We got best results with a Chord DAC64 and transport, and an Eastern Electric M520 'valve' CD player as sources. It's best not to partner the speakers with a bright player, nor one lacking depth and body within its sound, as the 101Es can easily be tipped into sounding bright and a little lifeless with poor equipment.

We tried a wide range of amplifiers, including valves, but none worked well. Sound Venture were happier for us to use two mbl 9008As monoblocked as they would certainly answer the problem. These 60kg monsters were used as monoblocks initially, then as stereos after the mbl preamp decided it had had enough of life, more of which later...

Hooked up to the 9008As, the Radialstrahlers sprang to life. Suddenly, instead of sounding slightly restrained, if pleasant, they developed powerfully controlled low frequency dynamics, and real speed of delivery too. The sub-bass unit knitted into lower midrange, the two working as a subjective whole instead of sounding divorced. The 101Es certainly suit the 9008 power amps, although whilst monoblocks are more grippy, one unit working in stereo seemed perfectly adequate I

found later. However, although we ran bi-wired, bi-amping would be a good idea, I suspect.

Mbl provide specific instructions about placement which we met, the loudspeakers being 2.5m apart and 0.8m from rear wall in our set up, listening being at 4m in a 9m square room. These instructions are a bit too specific I feel though; omni-directional loudspeakers work well in most rooms, I have found. Certainly, we ended up with a beautifully open sound stage, across which instruments and singers were convincingly placed. The sense of spaciousness to a performance was wonderful, especially with performances associated with a large space. With Beethoven's 'Missa Solemnis' the choir had an ethereal presence, hovering majestically between the loudspeakers, accompanied by the occasional mournful beat of a drum. A long echo faded away into the distance from the solo vocalist, free to die gently, unhindered by the room's boundaries, or so it seemed.

Vocals were sparklingly clear and well detailed presentationally too, so it was possible to get a very explicit picture, if one that seemingly didn't quite mine the very lowest layers of information, like the ambient signature of the environment. But then omnis don't by their nature peer quite so far into a performance as a conventional loudspeaker, and certainly a horn. They don't hold up an audio magnifying glass to a recording so much as present it beautifully on a wide, open stage, populated by rounded, stable and believable images in the case of the 101Es. As omnis they work wonderfully, because this a method of presentation can give a vague sound when not done properly.

Part of the cleanness of their sound and lightness of touch comes from the fact that the lamella are aluminium, and I did on occasion detect the characteristic qualities of aluminium, with just a slightly over-exaggerated sheen to give a useful boost to apparent clarity. However, this isn't the only reason. Another is that the 101Es spherical drive units don't radiate through a horn, like the dustcap of a standard bass/midrange unit for example. As a direct result the slight cupiness we are so used to from most conventional drivers - electrostatics excluded - doesn't exist. Omnis I have heard in the past have used cone units; only the Radialstrahler uses a drive unit that's intrinsically omnidirectional and this contributed strongly to its wide open sound.

Talking about the sound stage

though, brings me to a peculiarly fortuitous event, although mbl won't think so! Along with the power amplifiers we received a 5011 preamplifier. It was dutifully hooked up with the power amplifiers and this all-mbl system is what we intended to review. There was a brittleness to its clarity that reminded of solid-state amplifiers of yore, however, an edginess that if impressive, wasn't real. Asking myself if singers ever sounded quite this edgy in real life, I had to answer "no".

Then after a few weeks the preamplifier decided to bale out. Next to it sat our (valve) Quad QC twenty four, which we connected up using phono cables. This meant using the power amps in normal dual-channel mode, as bridged (monoblock) mode is only possible through the XLR inputs. Connecting up and switching on I span a disc and walked away. My attention was drawn back immediately to the



change in sound. The system had not only lost its brittle edginess, but more engagingly it had developed an organic subtlety that came across as altogether more real and less electronic. In particular there was a sense that singers and instruments had developed more of a living, breathing presence as dynamic contrasts were better supported and resolved, where before a sense of flatness had seemingly drawn the life from performers. It was a subtle difference yet at the same time a dramatic one. Whilst mbl may not be happy their preamp failed, I was, as it showed me just how good the 101Es and 9008 power amps could sound.

But let's get back to the music. As you'd hope and expect, the 101Es have a wonderfully open and airy presentation, yet at the same time



## THE EDITOR SAYS:

They often say that listening to Quad electrostatics can be a depressing experience - if you have to go back to a box loudspeaker, that is. True enough, but listening to these amazing objects does much the same to my regular home reference, the Quad 989 electrostatics. Now, this is perhaps to be expected, as the mb1s cost over four times as much as the Quads, so my point is an intellectual one, as opposed to a remark on the Quads. The thing is, moving from an excellent panel electrostatic to the mb1s makes you realise just what the former is doing wrong. The Quad suddenly sounds positively constrained and closed in, not to mention slow (in transient attack) and tonally congested (as if the listener is wearing a woollen balaclava). Now, normally it's the Quads which do this (to almost every other loudspeaker on the market), so to find the mb1s giving the Quad a dose of its own medicine is interesting, to say the least...

Are they the best loudspeakers in the world? Well, here you're into problematic territory. I have to say that in some respects, yes they are. Their ability to project instruments into space is - as you might imagine - utterly remarkable. So much so that I'm afraid it makes you realise how woefully inadequate conventional box loudspeakers are (think of the difference between dial-up and fast broadband modems, so profound is it). The music just floats in your listening room, just like it does in a concert hall; there's little else to say in this respect - it is eerily lifelike and frankly a shameful indictment of what you and I have to put up with, when listening to our wooden boxes everyday.

Tonally, these are truly special too; they're not quite as varied in their tonal palette as my reference Yamaha NS1000Ms, and as NK says they have a slight aluminium patina, but don't think for a second that they're 'clangy'; they're not. It's just that no drive unit of any description is totally uncoloured, and the mb1s are no exception. These loudspeakers are still very neutral; they let you hear into a recording with tremendous, virtually unparalleled ease. Cellos are deep and breathy, brass is light and sonorous. Whatever you put into them, comes out with bell-like clarity.

I was amazed how well the frequency extremes integrate with one another; they are truly wideband loudspeakers that go all the way up, and all the way down again, without any unwanted lumps or bumps along the way. In truth, there's a tiny, subtle sense of things changing shape slightly in the low bass, but almost all of the frequency range is as smooth as the imaging is unconstrained. Even the treble is a wonderfully delicate and finessed affair, as spacious as the midband, which is really saying something.

The upshot of this speaker's brilliant technical accomplishment is a brilliantly technically accomplished performance, strangely enough! Sit back and be amazed as these transducers scythe through the mix like nothing you've ever heard before at any price, bar none. It's quite shocking in some ways; if you ever had 'fear of music', these are the boxes to communicate its massive emotional power and poignancy. Would I have them? Yes and no; if I had a perfect house, perfect music collection and perfect ancillaries, I might feel I had a fighting chance of getting the best from them. Back on Planet Earth, however, I find myself craving something with a little more 'character', something that's not so amazingly open, even and revealing, something that's a touch more coloured (in a warmly satisfying way), more dynamically impactful at lower levels and better able to engage me rhythmically, no matter how bad the recording is. That's just me, and at around £30,000 you should jolly well buy what's 'you' - and many will find the mb1s their ultimate, dream loudspeaker - literally out of this world. DP

firm imaging. The 9008 power amps brought a sense of body to vocals, lifting them nicely from the mix. Guitar strings sounded light yet beautifully vibrant and well separated at the strummed start of Santana's 'Put Your Lights On'. The sinuous path of Santana's lead was clearly evident in the background as it slowly worked its way into the rhythmic fabric of the piece. All this the 101s made deliciously apparent - and it was a sound I felt I could walk

around.

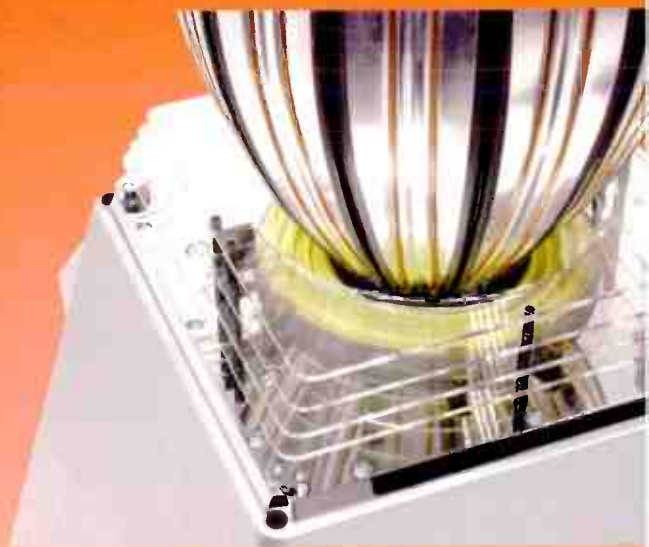
That the 101Es are fast and able to keep a nice grip on rhythmic progression was made obvious with 'Smooth', also from the 'Supernatural' album. Here, a little sheen was generally evident, there was some small spitch with vocals - a small amount of sibilance on occasion - and a lightness of timbre was apparent.

In 'Goodbye My Lover', James Blunt's voice was similarly a little light of timbre, as if some energy had

been lost from lower frequencies; there was no chestiness. His stark but strong delivery also revealed just the smallest amount of metallic zing from the 101E's aluminium lamella, followed by a little hollow sounding colouration. I would expect this, as they must produce a lot of internal energy and, I was told, possess no internal sound absorption. However, few loudspeakers are going to handle this track perfectly; there will always be something not quite right as the perfect loudspeaker has not been invented.

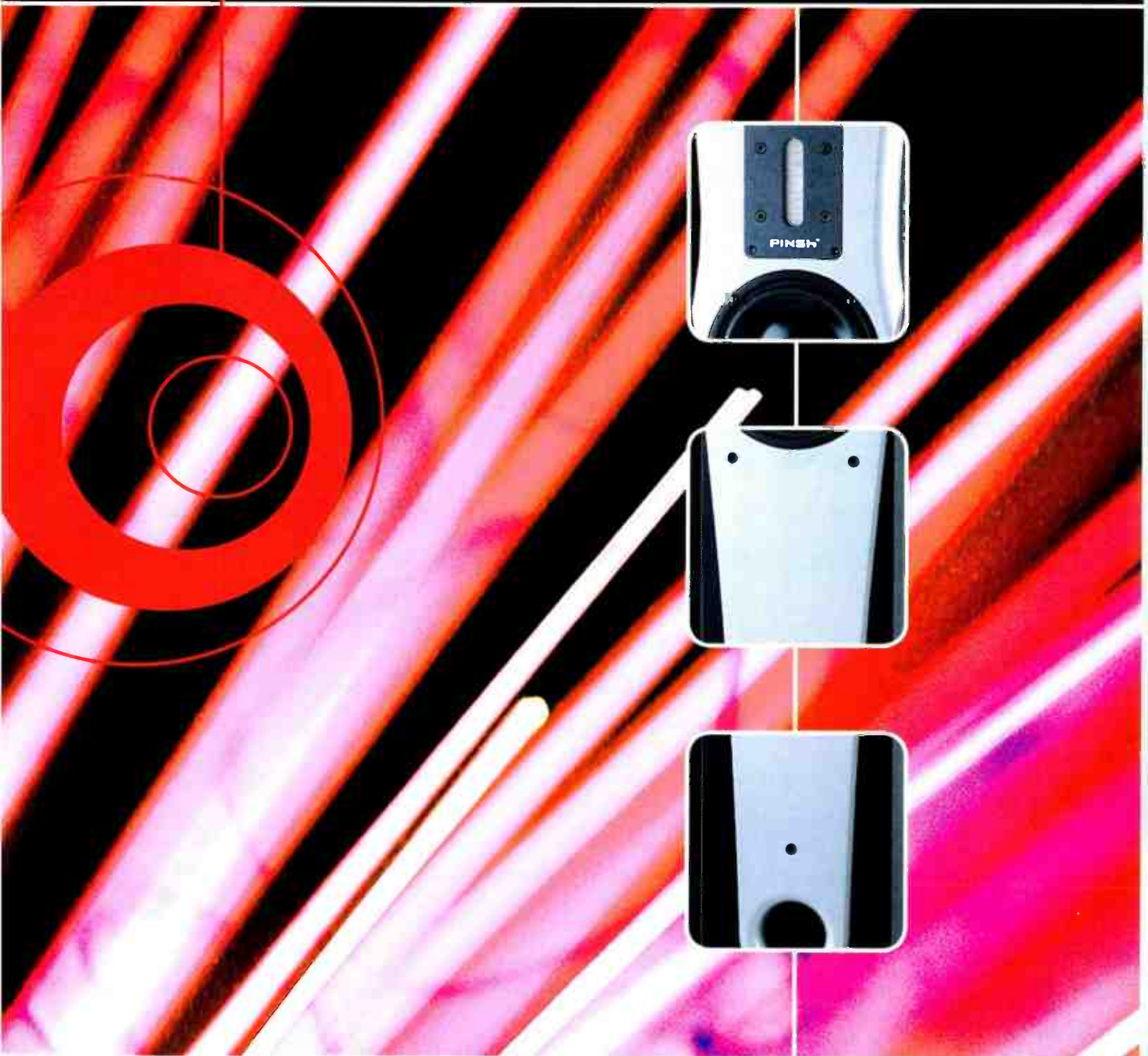
What I am cataloguing here is the 101Es character, rather than anything I found particularly inaccurate subjectively, or annoying. Certainly, the spherical radiators have a set of properties that are unique to them and their construction, but their openness was a delight and I was little distracted by these minor traits. Because the lower midrange unit doesn't have a cabinet behind it, unlike conventional loudspeakers, you do not get the warm thrum behind vocals that we are so used to hearing and which adds artificial body.

At the Manchester Show the 101Es were playing in a large room to a sizeable audience at high volume, yet they sounded unstrained. I didn't





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get more than 50W into them when really trying and ran them at 5W or so most of the time, but they are able to take a lot of power and deliver it as sound (rather than heat).

With Holst's 'Planets', kettle drum firmly underpinned 'Mars', producing a satisfyingly majestic feel to this opening sequence. Violins were vivid and clear in 'Venus', their gentle flow nicely conveyed. Solo horn struck out with convincing body and a full, rich sound. Always I was aware of what seemed like a large, three dimensional presentation, a graphic description of an orchestra. The mbl 101Es were, in this area, obviously different, unique and undeniably impressive. This is a loudspeaker you'd certainly want everyone to hear as well as see, its sound is so expansive.

The higher drive units brought a delightful tinkle to orchestral bells in 'Mercury, Winged Messenger'. The 101Es not only sound crisp and fast, they have subjectively extended highs that bring delightful sonority to metallic percussion instruments.

Violins were well separated, one from the other, precisely positioned and sufficiently smooth to be convincing. I could not detect any coarseness in these loudspeakers: yes they do sound a little over vivid at times, massed strings had sheen, yet they also danced energetically in 'Jupiter', falling silent then starting suddenly with a fleet foot. The ending of this piece had bassoons sounding rich and fruity, before a kettle drum brought the sequence to a close with a convincing display of power. The loudspeakers sound marvellous with a large orchestra.

The 101Es were revealing of production balances. Whilst Phil Collins' 'Do You Remember?' was pacy and crisp, the bass line showing real low grunt. Collins sounding clear, if a little light of timbre again. Spinning Steve Winwood's 'Don't You Know What the Night Can Do?' revealed an expansive sound stage, underpinned by a rumbling deep bass line and some hard hitting percussive strikes

from the drum kit. The sustained chords from his signatory Hammond B3 in 'One More Morning' were nicely conveyed, the strength and range of his voice made very obvious. Lord Alge's complex arrangements were well sorted: on 'Shining Song' backing vocals never bumped into the Memphis horns, for example.

The 101Es have deep bass, and it's powerful too. This became apparent with the emphasised walking bass lines behind Angelique Kidjo; 'The Sound of the Drums' had the settee physically trembling beneath me, a feat only Yorkminsters have managed to date, as this takes more acoustic power at very low frequencies than most cabinets of domestically acceptable proportions can muster. 'Wombo Lombo' had the air in the room seemingly stop in response to particularly deep downward sweep of bass; the 101Es go very low. Percussion was ringingly clear and backing vocals richly layered but well separated.

Gabrielle's smooth, rich tones lost some of their usual smokiness perhaps, partially due to absence of cabinet colouration. The upside was a stronger sense of insight into the recording: it allowed the 101Es to throw light into complex arrangements, helping clarify them.

Loudspeakers come in all shapes and sizes, but few look as radical as mbl's 101E Radialstrahlers. Few are as radical in construction too, or as unique. In spite of this mbl have brought this loudspeaker to a

state where it truly offers a unique experience. At the price I cannot talk about value. If you have the money the 101Es are a serious proposition in real hi-fi terms. They can construct an open sound stage quite unlike any other loudspeaker I have ever encountered, and certainly better than all other omnis. Combine this with their extraordinary appearance and you have a package that, if you can afford it, offers an audio experience quite unlike any other.

Amongst all the glam and glitter at that Berlin show these loudspeakers were undoubtedly the most amazing exhibits. I'm glad I finally got the opportunity to hear them. Truly, one of the world's most extraordinary loudspeakers.

**VERDICT** ●●●●●

Startlingly technically accomplished, many will judge these the best loudspeakers in the world.

<b>MBL RADIALSTRAHLER</b>	
101E	£28,200
<b>MONO POWER</b>	
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PNE AMP S011	£5,490
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www.mblworld.com	

### MEASURED PERFORMANCE

The frequency response of this loudspeaker was flatter than I anticipated, as novel complicated drive units rarely produce the sort of results we see nowadays from highly developed coars. The upper trio of omnidirectional drivers work smoothly up to 12kHz with little variation, our published response analysis shows. Interestingly, this result was maintained over a large vertical angle; there's no phase interaction between drivers.

The fall off above 12kHz is due to surface wave interference from the tweeter plinth: the mic was on the midrange driver's horizontal axis. Moving it close showed the tweeter does in truth reach 20kHz.

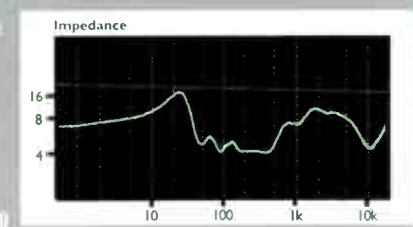
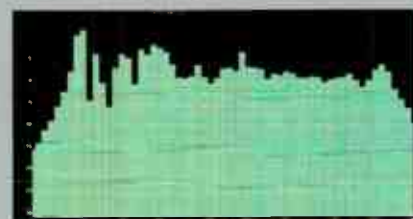
There is a steady rise in level to a peak at 12kHz, which will add a little brightness to the sound. There is another narrow peak at 900Hz, but whether this will be audible is open to question. It may slightly slight colouration.

Output peaks around 180Hz here, but this is a room effect. At a distance it was absent. Similarly, the bottom sub-bass chamber that fills in below 50Hz, had extended output down to 25Hz at a distance, driving the large room well, allowing the 101E to produce very deep bass.

Our impedance curve shows no big

surprises here either. The low-bass unit has a DCR of 7.4ohms and this sets the minimum below 100Hz, the air load adding to it as usual. A minimum of 4ohms is hit, between 50Hz-400Hz, but impedance measures 5ohms over the audio band as a whole: the 4ohm quoted by mbl is a minimum. Sensitivity measured 84dB - low, but not as low as quoted, as this was not under anechoic conditions. A powerful amplifier of 100W or more is preferable.

The 101E is a refined piece of engineering that measures well. In light of its nature and complexity, these results were impressive. NK



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# Stereo Types

**Faced with a declining surround music market, self-confessed multichannel enthusiast Patrick Cleasby gets to grips with the beauty and simplicity of two channel stereo, auditioning four new CD players from Creek, Eastern Electric, Marantz and Rotel...**

**W**hen evaluating the performance of a CD, SACD or DVD-Audio player, it always pays to know the sound you are expecting from a particular disc. We typically view a group test as much like the experience of a potential purchaser going down to his local hi-fi dealer with a shortlist of machines to try. Here we give you the shortlist and tell you how our subjective listening tests work out.

How do we know what that new Morrissey album should really sound like? We know what particular albums, often personal favourites, can sound like in optimal conditions by focussing our attention on them in a variety of expensive, high definition players. I listen to a broad range of musical genres, sometimes on a twenty year old CD, sometimes on one bought this week. This raises issues due to the way CD mastering has evolved over nearly a quarter of a century.

Digital technology allows mastering engineers to wring the maximum perceived volume out of a recording using dynamic range compression. But for an audiophile compressing dynamics means losing just that - dynamics - from the listening experience, and can also introduce artifacts into the sound if carelessly or inexpertly done - digital clipping, pumping and a generally fatiguing sound.

The twenty year old CD of the Jaco Pastorius album sounds just as good (probably better) as the six year old remaster - but it also sounds enormously quieter.

To avoid too much volume resetting, and to keep tests current with respect to the new CDs most people will be feeding to their players, I generally use either recent remasters or recent releases, in order to see how a modern player copes with often overly compressed source material.

My other personal concerns I highlight because some readers may share them. Dual Discs (DVD one side, CD the other) are not that prevalent and are usually a premium cost option. But if you want to hear the new Pink album in 5.1 from the DVD-Video side on your PC and listen to the CD side in your expensive CD player, you need to know if this non-spec "CD" is going to play - or jam your mechanism!

Equally HDCD (discs using High Definition Compatible Digital encoding to extend CD resolution from 16bit to effective 18bit - see [www.hdc.com](http://www.hdc.com)) may not be that common anymore, but if you have an interest in listening to Van Halen I or the Doors back catalogue in higher-than-CD quality, you have that option if you get an HDCD-equipped player. Try it, it really works!

## REFERENCE SYSTEM

Denon DVD-A11 DVD universal player  
Creek Destiny amplifier  
Monitor Audio GR-20 loudspeakers  
Chord Odyssey 4 speaker cables



## CREEK DESTINY CD £1,200



**T**he fact that this is the most expensive player in the group by a good margin is certainly reflected in its build and connectivity - the Destiny CD sports a 'reserved for future use' set of Creek Link network ports, to allow centralised control in installation-type environments, plus both TOSLINK and coaxial digital connections. Intelligent surge protection and power problem detection circuitry is included - and it works, returning the machine to standby after a momentary power blip during my testing.

Once fired up, using the sleek brushed aluminium front panel switchgear supported by a gorgeous 10mm thick aluminium front panel, the standby light goes from amber to green, the simple green display burns attractively and the transport welcomes the first disc. Despite it being of the DVD-ROM type (claiming firmware upgradeability as its *raison d'être*), the musical results that emanate from the player are deeply satisfying.

### SOUND QUALITY

Starting off with the fashionably current, but also deeply old-school new album from David Gilmour 'On An Island', and the opening track 'Castellorizon' is a glorious *tour-de-force* stereo tester, with decaying guitar pings dropping from centre to right. The Creek portrayed this with great gusto and pinpoint accuracy; the orchestral work throughout is recorded beautifully, and the swell before the initial guitar solo was

rendered with emphatic power, while retaining discrete appreciation of the sections of the orchestra. As the solo comes in, the orchestra seems intimately to hug the central image of Gilmour's blazing, rich guitar tone, giving a great sense of a cohesive blend of rock and strings.

Moving to 'On An Island' itself, which features the sublime high vocal harmonies of David Crosby and Graham Nash (which can be very hard indeed for a common-or-garden CD player to convey convincingly), and the Creek almost managed to present separate virtual audio images of the two legends, with none of the sibilant harshness that can result from less able players. This track was also a fine indicator of one of the most distinctive and enjoyable properties of the Creek - its ability to make bass guitar more than just a low-end presence in the room, making it sound like it is actually an instrument being played by a human. A guilty pleasure here, but this property was also demonstrable within the maelstrom that is Def Leppard's 'Let it go' from 'High 'n' Dry', their last album before computerisation began to take over from real playing...

This search for the perfect musical rendition led me to one of the most successful organic recordings ever - Talk Talk's 'The Colour Of Spring' in its 1997 remastered form. I selected 'April 5th' for its multi-layered variophon-inspired complexity and spell-binding dynamics. Here the pulsing percussion sounds that are

sometimes reproduced as sounding tinnily artificial were attractively naturalistic. The most notable finding was realistically played bass. As the song progresses there are a sequence of subtle but building four note progressions which can disappear on inadequate systems, but on the Destiny they were still subtle, but strong, present and correct. The huge bass notes which mark the end of the song did not sound overblown, but tight and in control.

Searching for a more current, electronic piece, I happened across Depeche Mode's 'Precious' single. A somewhat compressed recording, it still has multiple layers of mid-tempo synth rumbling and warbling - and can seem to plod overly in the hands of some players. The Destiny gave impressive energy to the synth bass line and a mighty thump to rhythmic stomp of the track. It is here that a serious solid-state machine has an edge on the valve analogue output stage-equipped Eastern Electric rival, its tighter bass line in the chorus really pushing the song along. The second verse also contains some strong convincers, as the small croaky breakdown in Dave Gahan's voice seems eerily real and present, and Martin Gore's subtly double-tracked backing vocal is cleanly discernible from the lead singer's amidst all the industrial instrumentation. However, the overly compressed modern mastering does leave a slight sense of fatigue after a mere four minutes at my (admittedly quite loud) reference volume.

Another compression test





used, and one in a similar vein is 'The Hand That Feeds' from NIN's 'With Teeth' Dual Disc, and much as with 'Precious' the Creek gives an energetic performance, and once again a stomping kick drum. But the battered hi-hats - which could be a harsh mess - are kept subtle and well in control. It is here that I would throw in the Foo Fighters' 'Best of You' from their 'In Your Honour' Dual Disc, but while the Creek happily took the Universal disc from NIN, it refused the Sony/BMG disc from the Foos. Ah, the joys of DVD-ROM drives and their associated firmware niggles!

This minor bug apart, my main issue with the Destiny is lack of the (for me) essential HDCD functionality. I have hundreds of albums in this format, and am of the strong opinion that where you have a disc with HDCD-encoding it is a crime to play it back without the decoding - such is the sonic potential of a properly decoded High Definition Compatible Digital disc. The Marantz may come close to convincing me otherwise, but the HDCD-equipped Eastern Electric excels enough to support my assertion...

Joni Mitchell's 'Blue' is the tester here, and on the Creek the lack is self evident - from the lacklustre lead vocal on 'River' to the artificial sound of the stringed instrumentation on 'Case Of You', the Destiny is just not as compelling as the Chinese Eastern Electric cracker. Without the aid of HDCD, the Creek was also unable to tame the blaring beast that is The

Flaming Lips 'Race For The Prize'.

Moving on to Soul-Jazz territory, using the first two tracks of Jaco Pastorius' first solo album (remastered edition), the Creek imparts a fantastic sense of space around Don Alias' congas on 'Donna Lee', but regrettably, as the leap into 'Come On, Come Over' is so short that an inter-track click is just discernible among the frantic clavinet and horns bluster of this 'Sam and Dave'-led stormer (we've informed Creek about this small bug and they are investigating; more of which in the next issue, we hope). Herbie Hancock's clav seems almost three dimensional. David Sanborn's alto soloing has a wickedly real tone, and Jaco's bass pattern is the glue which holds the complex musical stew together, just as it should be. As in most of these bass-led musicality demonstrations, this is due to an impeccable way with timing, coupled with a faithful and fully rounded bass tone.

Finally, a brief spin of 'Also Sprach Zarathustra' from the RCA Living Stereo Hybrid SACD demonstrated an attractive panoramic orchestral soundstage

and a creamy trumpet tone, but there was no hope of the Creek matching the huge leap up which the DSD stereo was revealed to me on the Marantz. (This may be an unfair test, but is proof that there is very much a place for two channel SACD players.) The Creek really rocks then, and is a joy to listen to, but here's not where the story ends, because - as you'll discover - it's up against stiff competition...

**VERDICT** ●●●●●

Tremendously powerful, engaging and musically articulate CD spinner, but competition is stiff!

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- FOR**
- styling
  - consummate musicality
  - Creek Link connectivity

- AGAINST**
- no HDCD
  - occasional inter-track click audible
  - Dual Disc incompatibilities

**MEASURED PERFORMANCE**

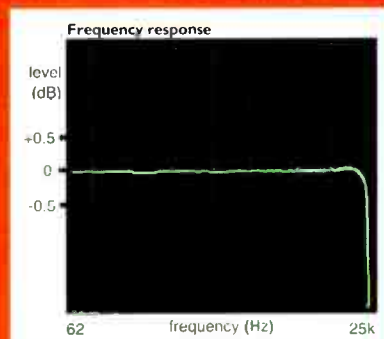
The Destiny has a flat, extended frequency response free from high frequency error. There's a slight hump above 10kHz, enough to ensure this player will sound at least lively; it's unlikely to come across as dull or warm.

Distortion was low at all signal levels, even far down where linearity often goes awry. As a result the EIAJ dynamic range figure was a good, coming in at 112dB.

Noise was low and output right on standard at 2.1V. Channel separation measured a very high 120dB in the midband and 114dB at 20kHz.

In all areas the Destiny turned in fine performance figures under measurement. Coming from Creek, it should give a good account of itself. NK

Separation (1kHz)	120dB
Noise (IEC A)	-112dB
Dynamic range	112dB
Output	2.08V



**Frequency response (-1dB)**  
 CD 4Hz - 21.25kHz

<b>Distortion</b>	<b>CD</b>
0dB	0.0004%
-6dB	0.0007%
-60dB	0.22%
-80dB	4.7%



## EASTERN ELECTRIC MINIMAX CD £879



**T**he virtues of this miracle of Chinese engineering have already been extolled in these pages last month, with CV's findings receiving the backing of editor DP. Well, in an embarrassed confession, I must tell you that due to my never-ending early adopter tendencies this is the first time I have ever engaged with a piece of hi-fi with hot glass bottles in it (other than at our editor's abode)! If this experience has anything to do with it then this time won't be the last, and I may find myself a valve enthusiast...

Like most of the players in this group test, for various reasons (valves, SACD output, HDCD output...) I imagine that it is highly unlikely that these integrated players will be bought with the intention of using them as a transport. The case for the MiniMax's analogue stage is perhaps the strongest, but just in case, it is equipped with coaxial S/PDIF output only. Other than that I won't expound further on the dimensions and accoutrements of this machine, as Channa did all that ably only last month, but I'll echo his sentiment that there's something appealing about the non-standard form factor of the little box. It reminds me of my very first Yamaha CDX-2 from twenty one years ago. If that were still working I wonder what it would sound like alongside this great-sounding mini marvel? [I had one too, and I'd say 'awful', probably – Ed.]

### SOUND QUALITY

Beginning with the David Gilmour disc, the MiniMax immediately demonstrated the characteristic which makes it stand out – a wonderfully mellifluous upper-midband tonality, which although is inevitably coloured somewhat, is far from unpleasant to listen to. Bottle enthusiasts know what to expect, and it is all a question of degree – the MiniMax does not overdo its attempts to 'warm up' the sound of CD, adding just the right (i.e. very slight) amount of sepia tint.

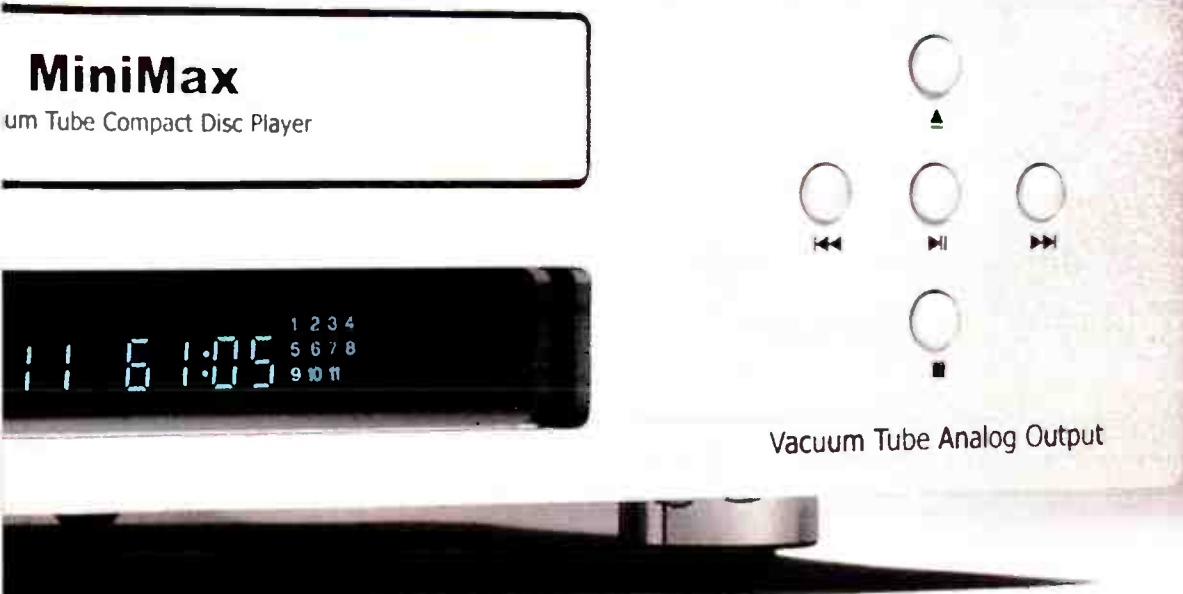
Throughout 'Castellorizon' and the ensuing 'On An Island', the MiniMax passes the demanding soundstage and steering tests, with the tympani in the intro being particularly emphatic. Most impressively, those Crosby/Nash vocals are presented with crystal clarity – high, pure tones, that are so precisely located you feel you could almost put your fingers on them and pick the two of them out individually. It is a close run thing but the MiniMax does manage to best the Creek here. It also equals the Creek in its ability to integrate the beds of strings with the soloing guitar – a fine show considering the price differential. However, although the valve machine does present the mighty bass pulse during the first solo on the title track as an impressively big and deep noise, it doesn't manage the Creek's sense of 'someone playing' tangibility. What it does do during the second guitar solo is pick out some of Andy Newmark's crisp ride cymbal pings in amazingly


rich detail, without making them stand out from the mix too much.

The Talk Talk test is slightly less impressive when compared with the Creek. The MiniMax has the requisite control of the extreme dynamics in the track – the dobro which bursts out of the left speaker can easily overpower and sound harsh, but it is well-managed here. The let down is the importance of the interplay between those groups of low subtle bass notes and the huge climactic bass pulses – they are just not as defined as tautly nor timed as impeccably as they are on the Creek. The ensuing track 'Living In Another World To You' is a vivid musical contrast and in its up-tempo stridency the rhythm section is key, but both kick drum and bass are recessed when compared with the up-front grappling presentation of the Creek.

Depeche Mode's 'Precious' is a revelation, perhaps against expectation. There is no doubt that the MiniMax's slight colouration does mask some of the intricate layered detail in the track, but the overall performance is so enjoyable that this could be overlooked, according to taste. Despite the measurement finding that the top end is slightly tweaked up in this player, both the Depeche Mode and NIN tracks exhibit a deceptively subtle way with hi-hat tonalities, the cymbals swishing along clearly in the mix, without overpowering it. The MiniMax had no trouble with the two Dual Discs used mechanically, but it was less successful





**VERDICT**  £  
A brilliant package at the price; sumptuous sound, great HDCD and build quality all delight.

**EASTERN ELECTRIC**  
**MINIMAX CD** £879  
Shadow Distribution  
☎ +44 (0)1592 744 779  
[www.shadowdistribution.co.uk](http://www.shadowdistribution.co.uk)

- FOR**
- stunning realism
  - design & build
  - HDCD implementation
- AGAINST**
- unfocused bass
  - warm up time!

at turning the heavily compressed Foo Fighters 'The Best Of You' into a bearable listen. But the MiniMax is not totally out of the game with real rock music – managing to get within a whisker of the Creek's Def Leppard capabilities. Once again its one Achilles' Heel is not being able to keep up with the solid state players' abilities with an up-tempo kinetic bassline.

The standout exemplar of the MiniMax's beguiling way with the human voice is also the best demonstration of its stunning HDCD capabilities. Listening to it put Joni Mitchell's voice flawlessly in the centre of the soundstage on 'River' is an unbeatable demonstration of what the art of recording is all about. Her piano also has an incredibly real 'in-the-room' feel to it. Who needs the (probably never to appear) DVD-Audio if HDCD can sound this good? The realism is extended to the strung instruments on the following 'Case of You', but it is the 'River' vocal that is the ultimate proof of this player's wondrous capabilities. The heights of this high female vocal performance can break up and destroy demonstrations on many other players, but here the Eastern Electric is very much in control.

The other HDCD test – the 'tame the Flaming Lips aggressive top-end' test – is more successful than on most of the players here, but is still on the limits of acceptably comfortable listening – more of a problem with the software than the player in my

opinion...

One might expect the valve machine to have the upper hand once we move on to jazz territory, and indeed that low-end sumptuousness imbues Jaco Pastorius' fretless bass with an even more 'woody' tone than it already has, in a not unpleasant way. It also deals with the dynamics impressively – conveying both Jaco's plucked bass harmonics and some of Sam (or Dave's) hugely plosive vocals more reliably than all the other players in the group that are barely hanging in there with these particularly transient events. Much like the Creek, those congas in 'Donna Lec' dart around the soundstage nicely, but in truth despite the attractiveness of the overall picture the MiniMax paints, I prefer the more 'honest' presentations of both Marantz and Creek.

Finally, much as the Marantz's highly capable non-HDCD rendering of the Joni material almost obviates the need for HDCD, the MiniMax's presentation of the Strauss could almost be said to do the same when compared with the Marantz's DSD version

of it, but not quite. For what it costs, this player is no less than brilliant; it's a fantastic 'do-it-all' package that delivers swingeing body blows to all the other machines here in the midband. Still, my own personal penchant for visceral power and punch is better satisfied by others here.

## MEASURED PERFORMANCE

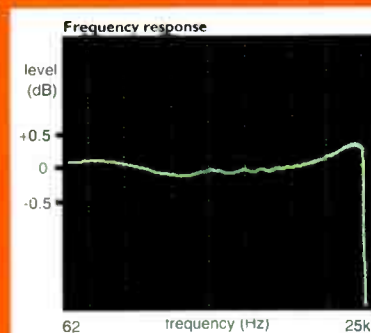
The Minimax has pronounced boost at low and high frequencies, its convolved impulse response shows. At high frequencies the boost amounts to +0.4dB, and at low frequencies +0.2dB - not too great but over a broad band, a sufficiently large increase in energy to be heard.

Distortion levels from the valves were higher than is possible, but as usual predominantly innocuous sounding second harmonic. Our analysis at -30dB, a typical music level, shows this, and also that higher harmonics from the solid-state convertor were around 0.005% as usual.

Noise was inevitably higher than usual, but at -93dB IEC A weighted, still not audible. Dynamic range was low as a result, but output normal at 2V.

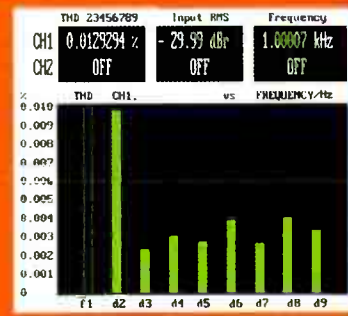
The Minimax doesn't match conventional players under measurement, but differences aren't great. NK

Separation (1kHz)	95dB
Noise (IEC A)	-93dB
Dynamic range	105dB
Output	2.01V



Frequency response (-1dB)  
CD 6Hz - 20.3kHz

<b>Distortion</b>	<b>CD</b>
0dB	0.32%
-6dB	0.16%
-60dB	0.32%
-80dB	7.3%



## MARANTZ SA7001 OSE £430



Once again, here's another machine which almost makes me feel like I have come full circle. The Marantz SA7001 OSE (Original Special Edition) eschews the sleek, low profile styling of many of the more recent Marantz machines. I far prefer its look to that of the other recent Marantz arrival, the 5001. In its slab-like black box appearance (silver also available) the SA7001 almost reminds me of my second CD player - a CD50 of more than fifteen years ago. It is of course more chunky than that, almost matching the heft of the Denon DVD-A11 Universal I sat next to it as an SACD reference.

Impressive as all the silver disc spinners are in this group test, there were only two that delivered reasonably consistent results right across the gamut of genres and recordings used to evaluate them with. The Creek player was the first, but still wasn't quite able to make me want to feed it all my best discs in a *nuit blanche* of listening and dancing about. The Marantz was the other machine that was solidly predictable in its performance, whether it was Bach or Beatles CDs I was spinning. Still, there was something holding me back, but considering it's one third of the cost of the Creek and half the price of the MiniMax I was still extremely impressed...

### SOUND QUALITY

The SA7001's way with David Gilmour and his stereo steering was almost up there with that of the Creek, but it did not manage to make the strings and the guitar gel as well as either the Creek or the MiniMax. Bass notes from the orchestra seemed a tad artificial, showing an element of digital grain rather than faithful purity. Despite this, I really enjoyed the overall performance, and as 'Castellorizon' drifted into 'On An Island' there were numerous positive markers. Bass guitar had a deep satisfying tone, achieving the formidable feat of sounding like a real instrument being played. Meanwhile, the strings floated effortlessly in the mix.

Even more satisfying, David and Graham's vocals exhibited great separation, only bettered by the MiniMax. Perhaps counter-intuitively, given our expectation of 'The Marantz Sound' the hugely dynamic snare and tom hits, and the foregrounding of those ride cymbal pings, all made for an upfront sound, which while being very musical and well-balanced was not as smooth as one might have expected.

The first bonus the Marantz gets from me having selected 'The Colour Of Spring' for testing is that this allows us our first peek at SACD performance. The results do not disappoint - this is a thing of beauty, not a mere simulacrum of it. 'April 5th' just comes across as an exquisite piece of music, not an association of hi-fi

testing trip-me-ups. Vocal presentation is much more discrete and faithful in tone than any other rendition, the savagely dynamic dobro is conveyed beautifully without distortion, the gentle bass notes are blissful and the big bass notes are awesomely firm. Even if you replace the SACD with the remastered CD, these findings, while all being somewhat diminished, do all still apply to a slightly lesser degree, resulting in what is still a thoroughly convincing rendition, up with any other player in this group.

Still, there's something peculiar with certain SACDs. As previously mentioned the Living Stereo Strauss in DSD trounces any CD rendition with gay abandon, but the one SACD I thought would impress beyond compare falls flat on its face. John Hiatt's 'Master Of Disaster' was a straight-to-DSD project, and the idiosyncrasies of his vocal style aside, sounds accordingly clean, wide open and crisp on the DVD-A11. For some reason - and I confess myself mystified - on the SA7001 it sounded flat and boxed in, with little of the crystalline separation of the reference Denon DVD-A11's version.

Anyway, back to CD, and the Marantz immediately bounces back with non-HDCD renditions of HDCD material, which are almost good enough to forgive it its lack of HDCD decoding. The vocal on Joni's 'River' almost matches the MiniMax, but just fails to make those highest of high





notes without beginning to sound strangled. Piano is faithful in tone but less lifelike in presentation, and while the string-driven things on 'Case Of You' are convincing they are not as flawless as they are on the Chinese player.

The Marantz also displays a mastery of the modern compressed disc that is only matched by the Rotel. The Flaming Lips' HDCD is rendered almost listenable, with a faithful vocal timbre. The twin Dual Disc attack reversed the finding with the Creek – here the Foo Fighters was turned into a listenable performance with fantastically fast, aggressive bass enabling the kick and the bass guitar to be clearly distinguished, and a rich, faithful vocal tone in the breakdown. On the other hand, the NIN disc, while it did load eventually, sat on "TOC Reading" for a long time first. When it did play, hi-hats et al. sounded too abrasive. In fact in my notes I wrote that "overall it swings along quite nicely, but it doesn't sound like it means it" (man!). Perversely, the Depeche Mode was conveyed with metronomic efficiency, solid drum patterns and great separation between the vocal parts. I suspect the NIN was affected by a Dual Disc playback issue...

Now once again one might have expected the Marantz to be an expert jazz performer, and this time suspicions are confirmed. Jaco's 'Donna Lee' exhibits a marvellous soundstage and a fluid solo bass. The Marantz once again demonstrates its facility with deep bass

as the low notes before the climax could only be described as "amazing". But it is with 'Come On Come Over' that the groove really starts to cook. Narada Michael Walden's drums are locked in from the start, those dynamic vocals are kept in check and sound true and Sanborn's alto really sings. Jaco's bass part is actually less in the forefront than on other payers, but the horns are simply stunning. The Marantz gives a master class in well-managed timing and fluidity on a very complex performance.

At the price, I loved the Marantz – it is very good – but perhaps it's a victim of its own success, because it tries to mix it with the big boys, and they occasionally give it a slap. Specifically, it's a midband that errs on the clinical, noted at the start with David Gilmour, but just left as an overall impression is over. For this reason, plus the variable SACD performance, I'm docking it its top globe (so near, yet so far). Methinks the forthcoming Ken Ishiwata

Signature component, chassis and transformer modification package (at an additional £170) will remedy these subjective assessment issues.

**VERDICT** £

Clean, refined, detailed sound - and SACD functionality too – makes this a cracking value budget CD spinner.

**MARANTZ SA70010SE** £410

Marantz UK  
 ☎ +44 (0)1753 680868  
 www.marantz.com

- FOR**
- clean sound
  - SACD playback
  - solid build
- AGAINST**
- patchy SACD
  - nothing else at the price!

## MEASURED PERFORMANCE

Marantz CD players usually turn in a fairly conventional set of results and the SA-7001 was no exception. Our convolved impulse response analysis clearly shows there are no significant frequency response deviations, although there is an unusual shelf down in output above 6kHz that, although small, may just affect matters a little, lessening the 'sheen' CD often has. This apart, response measures flat from 2Hz right up to 21.3kHz.

Distortion at all levels was low, although many players manage better at 0dB and just below. However, I don't think this is going to be significant subjectively. At -30dB, a crucial level, the SA-7001 managed 0.0041%, which is up with the best. Lower down it also performed well in this area, with just 1% second harmonic appearing from a time averaged dithered -80dB tone.

Channel separation was high, noise low and EIAJ dynamic range the best achievable at 112dB. Output was on the high side at 2.4V (+1.6dB up).

The SA/001 measures well in all respects. It should sound fine. NK

-6dB	0.003%
-60dB	0.22%
-80dB	2.7%
Separation (1kHz)	113dB
Noise (IEC A)	-115dB
Dynamic range	112dB
Output	2.4V

**Frequency response**

level (dB) vs frequency (Hz)

THD 2.3456789    Input RMS    Frequency

CH1 0.0047382 %    -29.599 dB    0.99598 kHz

CH2 OFF    OFF    OFF

THD CH1 vs FREQUENCY/Hz

**Frequency response (-1dB)**  
 CD    2Hz - 21.3kHz

**Distortion**    CD  
 0dB    0.003%

## ROTEL RCD-1072 £600



**H**ere's an affordable machine from a name with tremendous brand loyalty; Rotel proffers no-nonsense budget audiophile fare and that's what the 1072 delivers in spades. Styling isn't to everyone's tastes – including mine. It shares its silver-edged-with-black appearance with much of the current Rotel component range. This is a comment based on a personal aesthetic sense, but I like my components either one colour or the other, not a combination of both. Actually, the lug-shaped black sides to the RCD-1072's front panel suggest the appearance of a rack-mounted piece of professional kit - which I'm sure some folks will relish. The machine is decently well built, and feels characterful in use – more than you can say for some rival mid-price machines.

I also like the admirably 'old school' remote unit – functional, sits nicely in the hand and everything in a sensible place – isn't that the definition of good ergonomics? My reservations about the front panel switchgear are more of a matter of fashion – in a field where the rarely used programming buttons are more commonly kept on the remote leaving a more minimal look to the front panel, the Rotel's button clutter feels vaguely anachronistic.

### SOUND QUALITY

As with the rest of the group, I commenced auditioning with the David Gilmour disc. It immediately became apparent from the

performance of 'Castellorizon' that the soundstaging capability of the Rotel seemed slightly lacking in comparison with the rest of the group – it just did not have the certainty of placement that the other players exhibited. Similarly the desired integration of the orchestral beds with the soloing guitar was absent, leaving the two instrumental flavours uncomfortably isolated from each other in the stereo mix.

However, once we progressed into 'On An Island' the Rotel gave a very convincing low frequency performance, with lifelike bass and a kick drum with considerable impact to the fore. Here's a machine with a really solid low end, one that those whose systems are a little lacking low down will relish; given its relatively modest price – and the fact that it's likely to be used in such systems – voicing it in this way is the right way to go, I feel.

The Crosby/Nash vocals did not match the clarity and separation achieved by the other players, but those second solo ride cymbal pings were very attractively rendered. The Rotel proved itself adept at representing the Talk Talk experience, with naturalistic percussion and a lovely vocal performance on 'April 5th', but in this instance it was those tricky contrasting bass parts which it did not manage to relay as well as the other players, including the cheaper Marantz.

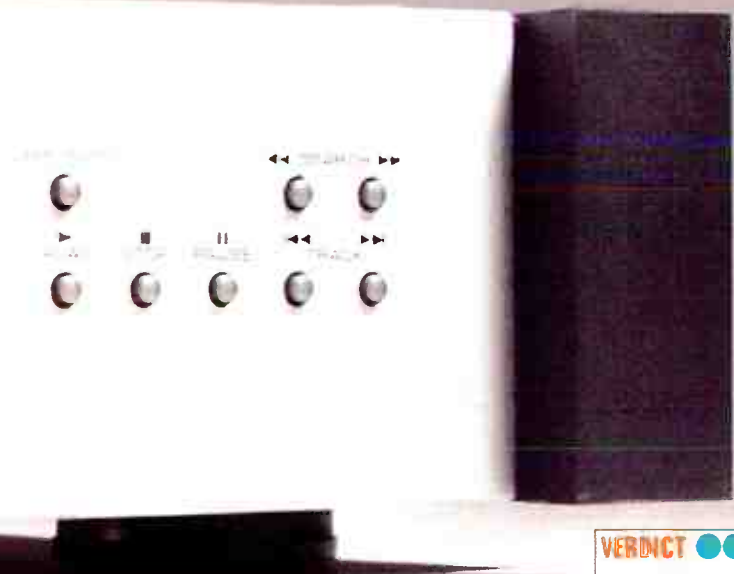
The soft bass part was distinctly lacking in presence, and the big bass notes were slightly too diffuse to have full impact. Allowing the

album to progress on to 'Living In Another World To You' the Rotel demonstrated a truly impressively well-timed performance, but the kick drum was less emphatic than the propulsive approach to this tune supplied by the admittedly more expensive Creek. Similarly, (and truly going from the sublime to the ridiculous), the driving rock of the Def Leppard track didn't quite reach the exciting yet musical heights it managed on the Creek – the top-end roll off alluded to in the technical measurements really does have the result of smoothing off the rough edges from music that really needs it to give the requisite excitement. Still, it was a fine performance at the price.

'Precious' was also the track used to test all the players working solely as digital transports via their digital outputs, using a Chord Pro cable connected to our reference Denon AVC-AISRA AV Amplifier. While the results were generally consistent with the analogue connection findings, with the Marantz supplying an extremely full bass sound, the Creek giving a satisfying all-round performance and the MiniMax excelling with a great vocal rendition, the Rotel disappointed with a slightly abrasive top end, a less compelling midrange and a concomitantly less compelling vocal. This bears out our measured performance findings - the Rotel's own DAC has a top end roll off, by contrast. It should be noted that Rotel do not provide a TOSLINK option.

While the Rotel does have the





(for me) very real benefit of HDCD encoding, it isn't quite in the same class as that of the pricier MiniMax. While Joni's vocal on 'River' does exhibit the same extraordinary clarity as the Chinese machine, the instrumental fidelity on 'Case Of You' is just not as good, showing an element of roughness that the MiniMax was able to transcend. The Rotel was also unable to make a much more decent fist of the Flaming Lips 'Race For The Prize' than the non-HDCD capable players, despite the theoretical advantage that its HDCD capabilities should have given it.

Moving on to the Jaco Pastorius disc the Rotel gave a really enjoyable sense of the performance. True it wasn't up to the Creek at twice the price, but it was engaging, musically lucid and extremely even handed - which I think is the secret to this player. Rotel has voiced it not to offend, but the obverse of this is that it doesn't excite so much either. It's a machine that's perfect for modestly priced systems, where it will allow the ancillaries to give of their best, and won't tax them.

Interestingly, this was borne out by the way it fared with highly compressed programme material, where it really let you into the recording without throwing anything nasty out at you, however poor the sound source originally was. It was up to playing the CD side of the Dual Discs without a problem, and let the submerged bass part in the Foo Fighters' 'Best Of You' be accurately tracked through the song, which is more than some players can

manage. 'The Hand That Feeds' from NIN was given a drier presentation than that of the Creek, with slightly more congestion between the bass pattern and the kick drum, and a more recessed vocal, but it was a not unimpressive rendition of an occasionally difficult track.

Such were the Rotel's capabilities in this area that I threw in some other 'compression nightmare' discs to really test its mettle. Both Morissey's new album and its predecessor suffer in this regard, so a quick spin of 'Irish Blood, English Heart' from the latter resulted in many virtually unlistenable renditions - the Marantz almost getting the point with a direct and discernible bass, but along with a very harsh top end. Of all the players the Rotel turned this into the most listenable version, not unsurprising given that the high-end roll off is smoothing things out. But as with any performance where one feels the hardware is having to wrestle with the limitations of the software, some of the spirit still seems to go missing, even if your ears are not being made to bleed.

It's a very good, amenable machine,

the Rotel. If this sounds like being damned with faint praise, then it's not; the more showy, exuberant machines here would challenge budget ancillaries, and create pain with poor source material. The 1072 by contrast flatters the discs it plays and the amplifier and speakers it feeds. Not everyone's cup of tea, but surprisingly capable as a real-world performer all the same.

**VERDICT** ●●●●●

Amenable sounding real world CD player, but not engaging enough for some tastes.

Rotel RCD-1072 £500  
 Rotel Europe  
 +44 (0)1903 221 763  
 www.europe.rotel.com

- FOR**
- pleasant, fulsome sound
  - HDCD functionality
  - build
- AGAINST**
- styling
  - sometimes unengaging

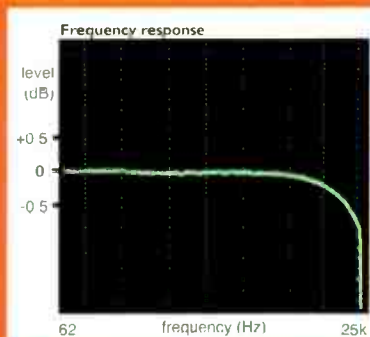
**MEASURED PERFORMANCE**

The Rotel has a pronounced high frequency roll off, our impulse analysis shows. This will ensure the player sounds smooth, free from the treble sheen associated with CD. It can lead to a little dullness if excessive.

The RCD 1072 produced a little more distortion than usual, our analysis at -30dB shows, with harmonics reaching 0.006%. This was most obvious at lower levels, distortion at -60dB measuring 0.02% for example, twice normal. This degraded dynamic range to 105dB. Output was normal at 2.3V and channel separation wide at 118dB.

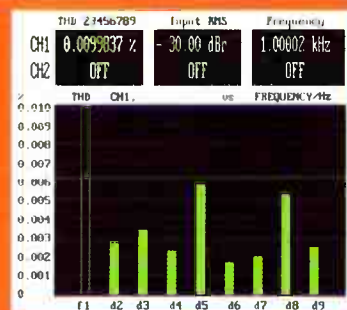
It looks as if the Rotel has been designed to sound smooth. Unfortunately its digital converter doesn't quite match rivals in this group. NK

Separation (1kHz)	118dB
Noise (IEC A)	-93dB
Dynamic range	105dB
Output	2.3V



Frequency response (-1dB)  
 CD 6Hz - 21.12kHz

Distortion	CD
0dB 0.002%	
6dB	0.006%
-60dB	0.01%
-80dB	6%



# Walrus



11 New Quebec St, London W1



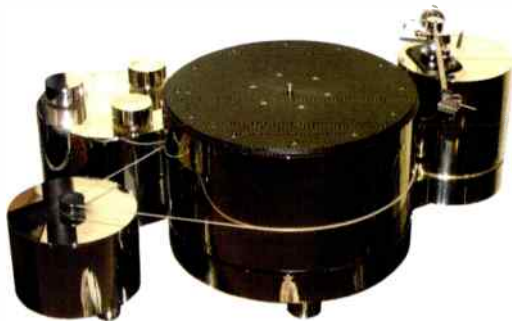
## Shanling

Some of the most stunning products in recent years have come from this small specialist manufacturer, from the flagship limited edition CD-T300 "Omega Drive" at £3999 to the humble but extremely popular (and superb sounding) CD-T80 at only £650. All their products use valves for a natural but exciting sound, and, in this age of "plastic" products, all feature sturdy metallic construction finished to a very high standard irrespective of cost.



## Hørning

The Hørning SAT1 Ultimate Interference turntable, only just available in the UK shows what can be achieved by a dedicated specialist manufacturer when not constrained by price. As well as being highly exclusive (it is only possible to make very small numbers) this turntable is one of the finest we have ever heard, having a neutrality coupled with incredible detail retrieval which has to be heard to be believed.



## A2T

We have the amazing A2T Mezzos on demo now. These beautiful French made compacts (with a studio pedigree) offer wonderful detail levels whilst sounding utterly natural at a price lower than the performance would suggest. These just might be the answer to all your speaker problems!



## Solid Tech

### Radius

It looks like other smart modern stands do, until you realise that virtually concealed between shelves and frame is a cunning and flexible adjustable suspension system which really does isolate individual components from each other, and from the outside world!



## Solid Tech

What we really don't need is another brand of equipment stand! Agreed, unless it's very special as we believe Swedish made Solid Tech to be...

## Solid Tech

### Rack of Silence

The ultimate in equipment isolation. No solid shelves to resonate, and up to three stages of isolation.

A totally modular design which can be expanded as your needs grow. There is no better stand.



The Hørning Sati 300B amplifier (one chassis is the amp, the other the power supply) is equally impressive. Even jaded cynics (like ourselves) will be hugely impressed by the refreshing neutrality (a Hørning trademark) together with the insight available into the performance. We really are very pleased to be able to demonstrate these superb products!



## Funk Firm

The new Funk V (V means Vector, not "five") is a stunning looking and affordable turntable (£750 without arm) that some of us have been waiting eagerly for since the sad demise of the designer's previous company, Pink Tr.!. Looks are striking, performance is stunning, well worth waiting for. Come and hear it now whilst it's still easily available.



## What else is Hot right now?

Stirling Broadcast 3/5a, marginally updated version of the classic BBC monitor  
Tannoy Autograph Mini, a delightful scaled down Autograph, only 14" high!  
Graham Phantom tonearm, proving itself one of the top arms in the world  
Audio Aero's latest CD and SACD players are absolutely stunning  
Bocchino cables, outrageous interconnects from the well known plug manufacturer

We deliver by Citylink 24hr service (subject to stock availability), and internationally by DHL or TNT.  
Major credit/debit cards accepted, even known to take cash on occasions!  
Please visit our website for more info (even if we don't update it often enough!).

a2t  
air tangent  
amazon  
amplifon  
apollo furniture  
argento  
audible illusions  
audio aero  
audio physc  
black rhodium  
bocchino  
breuer dynamic  
brinkmann  
cartridge man  
cawsey  
clearaudio  
consonance  
decca london  
duevel  
dynavector  
ear yoshino  
funk firm  
goldring  
graham (tonearms)  
graham slee  
hadcock  
heart  
heed audio  
hørning  
hyperion  
incognito  
isolda  
jadis  
kr electronics  
kiimo  
koetsu  
lavardin  
lyra  
magneplanar  
mcintosh  
michell engineering  
morch  
musical fidelity  
nordost  
nottingham analogue  
opus 3  
origin live  
ortofon  
pro-ject  
rega (turntables)  
revolver  
ringmat  
roksan  
shun mook  
shanling  
shelter  
sme  
solid tech  
something solid  
sonneteer  
spendor  
stax  
stirling broadcast  
sugden  
sumiko  
tannoy  
tci cables  
tom evans  
townshend audio  
transfiguration  
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Power



HDCD



Volume

## MiniMax

Vacuum Tube Compact Disc Player

11 6:05

1 2 3 4  
5 6 7 8  
9 10 11

**W**ith prices ranging from £430 to £1,200, there's no denying that this test is casting a wide angled lens at the market, and it's all the better for it. Our line up of almost equidistantly priced machines shows four very different designs with contrasting strengths and weaknesses – and these can't be put down to retail prices alone...

Overall, the Rotel comes in fourth place. Considering that it's the second cheapest here, this is no bad show. It's an amenable machine that's universally smooth and sophisticated, no matter what music you feed it. Indeed it's worth remembering that on certain heavily compressed, low-fi programme material, the Rotel was the most forgiving - and therefore the best sounding - here. As ever, you should think about what you listen to before buying; just as a you'd be a fool to buy a Ferrari for supermarket runs, so those with a penchant for heavily produced pop, raucous rock or trad jazz would really appreciate a svelte performer like this. Likewise those with systems with too many rough edges – the Rotel will make the best of them.

Once past the Rotel however, the potential purchaser has a harder three-way decision to make. Budget is obviously a factor, but putting that to one side, it comes down to a simple case of personal requirements and preferences. Much as I love the involving sound of the Creek Destiny I would have to say that personally I find the absence of HDCD decoding a disappointment. That said, for straightforward CD playback it is easily as consistent in its quality across a wide range of material as the remaining two players, and more exciting to listen to than both. It's also definitely the group winner in

the looks stakes. Loudspeakers aside, for roughly £2,300 when partnered with the matching Destiny amp you'd have a gorgeous looking system which - although the Destiny CD player is definitely at its best with contemporary rock/pop material - would meet the challenge of making just about any CD you put into it into a great listening experience. For this reason, and the nascent Creek Link technology, it is not difficult to see the Destiny CD player becoming an installers' favourite – even if you hid the beautiful aluminium-fronted box away, it would still be making wonderful sounds that easily outstrip the CD capabilities of most Universal AV machines at far higher prices.

Like the Creek, the Marantz SA7001 doesn't meet the HDCD criterion, but does make a slightly better fist of concealing that lack. What it does have is SACD capability, and although from a personal perspective once again, most of my SACDs are multichannel and are listened to as such, I can see the merit of stereo-only SACD machines intended for a stereo listening room. For the many high end audiophiles who run a video-less stereo room and a separate surround home theatre, then this is a fine CD playing option, (spectacular for jazz), which also allows for stereo SACD – it's just that that SACD reproduction could be better. For this reason and also because of the ever-so-slightly glacial midrange of the SA7001 OSE, I'd probably go on to either audition the forthcoming SA7001KI Signature, dig deeper into amplifier and speaker matching issues, or consider the Eastern Electric MiniMax CD player. Still, let's not forget the Marantz is half the price of the EE, yet runs it

surprisingly close... It's a redoubtable budget bargain.

Contrary, perhaps, to the expectations of editor DP, I wouldn't declare the Eastern Electric MiniMax CD the out and out winner of this group – it feels more like a three way tie for first – but even so this machine has delightful properties which really make one sit up and take notice. Its appealing sound may not be as neutral as either the more involving Creek or the more clinically precise Marantz, but it simply imbues welcome warmth to the cool sound of Compact Disc, and it was a surprise that the MiniMax could

"the Eastern Electric has delightful properties which really make one sit up and take notice..."

come out with a punchy well-timed rock performance, despite those glowing bottles around the back! However I strongly suspect that its natural constituency is more likely to be the classical listener who will experience a rich, full sound, and for dyed-in-the-wool HDCD freaks this one should be an absolute no-brainer.

This group test shows just how much life there is - if you pardon the expression - in the old dog (CD) yet. It shows there are some great bargains, and most importantly proves how essential it is to spend time making a wide range of comparisons across the various genres you listen to. My views criss-crossed and leap-frogged each other several times during the days spent evaluating these silver disc spinners. This done, you're sure to end up with a great machine - like Punk music, ye olde stereo CD is not dead!

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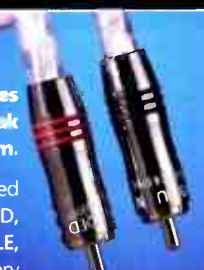
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# Bright work

**Musical Fidelity's arrestingly styled, high end kW DM25 Compact Disc transport and DAC combination is auditioned by Noel Keywood...**

**T**he kW line is designed to complement Musical Fidelity's vast kilowatt amplifiers. As such it's been designed to look the part, with expensive front panels of brushed aluminium. Both the kW DM25 transport and its partnering DAC are 400mm wide (17.3in), the usual maximum for a hi-fi product, as racks are nominally 19in wide. This is more than enough for an expansive fascia and rear panel, large enough to carry a goodly array of controls and the increasingly popular XLR connector, a humongous object that consumes acres of panel space but is ruggedly sensible in a way that petite DIN sockets never will be. The transport uses two XLR panel sockets to output left and right channel balanced digital signals. These are upsampled from CD's 44.1kHz to 96kHz, the latter not being an integer multiple of the former, which is where upsampling differs from oversampling. Musical Fidelity use Crystal's CS8420 chip for this and Crystal say only that the signal is multiplied up to a very high frequency and then divided back down to the desired output rate, in this case 96kHz. Although upsampling will in itself push all unwanted 'digital' images further up in frequency, making filtering easier - the stated aim of the process - it's common to improve amplitude resolution too, in order to give a 'smoother' description of the audio signal.

There are lots of internal subtleties in this processing, including the use of dither to smooth low level transitions in order to lessen distortion. I should point out that you can't add information to the original 16bit signal. The idea is to avoid the use of steep analogue filters, in order to improve time domain (impulse) behaviour and so lessen degradation of the 16bit CD signal when it is processed.

The kW DM25 transport

extracts left from right channel information and sends it via separate AES 3 links, through those chunky XLR sockets situated on the rear panel. There is no independent master clock output; synchronisation within the DM25 DAC is from the incoming data stream. Musical Fidelity provide two short connecting cables. As there is no S/PDIF data output and 96kHz via a balanced AES link is unusual, this transport will work with little else other than the partnering kW DAC.

A remote control unit offers all the usual tricks we've come to expect from CD, including track repeat, A-B repeat, shuffle play and program play. There is no remote digital or analogue - volume control, as this exists on other partnering products. The transport does not read CD text and its displays cannot be dimmed or switched off. As they are back lit liquid crystal types this is likely of little consequence.

As always with Musical Fidelity products the transport is solidly built, weighing 12.3kgs, and very well finished too. The front and side panels look to be machined extrusions. You get a chunky feeling product with a superb satin silver finish on the front panel, contrasting with the black sheen of the casework. The display lights up sky blue and the buttons feel solid.

As always the disc tray is plastic and a little ratty, but these items simply carry the disc in, whereafter it sits on a hub, so the tray provides no support, unlike a turntable platter beneath an LP. The tray is speedy enough, and the transport reads the Table of Contents of a disc within a second or so. Musical Fidelity use their preferred choice regulated power supplies internally, for clean, low noise power feeds to transport and electronics.

The kW DM25 Digital to Analogue Converter (DAC) accepts the transport's unusual 96kHz balanced AES3 digital signal or it will work with a conventional S/PDIF signal, input via electrical (RCA phono socket) or optical (TOS link) connectors. These are







for connection of a CD player. An internal receiver accepts sample rates from 32kHz up to 96kHz. The internal DAC operates at 192kHz sample rate, accepting signals up to 24bit resolution.

Audio outputs are via standard (unbalanced) phono outputs, either Direct (i.e. solid-state) or via a Tube amplifying stage. This seemingly puts the kW DM25 on par with the rash of valve output CD players coming from China at present. Where most use conventional valves however, usually double triodes like ECC83s or 88s in Philips nomenclature, Musical Fidelity prefer the robust and compact NuVistor, a sort of space age valve, miniature and housed in a

"If you want a CD player that is deeply insightful and detailed across the upper frequencies, then this is the one to hear..."

metal can, it was reputedly used in early missiles. With a very long life, said to be ten times that of a conventional triode, the little device should outlast the player.

As our pictures show, the kW DM25 DAC is styled, built and finished just like the transport. It weighs 11.9kgs, is 440mm wide and 440mm deep, taking into account protrusion of the rear XLR plugs and cables. The blue display lights up to

show sample rate and the input to which it is locked.

#### SOUND QUALITY

As always I used this item in many differing systems, over a relatively long period of months. After run-in listening was via a Quad QC-twenty four preamplifier and 11-forty power amplifier driving Sendor S8es and my own, tweaked World Audio Design KLPI preamplifier and 300B

**"A little champ of price/quality ratio:  
available at an affordable price, especially for a  
tube amplifier of more-than-usual power."**

*AUDIO REVIEW Italy, July 2004, Claudio Checchi*

**"PrimaLuna ProLogue One is now my  
'affordable reference amplifier'. With  
apologies to various British and Italian  
geniuses, this amplifier has to my ears-  
no equals at its retail price."**

*HI-FI NEWS and records review, July 2004, Ken Kessler*

**"A refreshing change from the transistor  
competition with a captivating presentation.  
Excellent finish and build quality makes  
for a package strong on value."**

*HI-FI WORLD, August 2004, Dominic Toon*



# PrimaLuna

Music is a pleasure not to be denied. So, too, the beauty of music reproduced by valves should be accessible to all. To make available to a wider audience the seductive, silky sound of the vacuum tube, PrimaLuna has developed a range of all-valve amplifiers with the construction, power and sonic performance of high-end electronics, but with one unique, inimitable feature: prices that can only be described as 'entry level'!

Since the arrival of the Prologue One, the audio community has been unable to contain its joy nor reign in its praise because PrimaLuna has revolutionised the concept of 'affordable audio.' With a pair of integrated amplifiers with prices more typical of mundane, solid-state products, PrimaLuna showed other manufacturers that compromises in fit and finish, styling and facilities are unnecessary.

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And there's more good news: PrimaLuna has also announced retro-fittable auto bias boards for the Prologue 1 and 2, and a moving-magnet phono stage for the Prologues 1, 2 and 3. Additionally, there is now a choice of optional gold or silver front panels in place of the standard finish.

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With James Blunt's 'You're Beautiful' the sharply etched sound of the plucked guitar's strings almost lacerated; here the Musical Fidelity was quite stunning. There was a little less air around Blunt's vocals and the accompanying instrumentation was dynamically more muted upon introduction against what is possible though. This gives the player a svelte air, one that is more about refinement and insight than brutal dynamics.

Blunt's vocals were best displayed in a realistically reverberant location when using the balanced mains supply, but then this is a consistent advantage of benefit of balanced mains, with a brace of suppression capacitors to kill noise and harmonics, I should add.

Musical Fidelity line up the latest chip technologies in this complex player, to bring a sound that is undoubtedly challenging in many areas. If you want a CD player that is deeply insightful and detailed across the upper frequencies then this is the one to hear. It may not quite 'kick ass'; this is no playground bully. Other players need not fear it in this respect. What it does offer is a presentation as sleek as current generation chip sets can manage, one that is not short of refinement, courtesy of all the little extras Musical Fidelity apply.

power amplifier driving both the Spondors and Tannoy Yorkminsters. I additionally used a fully balanced mains supply and an Advance Electronics power conditioner.

At £1,995 apiece, or £3,990 in total, the Musical Fidelity combo falls into a little contested category, lying well below the uniquely impressive Chord transport and DAC combo priced at £7,000, yet above most Japanese valve output CD players, like the lovely Eastern Electric Minimax, reviewed in this issue. However, I did spend an interesting weekend comparing the Musical Fidelity pair to the radical Tube Technology Fusion CD64 CD player, priced at a not too dissimilar £2,200.

In the upsampling players I have heard to date it was their finer resolution of high frequency information that struck me as most significant. Filigree detailing within percussion instruments like bells, cymbals, triangles and the like was more apparent, fine nuances of their decay pattern made more obvious. As a part of this there was also more apparent clarity and generally less grunge at the higher frequencies than we ordinarily accept from CD, with or without knowing it. It was in this area that the kW combo showed it wasn't left wanting in this respect.

Initially I elected to use the 'Tube' output but, feeling there could be more available, I swapped over to the 'Direct' output. Which to prefer is going to be a matter of taste, I feel, in this product. Differences weren't as great as expected, but the Tube stage slightly softens what is undoubtedly a very strong sense of insight this player has at high frequencies. Violins of the Berliner Philharmoniker were strongly lit and very clearly differentiated, one from another, in a nicely balanced recent recording from EMI of Leifove Andnes performing Rachmaninov's popular Piano Concerto 2. The kW combo held up a magnifying glass to strings

and cymbals, peering right in to the physical structure of the instruments I felt at times. Yet there was little of the coarseness traditionally associated with CD; what you do get is vivid detailing and a great sense of precision. This property of the kW units transferred across musical genres; it could mine the finest details and nuances from deep within performances; I loved the upfront breathlessness of Alison Goldfrap's dreamy vocals in her 'Time Out from the World', the slow melody from the synthesiser drifting serenely around my room. Here the Musical Fidelity combination showed just how revealing it could be. In all my weeks with the units they weren't upstaged in this respect, showing an ability to resolve instrumental detail and fine time domain events that was about as good as it gets.

The player's great resolution of higher frequency information was always attention grabbing, this emphasis drawing the ear away from a strong, clean midband that gave vocals a firm presence in the scheme of things, and a satisfyingly deep, clean bottom end delivery that had both drums and plucked bass sounding convincingly forceful, yet not overpowering and quite well outlined. There was a little less dynamic force and resolution down that the lower end of the audio band than the Tube Technology Fusion CD64 and this made the Musical Fidelity a more refined and cerebral experience of the two, if less visceral.

**VERDICT** ●●●●●

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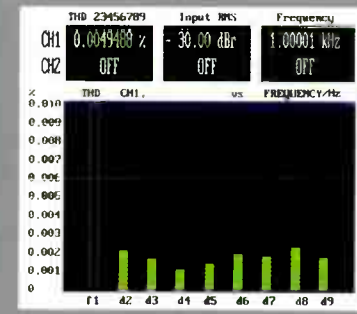
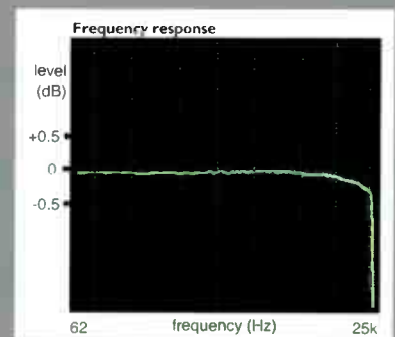
The DM25's direct (solid-state) and valve outputs had an identical frequency response, a gentle roll down at high frequencies being evident in the convolved impulse response. This isn't great, just enough to ensure there's no sting to treble.	-6dB -60dB -80dB	0.0008% 0.21% 2.6%
Separation (1kHz)		122dB
Noise (IEC A)		-121dB
Dynamic range		111dB
Output		2.02V

Both outputs were very close in distortion behaviour too. As is common with valve output stages there was a little more distortion at high signal levels, but it was innocuous sounding second harmonic. At -30dB, a typical music level, distortion measured 0.005% through both outputs. This is a relatively low value, up with the best. Results were good lower down too, so the convertor is linear enough through its operating range.

Channel separation was high, noise low and EIAJ dynamic range high at 111dB, due mainly to low noise and distortion at -60dB. Jitter from the transport measured 20pS, which is very good.

The kW DM25 measures well in all areas, through both outputs. NK

Frequency response (-1dB)	CD	0.0007%
Distortion	CD	0.0007%



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# Silver Machines



**Love it or loathe it, from its early inception in the seventies to a complicated future in the noughties, the digital audio disc has dominated the global audio scene. Here, David Price and Patrick Cleasby trace its past, present and future...**

It is 1975, and Mike Oldfield's 'Tubular Bells' seems to have been top of the album charts for forever and a day. Racks in record stores are bending under the weight of vast quantities of vinyl, and there's a seemingly incessant flow through of buyers snapping up their own personal copy of one of the best selling Virgin Records album release to date.

The Long Playing record is mighty; cassette is still something for journalists taping interviews and families sending recorded messages to their loved ones in Australia – unless you're one of the few devotees of Hiro Nakamichi, that is. Open reel is the serious recording format of choice, and eight track cartridge may be standard fitment in your new Aston Martin or Rolls Royce, but it's failed to set the commercial world alight...

Around this time, the genesis of an idea for a new format was being hatched. It was just this – an embryonic idea – but consumer electronics giants Philips and Sony had begun to think about the replacement for the almighty vinyl LP.

How and what would it be? Well, there was no shortage of fresh ideas – Sony's Elcaset was a glorious failure, and Victor had recently tried and failed to launch an analogue video disc, played (a la LP) by a stylus in a groove, using very high quality,

low noise vinyl formulation, which (trainspotters take note) ended up being the staple for Japanese LP records.

## THE PLAN

Several years passed, and the ideas coalesced into something real. A digital format was decided upon, but it was still the stuff of science fiction for most people – and exceptionally difficult, almost a pipe dream, to productionise. It required a lot of 'blue skies thinking' on the part of the two giant companies able to turn the dream into reality. The new LP replacement was to be, "a very long discussion between Philips and Sony regarding standards," says Marantz's brand ambassador Ken Ishiwata, who at the time had just joined the company that had just become a Philips subsidiary, "the Japanese were thinking of a twelve inch disc like LP, then Philips came up with an eleven centimetre disc (rather than the twelve cm disc of today)... How did it become twelve? Well, it was Beethoven's 'Symphony No. 9' which swung it – we needed the capacity to record it completely."

As for the actual digital format that was to go on the twelve centimetre disc, there was little room for manoeuvre. Direct Stream Digital and/or compressed formats hadn't got beyond the drawing board, because the processing

power needed to facilitate them simply wasn't there. No, Pulse Code Modulation that was the only game in town. Ken Ishiwata adds, "the only possibility they had was PCM, no other technology was realistic enough to become a standard. The only question was what sampling frequency and number of bits to use – in other words, what frequency response and dynamic range?"

He continues, "Based on the analogue LP record, it seemed that 20-16,000Hz as the frequency response and 58dB dynamic range was the start point. But we wanted to make this a mass consumer format, so we had to consider costs! We had to make this relatively easy to achieve on cost grounds in a short period of time, and so fourteen to sixteen bit (giving an 84dB or 96dB dynamic range respectively) looked the most promising, with 20kHz as our upper frequency limit. With this specification", Ishiwata adds, "we knew for sure that within a few years everybody would be able to make cost-effective products..."

The standard



**Albums like Fleetwood Mac's 'Rumours' underwrote LP's success in the seventies, but how to replace the ageing format?**



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**The first generation of CD spinners, such as this Marantz CD73, hit UK shops in 1983 - features were basic, and prices high, giving Compact Disc a 'yuppie' lifestyle image...**

was finally set, and to give Philips and Sony their due, it wasn't an unambitious one in 1979... The boffins at Sony and Philips certainly weren't opposed to twenty bit digital audio with a 50kHz upper limit, in theory but in practice it would never have become a mass consumer format, which was – first and foremost – the name of the game. Ken Ishiwata adds that such a format, "would have been 'Audiophile Digital Audio Format Disc', with no chance of surviving due to the cost of both hardware and software at that time... Compact Disc Digital Audio as it became known was the best we could do"...

## EARLY DIGITAL

Very early eighties hi-fi magazines were full of little tidbits – pictures of prototype Compact Disc players from Philips and Sony, and by 1982 British audiophile title *Hi-Fi Answers* was proudly showcasing the Philips CD333 – a deck that looked visually identical to the very first Philips CD100 that emerged just a few months later. By this time, now that the 'Red Book' standard for CD had been arrived at, the race was on between Philips and Sony to be first to market. In the end, it was practically a dead heat, but the two models (the aforementioned Philips CD100 and Sony's CDP-101) were quite different.

The Europeans and Japanese ended up taking two almost opposing paths. With their TDA1540 DAC, Philips went with 14bit, 4 times oversampling. This meant that the two least significant bits of the disc were simply ignored (truncated), but each 'read' of the digital 'word' was done at four times the base sampling frequency. Sony and the Japanese ran the technology at the limit, reading the entire(!) sixteen bit word, but only sampling it twice (hardware limitations wouldn't permit any more

at the time). This betokened a basic philosophical difference, and Ken Ishiwata is in no doubt as to which approach was superior...

"The Japanese didn't understand the effect of oversampling technology on sound quality. With high oversampling, CD had the potential to deliver a very high standard of sonics... Actually, the Japanese knew 16x2 was inferior, but (publicly) communicated simply that sixteen was better than fourteen, and sadly they succeeded in the propaganda war. That is why Philips had to come up with 16bit, 4 times oversampling DAC, in the shape of the TDA1541..."

Word lengths, then, are only half the story; they define the signal to noise ratio, but are not the beginning and end of sound quality - after all, the analogue vinyl LP has a signal to noise ratio that is easily bettered by 14bit words. Ken Ishiwata adds, "Actually it was Philips' digital filter chip that made the difference – its four times oversampling system pushed sampling up to the 172kHz area, which allows a very gentle analogue filter to get rid of digital noise, including noises where non-oversampling players must have stop-band (24kHz) rejection of 60dB or so. This means they needed very sharp filtering in their analogue stages, which of course influences audio quality!"

## MOVING ON

As the eighties progressed, CD players became ergonomically more refined devices. The clunky, slow user interfaces and crude displays of the early machines gave way to faster, sleeker and more convenient machines, although the Japanese couldn't resist festooning players with buttons, if the truth be told. Inside, the machines were getting cheaper to make and arguably less well built, but the manufacturers kept up the

commercial assault with a 'numbers' war that promised all manner of different oversampling rates (up to sixteen in the case of the Cambridge Audio CD3) and digital word lengths (18bit, in the case of Sony's late eighties machines).

In a sense, Bitstream changed all this, as its manufacturer (Philips) promised lower measured distortion and superior sound, despite being notionally 1bit [see this month's *olde worlde* on Philips' CD850 II on p68]. Behind the scenes, Ken Ishiwata notes, a far more serious change had taken place in the shape of a change from BIMOS to C-MOS integrated circuits. "This meant all chips suddenly had very low power consumption, which in turn meant very, very low current. And as you know, current is a very important factor for good sound quality, but today's C-MOS DACs don't deliver high current at all! That's why modern CD players sound like today's DVD players..."

The issue of jitter, or digital distortion in the time domain, began to get serious attention in the nineties, and the spectre of aftermarket master clocks arrived, with companies like Trichord making an excellent name for themselves with their 'Clock' modifications. Manufacturers showed ever better attention to power supplies too, and the result is that a mid-nineties CD spinner was an altogether more couth sounding device than a mid-eighties one, even if the eighties ones were surprisingly powerful and musical sounding by comparison (a fact often ignored by the nineties hi-fi press, it should be said). It was only in the mid-nineties, with the announcement of Super Audio Compact Disc and DVD-Audio, almost at the same time, when real, unequivocal advances in digital music reproduction arrived...

## NEW GOLD DREAMS

By 1995, the forthcoming Digital Video Disc (as it was then called) format was being actively discussed, but it was to be several years before anything arrived in the shops.



**...it took another 18 years for CD's supposed replacement to reach us, in the shape of SACD.**



**When DVD-A met SACD, so-called DVD universal players arrived to head off a format war - but it was too late...**

In the meantime, an interesting stopgap format arrived, in the shape of High Definition Compatible Digital (HDCD). Developed by US company Pacific Microsonics, it used the (small amount of) spare data capacity on standard CDs to provide what was claimed to be 18bit resolution. Cleverly, it was backwards compatible, and could be played on standard CD players with no adverse effect. Quite the reverse in fact, because the digital filter developed by Pacific Microsonics, the PMD100, turned out to be a cracker, and any standard CD played through this sounded silkier and sweeter than via other digital filter chips.

HDCD was a curious format, simply because despite the obvious sonic benefits it offered (HDCDs sounded quite noticeably smoother and more musical, by and large), it wasn't taken up by the recording industry en masse – simply because at the time, in order to make HDCD studio recordings, special equipment had to be installed in studios, and



**In theory at least, 24/192 DVD-Audio was superior, but the discs rarely carry such high resolution...**

most were unconvinced of the need for it, especially considering that most were waiting for 24bit, 96kHz recording technology that the new DVD format would employ. Still, a number of albums – albeit a very small percent of the total – continue to be released even today,

and invariably sound superior to standard CD given the right playback equipment.

When Digital Versatile Disc (i.e. DVD) finally hit the shops in 1997, there was a delay in the DVD-Forum rubber-stamping the new high definition format(s) – what would become SACD and DVD-Audio – due to lengthy squabbles about copy protection systems. During this time, which at the time seemed like forever, some enterprising American audiophile labels started their own informal standard. Possibly thanks to the simple expedient of the DVD Forum extending PCM support in the basic DVD format up to 24bit, 96kHz in stereo (alongside lossy Dolby Digital and DTS for surround sound), companies such as Chesky and Classic Records launched the Digital Audio Disc (DAD).

In the classical and jazz arena, Mark Waldrep's AIX Media group also put out discs which could be dubbed DAD, although Mark decries the term as a fiction of Classic Records' marketing department. That notwithstanding, as DVD-Audio's 24/192 capability finally came on stream, Classic upgraded some of their existing 24/96 catalogue to add a 24/192 stereo DVD-Audio side, and still sporadically add new titles in that guise. Their equally non-official term for this 'format' is HDAD ('Hybrid' DAD), but it does at least serve as a handy abbreviation so we know what we're talking about! Mark Waldrep is also associated with a company called Hi-Res Music who produced a smattering of low profile rock and jazz titles in DAD/HDAD-like formats, but releases have slowed as licensing major label material and putting together the high-res product often winds up as cost-prohibitive.

Finally, the long awaited DVD-Audio and SACD hit the shops practically at the same time. The DVD Forum, comprising ten consumer electronics companies (Matsushita, Mitsubishi, Pioneer, Toshiba, Hitachi, Sony, JVC, Thomson, Time-Warner and Philips), had been working together on an audiophile derivative of DVD for a while, and in February 1999 the final DVD Audio Disc Version 1.0 specification was announced. Impressively far reaching, it offered high quality digital sound in a number of formats, including 16, 20 and 24bit resolution PCM, with sampling frequencies spanning 44.1, 48, 88.2, 96, 176.4 and 192kHz. At its top 24bit, 192kHz resolution, DVD-Audio would have dramatically better performance than Compact Disc on paper. Whereas CD had a theoretical frequency response of 20Hz-21kHz

and a dynamic range of 96dB, DVD-A gave 20Hz-96kHz and 144dB of dynamic range.

There was also a multi-channel mode running at up to 24bit, 96kHz resolution, giving up to six channels of surround sound with over 74 minutes on the lowest capacity single-sided, single-layer DVD disc. This was all possible thanks to the dramatically enlarged storage capacity the new DVD discs had, plus the provision for 'lossless packing'. Developed by Meridian's Bob Stuart, Peter Craven and the late Michael Gerzon, Meridian Lossless Packing (MLP) allowed music data to be stored in a compressed form which could be subsequently decompressed during playback with no quality degradation.



**Unlike DVD-A, SACD did not require a TV to access all its menu functions, making it more accessible; some prefer the sonics too..**

While DVD-Audio was an unexpected - albeit very welcome - offshoot from a project to replace Laser Discs, Sony and Philips were also planning an upgrade to their ageing and now brilliantly successful baby, CD – a technology whose patents would one day expire, leaving the two giants without a major source of revenue. To wit, Super Audio Compact Disc (SACD) was announced - a bespoke audio format used the DVD platform but was not compatible with DVDs.

Confusingly though, it didn't offer obviously superior or inferior specs, because it used a completely different digital coding system to that found in both DVD-A and CD. Rather than the Pulse Code Modulation (PCM) system, where 16, 20 or 24bit samples are taken at high speed, the new Direct Stream Digital (DSD) approach took far smaller 1bit samples at a far higher speed of 2.8224MHz. This gives a frequency range of up to 100kHz (better than DVD-A) and a dynamic range of 120dB (not quite as good).



Like DVD-Audio, SACD offered impressive multi-channel capability, but unlike its rival format, it doesn't need to drop the quality when carrying surround sound information. Six full channels of high resolution audio playback can be provided, along with a separate, studio-mixed 2 channel version of the same music on the same disc. Playback can consist of 3 channel, 4 channel, 5 channel or 5.1 channel, depending on what the artist/producer wants to achieve musically. Furthermore, with the hybrid disc option, an addition CD layer will offer the same recording in CD quality, for replay on conventional CD players.

Like a London bus, after seemingly years of waiting, both arrived at the same time, and lo and behold, a format war looked likely! This confusion was what probably did for them both, at least as far as the mainstream music buyer was concerned. There is no doubt that there would have been far greater clarity to the buying public, (and even the record companies!) if only one format had been available – but there's nothing like the internal politics of the Consumer Electronics industry to spoil things at the last minute... As worthy and impressive as both formats are (here is not the place to discuss their relative merits), the ensuing confusion has conspired to kill these 'hi res' formats in the minds of the average buyer.

Here we are in 2006, five years later with two moribund formats on our hands. Surprisingly, the new HD-DVD standard does not support DVD-Audio, and likewise the new Blu-Ray format does not support DSD either! Warner Music occasionally releases an unheralded CD/DVD-Audio double pack, but Sony/BMG have all but given up on SACD, instead releasing non DVD-A Dual Discs – the nasty combination of back to back CD and DVD, usually with 16/48 PCM and surround audio as Dolby Digital, if present at all. I recently received beautifully done SACDs of five classic Moody Blues albums from Universal Music Group, but it has been intimated to me that these will be their last (EMI are also ominously quiet) - the Moodies' discs are not even being released properly in the United States. The failure of these formats is a real shame...

## HI-DEF MUSIC?

Having been burned by the huge investment and low return DVD-Audio and SACD, the record industry will be unlikely to plough a lot of investment into going through the whole format-war exercise again just

in pursuit of reselling studio recorded music with High Definition pictures. Their sights will be firmly focussed on reproducing some of their many HD-shot DVD-Video concert extravaganzas as High Definition discs and reselling them to a HD-starved public. (These projects are usually the ones directed by HD advocate Hamish Hamilton, and usually consist of U2, Robbie Williams and Peter Gabriel – these are my predictions for the early HD concert disc release slate!). Which format they end up using is still open to question, but the recent delays to Blu-Ray release dates could mean HD-DVD steals a march on the Sony format – however the initial raft of movie HD-DVD titles in the States is pitifully small. Still, look what happened to DVD from similar beginnings...

Owners of flash High Definition capable home cinema installations will inevitably want some music demo material to impress their friends and neighbours, and indeed, at the Bristol Hi-Fi show this year Meridian were using some Standard Definition AIX Records material to showcase their DVD players' capabilities with MPEG2 video and lossy surround audio. Plainly in shot were Sony HDCAM cameras – meaning what we were looking at was likely to be an SD down-conversion of an HD-shot performance.

Mark Waldrep comments, "As for HD-DVD and Blu-Ray music projects, AIX Records is at the head of the pack with almost twenty programmes that have been shot in HD and stand ready for production. Until there is resolution on a single format, reasonable costs for authoring and a marketplace ready to support a high-resolution optical format, it's a tough decision to make. I'm busy making more high-resolution discs with down-converted video and our usual extensive bonus mixes and features."

So, from one of the pioneering early adopters of new formats for high resolution ends, we get an unequivocal 'not sure!' Authoring is one of the biggest blocks to affordable music High Definition disc production – I am sure Mark will not mind me revealing that he does use Apple's affordable DVD-Video authoring tool DVD Studio Pro, and it is not unlikely that this year's NAB show will see Apple revealing powerful additions to the already one year old rudimentary HD-DVD authoring capability (missing the new lossless codecs and the sophisticated interactivity) in its software.

More difficult to call will be whether it extends its abilities to incorporate Blu-Ray authoring, but

## KI'S DIGITAL DREAM

Marantz's Ken Ishiwata outlines his very own 'Ultimate Digital Audio Standard'...

"My dream system is very simple – to use a Blu-Ray disc, and come up with a new audio standard using floating point variable bitrate encoding. Music dynamics are changing all the time, so why should we have a constant dynamic range system like PCM? It's such a waste! Can you imagine how much data is wasted in a 24/192 system like DVD-Audio? So instead, we take, let's say a 1MHz sampling frequency, but allocate the required numbers of bits in accordance with the music's dynamics! For silence we don't need any bit allocation, do we? In such way you can create a wonderful new Ultimate Digital Audio Standard...

my feeling is that if Apple were to come out with a more advanced authoring option of whichever hue, it may tempt potential music disc producers to get in the game, at a much more affordable level than the Sonic software which is de rigueur in movie disc production, and hence hugely expensive. Anyway, that little debate has dragged us some way from the issue of music formats, but has at least elucidated why audio-only, or even high-resolution-audio-with-pictures discs for the new formats are still some way off.

## FUTURE SOUNDS

It's not an unreasonable supposition to say that new releases on 'physical



*New lossy formats have proved a massive commercial success, leaving 'hi res' sidelined. AAC was a hit in Japan long before Apple's iPod...*

media' (i.e. CD, DVD, Blu-Ray) will one day disappear. This has already become a hackneyed truism when the likes of Bill Gates repeatedly get up on a global platform and state that the High Def disc formats will be the last physical medium. How long the two High Def formats last depends on how this latest silly format war turns out. If it is anything like the mutually assured destruction of the SACD versus DVD-Audio spat it won't be long...

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Demonstration Room 6



**There's no other way!**





*Ye olde black plastic - many still regard the 'analogue disc' as the ultimate 'hi res' format...*

speeds will mean that we will very shortly not only be drifting towards a download model for mass-market music consumption, but also towards perfectly adequate compressed HD-resolution video with compressed 5.1 (or greater) surround sound. It is unavoidable that the main driver for the download model in both music and video is Apple, with their vice-like grip on the download arena thanks to the success of the iTunes music store. It is too soon to call whether they will have the same success with compressed H.264 video they had with compressed 128 kbps AAC audio, but it would seem likely that they will.

We audiophiles need not overly concern ourselves with this compressed world – as long as we still have access to uncompressed (or at least losslessly compressed) music. I had occasion to grill one of the Apple consumer audio team at the recent launch of the iPod Hi-Fi – and unfortunately it would seem apparent that although they are aware that the audiophile community would prefer lossless (and 24bit lossless at that...) downloads, they perceive the audiophile market to be too small to justify that move at present. Host server disk storage still costs money...

I also enquired as to whether the emergence of 5.1 AAC audio tracks to their recent H.264 movie trailer downloads indicated that they were to move into selling surround files – given that there is a library of surround mixed titles. He said they



**Nowadays, digital downloads are enough to propel singles to Number One - are they the future for hi res too?**

#### PC'S PRACTICAL DREAM

HFW's Patrick Cleasby offers his view of what is achievable within the bounds of current specifications...

"Ken Ishiwata is in the enviable position of being able to do the 'blue skies' stuff which influences decisions of coding mechanisms and disc specs. As Blu-Ray has proven, even once a prototype has taken shape it takes many years for a finished spec product to come to market. At the other end of the food chain those who have an eye on the production of audiophile audio-only discs are confronted with multiple challenges and have to use the specs to their best advantage to create a product.

Ken's prescription assumes that you are creating a finished digital version of a master which still has some dynamics left in it – the harsh reality is that at least in the pop / rock and legacy remastering fields we are faced with masters created by engineers who for whatever reason are choosing to or being exhorted to compress all of the dynamics out.

So we do need an audiophile digital standard, and we need to decide what it is. If DSD and DVD-Audio capabilities continue to be left off the new Blu-Ray and HD-DVD players there is only one option, and it is back to well mastered, relatively flat-transferred DAD/HDAD. DVD-Video is so ubiquitous and pervasive that if the new machines retain full-spec DVD-Video compatibility they should all make a decent job of playing 24/96 stereo discs – if such discs are made available.

Despite the coming wonders of Blu-Ray, the concern remains that at the present time the new machines are being considered as almost exclusively video players, notwithstanding the fact that the specs now allow for 7.1 channels of uncompressed 24/192. (note we are still talking about PCM as the default coding mechanism!), while Dolby and DTS offer losslessly compressed versions of the same in potentially even more extravagant multi-channel configurations.

The 7.1 (or higher) channels of surround and High Definition video capabilities of the new formats are of little significance in hi-fi if:

As the legacy hi-res formats have proved, the cost and timescales involved in discrete multi-channel mixing are prohibitive.

Most rock projects are still tracked at 24/48 for efficiency and convenience

Multi-channel versions of studio recordings have failed to excite the buying public (or maybe it's their wives who are the problem...!).

Audiophiles are really not interested in a High Definition video accompaniment to their music and record companies are unlikely to wish to fund such.

Therefore I'd contend that in line with the hi-fi industry's prevailing wind, 2.0 channels is adequate and as the likes of Neil Young's 'Greatest Hits' and 'Prairie Wind' limited edition CD/DVD-Video (24/96 DAD effectively...) dual packs ably demonstrate, well mastered DVD-Video 24/96 stereo is more than good enough for most listeners – those who retain DVD-Audio capability can use the 24/192 side of an HDAD if it is present.

It remains to be seen if the new machines will allow the stereo 24/96 on DAD-type discs out of the box digitally for those using dedicated audiophile stereo DACs. If they do, or if the 24/192 DACs of Blu-Ray and HD-DVD machines are up to high-end DVD-Audio equivalent capability, audiophiles will still have a route to create and listen to high resolution material.

If somebody does not do this commercially, audiophiles will raise their game to archive their vinyl to this level of quality on DVD-R rather than hobbling the resolution of their needle-drops to 16/44.1 CD-R, Adobe Encore or Apple's DVD Studio Pro are all you need folks...

were aware of that, and smiled that smile which Apple guys have which says "I could tell you the answer to your question, but Steve would then kill me..."

I strongly suspect that the preservation of interest in both better-than-CD-quality audio and the surround version thereof is going to be down to the independents

– there are already a smattering of web-based audio sellers who will give you a lossless FLAC option, and others promising a downloadable surround music capability. By the end of the year we should know if high resolution stereo and surround audio are going to survive in any substantial form, or whether they will by then have gone the way of Quadraphonic.

# The New Gold Standard



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 MONITOR AUDIO

World Radio History



# Lost In Space

**Digital Audio Broadcasting was meant to usher in a new age for radio, with the promise of CD-quality sound, rock-solid reception and a wide array of stations catering for niches that had previously been impossible to serve on analogue. Steve Green explains what went wrong...**

**A**lthough most people think DAB is a new digital radio system, it actually dates back to 1986 when the European research project 'Eureka 147' was formed by a consortium of French, German, Dutch and UK companies.

The breakthrough that led to the formation of the Eureka 147 DAB project was the emergence of so-called 'perceptual' audio codecs, which were able to compress the 1,411 kbps (1,000 bits per second) bitrate of CD audio down to around 250 kbps with relatively little deterioration in sound quality. Prior to this, only crude audio compression formats existed, which could reduce the CD bitstream down to around 1,000 kbps. Perceptual audio codecs made it possible for the first time to transmit radio stations digitally using a similar amount of bandwidth to an FM station.

"the system in use today still uses exactly the same technologies as those chosen sixteen years ago..."

The main original requirements of the Eureka 147 project were to design a digital radio system that transmitted radio stations with "audio quality comparable to that of a CD" and to provide robust reception even when on the move (more of which later). Other requirements included easy-to-use receivers and the transmission of data services. On the transmission side, the system was required to use spectrum efficiently and that the transmitter powers should be low.

By 1990, all the main technologies that make up the DAB system had been chosen—the audio codec, modulation scheme and error correction scheme. And the system in use today in the UK still uses exactly

the same technologies as those chosen sixteen years ago.

Of the technologies chosen for the DAB system, the modulation scheme, called OFDM, or Orthogonal Frequency Division Multiplexing, was without doubt the best of the decisions made. DAB was the first system to adopt OFDM, and it is now the favoured modulation scheme for terrestrial broadcasting systems and wireless computer networks (e.g. Wi-Fi), and it is expected that the 4G mobile phone system(s) that will be developed over the next decade will also use OFDM. The main benefits are that transmissions are relatively immune to multipath reception, and that it allows single-frequency networks (SFNs) to be employed.

Multipath reception occurs when the transmitted signal travels over many paths from the transmitter to the receiver (for example signals can

bounce off hills or buildings), and multiple versions of the transmitted signal, or echoes, arrive at the receiver with different relative delays. The sum of all the received echoes can lead to 'frequency dependent fading', where a band of frequencies is heavily attenuated due to the phase angles of the sine waves - that the signal is comprised of - cancelling one-another.

OFDM mitigates multipath reception by splitting the high-speed data signal into hundreds or thousands of low-speed sub-channels, called subcarriers—DAB transmitted in the UK uses 1,536 subcarriers. All of these subcarriers are prone to fading, but by using forward error correction (FEC) coding,

data received in error on faded subcarriers can be corrected to a certain extent.

The error correction scheme is thus vital to the robustness of the signal, and it also dictates how much data can be transmitted on a multiplex. Unfortunately, the DAB system designers chose to use a relatively weak error correction scheme, which explains to a large extent why so many people suffer from poor DAB reception, although this can be solved by significantly increasing transmitter powers.

The second advantage of OFDM is that it allows single-frequency networks (SFNs). This is advantageous because instead of having to transmit a national FM radio station such as BBC Radio 2 on around thirty different frequencies between 89-91 MHz, SFNs, as the name suggests, use just one frequency for all transmitters. This makes national SFNs, such as the BBC's, much more spectrum efficient than FM. Local FM stations, on the other



*Philips Digital Compact Cassette was the first commercial use of 'Perceptual Coding', aka 'data reduction'...*

hand, are only transmitted on one frequency, so local DAB multiplexes are no more spectrum-efficient than FM in this case.

**LOSS IS MORE**

The audio codec used in the DAB system was chosen after a listening test in 1990 that compared the performance of various proposed perceptual audio codecs. The two clear winners were the codecs that went on to become MPEG audio codecs Layer 2 and Layer 3, nowadays better known as MP2 and MP3.

The main characteristics of MP2 and MP3 are that MP2 is simpler to decode than MP3, and hence MP2 consumes less power—although the difference is very small when compared to the total power consumed by a DAB portable radio.

"why didn't the UK broadcasters and regulators spot that the current DAB system was not up to the job?"

But MP2's lower power consumption comes at the price of it needing to use 192 kbps to achieve the same level of quality as MP3 provides at 128 kbps.

The efficiency of the audio codec is crucial for a digital radio system, because in the case of using MP2 versus MP3, a system using MP2 requires 50% more spectrum than if MP3 were used. And the efficiency of the codec determines how many radio stations can be transmitted in a multiplex, which means that if a less efficient codec is used the transmission costs per radio station are higher because the total transmission costs can only be shared between a smaller number of stations.

What it really boils down to is that if you use an inefficient digital radio system it is far more likely that the audio quality will be traded-off because there is insufficient available spectrum, and

because radio stations will not want to pay high transmission costs. Which begs the question: why didn't the UK broadcasters and regulators spot that the current DAB system was not up to the job?

For instance, the BBC's plans to launch new digital services on both TV and radio can be traced all the

way back to 1992, when John Birt, the then Director-General of the BBC, published a document called "Extending Choice in the Digital Age". And to quote Jenny Abramsky, the current Director of Radio at the BBC: "[the BBC] always planned to launch new services".

The BBC started test transmissions of DAB in January 1990, and its national DAB multiplex went on air in 1995. The BBC DAB multiplex carried Radios 1 to 4 at a bit rate of 192kbps per station, plus the mono services Radio 5 and the World Service using bit rates of 96 kbps and 80 kbps, respectively. At these bit rate levels the audio quality was good, albeit not as good as on FM. The BBC's DAB multiplex has a maximum capacity of 1,184 kbps, which meant there was enough room

to add one more stereo station without degrading the audio quality. Instead, they added five new stations, and the audio quality of the stations plummeted...

It's interesting to think that the BBC went from 1992 to 2002 either without noticing that there was a glaringly obvious problem with their plans to launch new services, or that they noticed the problem but did nothing.

The other organisation behind the poor audio quality on DAB is the Radio Authority, which regulated commercial radio before it was subsumed into Ofcom. The number of commercial radio stations increased rapidly throughout the 1990s, which meant that by the time the Radio Authority began awarding DAB multiplex licences in 1998 it should have been obvious that DAB would require a huge amount of spectrum if all the existing and envisaged radio stations were going to transmit at good audio quality levels on DAB. But instead of taking some decisive action to ensure that the audio quality standards would be kept high, the Radio Authority made the fateful decision to set the minimum bit rate for stereo radio stations at 128kbps, which 98% of all stereo radio stations on DAB in the UK now use. This is why DAB sounds so poor in the UK.

Quite simply, the MP2 audio codec should have been replaced and stronger error correction used. MP3 was available from the very beginning,

but by 1993 development of the AAC (Advanced Audio Coding) codec had begun, with its main intent being to provide better performance than MP3 at low bitrates—which made it perfectly suited to what DAB needed. If AAC and stronger error correction had been adopted, then I doubt there would be a problem with the audio quality at all in the UK, or at the very least the BBC would be providing very good audio quality on all of its stations.

Ironically, it now looks virtually certain that the AAC and AAC+ audio codecs and stronger error correction will be incorporated into the DAB system in the very near future. Unfortunately, though, too many DAB radios have already been sold in the UK for us to change to the new version of the DAB standard now, so it looks like we're stuck with the MP2 codec with its dull and muffled sound, either indefinitely, or for a number of years at the very least.

**NEW CONTENT**

It's certainly fair to deride DAB – as we know it in this country at least – for its ropery sound, but to be fair it does have one abiding benefit over FM, which is the number of stations you can receive. In London you can receive over fifty stations and in most of the larger towns and cities you can typically receive about thirty five stations.

The best known of the new digital stations - if for no other reason than the amount of TV advertising they receive - are the new BBC stations. The new speech station BBC7 has been the most popular addition, with its mix of old and new comedy, drama and children's programmes. The second most-listened-to of the new BBC stations is Radio 5 Sports Extra, which broadcasts around thirty five hours of sports commentary per week, including football, rugby, cricket and tennis. Controversially, however, whenever Radio 5 Sports Extra goes on air, either Radio 4 has to be reduced to mono in the evening or Radio 3's audio quality has to be reduced in the daytime...

BBC 6 Music's remit was originally to play the best in popular music over the last forty years, and although it plays some good stuff, it seems to have drifted towards an NME-approved indie/alternative style of music, which isn't actually a particularly good representation of what has been popular over the last forty years, in my humble opinion. Given the ongoing controversy over Radio 2 targeting an ever-younger



thanks to heavy promotion, DAB portables are now selling very strongly...



age-group, it would seem that 6 Music was the ideal station to fit in-between Radio 1 and Radio 2, but the presentation style and choice of music combined with the dubious audio quality makes it sound like Radio 1 on Valium much of the time.

The remaining two new BBC stations, Asian Network and 1Xtra, were launched as a result of the BBC "under serving ethnic minorities". Translated from BBC-speak, what this actually meant was that a lot of Asian and young black people were simply not using any BBC services - Asian people were increasingly watching the Asian-language TV channels on satellite, and young black people preferred pirate radio and dedicated urban radio stations to BBC services - which is bad news for a corporation that relies on a universal compulsory TV licence. And if you thought the audio quality of the BBC's main radio

stations on DAB was bad, spare a thought for listeners to the Asian Network: 32% of its output is music, yet on DAB it is broadcast in mono, and to my ears sounds little better than MW.



**DAB portables are a great way to enjoy all those new digital networks, but reception and battery life are poor...**

The commercial radio groups have also launched numerous new digital stations, although they have predominantly targeted the same genres of music, which has led to a lot of stations overlapping one another. The most favoured genre has been rock music, both in classic and contemporary forms, but inevitably a number of pop music stations have been launched as well.

One of the most significant phenomena has been the rise of the so-called 'quasi-national' radio stations. These stations consist of either new digital services, or well-established larger local stations wanting to expand, that are transmitted on numerous local and regional DAB multiplexes across the country, as well as transmitting on the digital TV platforms. The rise of the quasi-national stations - typified by the likes of Kiss 100, Galaxy, Heart, Kerrang, Smash Hits, Classic Gold and Xfm - was a reaction to the Radio Authority's decision to only licence one national commercial DAB multiplex, which, in typically short-

sighted manner, they advertised as being the only one there would ever be! Ofcom has recently overturned that decision, however, much to the disgust of Digital One, who had threatened Ofcom with legal action if any more national multiplexes were licensed.

The negative effect of these quasi-national stations is that they consume such a large amount of capacity on the local and regional DAB multiplexes. Also, as mentioned earlier, local DAB multiplexes represent the least spectrum-efficient way to transmit DAB stations (whereas national SFN multiplexes are efficient). So starting from a position where there was a serious lack of spectrum, the Radio Authority allowing these quasi-national stations onto the local DAB multiplexes actually exacerbated the situation substantially.

### GOING FORWARD

Reception quality is currently very hit-and-miss, with some people getting very good reception while others are plagued with the dreaded 'bubbling mud' sound that occurs when the signal strength is too low. But reception quality should improve after the Regional Radio Conference (RRC) in Geneva concludes this summer, which should allow broadcasters to increase the transmitter powers they use.

Another method to improve reception quality, that has actually always been an option open to the broadcasters, is to add low-power 'gap-filler' transmitters to the single-frequency networks, in locations that suffer from low signal strength. The only thing stopping the broadcasters from doing this is cost, but as DAB ownership increases they will be more likely to invest to improve coverage this way.

Ofcom also announced last year that they will be licensing a new national commercial DAB multiplex and local DAB multiplexes for areas that don't already have one. The new national multiplex, which will be licensed later this year, is likely to add between seven and ten new stations, depending on whether and how much capacity will be used for mobile TV channels (i.e. TV on mobile phones).

Virgin Mobile is planning to launch a mobile TV service later this year, which will be transmitted on the Digital One multiplex. Interestingly, the service is only made possible by using the stronger error correction and modern audio (and video) codecs that are denied to the radio stations. The casualty to

make way for the new mobile TV service is the Primetime radio station, which has been forced to withdraw from the Digital One multiplex.

Ofcom is also trying to acquire spectrum for a second national DAB multiplex, but judging by the language it used it doesn't expect to be successful. If it does acquire this additional channel then the BBC might be able to lease a small amount of it, but if only one new national multiplex is launched the BBC doesn't stand any realistic chance of acquiring any capacity on it. All will be revealed following the RRC this summer... But despite the new spectrum being made available for DAB, Ofcom admitted last year that even after the expansion there will be around 90 analogue radio stations—out of a total of 326—that are either unable to get on DAB because the local multiplexes are full or they can't afford the carriage fees. Ofcom is also planning to issue a further thirty FM station licences, which will undoubtedly push that figure higher still.

To end on a note that typifies the way DAB has been regulated in the UK, Ofcom announced last year that it will allow the broadcasters to reduce the bitrates of their stereo stations from 128 kbps to 112 kbps if they invest in slightly improved MP2 audio encoders. The BBC already uses these encoders, and – as anyone can hear with their own ears - their stations sound terrible at 128 kbps, so Ofcom's decision doesn't exactly bode well for the medium's future...

The sad thing about DAB is that it's a missed opportunity; flawed from the conceptualisation stage onwards, the various parties responsible for 'Digital Radio' in this country have repeatedly missed chances to improve it. If anything, they have made it worse. It's another case of a great idea, ruined by poor execution.

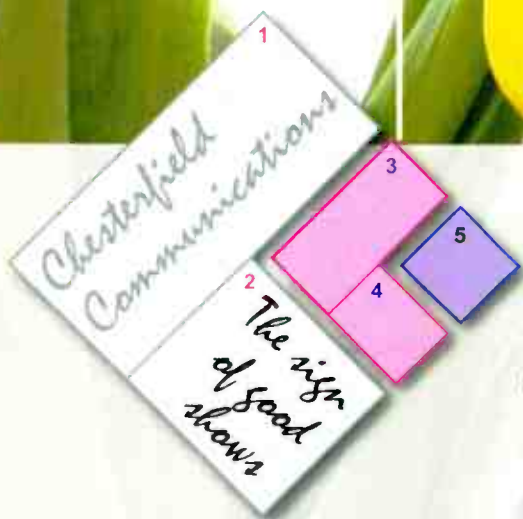
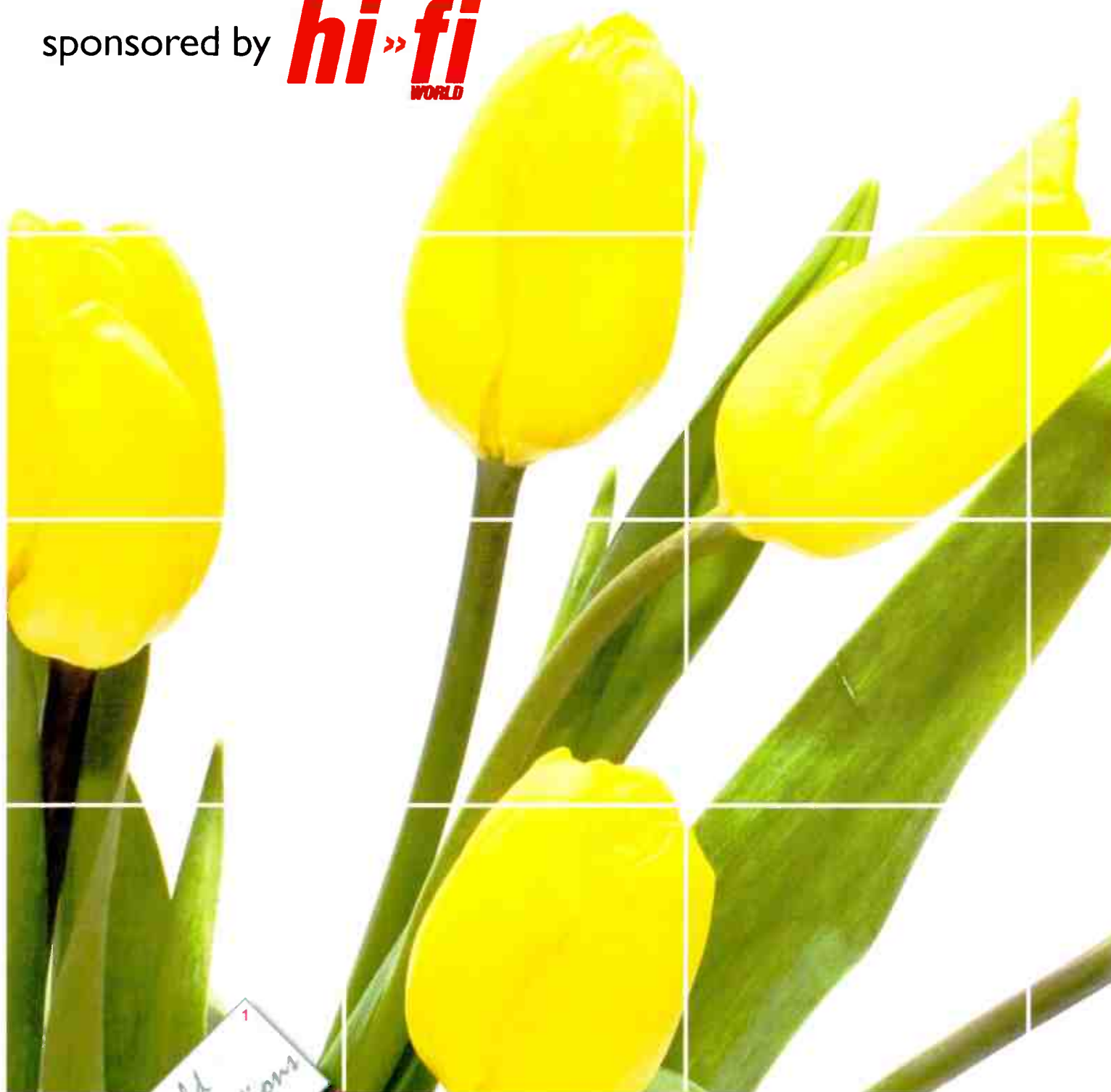


**Arcam's DT91 is one of best new DAB tuners, but still features an FM option for serious listening...**



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# Radio Star



The affordable DAB/FM tuner market is finally hotting up, and Marantz's brand new ST7001 is now the one to beat, says Steven Green...

**T**he Marantz ST7001 is a high-performance quad-band digital and analogue tuner, covering all the broadcast radio bands currently in use. It has a high-performance Analog Devices 24bit/192kHz multibit Delta Sigma DAC. The FM section uses analogue circuitry, as opposed to some recently released DAB/FM tuners such as the Cambridge Azur 640T, that implement FM using software-defined radio (SDR) techniques.

With an RRP of £299 (£275 from [www.harrowaudiophile.co.uk](http://www.harrowaudiophile.co.uk)), its main competitors are the Sony STSDB900, Pure DRX702ES, Denon TU1800 and Cambridge Azur 640T, all of which also offer the DAB, FM and AM bands. Like the Cambridge, Denon and Pure, the Marantz can receive both DAB bands - Band III, which is used in the UK, and L-band - making it suitable for use across Europe.

The ST7001 is a solidly built unit with a brushed-metal silver front panel and nicely rounded corners. Central on the front panel is a large LED display. The bright white LED on black background offers a high contrast display that's easy to read from distance as well as from a wide angle. The top line displays the station name for DAB and FM stations that use RDS (Radio Data System), and the frequency is displayed for all other analogue stations. The bottom line displays the station's scrolling text for both DAB and FM stations with RDS, as well as other text information for DAB stations.

Beneath the display are small buttons for dimming the display, cycling through the text display options, cycling through the menu options, and instigating DAB auto-tuning.

To the right of the front panel are the band select button and four small LEDs that illuminate when there is a secondary service available.

The large rotary tuning knob allows you to step through the station names on DAB, then press it in to select a station. In FM mode it auto-searches for the next station that is higher or lower in frequency. One hundred station presets can be stored for each of the DAB and FM bands, which should be enough to be going on with.

"FM was stunning, squeezing every last drop of detail out of the signal..."

Remote control is very responsive, allowing fast selection of stations either by scrolling through a sorted list of DAB stations or through the presets.

On the rear panel there are 75Ω aerial terminals for DAB and FM, the DAB connection being an F-type female and the FM one being a Belling male co-axial. There are also connectors for an AM loop aerial.

As well as the usual phono connectors the unit provides both electrical and optical digital audio output connectors and an RDI

optical digital output. No devices have been designed that receive the RDI datastream as yet.

Also on the rear panel is a serial port for possible future software/firmware upgrades, plus remote control connectors

Supplied with the tuner are an FM wire aerial, an AM loop aerial and magnetic mount DAB aerial, but you would be well advised to replace the DAB and FM aerials with dipoles or multi-element directional aerials if you want to get the best out of the tuner.

The tuner has a clock/timer, for which the time can either be set manually or automatically from the RDS station clock, and there are

three timers that can be set to allow recording once, every week, every day or just on weekdays.

DAB stations can be sorted alphanumerically, by multiplex order, or by programme type (PTY), although alphanumerically is by far the most sensible when there is a long list of stations available. And the 'search mode' allows either scrolling through the list of sorted stations or through the presets, as well as allowing manual tuning.

The display buttons on the remote and on the tuner allow





you to cycle between the normal DAB scrolling text, multiplex name, programme type, channel and frequency, audio bit rate and mode, time/data and bit error rate. I'll discuss the bit error rate below.

The tuner includes Dynamic Range Control (DRC), which allows you to compress the dynamic range of stations that support this facility, such as some of the BBC stations. Compressing the dynamic range is only useful for noisy cars.

The ST7001 uses the TDE-2002-AS DAB receiver module from Korean company TBK Electronics, which is the same DAB module as used in the Denon TU1800 DAB/FM tuner, and the processing is carried out on the Texas Instruments TMS320DRE200 DSP chip, which Radioscape also uses for its DAB modules - as used in Roberts portable DAB radios and Cambridge Audio DAB products, amongst others.

Instead of having a signal strength meter the tuner displays the bit error rate (BER) for the station you're listening to, which is the proportion of bits received in error (after error correction), and is a measure of the reception quality - the lower the BER the better the reception quality. DAB reception performance was similar to other DAB products I've tried when fed by the same aerial. On FM the reception quality was excellent. Marantz say they have achieved this by a careful balance of sensitivity, selectivity, capture ratio and dynamic range. Perhaps most impressive was the ability to receive very distant stations with minimal hiss, where my Denon TU260L tuner would be struggling. It goes without saying that reception quality on strong stations was perfect.

## SOUND QUALITY

FM on the ST7001 can only be described as stunning, squeezing every last drop of detail out of the

signal. Sound quality on FM was precise, dynamic and authoritative. The classical music stations, BBC Radio 3 and Classic FM, were engrossing and superbly defined; BBC Radio 1 and Radio 2 sounded pin-sharp, with a good top end that made vocals stand out, and provided a lively and engaging sound overall. The better-sounding FM commercial stations also sounded vibrant and open, surprisingly!

Equally impressive was the Marantz's ability to make the most of the more average-sounding commercial radio stations, which it managed to present in as lively a manner as possible. The Marantz was no slouch with speech either; delivery was sharp—but not overly so—and dynamic, with the speaker's voice standing out in the stereo image.

On DAB, the Marantz gave a refined, detailed and open delivery of Radio 3 and Classic FM, albeit lacking the precision and vitality apparent on FM. On the other DAB music stations, the Marantz's high-quality output circuitry made the most of the quality of the broadcast material, delivering a well-defined bass, with the best-sounding examples being some of the middle-of-the-road (MOR) stations and stations that tend to play bass-heavy music, such as urban stations. But it is speech rather than music where the tuner comes much closer to the high performance on FM. Speech delivered

on DAB is rich and has a warm tone, with the best performance being on the BBC stations Radio 4 and BBC 7.

Sound and reception quality on AM was as good as can be expected on this band, but as all of the main AM stations are now also broadcast on DAB, the AM band is becoming redundant on tuners with DAB - DAB coverage permitting, of course.

Overall, as the best sound quality available on terrestrial radio is on FM, the Marantz's stunning FM performance makes it a very hard act to beat. And coupling this with its high quality output circuitry making the most of DAB broadcasts, this Marantz is a great buy.

## VERDICT

Stunning performance on FM coupled with its ability to get the most from DAB broadcasts makes this a superb, affordable tuner.

**MARANTZ ST-7001** £299

Marantz

+44 (0)1753 680 868

www.marantz.co.uk

## FOR

- superb on FM
- makes most of DAB
- remote control

## AGAINST

- nothing

## MEASURED PERFORMANCE

Our frequency response analysis of the VHF/FM section shows the ST-7001 provides an even output all through the audio band. A pilot tone filter notch at 19kHz places the upper limit (-1dB) at a high 15.2kHz. As a result the tuner should sound tonally balanced, with clear and apparently extended treble.

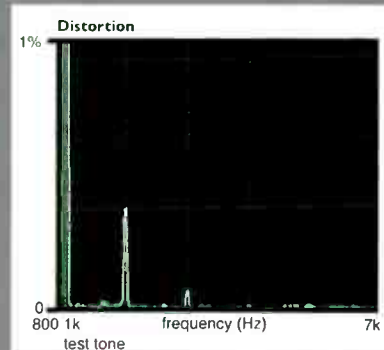
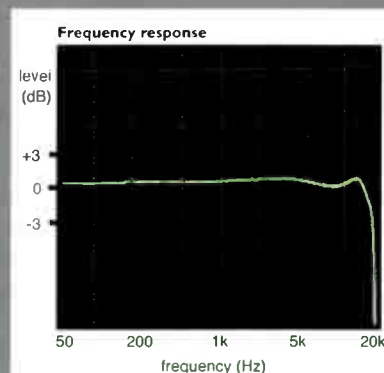
Although distortion figures didn't look good at full output (i.e. modulation), coming in at 0.5% or so, at a representative 50% modulation the ST-7001L was producing around 0.2%, mainly second harmonic, low enough to be audibly of little consequence. Hiss was low at -72dB, a common enough result. This was achieved with 1mV or more from the aerial; at lower signal levels hiss rose as always, the -50dB stereo sensitivity figure being 38uV, a normal enough result. The tuner mutes signals below 22uV, so it won't pick up really weak stations.

The ST-7001L offers good results in all areas. It is well engineered and should give a clean, evenly balanced sound. NK

Frequency response	5Hz-15.2kHz
Stereo separation	40dB
Distortion (50% mod.)	0.18%
Hiss (CCIR)	-72dB
Signal for minimum hiss	1mV

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# Operation

**It's a question many owners of 'CD players of a certain age' ask themselves (and us) – 'do I buy a new machine or give my existing one a new lease of life?' So David Price asked specialist digital surgeon Mark Bartlett to revive an ageing Sony, with fascinating results...**



**I**nteresting, isn't it, that most turntable lovers have real working knowledge of all the various springs, grommets, bearings and power supplies that their machines use? CD player users, by contrast, buy a black (or silver) box, connect it up (if they're really devoted) with special interconnects and power leads, and that's that. Every bit inside the box is a mystery to them, and they have little or no knowledge of what could be improved.

A couple of years back, arch tweaker Ken Ishiwata took a 'standard' Marantz CD63 KI Signature and souped it up with a variety of special components, and copper plated the whole chassis and case. The result, the KI DP, was amazing – it's a lovely machine that totally belies its budget origins.

Since 1996, Mark Bartlett has supplied 'designer' audiophile passive componentry, along with a range of clock modules and associated power supplies. His company Audiocom also routinely takes customers' CD players, DACs and transports in, only to go through them with a fine-tooth comb, upgrading bits inside when appropriate. This got me thinking, and I challenged Mark to see what he could do with an old Sony CD player, a 1989 CDP-X33ES. This was a decent performer (at least by the standards of the day), but was sounding distinctly off the pace as it reached middle age...

## THE EXAMINATION

The princely sum of £399 would buy you a new CDP-X33ES in 1989/90 – or if you were in Japan it was cheaper still at a mere ¥59,800 (at the then exchange rate, we're talking around £220). Still, it sports 'battleship' build – not quite up

there with the top-of-the-range X77 et al., but it shamed the likes of Marantz's CD50 rival. It was one of the very first Sony players to use the SONY CXD2552Q current pulse DAC chip, which combined with the CXD1244 digital filter gave a claimed signal-to-noise ratio above 113dB (EIAJ) – this was superb by the standards of the day, when most machines used the noisy old Philips TDA1541...

The optical pick-up used is the KSS-270CA, and the design and quality of parts from disc tray to the floating, sprung, spindle motor is excellent. The chassis is solidly constructed from 1.5mm stainless steel plates with several internal cross bracing supports for rigidity. The power supply is based on a single frame transformer with separate windings for digital and analogue circuits. Good quality capacitors are used for the analogue stage with two ELNA DUOREX 25v 4700µF for the power supply reservoir and a scattering of ELNA DUOREXII ARZ grade for local

decoupling. Mark says, "the quality engineering, style of power supplies, clock system and analogue stage used in the X33ES makes it an excellent unit for modifications"...

## THE SURGERY

The question was 'how well would the Sony (and machines like it, which sell for around £250 secondhand),

respond to open heart surgery?' Would it approach (or better) the best modern mid-price machines? While most won't want to buy an old machine to get it tweaked, many *Hi-Fi World* readers may be wondering if it's worth spending several hundred pounds on giving their existing machines of this vintage a new lease of life.

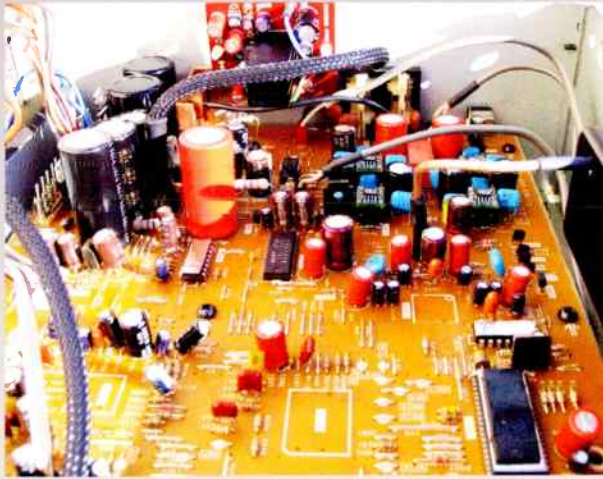
Audiocom's target was to focus the budget on critical areas of the circuitry, including master clock, main power supplies, regulation, analogue stage and component level upgrades. Mark Bartlett began by evaluating the components used across the entire player to create a balanced list of replacements.

First, the Silicon power supply

"greatness is bestowed upon a middling machine through careful, methodical component replacement..."

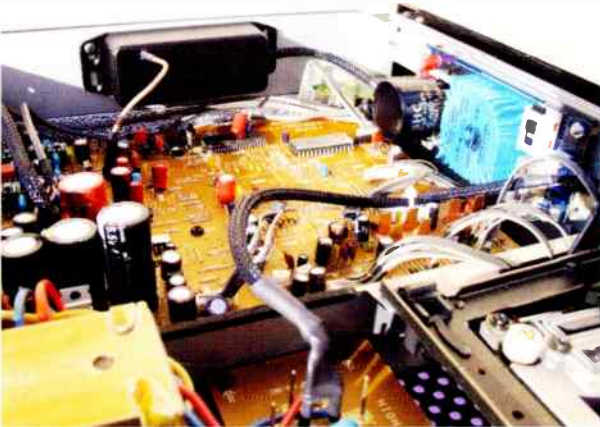
diodes were replaced with HexFRED types for both digital and analogue supplies. "HexFRED are renowned for their very fast, low noise action and superior sonic characteristics," Mark notes. In the analogue supply, the ELNA DUOREX were removed and replaced, since the likely thousands of hours of use to date may have caused performance loss.





**Digital and analogue power supplies get audio-grade diodes and capacitors; op-amps upgraded.**

"Also, higher grade alternatives are available and for this application we selected the Mundorf M-LYTIC; a new capacitor for 2006 which we have recently tested and approved". Mark describes the M-LYTIC



**Chassis damping added; the master clock is replaced by an Audiocom SC3...**

as "an audio-grade electrolytic in the truest sense". For the digital power supply Audiocom selected Black Gate standard to replace the 'cooking' electrolytics used in the stock model. Equal attention to detail was given to regulation bypassing and local decoupling capacitors in



**...which even gets its own bespoke power supply!**

both digital and analogue circuits with a combination of Black Gate N series and Rubycon ZA types used at strategic points.

"To complete the upgrades to the X33ES's power supply we drew our attention to the +5V

regulated power line," adds Mark. The +5V supply is a highly critical DC feed to several data processing chips including the DAC. The OEM fitted 7805 fixed type regulator was replaced with an Audiocom Invisus series 2 card, a PPR2/+5V regulator. "The very low noise, wide bandwidth design of the PPR2 ensures that clean, fast, stable power is fed to all data processing sectors to ensure digital and analogue signals are preserved."

The analogue filter stage is op-amp based, using the classic NE5532 for filter and buffering. Most agreed that the 5532 measures well and gives reasonable sound quality but modern day op-amps easily outperform it. The 5532s were removed and replaced with high quality, Gold-plated DIL sockets. This allows the option of upgrading or experimenting with different types of op-amp to fine-tune the sound. The op-amp selected was the AD8620, a costly alternative but one with superior sound, says Mark.

Unusually, the Sony CDP-X33ES uses two clocks, one for the DAC (45.1584MHz) and the other for the digital filter (16.9344MHz). To keep in line with the budget, Mark focused on the master clock for the DAC. "Like so many CD players of this vintage, it consists of a quartz crystal, 2x capacitor and inverter IC. Not only is this type of clock arrangement jittery but the +5V DC power supply, a 7805 regulator is shared with the DAC, digital filter and other processing ICs, a sure way to corrupt both clock and DAC power feeds. We replaced the OEM clock with the Audiocom Superclock 3 (SC3), housing the clock in an RF screen case to ensure no stray RF affected the CD player's circuits. The SC3 was powered from its own independent clock power supply, the Superclock 3 PSU Mk2. The SC3 PSU, with its wide bandwidth control system, is designed to deliver extremely low-noise, DC feed to the clock for optimal performance," he says.

During the stages of reassembly, Audiocom applied resonance control to chassis and components using two materials from Sontech of Sweden - Material SFRT-AL and SFRT - to reduce both air borne and structural vibration. Despite the rigid build of this machine, the transformer and disc motor cause unwanted vibration which affects the performance of all components. Additional RF screening is applied to the semiconductors such as the digital filter, to avoid the affects of any stray RFI. Finally the X33-ES is soak tested for over one hundred and fifty hours to allow new

components to burn-in. In Audiocom's experience, this period of burn-in is very real and the X33ES will benefit further from an additional three hundred hours before the sound quality settles.

**THE PROGNOSIS**

Let no one get any romantic notions about a stock Sony CDP-X33ES – it may be built better than most modern £1,500 machines, but it wins no prizes for sonics. It has the very fast, punchy, fizzy sound which Sony (and most Japanese machines of that age) were famous for. It's a little topky and rather mechanical sounding in absolute terms. Bass is strong and punchy, although not terribly tuneful. Midband is very detailed, but very two dimensional, and treble is splashy and over-explicit. It's a slightly forward and edgy sounding machine, with a rather 'grey' tonality. Plenty to improve upon, then...

The Audiocom modded 'X33ES was a fascinating change. You're left in no doubt that it's still the same machine, but then again it isn't at all! Most dramatic is the way the midband moves several metres back, bringing real depth perspective to recorded acoustic that previously seemed locked firmly between the plane of the loudspeakers. Next most obvious is the change in tonality. It still has a touch of that 'Japanese sound' – i.e. dry and crisp; most positively not like a Marantz KI DP – but suddenly it's multicoloured, so you can hear the differences between recording studios used, between mics and between guitars, for example.

The Audiocom mods strip it of its 'black and white' sound, bringing warm colours where appropriate, but not always – as this is no 'rose tinted' impostor. Interesting too that its default tonality is still dry, unlike a modern machine with a tube output stage, yet when called upon to reproduce sumptuous, fruity jazz piano sounds for example, it does just that.

The mods have given breadth and depth to its tonal palette, but do not just summarily add colouration – this is just how it should be. To give you an idea, the tweaked '33 has a fuller tonal palette than the superb Chord DAC64, yet sounds cleaner and more incisive too – due to it not having a high frequency roll off.

Bass is another impressive area; the original 'X33ES bass was reasonably strong by budget standards, but the modded one is a revelation. It's like someone's pressed the 'Loudness' button on an old seventies integrated amplifier.



**TRADE SECRETS –**

David Price talks to Audicom's Mark Bartlett...

**WHAT ARE THE BASIC LIMITING FACTORS OF CD PLAYER PERFORMANCE?**

A CD player can be considered as a chain of links consisting of main power supply, CD transport (disc pick-up), voltage regulators, master clock, digital processing circuitry, digital filter, DAC and analogue filters. From this simple viewpoint it can be argued that the weakest link determines the overall strength of the chain. To highlight two points; if the master clock causes jitter due to poor design or power supply induced problems, information is lost or corrupted. The result is reduced resolution, dynamics, digital hardness and glare. Similarly, noise in the digital and analogue power supplies colours sound reproduction. The whole deal with the power supply is to deliver pure noise free power, especially to the clock, DAC and analogue stages. Pure signal in and a noisy supply equals noise in the signal out - simple.

Respected audio manufacturers are aware of the benefits of higher quality clocks, low noise power supplies, etc., but many still choose to use basic clock circuits, regulation and components which ultimately limit performance. This choice is likely due to cost restraints forced by profit targets and marketing costs placed on the OEM which is constrained further for the larger manufacturers who dominate the budget to mid sector of the market.

**WHAT STEPS CAN BE TAKEN TO GET ROUND THEM?**

For a cost effective solution, one would not replace a single element in the system with an esoteric component in a non-critical area which may only result in a small performance gain. A more effective improvement would be made targeting key areas of circuitry such as power supply or analogue stage op-amps, then selecting a range of cost effective replacement components to achieve an improvement and, equally important, a balanced sound. At higher cost, more effective options are available such as replacements for master clock, voltage regulators and alternatives to the OEM analogue stage. Here Audicom offer a range of products such as the Superclock 3 low-jitter master clock which gives the most fundamental sound quality 'gains to cost ratio' of any given DVD or CD player. In addition, we have a accompanying clock power supply, a range of discrete voltage regulators to design and build upgrade solutions. The price of Superclock 3 is £199.17, and the discrete voltages regulators start at £52.82 for Super-regulator 2; all prices are inclusive of VAT. Audicom provide a custom modification service designed to suit the customer's budget and desired performance.

**ARE MODERN CD PLAYERS BETTER?**

There have been several advances in circuit design seen in recent generation players. SMD components with multi-layer PCBs are becoming standard which when combined optimise topology. Likewise progress in DAC chipsets has yielded higher sampling rates and increased bit resolution. On the downside we see that the quality of optical disc mechanisms has diminished. Power supplies are down sized; clock systems and regulator quality often do not differ from machines of the eighties. Higher-end players benefit from a higher attention to detail such as improved circuit design, topology, build quality, component quality, finish and ultimately sound quality. Whilst these improvements and refinements are generally true, it is not always the case and it can be said that brand names and marketing budgets have a role in what defines the "high-end". Special features such as Copper plating do bring performance benefits but these can reduce or in a worse case become lost if other more important areas such as clock or power supplies are overlooked.

4hero's 'Universal Love' showed prodigious amounts of it, and it was tonally accurate (not just a big booming sound), and impressively tuneful too. Now, again it's not exuberantly romantic a la Marantz KI DP, preferring to remain accurate, expressive and considered rather than gushingly emotional like the modded Marantz, but the Audicom 'X33ES is an extremely effective tool. Fast, crisp, taut and punchy, it provides a deliciously firm and strong underpinning to that lovely 'glass clear' midband.

Treble is another area of improvement; the standard Sony treble was scratchy; a really toppy

sound that almost obsessed on hi-hats. Now, it's smoother and warmer, yet with finesse and incision. It cuts deep into the recorded acoustic, letting you hear the air and space of a concert hall, or the lack thereof in a small studio. In absolute terms, it lacks the silkiness of the very best CD, but again it shows the modern, superb, Chord DAC64 a thing or two by remaining flat right up to 21kHz (or so it sounds), rather than achieving smoothness by treble attenuation.

Overall, it's a dramatic change, making for a fast, powerful, animated listen (a la high end Sonys of yore), but with real depth and

dimensionality plus a lovely tonal range – one that retains the original machine's spry neutrality, yet loses its greyness and thinness. The stock machine is pretty dynamic, but by seemingly lowering the noise floor, there's far more subtle clues to hear; it can eke out the softest of sounds, yet pound out vast tracts of bass in the same breath.

**CONCLUSION**

First, there's no point in modding your old machine if the laser pickup is no longer available, or you'll end up with an expensive inanimate object when the inevitable happens one day. But if your old CD player is still supported for spares, then this is a hell of a dramatic upgrade for £550. It takes a machine that's well off the pace compared to the Eastern Electric MiniMax CD, for example, and catapults it ahead (to my ears) quite dramatically. I think you're talking at least £1,500, for the likes of something like a Musical Fidelity A5CD to even come close, and even then the new boy can't match the amazing bass emanating from this oldster. Just as Ken Ishiwata showed what could be done with a stock Marantz, so Audicom have bestowed greatness upon a middling Sony – and the secret is careful, methodical component replacement based on good old fashioned experience. More than just pulling through, the patient has come out of this operation with flying colours.

*The finished article - after a long burn in, the patient is in rude health!*



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# Sound Service



Now that 'iPod' is in the Oxford English Dictionary, hard disk-based music is the rule (not the exception) in portable audio. Yet to date it hasn't managed to make such a dent in the real hi-fi market. Neal Gibbons wonders if these two latest examples of the breed – the Acoustic Solutions SP150 and Cambridge Audio Azur 640H – will change things?

**W**hilst idly browsing through some back issues of *Hi-Fi World*, I came across a review of the Imerge hard disk based player by our esteemed editor, DP, in May '02. He posed the question that "surely in a few years time all audio players will work this way, a hard disk to replay music and a CD/DVD-ROM spinner for recording?" Well, interest has steadily grown with a plethora of systems launched onto the market in recent years. Sales of these have increased due to improved sound quality, ease of use, functionality and a large drop in price. But despite this, hard disk based systems have not quite managed to dominate despite their obvious benefits, many folks preferring to spin their silver disks the old fashioned way.

To date at least, it seems DP has been proved wrong [*surely a first?* – Ed.], with sales of ye olde single box, single mechanism, real time machines holding reasonably well, despite the onslaught from hi-res formats, DVD and the HD 'music servers'. Well, could it be that this extremely keenly priced duo from the Audio Partnership stable - the Azur 640H from Cambridge Audio and the SP150 from Acoustic Solutions – will change anything? Let's see...

## ACOUSTIC SOLUTIONS SP150

A normal enough looking box, measuring 95x430x285mm and weighing 4.8kg, the £200 Acoustic Solutions feels weighty, but the construction is rather haphazard, my sample having an ill fitting case and rather flimsy construction. The SP150 is a no-frills, entry level player. At rear there is a single pair of RCA phono output sockets, a mains IEC socket and...err, that's it!

On the front panel there's a Liquid Crystal display, normal CD control buttons, on/off switch and a large rotate-and-select control knob for the menu. Unusually, the CD draw is located on the right hand side.

Functions are limited to CD playback from the computer derived CD mechanism or hard disk; there is no CD recording facility. Audio can be stored as MP3 files up to a user selectable 320Kbs data rate or as raw WAV. A CDDb music database is held internally to recognise CD title, artist, etc. but all updates for this have to come from Acoustic Solutions directly.

I found the menu interface easy to use, either by the front panel or the bundled remote. There was some mechanical noise from the unit despite the 40GB hard drive and CD transport being rubber mounted. Playing a CD is simple enough,

load a CD into the drawer, select 'Play', select the CD title from the presented list and away you go.

Storing CD to hard disk was just as easy. Instead of selecting 'Play' you select 'Store', after which you are asked to 'Compress Later?' Selecting 'no' will copy the CD in raw WAV format. Selecting 'yes' will compress the copied CD into MP3 when the unit is placed into standby mode. This is done because compression can take some time and is therefore best performed when the unit is not playing.

Copying to hard disk is extremely fast, one of the fastest I have encountered.

## CAMBRIDGE AUDIO AZUR 640H

Where the beer-budget SP150 has limited features, the far pricier 640H is bristling with them. Weighing in at 8kg and measuring 80x430x315mm, the £600 Cambridge Audio looks and feels a quality piece of kit. The casework is finished very well, constructed from thick steel panels and neatly counter-sunk Torx screws. The supplied remote control is also an elegant design with a nice feel and weight to it. On the front panel there is a Standby/On switch, CD/CDR/CD-RW mechanism, LCD display, rather small CD style control buttons, menu navigation



and selection buttons and a USB v2 port. At the rear there are PS/2 connectors for mouse and keyboard, two USB v2 ports, an Ethernet port, S-video out, composite video out and an RS-232 port. Also there is a control bus port for linking to other products in the Azur range, RCA/Toslink S/PDIF out, gold-plated analogue RCA in/out, main on/off switch and IEC mains connector.

The 640H features Cambridge Audio's own AudioFile operating system, a menu-driven system that is ideally accessed with a keyboard and mouse, although the remote can also be used. To fully utilise all the features the unit needs connecting to a TV or monitor. A large number of features are available from the front panel and remote control but features like Static IP settings and Network share set-up need to be performed via the menu interface. This is all very well if you have a TV located close by, however, since my hi-fi is in a TV-free room, it meant carting in a small portable to get the 640H set-up!

Internally, there is a 160GB disk drive allowing up to 300 CDs to be stored in uncompressed WAV format. User selectable MP3 compression rates up to 320kbps can also be used, other formats include WMA, AAC, SND, AIFF, etc. The 640H features the same Wolfson 8740 DAC as used in the Azur CD players, an oversized mains transformer (no PC based SMS supplies here!) and seven linear regulated supplies for all the critical audio stages.

There is no in-built wireless networking functionality but the unit can interface with iTunes on a Mac or PC via the Ethernet port. It's possible to stream music from the 640H to other AudioFile based systems or to your Mac or PC. The unit can also access Internet based radio stations. A really nice feature is the ability to set-up Network Shares. This means it's possible to access music directly stored on a computer

or visa versa without having to first import the music in to the 640H.

Using the front panel and remote control I found the interface easy enough to use and on the whole intuitive, there were a few 'niggles' though. The first was having to move the cursor up to 'Back' and then pressing select to jump back a menu, where a single left arrow key press would have been more intuitive.

Also, there was a short but annoying delay between selecting something and the front panel display registering and then responding to your input. The more I used the 640H via the front panel the more I realised that the AudioFile software was really designed to be accessed via the on-screen menu and not via the front panel. For instance, there is no way to input album details if you don't have an Internet connection. With no in-built CDDB database the 640H must rely upon the internet for album data retrieval. In cases where there is no internet connection the front panel LCD screen refers you to the on-screen menu for manual data input, very limiting!

The 640H can record via its analogue ports and this worked well in use. However, there is no editing facility such as the one provided with the HiFiDelio unit, making this facility a little redundant. Recording CDs out to CDR on the other hand was easy enough with no issues.

**SOUND QUALITY**

The humble little Acoustic Solutions SP150 acquitted itself rather well in sound quality. It has a nicely balanced presentation with smooth treble and reasonable bass performance. Its sins were ones of omission, rather than any real failing. It lacked a little speed and attack on drums and bass guitar, I felt it was somewhat cuddly in the bass. Van Morrison's 'Back on Top' was smooth and easy on the ear but lacked the necessary drive. Detailing was good enough though and the

treble clean if lacking real depth and air. Performance from hard disk was better than from the PC CD player, these units all seem to have a similar sonic signature, I'm finding.

As you'd expect, at three times the price, the Cambridge Audio 640H was a marked step up in quality from the SP150, again hard disk being better than direct from CD. Even via its analogue ports the 640H proved more tuneful and engaging. Bass took on good attack and depth, driving along rhythms with ease. Female vocals came over with good emotion and detail; Hem's 'Eveningland' was reproduced well, conveying all the right emotional cues. On The Be Good Tanyas' 'Blue Horse', vocal interplay between the three singers was spot on, with great timing, separation and detail. I felt the 640H gave my modified SqueezeBox a good run for its money, just falling short with a little less depth, detail and attack.

**CONCLUSION**

To be successful, a hard disk player needs to offer real user benefits, good features with an intuitive and easy to use interface. The SP150 lacks features but is indeed easy to use, sounds good and would be even better if it had a S/PDIF output and a CD-R facility. The trouble is, with its dubious build and small HDD, it may find the market tough going, however keenly priced it is.

By contrast, the Azur 640H is a fine sounding machine with excellent build quality. Its main failing is the user interface, relying too heavily on the need for an Internet connection and a TV for menu navigation and set-up.

Both of these are genuinely interesting and capable products, each representing super value for money, but whether they can pull traditional CD players buyers over to the hard disk camp is another question altogether...

**VERDICT** ●●●●£  
 Fine value for money and surprisingly good performance at the price, but there's a definite shortage of features and build quality and storage capacity are marginal.

**ACOUSTIC SOLUTIONS SP150** £199.95  
 Acoustic Solutions Ltd.  
 ☎ +44 (0) 1327 340601  
 www.acousticsolutions.net

**FOR**

- price
- ease of use
- good sound

**AGAINST**

- limited features
- no S/PDIF output
- small HDD

**VERDICT** ●●●●£  
 Fine sound and good build make this an excellent machine, compromised only by the fiddly user interface.

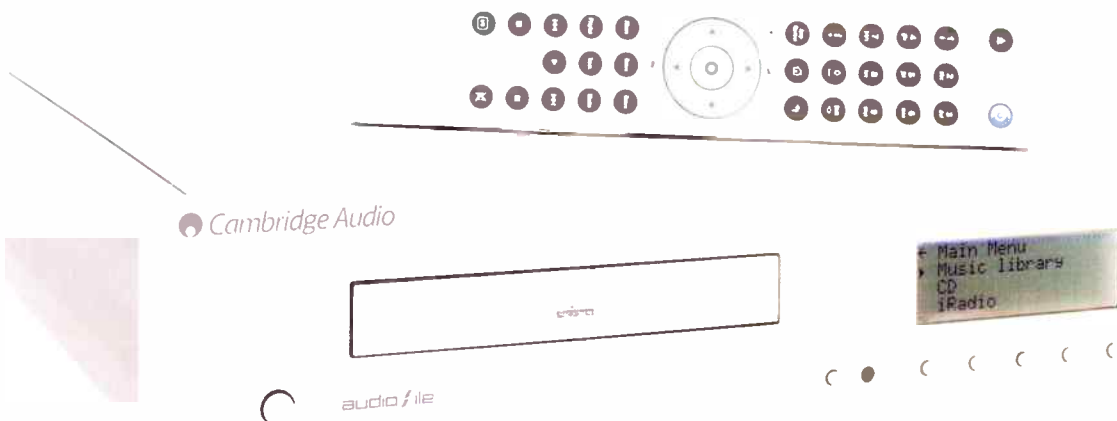
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**FOR**

- fine sound
- features
- build quality

**AGAINST**

- no internal CDDB
- needs TV
- menu Interface





# Sole Provider

Given that most commercially available CD spinners are amalgamations of off-the-shelf digital and analogue electronics, it's interesting to find one that uses a bespoke components throughout. Channa Vithana says there's nothing normal about Tube Technology's Fusion CD64...

**E**stablished eighteen years ago, Tube Technology have continued to manufacture, without fuss or hyperbole, very distinctive hi-fi instruments that are decidedly technologically advanced yet feature, for the most part, valves. For instance, their stunningly designed 200W valve Genetix Monobloc amplifiers with their striking semi-circular ventilation grille design and accompanying Rostrum equipment supports make quite a visual statement even before they have been heard.

The Fusion CD64 CD player we have here for review is more conventional in appearance but can also be mounted onto the Rostrum support along with a matching tuner and preamplifier as well as the Genetix Monoblocs. It uses a Sony KSS213B dual beam optical block transport, which closes with a damped action and does so attractively flush mounted into the thick front panel, without any ugly or noticeable gap inconsistency.

Build quality of the Fusion CD64 is good. It has nicely finished edges, which offer smoothly machined and chamfered openings for the display and buttons. The quality of the surfaces is good as it features a very

fine grain to the main top cover and a slightly deeper brushed finish to the thick front panel. The buttons look better than other iterations of Fusion players as they are no longer fitted to an extruded section which was located forwards from the front panel. I would have preferred a more sombre satin silver/titanium colour to the buttons though, as the gold on the review model is a little ostentatious in contrast to the fine charcoal black casework.

The Fusion CD64 usefully has digital inputs to take advantage of its special 64bit DAC (more of which later) and can accommodate other digital sources such as a computer soundcard, satellite, DVD or DAB for instance. It utilises both optical and BNC digital inputs with auto sensing. There are also optical and BNC digital outputs along with switchable clock-in and clock out sockets.

The transport is automatically switched off when in standby mode, while the digital inputs, DAC and valves are kept warm so an external digital source can be accepted.

The Fusion CD64 is available in black or silver finishes and can also be specified with Rostrum supports. It measures 410x310x95mm and weighs 10kg.

Tube Technology supplied an

optional £150 Fusion Power Link mains cable. The Power Link features 24 carat gold-plated pins and fuse enclosed in a non magnetic plug which they say ensures maximum power transfer, while the high current gold-plated IEC plug maintains maximum contact. The cable itself is triple insulated using multistrand high current copper conductors, while the outer copper braid screens EM and RF interference. To provide further shielding, the Power Link has two unspecified cylindrical components, sheathed in lilac, one before the plug and the other before the IEC socket. In use, and specifically within the context of the Fusion CD64, I preferred the dedicated Power Link mains cable, when comparing it to similar priced alternatives as it







enabled a more focused and balanced sound quality when it came to the cohesion of different instruments.

### DAC SPECIAL

Tube Technology has a long association with ex-DPA (Deltec Precision Audio) designer Robert Watts. This man is the creator of many fine DACs, including the DPA Little Bit, which features in our World Classics section. Robert Watts designed the WTA filter (Watts Transient Aligned), and Tube Technology says that they were the first to use a WTA filter in their original Fulcrum DAC. This was developed in 1996 and released in 1998. It featured the excellent HDCD (High Definition Compatible Digital) system for suitably encoded CDs and was a 24bit WTA design. Later, the developments of the 64bit WTA Fulcrum DAC64 and Fusion CD64 iterations were evolved, which were much more powerful to the previous 24bit versions in comparison.

This 64bit WTA filter, along with the Pulse Array DAC and reprogrammable Xilinx EPROM chips, are also used in the superb £1,995 DAC64 by Chord Electronics (see HFW February 2006, p11), which employs switch mode power supplies. However, the Fusion CD64 is different. Tube Technology says, "the output from the DAC array is a balanced voltage, implementing a simple first order low pass filter, which is fed into a balanced high linearity hybrid output stage, featuring a (Russian Sovtek) Milspec 6922 vacuum tube per channel and operational amplifier. Independent regulated power supplies are used to supply all the individual stages. All digital and analogue supplies are from independent transformers".

Tube Technology also supplies

optional cryogenically treated 6922 valves at £58 per pair – our experience of DCT-ing tubes suggests this would be well worth the price premium.

"this reproduces some of the finest instrumental and vocal timbre in music I have yet to hear from a CD player..."

So why is the WTA filter important? Well, it's all to do with the taps! The previous 24bit HDCD WTA Fulcrum DAC had approximately 256 (or less) taps and the latest 64bit WTA utilises 1024 taps. Tube Technology says, "all reconstruction filters have relatively short tap lengths (and) the largest commercial device is only about 256 taps. It is due to this short tap length and the filter algorithm employed that generates the transient timing errors. These errors turned out to be very audible. Going from 256 taps to 2048 taps gave a massive improvement (with) much smoother, more focused sound quality, with an incredibly deep and precise soundstage. Initial experiments used variations on existing filter algorithms. Unfortunately, going from 1024 taps to 2048 taps gave a very big improvement in sound quality, and it was implying that almost infinite tap length filters were needed for the ultimate sound. At this stage, a new type of algorithm was developed (called) the WTA filter. This was designed to minimise transient timing errors from the outset, thereby reducing the need for extremely long tap lengths... A 256 tap WTA filter sounds better than all other conventional filters, even with 2048 taps. WTA filters still benefit from long

tap lengths; there is a large difference going from 256 (WTA) taps to 1024 (WTA) taps, so the Fusion CD64 features a WTA Digital Filter with 1024 taps."

Consequently, an excellent algorithm, as provided by the WTA filter, is essential because "a digital filter's purpose is to accurately reconstruct the leading edge of the data so it is in its purest form, so a higher tap length must be combined with a sympathetic algorithm (to give) the best results". For further in-depth technical information, see the Tube Technology website at [www.tubetechnology.co.uk](http://www.tubetechnology.co.uk).

### SOUND QUALITY

In some respects – but not all – this was one of the most convincing CD spinners I've yet heard. The emotional quality of the music from the 'BACH Trio Sonatas' by the Palladian Ensemble was most enjoyable, as the timbre of the strings was compel-

lingly lifelike and vividly textured. The lower frequencies of the stringed instruments were a particular delight, as they had convincing dimensionality in their expression. Midrange and treble frequencies of the recorder were handled very well, as they did not go into stridency, nor were they reticent, so I could appreciate all the



different instruments' identities - important because their respective timbres remained clear, differentiated and intact.

The atmospheric live cut of

# SIMPLY STAX

## So .....

You've probably read the review of the Omega system here in this issue of *Hi-Fi World*.

I'm not sure I've seen it yet, but I suspect it's pretty good. However what you don't know from the review – *but scores of my customers do* – is that there is one system that many find musically superior to the SR-007 Omega-2 reference system. It's the **SR-717 Omega-2 reference system**.

It's the same price as the SR-007 – but it uses the STAX SR-717 Direct Coupled FET's pure Class A energiser instead of valves. One owner described it as *"like having a mini Krell driving my Omegas"*

Quite so.

You've probably not heard about this energiser. That's because it's **exclusive to me**. I order and sell more STAX than anyone else on the planet and the good people at Symmetry (the UK importers) happily get STAX Japan to supply these.

Another advantage of buying from me is that I can supply – on an **exclusive basis** – some energisers in **black**. I don't charge extra for this. It's a service primarily for (but not restricted to) my many customers who own NAIM and MARK LEVINSON equipment and who quite naturally want their STAX equipment to match visually.

## Here are a few of the reasons people buy from me:

1. The power cord supplied by STAX really isn't very good. Bin it. I supply free of charge one of 4 custom-built power cords. They are made exclusively for me by a well known maker and are known as CASSIEL. They range in price from £44.74 to £148.80. Whatever STAX energiser or system you buy, **you get this vital upgrade entirely free**.

Details here: [http://www.simplystax.co.uk/tuning.html?tp\\_id=4](http://www.simplystax.co.uk/tuning.html?tp_id=4)

2. The interconnect supplied by STAX is not too good either. Bin that too. Depending on your needs, I supply you at a very good price either the LAT XLR interconnect, or the STEREOVOX Colibri or entirely FREE, one of the many traded-in NORDOST interconnects – usually 6 or more to choose from.

I do this because there's no sense in compromising on the interconnect and there's no point paying more than you have to. Am I right?

3. I have the *entire* range of STAX on permanent demonstration. As far as I'm aware, no other UK retailer offers this.

## Trade-ins

*"Uncommonly generous"* trade-ins for new buyers and unbeatable p/ex for existing customers.

## News

By the time you read this, I should have on demonstration the brand new 006t series 2, the 007t series 2, the 4040 series 2, the 3010 system, and the SR-007 Omega system Mk2 - **which is the upgraded version of the system you've just read about in this issue**.

## Used items

This ever-changing list can be viewed at [http://www.simplystax.co.uk/second\\_hand.html](http://www.simplystax.co.uk/second_hand.html)

If you aren't on-line, just phone me and I'll mail you a copy right away

## Demonstrations?

Just 1 the morning & 1 in the afternoon.

## What about the music though?

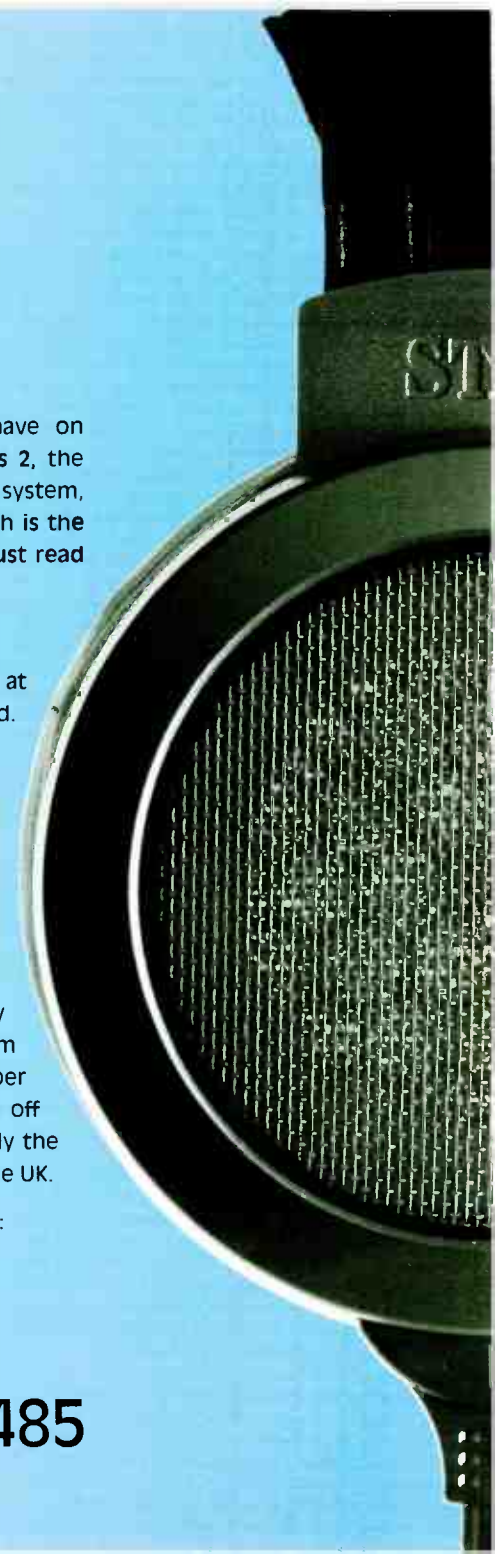
No problem. Until May 30th – if you buy any piece of new STAX equipment from me you get a unique personal ID number that gives you 20% (yes, twenty percent) off all new recordings from Vivante – probably the friendliest music mail-order company in the UK.

Finally, you might want to take a look here:

<http://www.listencarefully.co.uk/>

[www.simplystax.co.uk](http://www.simplystax.co.uk)

Telephone 0208 447 8485







'Tea In The Sahara' by Sting was beautifully rendered, with a deep, lush and surprisingly powerful bass underpinning to the musical structure. The vocals were just right with the Fusion CD64, and not painful considering this was recorded in the mid-eighties when he was just starting to evolve from his screechy Police singing style. The whole musical ensemble, completed in shimmering jazz style with drums, guitar, vocals, was excellent. I was truly impressed with the trickiest aspect of the ensemble, the reproduction of Darryl Jones's immaculate bass playing. The player displayed power and agility in the hypnotically meandering basslines, to authoritative effect. The music timed well, and all the players were presented in perfect respective balance.

'Munich' by Editors had excellent low frequency ability, as the bold structure to this busy and frenetic song was revealed. Vocals were very good indeed in their expression and were powerfully emoted in a great combination with the basslines and drums. The music was big and voluptuous in its instrumental communicative ability, although the sheer speed, rhythm and ferocity required for this song wasn't quite captured as well as some rivals. This is an important point, showing that the Fusion 64 is no Naim CDX2/ XPS2 - it doesn't major on speed on grip in quite the same way.

The elegant and lyrical melodies from the harmonica on 'Midnight Cowboy' by John Barry were utterly convincing in a fluid and emotionally sophisticated manner, and I could simply follow the lilting melodies as they unfolded and enwrapped the listening room. As the expansive orchestrated harmony and sub-melodies appeared, the whole sound, though enveloping, was never cloying, sweet or uncomfortable. Rather the resolution of the instruments was excellent and these elements combined to make up a very enjoyable musical entirety with 'Midnight Cowboy,' much like Sting's 'Tea In The Sahara'.

When comparing the £2,200 Fusion CD64 with its 64bit WTA/ Class A valve output, to my reference £1,350 Densen B-400 Plus CD player which has a 6 Watt zero-feedback

Class A solid state output - I found the Densen focussed on a more free-flowing structure with all the music used. For instance, the Densen locked onto the inherent musical constitution and rhythms of 'Midnight Cowboy', where it was better in layering each successive musical note, so its timing was stronger. However, the sheer lyrical brio of the Fusion CD64, when it came to the individual qualities of the musical instruments and their timbres, was lost through the Densen. The Densen was better timed - instruments and vocals were presented with lightning-fast layering, phrasing and attack on 'Munich' by Editors, with an appropriately more exhilarating musical stance. However, the cavernously deep bass and emotionally developed vocal communication on 'Munich' was lessened in comparison to the Fusion CD64.

On the Bach's 'Trio Sonatas,' the same applied - the Densen was better with phrasing and pace, dynamism and rhythm, although it couldn't quite reveal the timbral qualities and therefore the identities of each musical instrument as well as the Fusion CD64. Spatially wide and free flowing, the sound was tauter, lighter - so, while I could accurately follow Darryl Jones's bass lines and accompanying melodies with the Densen, the Fusion CD64 was even more enjoyable in this respect - where the bass lines had a more rounded and tangible feel. Interestingly, unlike the Editors, John Barry and the Palladian Ensemble CDs; both the Densen and Fusion CD64 were equally poised when it came an effortless rendering of Sting's 'Tea In The Sahara'.

**CONCLUSION**

With the obvious exception of the matchless £9,000 Esoteric X-01 (HFW August 2005, p10), the

£2,200

Tube Technology Fusion CD64 reproduces

some of the finest instrumental and vocal timbre in music I have yet to hear from a CD player. It may not

quite equal the timing and rhythm of the Densen B-400 Plus, for example, with the rock music of 'Munich' by Editors, but the Fusion CD64 - with its wonderfully revealing and life-like timbral qualities - was so very musical with the atmospheric jazz vibe of Sting's 'Tea In The Sahara', the intricate playing of the 'BACH Trio Sonatas' by the Palladian Ensemble, and John Barry's 'Midnight Cowboy'.

With these recordings, the Fusion CD64 excelled and really brought them to life where the individual instruments and vocals were not only entirely convincing in their tonality but importantly, these musical elements - individually and within the greater musical structure - maintained their respective identities. Sonically - and technologically - the Tube Technology Fusion 64 is on its own.

**REFERENCE SYSTEM**

- Densen B-400 Plus CD player (£1,350)
- Densen R-250/B-330 amplification (£6,000)
- Bosendorfer VC-2 loudspeakers (£4,750)

**MUSIC**

- Palladian Ensemble 'BACH Trio Sonatas' (1995)
- Sting 'Bring On The Night' (1986/1998)
- Editors 'The Back Room' (2005)
- John Barry 'Themeology... The Best Of' (1997)

Unique digital and analogue audio engineering makes for an exceptional CD player that, on some programme material, is peerless. Stunning.

**TUBE TECHNOLOGY**

**FUSION 64** £2,200  
Tube Technology  
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www.tubetechnology.co.uk

**FOR**

- emotionally engrossing sound
- outstanding vocal/instrumental timbre
- DAC inputs

**AGAINST**

- less accomplished with rock music

**MEASURED PERFORMANCE**

In spite of its radical technology, with Watts Transient Aligned filter and 24bit processing via a special pulse array convertor, the Fusion CD64 returned a conventionally flat frequency response. Here it differs from Chord's DAC64, which has a high frequency roll off. I would expect a brighter, or faster sound from the Fusion CD64 as a result. This player offers a wider response than today's best, stretching from 2Hz up to 21.5kHz.

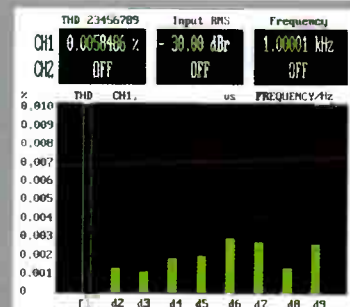
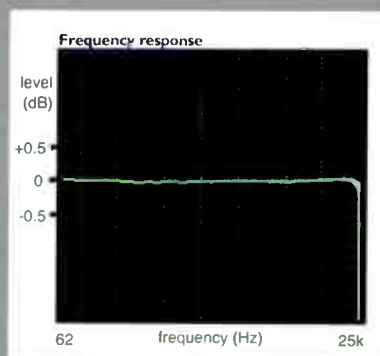
In spite of the tube (valve) output, distortion levels were low, even at peak output (0dB). Noise was a bit lower than usual for a tube type too, so where 105dB EIAJ dynamic range is usual, the Fusion CD64 offers 110dB. The use of low noise ECC88s (6922) is a prime reason, but these come in various flavours and cheap types must be avoided.

Output was high at 2.74V, so this player will sound loud if compared directly with others. Jitter was a minimal 10pS, with no programme related components.

The Fusion CD64 measured very well. There are no drawbacks to its radical internal technology. NK

Frequency response (-1dB)  
CD 2Hz - 21.5kHz

Distortion	CD
0dB	0.005%
-6dB	0.003%
-60dB	0.24%
-80dB	3.3%
Separation (1kHz)	92dB
Noise (IEC A)	-102dB
Dynamic range	110dB
Output	2.74V



# Minimum,

**Designed and built in Canada, the diminutive Audio Zone AMP-1 integrated amplifier is attractively minimalist in style, yet big in musical substance, says Channa Vithana...**

**T**he £1,595 Audio Zone AMP-1 has many of the qualities I find attractive in an attainably-priced hi-fi amplifier. It sets itself apart from all those mass-market, button-fetish clones dressed in standard issue rectangular boxes. Rather, here we have single input integrated amplifier, sans tone or balance controls. For me it's a welcome change and an attractive proposition for those who fundamentally use only one important source, but I can't see everyone thinking like that...

The AMP-1 goes further by being completely dual mono, where the power for each channel is fed from a solidly formed separate power supply. Audio Zone says that the AMP-1 can be upgraded with two PSU units, one for each channel, for complete dual mono operation and this would cost approximately US\$400 extra.

The AMP-1 amplifier unit is alluringly tiny, measuring approximately 166x212.5x71mm. It is beautifully crafted in anodised aluminium and features front and rear panels, about 13mm thick, that separate the two mono amplifier compartments, side to side. The resulting casework is reassuringly solid. The finely crafted volume knobs, which operate 31-step Noble 50k attenuators, are well weighted, nicely machined and usefully graduated with physical indents to help align the two channels correctly. Internally, Audio Zone states that the AMP-1 uses a point-to-point hand-wired circuit. The

with attractively formed anodised aluminium using thick front and rear plates that frame the main casework within. The AMP-1 PSU has a single, discrete, red LED at the front and two captive power supply output leads and IEC mains input at the rear. Audio Zone says that the "power supply for the AMP-1 (uses) a Plitron 400VA transformer, 22/22V on the rails and (is) split for 2 channels. All transformers are dual wound for world use 110/240V 50/60Hz operation. We wanted to obtain 45-50W per channel and our R&D configured these voltages as the most optimum to achieve these specifications."

## SOUND QUALITY

The combination of Richard Egarr on harpsichord and Pamela Thorby on recorder from the 2004 SACD release of 'Handel Recorder Sonatas' was a deft and lyrical delight through the AMP-1. Both instruments were nicely cohesive and in balance with each other – any one instrument did not dominate or sound forwardly located within the mix. I could appreciate the intricate melodies, phrasing and rhythmic interactions between the two players. The upper midrange tonality of the recorder did not flare out into uneasiness or coloration as crescendos were reached. The recorder was beautifully counterbalanced by the delicacy of the harpsichord, which was a texturally finessed and reproduced instrument via the AMP-1. Overall,

was superb, ably revealing the complex yet rhythmically accessible production. So here I could follow the unravelling of the instrumental textures from synthesiser keyboards, ethnic horns, percussion and the stunning vocal styles employed. As powerful percussion-led crescendos appeared and faded with alacrity, the AMP-1 displayed no strain or fuss in handling huge dynamic swings. The sound was never less than engaging, richly textured and unconstrained with the 'Passion' SACD.

Pounding hypnotically, the opening to 'Closer' from 'The Downward Spiral' SACD by Nine Inch Nails had plenty of low-frequency feel and tunefulness which set up the darkly themed subject matter of the lyrics and accompanying melodies perfectly. The AMP-1 peeled away the internalised emotional structure of the song through its melodies, rhythms and vocals and reproduced them all with a superb dimensionality. Just as with the 'Passion...' SACD, the AMP-1 was more than capable of handling the complexities of the busy electronic-to-analogue instrumental and sampling concoction of 'Closer' without strain, confusion or fatigue.

Comparing the £1,595 AMP-1 (with its claimed 45W/8ohms) to its fellow Canadian £1,595 Moon Audio i-3 integrated was intriguing. The Moon yielded a wider, broader canvas to bestow its musical abilities. It also had a deeper bass extension and just edged the AMP-1 on speed and attack. The AMP-1 however had superior bass tunefulness and was better overall with the Peter Gabriel and Nine Inch Nails SACDs, where it was more able to portray instrumental timbre with three-dimensional life-like authority. It was also better imparting the collective rhythms, melodies and harmonies with atmosphere and finesse. Additionally on the Nine Inch Nails

"the sound was never less than engaging, richly textured and unconstrained..."

claimed power output is 45W/8ohms and 65W/4ohms. At the rear panel are a set of high quality loudspeaker binding posts, phono socket input and power supply input per compartmentalised mono channel.


The AMP-1 PSU measures approximately 152x204x82mm and is built and designed to the same high standards as the amplifier unit

the speed and interaction between the harpsichord and recorder were excellent.

The deeply atmospheric soundtrack SACD 'Passion, Music For The Last Temptation Of Christ' by Peter Gabriel, was beautifully rendered and acoustically enveloping through the AMP-1. The sound was effortless. The instrumental separation



# Maximum



AMP-1

£  
Surely one of the most purposeful integrateds on the market, this wonderfully alluring sounding amplifier is not all things to all men - yet is all the better for it.

## DESIGN MATTERS

The two-box AMP-1 is a design success overall and I find its simplicity in appearance (without visible fixings to the front, sides or rear) and function very appealing. The AMP-1 amplifier unit on its own does indeed look similar to the black-clad, esoterically high-end Gaincard integrated amplifier by 47 Labs, which is an amplifier and manufacturer that I have admired since the late nineties. However, George Tordai (AZ Sales & Marketing) says, "to be honest we don't much like comparisons with 47 Labs just for using the same power source. Our approach is totally different; we started from the ground up, (with) design for chassis resonance control and to achieve user-friendly operation. We use different voltages, transformers, parts and circuit layout. It's really like comparing Pass Labs to a Krell even though they both use Mosfet transistors. We have great respect for (47 Labs') Mr. Kimura for being a real pioneer and having the foresight to take a new direction in sound reproduction. I believe Audio Zone has taken this evolution to next level."

Personally, I think Audio Zone should supply the AMP-1 amplifier unit as two components, to visually separate it from comparisons to 47 Labs. On the philosophy of using very short signal paths, and hence such a small enclosure, George Tordai says, "I have been a firm believer throughout... that a short and simple signal path reproduces recorded music at its best. I have the luxury of listening to more equipment from around the world than most enthusiasts can do in a lifetime. To my ears the simple circuits always sounded the best and conveyed music more true to life in reproduction."

recording, the Moon struggled with the dynamic crescendos and sounded a little brittle in comparison. On the 'Handel Recorder Sonatas' the Moon was again better when it came to outright speed and vibrancy, yet it was a little forward with both the harpsichord and recorder. The Moon had more prominent timbre yet strangely, instruments weren't as richly textured or rendered with artistry as on the AMP-1. Consequently, the Moon and AMP-1 were both excellent but different in method - where the Moon was more charismatically engaging, the AMP-1 had finer musical sophistication with greater dexterity throughout the frequency range.

## CONCLUSION

The Audio Zone AMP-1 will appeal to music lovers who want the simple life, where they primarily use just the one source. It is well crafted, nicely styled and has performance beyond its price tag. In sound, design and build quality terms it offers excellent value. In performance terms it compares

brilliantly against the £1,998 Copland CSA29, the £2,000 Phonosophie Classic I and the Moon Audio i-3 at £1,595. If a multitude of inputs, balance, remote and tone controls are not important agendas, then audition the AMP-1 with confidence

AUDIO ZONE AMP-1 £1,595  
Audio Zone  
☎ +44 (0)1592 744 779  
www.shadowdistribution.co.uk

## FOR

- build quality
- minimalist style
- richly-textured performance

## AGAINST

- single input only

## MEASURED PERFORMANCE

This tiny amplifier reveals its specialist nature under measurement. Power output is a limited but adequate 40W into 8ohms, or 50W into 4ohms. Power supply regulation isn't great, but again it is satisfactory for reasonably solid and controlled bass. Obviously, the Z Amp is for use with sensitive loudspeakers that are likely to be well damped acoustically in any case.

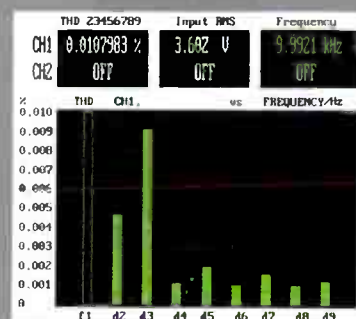
The distortion pattern was unusually stable under all conditions. Although this amplifier actually exhibits crossover in the midband - rare nowadays - the harmonic content was predominantly third and, more importantly, the pattern was maintained at high frequencies, so there was very little change in distortion pattern with either frequency or level. With distortion levels not rising above 0.04% (full output, 10kHz, 4ohms) I would expect this amp to sound clean and open.

Although distortion behaviour suggests low feedback, an unusually wide closed loop response of 1Hz-186kHz suggests the opposite; the Z Amp-1 is unusual. Unfortunately, the amp is direct coupled and there is no d.c. servo, so any input offset will affect the loudspeakers. Output offset

varied with volume control position too, although not badly. This amp. should be used with an a.c. coupled preamp or CD player, especially as its input sensitivity of 0.6V is very low.

This is an interesting low power amplifier; it measures well and will likely sound good. NK

Power	40watts
CD/tuner/aux.	
Frequency response	1Hz-184kHz
Separation	96dB
Noise	-110dB
Distortion	0.01%
Sensitivity	600mV
d.c. offset	8mV/14mV



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MINI-MONITORS WORTH  
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GREAT COMPETITION!**



**H**ere's your chance to win a fantastic pair of Acoustic Energy AE1 Classic mini-monitors! In April 2006's Hi-Fi World, this is what David Price had to say about them:

"The tiny, two way AE1 arrived in 1987, and caught the eighties zeitgeist brilliantly. Epitomising the 'source direct, big amp and mini monitors' audiophile credo, it's fair to say that nothing captured the 'quintessence' of the decade better...At 295x180x255mm it's a small loudspeaker alright. Treble duties come care of a 25mm SEAS magnesium alloy dome, with a purposeful mesh grille in front. Below 3kHz, the Acoustic Energy designed and built 90mm ceramic sandwich aluminium alloy cone mid/bass driver takes over, via symmetrical third order crossover. This said drive unit was designed by bass player extraordinaire Phil Jones. Interestingly, it's a straight sided design spun from

aluminium alloy with a graded thickness across its profile and then hard-anodised black on both sides... The bass unit is reflex loaded by two frontally mounted 1 1/4" ports, profiled to reduce wind noise. The rear terminal panel mounted crossover is a complex affair; a third-order Butterworth, 18dB/octave high-pass leg and a 24dB/octave low-pass leg with a phase-compensating network...The cabinet was no less innovative in its day, a heavy 8kg and dead affair made from 22mm MDF, with a concrete lining to damp out resonances. Finish is excellent, by nineteen eighties standards!

It's all true what they said about the original AE1. It's bracing, engaging, uplifting and musical in a way I haven't heard for a long, long time. This is one of the most musical loudspeakers I've ever heard, bar none. It sounds like it's pumped up full of caffeine; intense, full of vim and brio. It just romps along, no matter what you play. Even the staid

seventies pop-rock sensibilities of Fleetwood Mac's 'Don't Stop' (on vinyl), with its laid back, 'seventies-super-group-tries to do an uptempo number' feel suddenly becomes infused with pace, power and passion. It's like they started listening to The Undertones, or something. Put on Chic's 'Le Freak' and you're glued to your seat; it's riveting. The bass is fast and lithe and just runs away; whereas most loudspeakers play bass lines about half a minute behind the midband, the AE seems to start with the bass (always bang on time) and work upwards. There is a vast amount of information bubbling out everywhere; it's like there's too much music and not enough time to experience it. It's a fast loudspeaker, alright...The AE1s chomp at the bit; every hit of the snare drum sounds like the drummer really meant it, every pause is dramatic and arresting, every tiny dynamic accent seems like thunder. It's a brilliantly successful remake of an iconic design; not flawless, but surely one of the most musical loudspeakers ever made.

If you'd like to win this superb pair of speakers, then all you have to do is answer the following four easy questions. Send your entries on a postcard by 31st May 2006 to:  
**June 2006 Competition,  
Hi-Fi World Magazine, Unit G4,  
Argo House, The Park Business  
Centre, Kilburn Park Road,  
London NW6 5LF.**

**RULES AND CONDITIONS OF ENTRY**

- ONLY ONE ENTRY PER HOUSEHOLD
- MULTIPLE ENTRIES WILL BE AUTOMATICALLY DISQUALIFIED
- PURCHASE OF THE MAGAZINE IS NOT A PRE-CONDITION OF ENTRY
- NO CORRESPONDENCE WILL BE ENTERED INTO
- THE EDITOR'S DECISION IS FINAL
- NO EMPLOYEES OF AUDIO PUBLISHING LIMITED, OR OF ANY COMPANIES ASSOCIATED WITH THE PRODUCTION OR DISTRIBUTION OF THE PRIZES, MAY ENTER

**QUESTIONS**

[1] The original AE1 arrived in what year?  
[a] 1967  
[b] 1977  
[c] 1987  
[d] 1997

[2] Which bass player designed the AE1?  
[a] Sting  
[b] Paul McCartney  
[c] Phil Jones  
[d] Nile Rogers

[3] What material is used to line the cabinets?  
[a] silk  
[b] satin  
[c] concrete  
[d] velvet

[4] How did DP sum up the AE1's sound?  
[a] "fair to middling"  
[b] "a bit plodding"  
[c] "surely one of the most musical loudspeakers ever made"  
[d] "dreary"

June Competition  
Hi-Fi World Magazine  
Unit G4 Argo House  
The Park Business Centre  
Kilburn Park Rd.  
London NW6 5LF

**entries will be accepted on a postcard only**

**MARCH 2006 ZYX R-100H MOVING COIL CARTRIDGE WINNER:  
Peter Scott of Northwich, Cheshire**

# BIT Player

David Price locks in on that critical moment when the digital world went Bitstream, courtesy of the Philips CD850 II CD player...

It is 1989, and the hi-fi world is a very different place. We're still in the midst of an intense debate on the merits, or otherwise, of digital audio – and unless you're one of a handful of hi-fi hacks around the world with early access to the new 'Digital Audio Tape' format running at a giddy 48kHz sampling frequency, 'digital audio' means Compact Disc in all its 16bit, 44.1kHz glory.

At this time, lest we forget, 'digital' was not quite yet a *faites accompli*. There was a strong renegade audiophile community who still believed in vinyl, and still bought all their music on vinyl – well, because you could! There were some very erudite people – Linn's Ivor Tiefenbrun and Naim's Julian Vereker to name but two – who were publicly pronouncing that vinyl was their favoured format (even if both

companies were just about to launch CD spinners!)

In the minds of its detractors, the main objection to 'digital' (i.e. CD) was its harshness. Interestingly, listening to the self-same players that were once accused of being 'fiercely forward' doesn't quite yield the same feelings of extreme aural agony. This is partly because eighties hi-fi, and those nasty early metal dome tweeters in particular, was pretty forward and hard sounding. Through modern, well matched systems, mid eighties CD spinners are 'vivid' alright, but not quite as horrid as was once thought.

The root of the problem was in no small part a silicon chip going by the name of the Philips TDA1541 digital-to-analogue convertor - which was practically ubiquitous. This, the first 16bit, 4 times oversampling design, arrived in 1985, replacing the

original 14bit, 4 times oversampling TDA1540, which was a far softer, vaguer and fluffier thing. The '41 was fizzy; it had a tremendous 'zing' to it, due in part to it throwing out higher amounts of distortion than were really desirable. Now, I'm not knocking it, because in some ways, I think this is the best ever DAC – it's brilliantly musical and a real 'seat of the pants' player – but smooth and languid it never was...

All Philips and Marantz players, along with a wide variety of other Japanese machines (such as the Sony CDP-557ES, etc.), boasted the '41. It was implemented in a number of different ways (and in later years even claimed, as with Sony for example, as giving 18bit, 8 times oversampling), but it was always instantly recognisable – such was its zippy, peppy, grippy sound.

Although Marantz made much of





its skills at tweaking the CD players of its (then) parent company Philips, Philips regarded the CD player separates market as a premium place to be seen, and made a range of very respectable CD players, from 1982's CD100 to 1990's CD950. All (obviously) used the latest Philips DACs, and indeed were often the first to get them. And so it was with the 1988 CD850, which was a high quality £400 machine (it would be in the region of £1,000 now, so certainly wasn't a budget design) with – if not quite 'battleship' then

Distortion was quite a lot lower, and this manifested itself in a consummately smoother and more even sound right across the audio band. But there was more to it than that, because the character of the music was different too; you could say more considered, more analytical even, with superior midband detail, a more expansive soundstage and a finer, smoother and more subtle treble. In short, it didn't sound 'digital' as most people understood it.

In today's climate – where Bitstream DACs have been

soon realise how odd, or perhaps I should say, 'exotic', a TDA1541 DAC now sounds; in today's hi-fi world where Bitstream is more the norm, the first Philips 16bit 'multibit' DAC is a truly racy, thrilling and yet horribly compromised thing. Two dimensional, edgy, glassy, characterful and extremely rhythmically engaging, it's a bit like going back to twin carburettors in a world of fuel injected car engines. It's tonally troublesome, musically temperamental and not to everyone's taste. The SAA7350 aspirated Philips CD850 II is, by comparison, neat and tidy and refined – just like every other modern silver disc spinner. This is how it started.

"the CD850 II was where digital came of age..."

– sturdy build. With the early, now revered, Philips CDM1 'swing arm' mechanism, it was a fine sounding player; lively and engagingly musical; but no one quite expected that half way through its life it would have its heart ripped out and suffer a totally novel transplant in the shape of the SAA7350 DAC.

Okay, so a CD player gets a new DAC – so what? Well, it was the first implementation of Philips' brand new Differential Mode Bitstream converter, and imbued the player with a special sound. The (then) unique architecture of the chip measured, in some respects, extremely differently.

omnipresent – this might not sound terribly dramatic stuff, but the CD850 II was where digital came of age. It became smoother, more detailed and far more accessible. This last point is important, because Bitstream DACs were cheaper to make, and ushered in a whole new world of affordable CD spinners, and then portables, which firmly put analogue on the fringes of the hi-fi world, where it has resided – and in truth thrived – ever since.

To get a gauge of how significant the SAA7350 (and its ilk) were, it's interesting to hear a pre-Bitstream DAC now. You

**BUYING SECONDHAND**

Make no mistake, parts for the early Philips 'swing arm' mechs are rare as hens' teeth, but the good news is that they're actually very hardy things. The Philips CD850 II will never make big money on the secondhand market, but find a minter in perfect working order and it's a lot of sound per pound at around £250.



**MEASURED PERFORMANCE**

The CD850 has a classic Philips frequency response from the period, characterised by filter ripples from the midband up to 20kHz. Our analysis clearly shows these. The overall trend is flat enough, so tonally the player should sound reasonably balanced.

Distortion behaviour of this player is also typical of the time and technology, distortion rising steadily at lower signal levels, with at least twice the distortion of today's players at -60dB and five times as much at -30dB. Again, our distortion analysis clearly shows this. Inevitably, EIAJ dynamic range was low at 104dB.

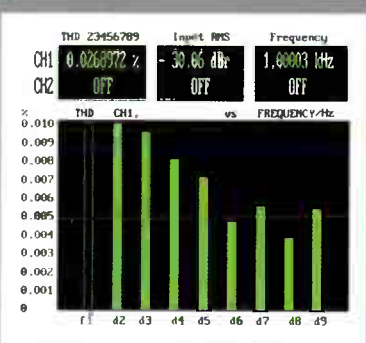
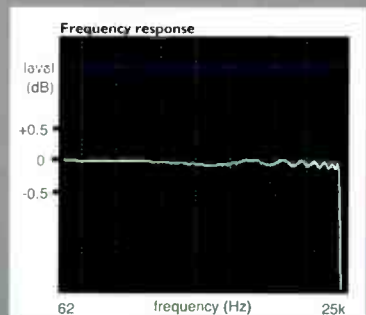
The transport has low intrinsic jitter, but there was programme related jitter of up to 120pS at low frequencies, a sweep showed.

The CD850 clearly shows its age against modern players in this issue, especially the Tube Technology Fusion CD64. NK

Frequency response (-1dB)  
CD 2Hz - 20.8kHz

Distortion CD  
0dB 0.001  
-6dB 0.0014%

-60dB	0.48%
-80dB	8%
Separation (1kHz)	108dB
Noise (IEC A)	-105dB
Dynamic range	104dB
Output	1.9V



# Air Show

Channa Vithana reports on the latest Heathrow High Fidelity Show, 2006, held at the Park Inn Hotel on the 1st and 2nd of April. Having gone from seven to around thirty last year; the 2006 High Fidelity show had approximately fifty exhibitors presenting primarily two channel hi-fi this time round. It's always a pleasure to attend, and this year was no exception, he says...



It was great to see the pioneering and much copied (and inspired from) Swiss turntable maker Thorens. Here, Thorens MD Heinz Rohrer demonstrated a finely crafted TD 350 turntable finished in an attractive 'Maple Red' wood plinth that matched the side cheek finish to their new (200W,8ohm/400W,4ohm) TEM 3200 monoblock power amplifiers and TE 23 phonostage.

AC Acoustics had an attractive, attainably priced system composed of the excellent JAS Audio Orsa loudspeakers, finished in yellow ultra gloss, and the 120W Qinpu A8000MKII integrated amplifier. CD players were the oval Consonance Droplet and Micromega Aria.



Alium Audio had a stylish new 'Forbidden City' range from Chinese brand Consonance called the Calaf (integrated amplifier) and Turandot (CD Player) along with a broad range of speciality replacement valves for the connoisseur.

From Ilioupolis, Athens, Greece; new high-end brand Ypsilon had a set of beautifully machined, finished and sculptured products that included preamplifier, CD, DAC and the strikingly big SET 100 single-ended monoblock amplifiers which feature in-house manufactured transformers and chokes as well as a substantial and intricately formed set of heat sinks. Ypsilon are distributed in the UK by Amadeus Audio.

In the Anglesound Audio room, the Sensorial loudspeakers from Italy's Ars Aurea were nice. They combined sleek by-design styling and well-built enclosures made from HDF rather than the usual MDF. The Sensorial was finished in a very attractive midnight blue with cabinet stiffening, wood side cheeks and integrated matching speaker stands that housed its downward firing port.







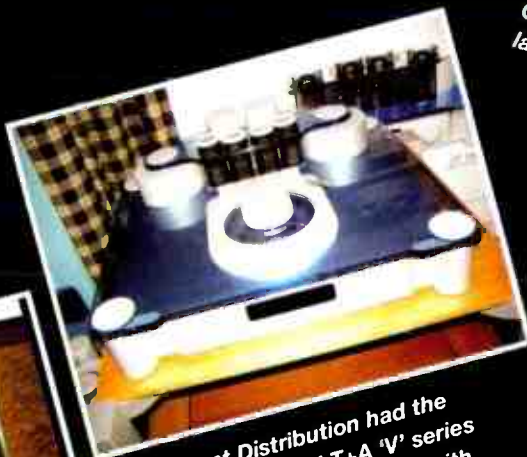
One room tuning/correction system, analogue based, was the Townshend Audio system featuring the TA712 Stereo Bass equaliser. The TA712 can, through front panel adjustment, claimed Max Townshend, eliminate bass boom from your speakers and should retail for approximately £2,000.



The second room tuning/correction system, demonstrated by Dynavector SuperStereo UK, featured the analogue domain, Japanese made, Dynavector Super Stereo ADP-3 system that created a superior, unforced sound-quality utilising an extra set of small speakers.



Audio Craft had a very high-end setup comprising the outstanding Esoteric X-01 SACD/CD player from Japan, Rogue Audio valve amplification from America or Lavardin Technologies from France and the luxuriously appointed £30,000+ Marten Design Coltrane speakers from Sweden. The Coltrane speakers feature diamond tweeters, carbon-fibre laminate cabinets and ceramic drivers.



Transparent Distribution had the beautifully designed T+A 'V' series top-loading SACD/CD player with valve output stage, large Criterion electrostatic tweeter loudspeakers, valve integrated amplifier and turntable. Also on show was French loudspeaker manufacturer Waterfall who included the twin mid-bass driver Victoria models which employ cleverly engineered glass cabinets, without using interior acoustic wadding, for better timing.



Whest Audio used Ayre amplification and an SME turntable, where they showcased their new high-end MC REF V two box phono stage which has an estimated price at approximately £3,500. The MC REF V is described as the basis for a Whest preamplifier scheduled for release later in the year.

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Review: David Price, Hi-Fi World, May 2006

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Marantz CD94, boxed, manual 9/10 condition		£299
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as this is a serious high end player, ex-dem.	(£2405)	
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Advantage CD1S in black, just fully serviced	(£4595)	£1395
Cyrus CD6, crackle black finish, unmarked	(£650)	£395
Bel Canto PL-1, boxed as new, ex-dem.	(£6990)	£POA
Bel Canto PL-1 Universal CD/DVD-A/SACD	(£9490)	£POA
Audio Analogue Paganini	(£950)	£695
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EAR V20 integrated amplifier	(£3595)	£1695
McIntosh MC252 power amplifier	(£3852)	£2495
Musical Fidelity kW (6112) Tube Pre	(£3000)	£1995
Musical Fidelity kW750 power amplifier	(£5999)	£3795
Croft Syntegra hybrid Integrated, ex-d	(£2500)	£1250
Croft TS1 with Epoch Pre	(£3000)	£1795
McIntosh MC501 Monoblocks(pair), ex-d	(£7800)	£POA
Roksan Caspian Integrated amplifier	(£1000)	£395
Consonance Cyber 800 Monoblocks(Valve)	(£3k)	£1995

Mark Levinson 26s 2-box ref pre-amp	(£8000)	£2495
Graaf GM50 Integrated Valve Amp	(£4000)	£2795
McIntosh MA6900 integrated amp	(£4549)	£2895
Conrad Johnson PV14L pre	(£2500)	£995
Electrocompaniet AW220 power amp	(£1500)	£895
EAR 834L de-luxe line stage valve pre	(£1123)	£695
Musical Fidelity A3cr pre and power	(£2000)	£795
Cyrus 3 integrated amplifier, black	(£500)	£195
Musical Fidelity A308cr pre-amp	(£2000)	£795
Krell KAV500i integrated, very very rare		£1995
Audio Analogue Primo Setanta, silver, ex-dem	(£475)	£295
Audio Analogue Puccini Setanta	(£950)	£695
Musical Fidelity A3cr pre. Unmarked condition		£395
Stello M200 Monoblocks, silver, NEW unused		£POA
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Pass Labs X350.5, supplied by us new	(£7600)	£4995
Chord CPA2200 pre amp, silver, unmarked	(£3710)	£1895
McIntosh MA2275 valve int	(£5773) as new, ex-dem	£POA
McIntosh MA6500 int amplifier, ex-dem	(£3361)	£POA
McIntosh MHT200 8x140 watts, ex-dem	(£6503)	£3950
ATC SPA2 150 power amplifier	(£3400)	£1995
Audio Innovations 2nd Audio Monoblocks	(£3000)	£1200
Linn Wakonda pre amplifier		£395
Bel Canto Evo4, boxed as new, ex-dem	(£3499)	£POA
Bel Canto Pre2, boxed as new, ex-dem	(£2999)	£POA
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Hovland HP100 pre+built in phstage	(£5350)	£3595
Hovland Radia Power amplifier	(£7995)	£4995
Hovland HP200 + phono stage	(£7325)	£4995
Audio Analogue New Maestro	(£1750)	£1255

### Loudspeakers

PMC IB25 Centre, boxed as new	(£2914 inc stand)	£1495	
PMC IB15 loudspeakers, black	(£3883 inc stands)	£1995	
Zingali Overture 3S, boxed, as new condition.	(£4000)	£1595	
Quad 11L speakers, premium birds eye maple		£249	
ATC SCM-20A S Tower speakers, walnut	(£5177)	£1995	
Merlin VSM MM in exc condition	10/10 (£8000)	£2595	
REL Q400E subwoofer in premium maple	(£1200)	£695	
Gershman Acoustics Avantgarde speakers, finished	in Piano Black Laquer, only few weeks old.	(£7900)	£POA
Wilson Benesch ARC's with stands, silver finish	(£2.5k)	£1699	
Living Voice Auditorium II in Cherry	(£2195)	£1495	
ATC SCM-50ASL, in Cherry, 4mths old	(£7947)	£4895	
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GamuT L3, in Rosewood, boxed as new.	(£3750)	£2750
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Nottingham Analogue Spacedec		£695		
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### Miscellaneous

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Some of the best reproduced music from the show came via systems that incorporated room tuning or room correction. Interestingly of the three that I heard; Dynavector Super Stereo, Townshend Audio and Lyngdorf Audio - only one was digital and ironically, it was the simplest to set-up. Danish brand Lyngdorf Audio demonstrated their new £1,200 RoomPerfect plug-in module fitted into the £2,400 TDA2200 amplifier, sourced with the £1,545 Lyngdorf CD1 and Dali Helicon speakers (right). The set-up was very simple as the included microphone is placed at a minimum of four locations and each position taking about a minute to self-calibrate the speaker harmoniously into the listening room. It worked superbly, as the timing of the music was wonderful when set-up to my listening position with no distorted bass lines either. Rather music was clear, informative and most importantly, tuneful.



Brighton Hi-Fi Exchange had the German brand ASR Audio, distributed by Manger-Audio UK, who also exhibited their speakers here. The ASR Emitter II amplifier is dual mono and features four cases including three power supplies and transparent front panels.



Überphon, who distribute Phonosophie and ALR Jordan loudspeakers, had a continually fully packed room. I particularly delighted in Phonosophie's Ingo Hansen demonstrating the spray-on effectiveness of their CD Flux to the flabbergasted expressions on the faces of 'hardened cynics' who had to admit it worked!



Tusk Audio, from Nottingham, were interesting as they featured an eclectic mixture of electronics, including transparent covered amplification and an ancient grey-bodied Cambridge Audio CD3 CD player from the early nineties, which displayed on its front panel a legend denoting its whopping 16bit x 16 times oversampling!



Finishing off the show, the complete MBL system; CD transport, DAC, pre-amplifier, monstrous monoblock power amplifiers and the stunningly designed Radialstrahler loudspeakers was spectacular. The system costs several hundred thousand pounds so it unsurprisingly produced the best sound quality of the show with a sense of complete ease and clarity and no added coloration or reverb to the music.



# Two's Company

**Sweet and smooth yet remarkably clear, Stax's SR-007 Omega II/SRM-007t electrostatic earspeaker system is one of the best ways of experiencing digital, thinks Martin Wolszczak...**

If this headphone system was a car, it would be a latest version of the Bentley Continental GT. Like Bentley, Japanese manufacturer Stax has been one of the most prestigious high end headphone marques since its foundation in 1938. The SR-007 Omega II/SRM-007t duo was launched in 1998 and since then has been among the best headphone systems ever made, at any price.

These headphones are electrostatics, working in the same way as electrostatic loudspeakers, but on a smaller scale. Their design is extremely simple. Two electrodes are arranged in parallel facing one another and very thin polymer film, which has a thickness of no more than a couple of microns, is set between them. In the case of an earspeaker, the diaphragm area is no more than the area of the ear, so it is extremely light - virtually zero. A high-voltage bias is fed constantly to the polymer film diaphragm, resulting in a plus potential. When a music signal is sent to the electrodes on both sides by push-pull, one of the electrodes becomes plus while the

other electrode acquires minus potential. Since the film has plus potential it moves to the minus electrode side to the extent of any change in voltage. This continuous motion generates compressional waves in the air, resulting in the production of sound.

always sung the praises of electrostatic transducers, and stood by the statement that earspeakers provide the standard by which audio quality is judged. The company's range of earspeakers and drive units is wide. The ultimate one, subject of this review, SR-007/ SRM-007t sits on top, and build quality is superb - as you'd expect. The ear pads are made of lambskin, and while circular on the outside are "D" shaped on the inside. They can rotate to form a semi-airtight seal over the ear. The housings containing the transducers also rotate to allow one to orientate them. The leather covered metal bands are adjustable to provide a proper fit over the head. After fiddling with the various adjustments, I found the SR-007s fit very comfortably. They can be worn for many hours without discomfort.

Drive to these electrostatics is from a Vacuum Tube Output Driver Unit, the SRM-007t. Its front panel is made of solid, thick aluminium. The whole unit is very heavy, which helps to prevent vibration.

SRM-007t is a combination of dual FET first stage and twin triode (6FQ7/ 6CG7) second stage valve amplifiers for each channel, for driving Stax earspeakers, including the SR-007 Omega II. It has two sets of line level inputs, one of which is single-ended (RCA) only, while the other can be switched between single-ended and balanced (XLR) connectors. The amplifier design is balanced, so using corresponding sources and interconnects provides for cleaner signal path.

SRM-007t has three jacks

for connection to Stax earspeakers: two "Pro" (580V bias) and one "Normal" (230V bias). The unit takes about thirty minutes to reach optimum operating temperature and consumes about 75W. I ran in the whole system for about one week before listening. It gets very hot, so adequate clearance for cooling is essential.

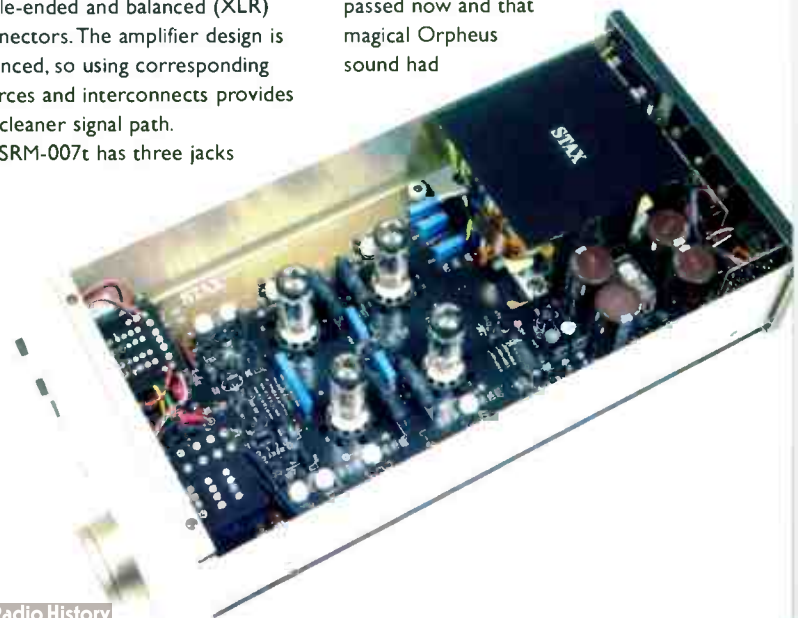
## SOUND QUALITY

I have always been a great fan of headphones. Owning a good headphone system worth £500 or so will give you better sound than a two-channel stereo loudspeaker system costing twice or even three times the price. Throughout the years of my hi-fi journey I have come across and owned many interesting headphone combos such as Grado/Project, AKG/ HeadRoom, Sennheiser/ Musical Fidelity, etc.. In 1994 I was invited to audition Sennheiser Orpheus. I remember listening to The Eagles 'Hotel California'. The sounds coming from Orpheus redefined my idea about high-resolution, natural and faithful reproduction of recorded music. It simply blew me away. I always wanted Orpheus, but I couldn't afford it. So I promised myself that I would try to memorise what I heard from that Sennheiser system for ever. It doesn't matter now, because Orpheus is out the production. Many years have passed now and that magical Orpheus sound had

"this Stax combo will remain my reference point from which I judge other audio products in terms of sound quality..."

other electrode acquires minus potential. Since the film has plus potential it moves to the minus electrode side to the extent of any change in voltage. This continuous motion generates compressional waves in the air, resulting in the production of sound.

Stax uses the term 'earspeaker', rather than 'headphone', to describe their products. This is because they are likened to tiny speakers floating at a small distance from the ears. This Japanese manufacturer has





faded in my memory till the day I plugged in the stunning Stax SRM-007t/SR-007 Omega II pair. What I heard from this Stax combo reminded me of the sonic excellence from the system I auditioned many years ago: the sound of this Stax combo is superb. It will remain my reference point from which I will be judging other audio products in terms of sound quality.

My usual set up includes Sony 9100ES SACD player, LFD Reference Silver Interconnect (RCA) and Isotek Supreme Power Cords and Power Audio Laboratories Powerbox v.4. The Stax SRM-007t drive unit was placed on top a thick glass shelf of my Audio Innovations Standard Rack.

I have spent over four weeks listening to the Stax without taking any notes. I must have listened over one hundred different albums, either CDs or SACDs, audiophile recordings or pop compilations and I must admit that every single time the Stax system has pleased me in a way unlike any audio gear I have auditioned in my whole life, playing anything from Mozart to Metallica - it never let me down.

What I like the most about the Stax is its open, fast and detailed presentation right through the whole audio frequency band. The sound is involving in a way that lets you forget about the electronics. It lets you appreciate and enjoy the music. Stax SRM-007t/SR-007 Omega II sound was vivid, uncoloured and superbly balanced from top to bottom. Compared with many other headphone designs, either electrostatic or dynamic, it makes music sound bouncy, full of life, more engaging. Yet this was not a case of a sense of urgency, or any sense of unremitting drive, the overall presentation still had a relaxed, slightly warm quality.

The Stax combo seemed capable of conveying the tonal qualities of backing instruments well down in the mix, revealing their essential character and rhythmic relationships with each other with ease and naturalness, and thus preserving the proportions of the whole. The midrange is especially well presented, male and female voices breathing in real space. When I played Norah Jones from "Come away with me" (SACD 72435 Blue Note) I heard a silky smooth, almost magical vocal sensibly floating in the air. The whole album sounded lyrical, melodic and very personal, in a way I have never heard before. The voice of Luciano Pavarotti from 'Ti Adoro' (SACD 470635 Decca) was more solid and weighty than I know it; this album

seemed more dramatic, like sitting in the front row of an opera.

With Mark Levinson's Live recordings at Red Rose Music Vol. 1 (SACD RRM 01), I noticed incredible levels of resolution and detail. For example, on Track 1 'In a Sentimental Mood' I discovered Chico Freeman humming softly, a fact I wasn't aware of before. The soundstage was very realistic, with a great sense of depth built in. Track 7 'Little Dog's Day' showed Kim Cattrall reading a poem not in my head, but a metre in front of me, the sound of chirping crickets coming from behind. The whole performance I found very airy and spacious. Frederic Chopin played by Artur Pizarro (SACD CKD 248 Linn) sounded very sensual; the music seemed to flow endlessly. Omega II's romantic tones, combined with effortless power and the tenderest pianissimo brought me the feeling of a live performance. Recordings like BlueQuest (SACD 1052

instruments and accompanying voices were well separated and sensibly placed on the stage.

Treble reproduction has always been a strength of electrostatics, and Omega IIs are no exception; their top end is crystal clear and free of coloration. Omega II highs were communicative and refined. Rock music sounded expressive and lively. The Police's live recordings from Boston

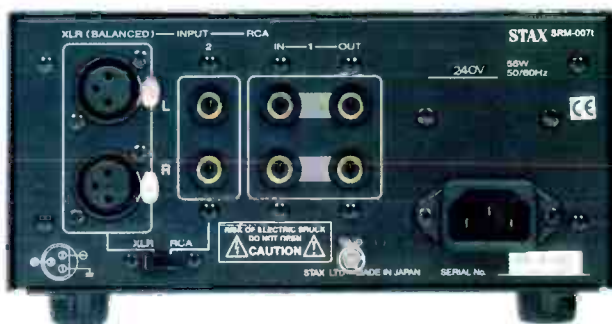


AudioQuest) and Bucky Pizzarelli 'Swing Live' (SACD 223 Chesky) proved Omega II's great dynamic ability. Bottom end octaves were well extended and controlled. Bass was tight and powerful.

With demanding, complex recordings like Mozart's Requiem (SACD CKD 211, Linn) all

and Atlanta (SACD 493648 A&M) transferred the sofa of my living room to the concert venues. Holographic sounds from these two gigs, both distant in time and location, were superbly rendered.

In conclusion I feel the Stax SRM-007t/SR-007 Omega II system is an outstanding choice for those, like me, who want a clean, open, fast and revealing sound. Omega IIs will let you rediscover and enjoy to the full your favourite recordings. Unfortunately, like a Bentley Continental GT, Omega IIs cost a small fortune, but they're worth it nevertheless...



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"I've lost count of the number of £1,000 amplifiers that sound as good as something three times as much..."



## dominic todd

**A**s readers of this magazine, you probably don't need to be told that hi-fi separates make great value for money. They last well – up to thirty odd years in some cases, hold their value and, most importantly, provide years of entertainment without the need to leave home.

Yet, as you're probably also aware, the past few years has seen hi-fi separates become even better value. Improved technology, both with product and manufacturing, and easier access to cheaper labour markets has brought prices, effectively, tumbling. You only need to take a look at the proliferation of "£" symbols within this very magazine to see the added value that hi-fi offers these days.

Personally, I've lost count of the number of £1,000 amplifiers that sound as good as something three times as much, or 'speakers that can compete with something twice the price. It's not just the sound quality, either. A recent encounter with Quad's 11L 'speakers, reminded me of just how good the finish of contemporary 'speakers can be. These compact standmounters use real wood veneer that's immaculately cut and then finished with seven coats of piano lacquer. The drive units are bespoke and the woofer's cone is even made from Kevlar.

I think we take this speaker, and many others like it, for granted these days. When you think that it costs just £380 per pair it offers value for money that would have seemed stupendous twenty years ago. Back then, you could pay more for a 'speaker of similar size, with an inferior sound quality and a far rougher finish. And that's even before

inflation has been taken into account. Mind you, despite the likes of the Quad L-series and Cambridge Azur coming along and altering our current perspectives of value, pioneers they are not.

One of the joys of the hi-fi industry for me has been the decades of products that have not just topped their class, but completely changed perceptions as to what is to be expected at any given price. Perhaps star billing can be given to the Rega Planar 3. Way back in the early 1970s it, and later the Planar 2, demonstrated to the world that simplicity of design really could lead to superior sonics. Later, in 1983, the RB300 tonearm was added and the rest, as they say, is history.

I well remember myself, back in 1990, listening to the brand new Naim CD1. This had created quite a stir as it was their first CD player, and also begun what many saw as something of a rift between the 'analogue brigade' and Naim. It sounded rather good but, as the guy demonstrating it at the time said, it sounded about as good a Rega Planar 2. At this I smirked. The Naim cost nearly ten times the amount, but looking back I can see he was right. The Naim sounded excellent, but Rega had honed the art of turntable building so finely that, to this day, it has yet to be beaten. Testimony to this can be seen now, with versions of the Rega still in production, badged Rega or otherwise.

When it came to amplifiers it was, in my opinion, NAD and Pioneer that made the real waves. With NAD it was, of course, the classic 3020. In the late '70s, one of these sweet and beguiling little amps could be had for less than £70. It made many of

the brutes and bruisers of the day not only look ancient but also sound pretty prehistoric, too. Like the Rega, current NAD amps can still trace links back to the original 3020, even if actual shared components are, these days, zero. Interestingly, had you paid your £69 or thereabouts for a new 3020 back in 1979, you could still sell it for close to that today – not bad for nearly thirty years of fun!

A good fifteen years after the 3020, Pioneer launched the A-400. Just like the NAD had done a decade and a half earlier, the £220 Pioneer shook the established market place. Rivals hastily revised products, prices were slashed and there was a good deal of despondency at dealers who didn't sell the A-400 – I remember, I used to work at one of them. Despite its weaknesses, the A-400 possessed qualities that were more usual in amps' costing £1,000. For many years, I used one myself and never failed to be surprised at just how good it could sound when given quality ancillaries.

Thinking back to the Quad 11Ls, there's a fine tradition of perception changing speakers, too. To list the countless number of baby Mission, Wharfedale Diamond, JPV and Goodmans speakers would take up too much space. However, in their own way each has been just as important as the Planar, 3020 or A-400 for bringing true hi-fi to a wider audience.

So there you have it. The bargains and trendsetters of today are simply part of an ongoing evolution in hi-fi. The only real difference is that this time around there are more of them. A lot more. As the Americans might say, there's never been a better time for bangs for your buck. ●



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"the BBC is trialing HDTV on satellite, cable and Freeview from the summer onwards"



## steven green

In an article in the December issue I discussed some of the BBC's plans for distributing its channels via broadband. This month I'll give an update on those plans, and introduce another promising new Internet technology for multimedia distribution.

The previous article was predominantly about the BBC's plans to use multicasting, which allows broadcasters to distribute their channels at far higher quality than is possible with the unicasting technology they currently use.

At the beginning of March, the BBC and ITV launched a six-month multicasting trial with all of the BBC's and ITV's TV channels and all of the BBC's national radio stations being available.

Some good news that has emerged since I wrote the December article is that the proposed move to provide the streams in the new MPEG-4 video and audio codecs has come to fruition, and the BBC TV channels are available at a bit rate of 1 Mbps (1 million bits per second) using the H.264/AVC (Advanced Video Coding) codec, and its radio stations are available at 128 kbps (1,000 bits per second) using the AAC (Advanced Audio Coding) codec. The latter is especially good news, because 128 kbps AAC is capable of providing audio quality equivalent to good quality FM.

Lower bit rate (350 kbps) streams of the BBC's TV channels are also available in Real Player and Windows Media 9 format for people with 512 kbps broadband connections, and ITV's channels are available in the Windows Media format.

Another recent development, although this won't be part of the six-month multicasting trial, is that the BBC has performed 8 Mbps HDTV

test transmissions using multicasting, with more trials set for the summer.

Unfortunately the multicasting trial is only available to broadband users on the JANET academic network and on the PlusNet, Cable & Wireless, Clara net, Net Services, Zen Internet, KeConnect and InterVivo ISPs, but hopefully more ISPs will sign-up over the duration of the trial. For further information visit [www.bbc.co.uk/multicast/index.shtml](http://www.bbc.co.uk/multicast/index.shtml).

Results from the BBC's interactive media player (iMP) trial have also been released recently. The iMP is a so-called 'catch-up TV' application, that allows users to download TV and radio programmes that they missed for up to 7 days after they were broadcast. The iMP uses peer-to-peer (P2P) technology—which is the same technology used by the music file-sharing networks—where users download small chunks of the requested file from other users that have the file on their computer, and then all the small chunks are reassembled into the correct order at the receiving PC. Like multicasting, the benefit for the broadcaster is that P2P technology vastly reduces the Internet server bandwidth required to distribute its content, so again the content can be encoded at good quality.

The 5,000 users in the trial, which ran from December to late February, were "overwhelmingly positive about the application", and a "strong majority" thought that it was something that the BBC should offer. The BBC Governors will make their decision about whether the iMP should be released to the public in the autumn, although I can't see any reason why they wouldn't allow it.

Ashley Highfield, the BBC Director of New Media, has also confirmed that they plan to make HDTV content available on the iMP,

which could mean that the iMP is the first service on which BBC HD content is made widely available—the BBC is trialing HDTV on satellite, cable and Freeview from the summer onwards, but the Freeview trial is limited to 500 households in London and the satellite and cable trials are limited to subscribers to the pay-TV HD packages, until free-to-air MPEG-4 HD-enabled satellite receivers become available.

Whereas everything detailed above is an update to the December article, a new and promising development is that the BBC hopes to make its TV and radio services available over the Internet using peer-to-peer (P2P) live streaming technology within the next 12 months. As mentioned above, P2P is best known for its use on file-sharing networks, but a Danish company called Octoshape was touting its P2P live streaming application to broadcasters last year, and piracy-led P2P streaming of TV channels has become popular in China recently using free software applications such as PPLive.

The reliability of P2P live streaming applications mainly relies on there being a sufficiently large number of users to download from, although if the Internet is particularly busy then streams could be interrupted. This problem is mitigated to a certain extent if there are a large number of users, though, so you would expect that BBC services should be quite robust.

It's good to see that the BBC is pushing forward with both multicasting and the iMP, but the prospect of P2P radio streams using 128 kbps AAC tops the lot—in the short-term at least—because it combines availability to anyone that has broadband with the crucial factor that it's live. ●



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"the quality promised by hi res was compromised by those that should have appreciated it most - the music business..."



## noel keyword

**M**y, how our view of digital is changing! If there's one feature of this brave new world that hasn't materialised, it is the great leap forward in quality we hoped for. Funny that, because from the outset, digital was touted as perfect and sold as offering ultimate quality. It never worked out like that. Nowadays quality on aggregate is declining rather than getting better. I'm thinking here of the sad comparisons between BBC radio on VHF/FM and parallel broadcasts on DAB. What a grim experience the latter has become, a grainy simulacrum of the real thing. Both DVD-A and SACD were going to get us back onto the road to a level of quality CD once promised, but never fulfilled - but they've failed too. Is quality not an issue any more?

It is with digital video cameras - here's a market where quality is the main criterion, and how it has leaped ahead. I used to quietly laugh at people waving around cheap hand-held cameras, with their blotchy colour and grainy images. They were analogue (I must ruefully admit) and, at the bottom end of the market, you didn't get much with these things. Then came DV, or digital video and, a bit like early CD, images looked over sharpened, would break up and often have strange fuzzy edges. The pictures had a peculiarly artificial processed quality about them, so even though the weaknesses of analogue had been banished they had been replaced by another set of blemishes that weren't better so much as different.

I had to get a video camera all the same. At Duxford air shows my cheap hand-held still camera captured everything as a blurred dot against a panorama of blue or green. Looking around, it was obvious the answer to this was to buy a lens

system so long it needed a red flag on the end, or get a video camera and join the despised masses. About the same time I realised that for all the same reasons - that is to capture the noise and action of flying objects - I needed a video to film the antics of my one year old son, as a still camera just didn't do the job. I was discovering what everyone else had already discovered: crummy pictures or not, a video can be essential.

I bought a Panasonic NV-GS70B, hoping for decent colour from its 3-CCD sensors, as well access to a 16bit stereo soundtrack which I could feed from quality external mics. It was better than I had dared to expect - and a great education too. Yet this camera is history. Now you can shoot video that is better than broadcast TV, from a Sony HDR-HC1 consumer camera costing around £1,000 - not a King's Ransom as far as video goes.

Meanwhile, back in audio land we are busy progressing backwards, the latest duff idea being sold as a benefit - signal compression. The situation almost mirrors that of video, but is ahead - and worse. As MPEG 2 is dropped in favour of the heavier compression of MPEG 4, so audio migrated to ultra high compression some time ago. In video, quality still reigns - so long as you don't watch Freeview. In audio quality has been dropped as the prime criterion of importance in so many areas. Accessibility makes money, the iPod phenomenon shows us.

The quality promised by DVD-A and SACD, but not consistently realised, was compromised by those who should have appreciated it most, the music business. Too many DVD-As were quite obviously carrying 48kHz sample rate recordings, spectrum analysis showed. SACD has been a different story; many swear by it and I have been impressed too.

Sadly, it has a bad reputation with those that measure but don't listen, because it is conspicuously flawed.

There are reasons. Studios are now obsessed with surround sound; stereo is dead as far as they are concerned. This imposes an enormous extra load, as well as complicating the technological landscape to an almost impossible degree. Five channels of 24/96 amounts to a massive data throughput. Hardly surprising that the need to equip to handle this has diverted attention away from quality. Yet music in the home remains resolutely stereo; and quality isn't an issue with surround-sound film track. That people don't want to fill their homes with loudspeakers and are not interested in surround sound has been lost on an industry that has totally geared up for it.

All Blu-Ray will offer is more of the same, I have to point out. Vast storage capacity means six channels of 24/192 is possible, but this is academic. It is what recording studios are prepared to do, here and now, that matters and 24/48 is plenty good enough at present to most, I suspect. Early 24bit at 96kHz sample rate hasn't impressed me much so far, especially against SACD, which suggests a smoother and more detailed sound from digital is possible.

At present our view of digital and access to it has become decidedly confused by all this turmoil. Happily, modern CDs and CD players get ever better. I'm completely impressed by players like the Eastern Electric Minimax, Chord's DAC64 and the Tube Technology Fusion CD64. Quality is an issue and the hi-fi business still has a strong grip on it, these players show. No reason to give up on LP yet, but I feel digital is catching up, in spite of all the turmoil and confusion ●



**ALISON KRAUSS & UNION STATION**  
*So Long So Wrong*  
 Mobile Fidelity/Rounder

A heavyweight package in every way, this double album has been half-speed mastered on 180gm vinyl with a heavy outer gatefold sleeve. 'Half-speed' mastering is expensive, but worth it. For example, the current feed to the vinyl cutter is approximately a quarter of a real time cut and the damping is reduced, which minimises overshoot and cutting inaccuracies. Also, the reduction in heating of the cutter coils improves linearity. The high frequency phase response is dramatically improved too, which increases the accuracy of the stereo image. Mobile Fidelity (MoFi) go further. Over eighty percent of MoFi's equipment is custom made or modified.

This Krauss album, as with any half-speed project, is more a work of love, as it took three times as long to create than a standard audiophile production. Also, the group's producer was very attentive and kept an eye on the mastering throughout. He monitored test pressings during the process, for example. This album, of course, is a contemporary release and, as such, Krauss's contemporary bluegrass stylings also brought the genre itself up to date as it also includes some folk, pop and modern country. That's not to say that this

album is a bluegrass sell-out. Krauss remains true to the fold and has not 'gone country'. Also, there's plenty of excellent musicianship featured on the album, no less from Krauss herself on the fiddle along with her exemplary vocals. MoFi has done a great job in creating space and clarity to the sparse song arrangements, allowing Krauss' crystalline voice to soar.

**FOREST**  
*Forest*  
 Radioactive/Harvest

Emanating in 1969 from that legendary world music hub, Walesby in Lincolnshire, folk outfit Forest comprised: Martin Welham, Derek Allenby and Hadrian Welham, who all shared instrumental duties.

Said Radioactive MD Steve Carr "We got access to the original tapes. EMI are really very good in locating tapes like this and, in fact, the tapes were held at Abbey Road, Studio 2, where we eventually worked on the master tapes. I used Nick Webb, an engineer there. The master tapes were in immaculate condition.

We also had an original LP which we used to set the levels, because there were no studio notes for us to use and refer to. We actually put it on the lathe and used the stylus that's built into the old Neumann against a Studer that was playing the tape. We didn't need to listen to the entire track to set the levels, just a

sample from each track was enough."

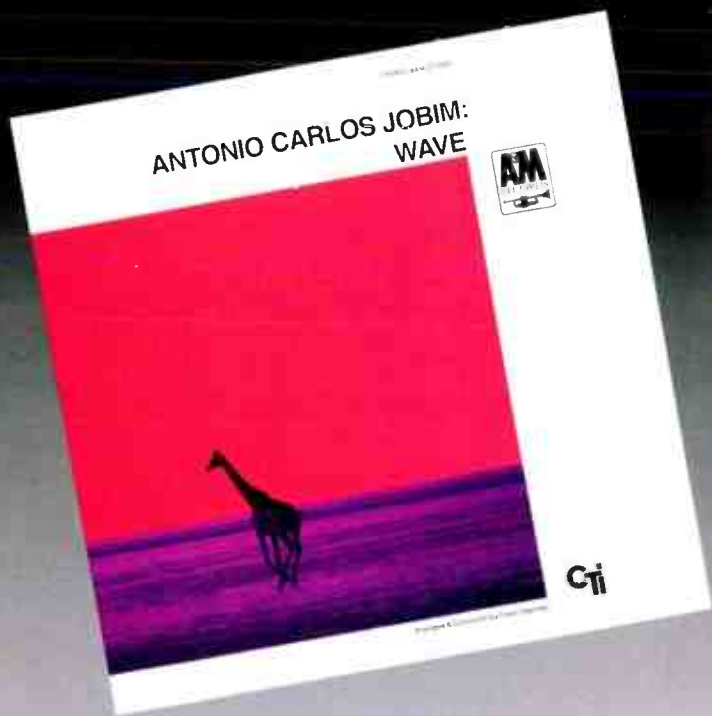
However, the act of setting the correct levels for the master tapes was eased by EMI's insistence of including 'tones' at the beginning of their master tapes. The tones are a series of noises that are set into the beginning of the tape before the music starts. These tones allow the heads to be aligned with comparative ease. The end result means that distortion is prevented – which is always a possible problem on a badly remastered record".

Released in a gatefold, numbered batch of 1,000, this is a seminal, classic piece of English folk with uniquely English psyche washes that gives the music a brilliantly discordant and dream-like quality, full of dark and haunting themes. You could describe the album, from 1969, as psyche-folk, acid-folk or even prog-folk – the struggle to label the release is, in fact, a tribute to the originality of the music itself. An essential album.

**ANTONIO CARLOS JOBIM**  
*Wave*  
 Speakers Corner/CTI

One of the most interesting aspects of this reissue is the artwork. For the vast majority of reissues, the artwork is secured through a process of, firstly, finding a mint condition original album and then transferring that image using careful colour matching and so on. Even with





cautious preparation, the reissued artwork is never quite as good as the original. Not so with Wave for, as Speakers Corner MD, Kai Seemann, explained, "We managed to contact the original photographer who supplied the original images for the original album, Peter Turner. He supplied the very same photographs." Turner produced other work for the labels, CTI and Impulse. In fact, you can still see Turner's work online at [www.peteturner.com](http://www.peteturner.com). The master tapes were sourced via Universal, but despite their age were in good condition. Normally, audiophile labels directly compare the masters with an original album to forge exact cutting settings. Unlike some labels, however, Speakers Corner pay only lip-service to the settings derived from A-B comparisons and those box settings, "Our aim is not to create the original LP but to create what was intended by the original musicians and technicians."

This is a contentious opinion, not held by all companies. The latter believe that reissues should duplicate the original album's sound. Seemann, however, states that when comparing the original master tapes with the original album the album often shows a limitation in extreme high frequencies. "We decided that, no, we can do better," asserted Seemann. "Why should I produce a faulty product?"

Relaxing and elevating, Brazilian

composer, Jobim's bossa nova vibes serve not only as an introduction to the artist (from here you can go to his more 'hardcore' offerings) but to the genre of music itself. Offering that wonderful lounge/acid jazz feel, it is an album that allows you to 'let yourself go'.

**MEL TORMÉ**  
**'Comin' Home Baby!'**  
**Warner Jazz**

Mel Tormé was one of the classic male vocalists, yet this is a strange record in many ways. It's a 1962 crossover attempt in an age when rock dominated the charts. However, it is arranged and conducted by Shorty Rogers as opposed to Tormé's usual and very successful partner in music, Marty Paich. Lastly, the content of the record features some odd repertoire choices from novelty pieces to cool jazz to standards ('Walkin', 'Moanin' and 'On Green Dolphin Street'), the latter being Tormé's usual fare. For four years, Tormé had been recording for impresario Norman Granz's jazz-oriented Verve Records, the same label on which such peers as Ella Fitzgerald recorded. The result was eight well-respected albums that were never big sellers. Verve was bought up in the early nineteen sixties and he accepted an offer from what he thought would be a more sympathetic Atlantic Records label. Atlantic wanted Tormé to make more

pop-oriented music.

His initial effort for them, the live album 'Mel Tormé At the Red Hill', released in 1962, was his best for the label. Atlantic then rushed out the album 'Comin' Home Baby!' which features the single of the same name - an excellent, super cool, bluesy jazz number - but the album didn't chart. However, it did give Tormé a Top 40 hit on both sides of the pond and earned him his first two Grammy nominations. As an album, it's a bit of a mess, Shorty Rogers doesn't really do Mel Tormé like Paich does and the novelty tracks such as 'Dat Dere' are just plain odd. However, this is still an album that can be rated as essential for any Tormé fan. Just try getting an original second-hand - we're in hen's teeth territory here. And the title track was unique. Tormé was a real jazz-based vocalist who could match the musicians for pace and this song has almost modern overtones in left-field constructions. Finally, the album was a gloriously failed experiment, there are many 'almosts' and a few poor songs with attractive elements to them. There should always be room to celebrate follies of this type, especially from a talent such as Tormé.

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# bass-ic instinct

## PART 5 - Tweaking

**Designer Peter Comeau explains how to tweak the WD25T floorstanding DIY loudspeaker**

**For those who haven't read the first FOUR articles, the WD25 kit loudspeaker is based on an aperiodic cabinet design that first achieved popularity in the Dynaco A25.**

**Why aperiodic? This type of cabinet loading offers the good bass clarity of a closed box (so-called infinite baffle) system, but with much lower resonant peak, in other words it gives you bass without the boom.**

**The first FOUR parts described a stand mounter, WD25A, AND a floorstanding variant, WD25T. Here's how to tweak the floorstander for the sound you want.**



**A**ny loudspeaker is a balance of compromises, but the home user is rarely able to adjust the balance in the way that you can if you are a DIY builder. With ready-built commercial speakers all you can do is mess around with cables and spikes (or stands if you have bookshelf speakers) but there's not much you can play with inside the speaker unless you are intrepid and don't mind invalidating the guarantee. The WD25 speaker, however, offers the speaker builder a wealth of opportunities to trim the performance to deliver exactly the sound they want.

One key to any speaker's performance is to get the mechanicals right before tinkering with the electrical side. A speaker is a highly physical device in the way that it operates. The cabinet is a large part of the equation and those who have followed this series of articles will have seen how the cabinet bracing and aperiodic loading have been refined at the outset with niceties like bracing the back of the bass unit magnet to the vertical cabinet brace.

With the WD25T and its larger panel area we introduced some cabinet damping; namely 6mm thick butyl rubber to coat the internal surfaces of any largely unsupported panels. This can also be applied to the rear panel of the WD25A. You will need a massy damping layer, like the Soniqs PDC material described on the World Designs website, that covers the central two thirds of the panel. Though what panel resonance there is is hidden round the back

of the speaker there is still a slight improvement to midrange clarity by damping this area internally. You should notice a refinement to vocals in particular and a cleaner transient edge to stringed instruments.

Naturally, the WD25A also needs to be supported by high quality stands. Our preference is for torsionally rigid stands with a footprint larger than the base of the speaker. Such stands will give good control over vibration through stability. Note that single pillar stands have poor torsional rigidity so go for the multi-upright type if you can. It is not necessary to have a heavy stand, in fact, filling a stand with sand or lead or similar only helps the stand store energy in such mass, releasing that energy back into the speaker after the transient has passed with a consequent blurring of the transient edge. If you want to fill stand uprights then try using vermiculite available from any garden centre. It offers good damping properties whilst adding the minimum of mass.

For the WD25T floorstander the 'stand' option is either one of spikes, or a plinth, or both. Spikes are necessary on carpeted floors to stop the 'rocking' modes of the speaker. Ideally, we want the drive unit diaphragms to move but not the cabinet. Spikes will pierce through a carpet (making only a tiny hole if you are worried about damaging your favourite Wilton) giving extra stability to the speaker. If you have very thick underlay consider driving cross headed screws into the underlying floorboards so that the spike points can locate on the cross heads.

Obviously, only do this when you have found the right position for the speakers in your room and make a template to get the screw positions spot on. Probably the easiest way is to put a large sheet of card under the speaker and press the speaker onto it with its spikes in place so that the spikes form pin holes in the card. This, then, becomes your drilling template for pilot holes for the screws.

## POSITION

Having got the mechanical side right you can start tinkering with the crossover. You'll have seen in the earlier articles that we came up with three stages of crossover of gradually increasing complexity. We went through this to show how the performance could be refined whilst still retaining what was, essentially, a straightforward crossover topology. We're going to do a bit more of this here – we are going to show you the measurements and you are going to do the listening.

First of all, though, make sure you have achieved the best performance from the speakers as you have built them. The aperiodic loading gives a beautifully clear and precise bass output, free from the lumpiness and boom that you normally get with bass reflex designs. The critically





damped performance also means that the WD25 speakers integrate with room acoustics superbly. They work well close to a rear wall and you can easily adjust the bass intensity by moving them nearer and further from the rear wall. You should find that as you move them close to a wall the bass level increases until you reach a point where the midrange is becoming too full and warm. You can easily tell this by listening to male vocals which will become too rich and chesty if you have the speakers too close. Move them away from the wall for a lighter bass and clearer lower midrange performance. Just listen to a variety of well recorded discs and position until the balance sounds right to you.

Similarly, you can adjust the toe in of the speakers from facing straight out to over-angled inwards. If you are the sole listener then you can sometimes achieve a very precise stereo image by angling the speakers directly towards you or twisted even further inwards so that they are pointing at a spot in front of your listening chair. Generally, though, a very good performance is obtained by angling slightly inwards so that they point to a spot behind your listening chair. This also has the advantage of giving good stereo performance for more than one listening position when you aren't the only one enjoying the music!

## CROSSOVER

So, on to the latest crossover. Designing a crossover is an iterative process. The designer has to flit between the measurement chamber and listening room, measuring and listening, listening and measuring, finding faults with each approach until the balance is just what is required. As you can imagine this could be a never ending process, trying out all the crossover permutations but, luckily, we have a few theoretical aspects of performance to guide us.

In the search for the 'perfect' crossover most designers have fallen into two camps – those who prefer the simplest 6dB per octave 'single element' electrical slope and those who map the acoustic performance of drive units to achieve the desired crossover performance. There is no 'right' or 'wrong' way, just preference. To achieve a single element crossover you need drive units which work well outside the crossover frequency and should ideally offer linear performance at least two octaves either side of the crossover point. As this is rarely feasible, using anything other than practically 'full range' drivers, it is a format which is hardly

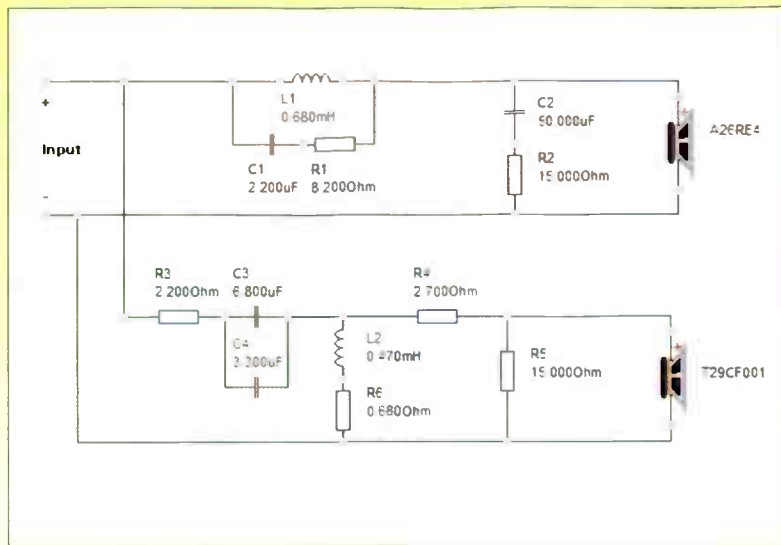


Fig 1. Stage 4 crossover for WD25 XL.

ever achieved in practice.

Our approach, therefore, is to consider the natural roll off of the drivers and utilise this, in conjunction with the electrical crossover, to achieve the best performance from the drivers, plus seamless integration between them. This is fairly easy to achieve with a first order element for the bass unit, just a single coil, with the addition of impedance compensation to allow the coil to do its job. The treble unit is always more difficult as, ever since domes took over from cone HF drivers, the typical treble response is one that falls away below a critical frequency based on dome area. When the driver resonant frequency is dialled into this one ends up with a 'shelf' in the roll-off which is difficult to hide with a single element. Using a second order electrical crossover helps flatten the 'shelf' and makes the behaviour of the treble unit more predictable.

So, putting our second order electrical crossover into the equation, together with the natural roll-off of the treble unit, gives us close to an acoustic third order slope. This, happily, integrates nicely with the roll-off of the bass unit which can also be made to approximate to an acoustic third order. This was the basis of our Stage 3 crossover for the WD25A.

But the process of refinement continues. A useful filter characteristic to pursue is the Linkwitz-Riley which promises flat power response in conjunction with optimal phase characteristics. Originally formed from two cascaded 2nd order Butterworth filters, the Linkwitz characteristic can be applied to other orders if you calculate the attenuation slopes to accord to the Linkwitz requirements. The nice thing about these quasi-Linkwitz slopes is the gentle approach to the ultimate

18dB slope and the good phase integration between the drivers with minimal lobing on the forward axis. This means that the output remains evenly balanced whether you stand up or sit down. With careful management of component values there is also no noticeable filter ringing.



Graph 1. WD25T measured on treble axis at 1 metre. Blue trace shows effect of reversing phase to the treble unit.

Taking our Stage 3 crossover we were interested in seeing how much we could flatten the midrange response whilst targeting a Linkwitz filter characteristic. The answer is shown in the Stage 4 crossover Fig. 1 and the corresponding Fig. 2 and Fig. 3 showing the simulated response for each driver in LspCAD against the Linkwitz target.

The fruits of this are demonstrated in Graph 1 which shows our actual measured response of the finalised WD25T. In blue you will also see what happens when we reverse the phase of the treble unit. This is a check of how good the phase integration is. Perfect phase integration should give a deep valley – exactly as shown here.

Applied to the WD25A and WD25T the results are to bring the two drive units together with



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- Eichmann Silver Bayonet banana plugs: £90
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- Furutech FI-1363 mains plug, perfect for large cables: £50

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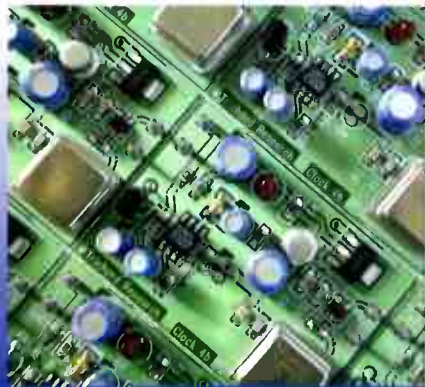
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even more seamless integration than the Stage 3 crossover, and that was considered remarkable in itself. Don't be concerned about the slight dip in output at the crossover point. This fills in nicely at 2 metres distance as it also does 30 degrees off axis as Graph 2 shows.

The end result is that voices now take on even more realism, with a greater sense of 'body' to male vocals in particular, aided by the more accurate spatial clues given by the extra precision to the stereo image. Instrument detailing is now managed evenly right across the audio spectrum, so much so that we've really enjoyed exploring how the studio mixed multi-layered albums like Steely Dan's *Gaucho*. Thanks to the Aperiodic loading it is really easy to hear the makes of bass guitar used on different tracks.

But, now, how do you manipulate this crossover to suit your own personal tastes? First of all you might like to work on the crossovers outside the box. In fact you might consider housing the crossovers permanently in their own wooden or plastic boxes (not metal) right behind the speakers. This removes them from any speaker generated vibration for a small (very small) improvement in clarity. You will need to fit new terminal panels in the hole in the rear of the cabinet left when you remove the crossover – spare TPI terminal panels are available on the World Designs website.

So having got the crossovers in a position where you can change components, which ones do you start with? Naturally, we have experimented with the subjective effects of the component value permutations which are as follows:

**L1** – This can be adjusted to give a more or less forward midrange. 0.56mH gives a brighter sound, 0.68mH flattens and gives more bass emphasis, 0.64mH is somewhere in between. The higher values drop the efficiency a smidgin, down to 88dB in the WD25T for example, but you might gladly sacrifice this for a fuller bass performance.

**R1** – In combination with C3 this adjusts the slope characteristic of the bass unit. Increase R1 slightly to 10 Ohms and the upper midband becomes a shade more recessed. You can balance this against changes to a resistor in series with L2 (see below).

**C1** – Similar to R1 as to its measured effect on performance but the subjective effect is slightly different. Reduce to 1.5uF for a change in

upper midband emphasis (you'll hear what we mean when you try it).

**L2** – This is specified with an internal DC resistance of 0.8 Ohms, but you should measure the one you are using with a good multimeter. You can then add a resistor in series (R6) to smooth the transition to the treble unit. In WD25T we added 0.68 Ohms to give a total resistance of 1.5 Ohms. No resistor gives sharper, more etched detailing to the upper midrange. Increasing total resistance to 2 Ohms gives a very smooth, if slightly warm, upper mid. For WD25A we preferred adding a 1 Ohm resistor for R6.

**R4** – Normally increasing series resistance to a treble unit changes the crossover point as the treble slope slides up and down the bass unit slope. We have used two resistors in order to give ourselves different options. R1 does alter the crossover point slightly but R4 just alters treble level without affecting the crossover – just what we want! A value of 2.2 Ohms for R4 gives a brighter treble. 3.3 Ohms gives a duller treble. 2.7 Ohms sounds just right to us but why not try it for yourself?

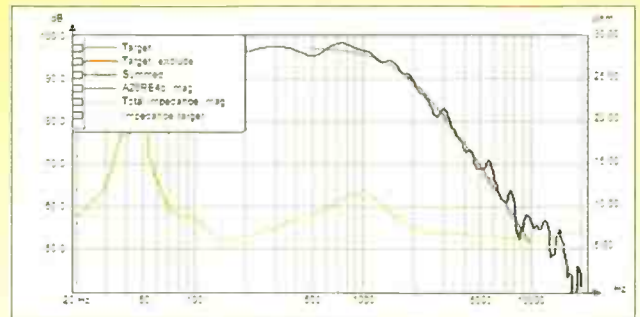
**C3/C4** – This combination of capacitors sets the crossover point for the treble unit. Two 4.7uF in parallel removes a little of the upper midrange from the treble unit giving it more distant presentation. A combination of a 6.8uF and 3.3uF gives a flatter, more precise upper midband.

**R2** – This sets the amount of impedance compensation across the bass unit. Reducing R2 to 10 Ohms gives the flattest impedance response. However it also has an effect on the slope of the bass unit crossover. We felt that 15 Ohms was a good compromise giving a small increase in impedance of the total crossover to 12 Ohms at 1kHz with the rest of the spectrum lying around 6 to 8 Ohms (Graph 3). As this coincides with a peak in the bass unit output due to baffle effects those of you using valve (tube) amplifiers may well prefer a slight loss in transfer efficiency through this region.

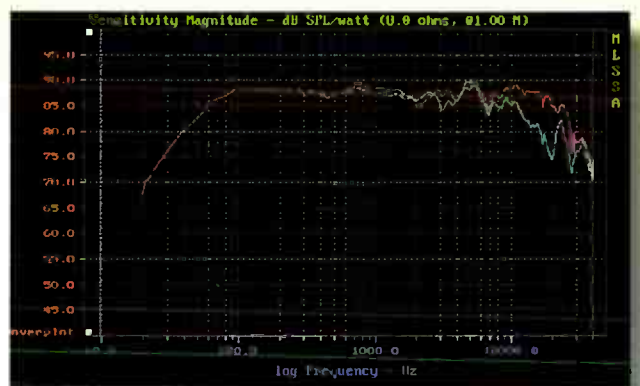
When you are changing components don't just settle back with one particular track and say 'ah, yes, that's the one'. Continue listening with a variety of music until you have a balance that satisfies with the majority of the discs you play. Some of the changes may appear to be

subtle at first but will take on more significance as you continue listening. Don't be afraid to come back to the original and listen again and, above all, have fun!

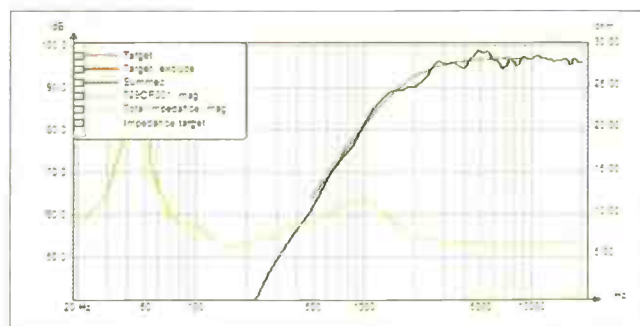
**Next month: Tweaking the WD25A Standard crossover.**



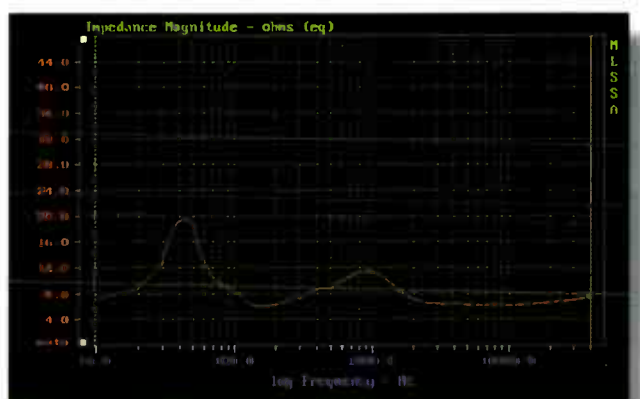
**Fig 2. Alignment to target 3rd order acoustic crossover for LF unit.**



**Graph 2. Response taken on axis and at 30 degrees horizontal showing good linearity through the crossover region..**



**Fig. 3 Alignment to target 3rd order acoustic crossover for HF unit**



**Graph 3 Impedance of WD25T.**

# NEW!

## VALVE AMPLIFIER KIT

from **WORLD DESIGN**

*35W from KT88s*

This month we are giving you a mouth-watering preview of the forthcoming WD88VA – an amplifier based around the magnificent KT88 power output valve and developing 35 to 40W output in push-pull mode.

GEC designed the KT88 specifically for audio use which gives it credentials that has seen its application in numerous audiophile designs. The 'KT' stands for 'Kinkless Tetrode'. GEC found that by manipulating the beam forming plates they could reduce the usual kink in the transfer characteristics of a tetrode to negligible proportions. This gives a valve that distorts very little. The KT88 was one of the last valves to be developed specifically for high quality audio use.

Often described as a 'sweet sounding' valve, our particular implementation of the KT88 makes sure that it is driven to its ultimate performance, both in terms of power and sweetness. The ECC83 front end matches the triode like characteristics of the output configuration as designed by Andy Grove, whilst the 5687 makes sure that the KT88s are powered from a driver stage that doesn't run out of breath when handling musical dynamics and transients.

We have also included a power supply transformer with multiple input taps so that you can more easily match your supply voltage to obtain the optimum drive voltage for the KT88. The anode dissipation of the KT88 runs at around 35W so we've gone for the larger glass envelope Svetlana KT88 to aid heat radiation. The power transformer has been specifically designed for cool running in the face of the current demands made on it.

The KT88 yields an amplifier which has the dual characteristic of providing clout when required in combination with an organic, musical, fluid performance. The result is an amplifier that combines majesty, transparency and rhythmic boogie factor with the ability to swing and sing on all types of music.

Much of this is due to the implementation of the Mullard style phase splitter, the powerful and well balanced driver stage and the attention to encouraging triode like characteristics from a valve traditionally known for its gutsy dynamic capabilities. But of course these would be nothing without the crowning achievement of the output transformer design; this really is the key to achieving the best performance from Ultra-Linear operation.

In the next issue we will be describing the practical implementation of this circuit and the component choice and build layout necessary to wring the finest performance from this sweetly singing powerhouse of a valve amplifier.





# world classics

In this heavily revised section, you'll find the great and the good from audio's glorious past. Most are seminal designs which have earned their place in hi-fi history, but you'll also see some oddities which aren't classic as such, but are great used buys. The year of introduction is given, alongside the original UK launch price. Think we've overlooked something? Then write in and let us know!

## DIGITAL

**CAMBRIDGE AUDIO CD11** 1986 £1500  
Inspired Stan Curtis redesign of Philips CD104, complete with switchable digital filter. Lean but tight and musical performer.

## CAMBRIDGE AUDIO

**CD4SE** 1998 £200  
A touch soft in the treble and tonally light, but outstanding in every other respect.

**LINN KARIK III** 1995 £1775  
The final Karik was a gem. Superb transport gives a brilliantly tight, grippy dynamic sound, albeit tonally dry.

**MARANTZ CD73** 1983 £700  
A riot of gold brushed aluminium and LEDs, this distinctive machine squeezed every last ounce from its 14x4 DAC -super musical



**MARANTZ SA-1** 2000 £5,000  
The greatest argument for SACD. This sublime Ken Ishiwata design is utterly musically convincing with both CD and SACD, beating most audiophile CD spinners hands down.



**MERIDIAN 207** 1988 £995  
Beautifully-built two-box with pre-amp stage. Very musical although not as refined as modern Bitstream gear. No digital output.

## MUSICAL FIDELITY

**TRIVISTA** 2002 £4000  
When playing SACDs, the sweetest, most lucid and lyrical digital disc spinner we've heard. Old school stereo, pure DSD design. CD sound is up in the £1000 class, too! Future classic.

**MERIDIAN MCD** 1984 £600  
The first British 'audiophile' machine was a sweeter, more detailed Philips CD100. 14x4 never sounded so good, until the MCD Pro arrived a year later.



**NAIM CDS** 1990 £ N/A  
Classic Philips 16x4 chipset with serious attention to power supplies equals grin-inducing sonics.



**SONY CDP-101** 1982 £800  
The first Japanese CD spinner was powerful and involving. Brilliant transport more than compensated for 16x2 DAC, and you even got remote control!

**SONY CDP-R1/DAS-R1** 1987 £3,000  
Sony's first two boxer was right first time. Tonally lean, but probably the most detailed and architectural sounding machine of the eighties.



**SONY CDP-701ES** 1984 £890  
Sony's first ever bespoke high end audiophile machine used a 16x2 DAC to provide a clinically incisive sound; supreme build quality allied to the pure unadulterated luxury of a paperbook-sized remote control.

**YAMAHA CD-X1** 1983 £340  
Nicely built 16x2 machine with a very sharp and detailed sound; sometimes too much so. Excellent ergonomics, unlike almost every other rival of the time.

## COMPACT DISC TRANSPORTS

**TEAC VRDS-T1** 1994 £600  
Warm and expansive sound made this a mid price hit. Well built, with a slick mech.



**ESOTERIC P0** 1997 £8,000  
The best CD drive bar none; TEAC's Tokyo boys pushed the boat out in style. Brilliantly incisive, ridiculously over engineered.

**KENWOOD 9010** 1986 £600  
The first discrete Jap transport was beautifully done and responds well to re-clocking even today.

## DACs

**CAMBRIDGE AUDIO DACMAGIC** 1995 £99  
Good value upgrade for budget CD players with extensive facilities and detailed sonics.



**DCS ELGAR** 1997 £8500  
Extremely open and natural performer, albeit extremely pricey - superb.



**DPA LITTLE BIT 3** 1996 £299  
Rich, clean, rhythmic and punchy sound transforms budget CD players.



**PINK TRIANGLE DACAPO** 1993 £ N/A  
Exquisite; the warmest and most lyrical 16bit digital audio we have ever heard. Clever plug-in digital filter modules really worked!



**QED DIGIT** 1991 £90  
Budget bitstream performer with tweaks aplenty. Positron PSU upgrade makes it smooth, but now past it.

## TURNTABLES

**ARISTON RD11S** 1972 £94  
Modern evolution of Thorens' original belt drive paradigm. Scotland's original super-deck was warm and musical, albeit soft. Still capable of fine results today.

**PIONEER PL12D 1973 £36**

The beginning of the end for the British turntable industry. When vinyl was the leading source, this brought new standards of noise performance and stability to the class, plus a low friction S-shaped tonearm. Later PL112D was off the pace compared to rivals



**DUAL CS505 1982 £75**

Simple high quality engineering and a respectable low mass tonearm made for a brilliant budget buy. Polished, smooth and slightly bland sound.

**GOLDRING Lenco 88/89 1963 £15.65**

Simple, well engineered middleweight with soft, sweet sound and reasonable tonearms. Good spares and servicing support even today from specialists.

**LINN AXIS 1987 £253**

Simplified cut-price version of the Sondek complete with LVX arm. Elegant and decently performing mid-price package. Later version with Akito tonearm better.

**LINN SONDEK LP12 1973 £86**

For many, the Brit superdeck: constant mods meant that early ones sound warmer and more lyrical than modern versions. Beguilingly musical but now off the pace.



**TECHNICS SP10 1973 £400**

Seminal Japanese engineering. Sonics depend on plinths, but a well mounted SP10/II will give any modern a hard time, especially in respect of bass power and midband accuracy.

**MARANTZ TT1000 1978 £ N/A**

Beautiful seventies high end belt drive with sweet and clean sound. Rare in Europe, but big in Japan.



**MICHELL GYRODEC 1981 £599**

Thanks to its stunning visuals, this bold design wasn't accorded the respect it deserved until recently. Early examples sound cold and mechanical, but now right on the pace. Clean, solid and architectural sound.

**REGA PLANAR 3 1978 £79**

Brilliantly simple but clean and musical performer, complete with Acos-derived S-shape tonearm. 1983 saw the arrival of the RB300, which added detail at the expense of warmth. Superb budget buy.

**GARRARD 301/401 1953 £19**

Heavy metal - tremendously strong and articulate with only a veiled treble to let it down. In many respects, better than the seventies 'superdecks' that succeeded it.



**ROKSAN XERXES 1984 £550**

Supposedly the first to 'better' the LP12. Super tight and clean sound, with excellent transients. Less musical than the Sondek, but more neutral. Sagging plinth top-plates make them a dubious used buy.

**THORENS TD124 1959 £ N/A**

The template for virtually every 1970s 'superdeck', this iconic design was the only real competition for Garrard's 301. It was sweeter and more lyrical, yet lighter and less impactful in the bass.



**TOWNSHEND ROCK 1979 £ N/A**

The product of academic research by the Cranfield Institute, this novel machine has an extremely clean and fluid sound. Substantially modified through the years, and capable of superb results even today.

**TRIO LO-7D 1978 £600**

The best 'all-in-one' turntable package ever made. Trio/Kenwood threw their 'engineering best practice' book at this one with startling results. Clean, powerful and three-dimensional sound, ultimately limited by the tonearm.

**TO NEARMS**

**ACOS LUSTRE GST-1 1975 £46**

The archetypal S-shaped seventies arm; good, propulsive and involving sound in its day, but ragged and undynamic now.

**AUDIO TECHNICA AT 1120 1978 £75**

Fine finish can't compensate for this ultra low mass arm's limited sonics - a good starter arm if you've only got a few quid to spend.

**ALPHASON HRI00S 1981 £150**

First class arm, practically up to present-day standards. Buy carefully, though, as there is no service available now. Totally under priced when new, exceptional.



**SME 3009 1959 £18**

Once state of the art, but long since bettered. Musical enough, but weak at frequency extremes and veiled in the midband. Legendary serviceability has made it a cult, used prices unjustifiably high.

**GRACE G707 1974 £58**

This early Japanese example of the tonearm art has a smooth, lyrical sound. Imported by Linn, fitted to early LP12s. Sonically way off the pace now, though.

**REGA RB300 1983 £88**

Inspired budget esoterica. Detailed, tight, neutral sound but tonally grey sounding in absolute terms. Responds well to tweaking, and its cheaper RB250 brother better still.



**SME SERIES III 1979 £113**

Clever variable mass design complete with Titanium Nitride tube tried to be all things to all men, and failed. Charming nonetheless, with a warm and inoffensive sound.

**HADCOCK GH228 1976 £46**

Evergreen unipivot with lovely sweet, fluid sound. Excellent service backup.



**LINN ITTOK LVII 1978 £253**

Arguably the first 'superarm': Japanese design to Linn specs made for a muscular, rhythmic sound with real dynamics. Now off the pace, but the final LVIII version worth seeking out.

**NAIMARO 1986 £875**

Truly endearing and charismatic performer - wonderfully engaging mid-band makes up for softened frequency extremes.



**TECHNICS EPA-501 1979 £ N/A**

Popular partner for late seventies Technics motor units. Nice build and Titanium Nitride tube can't compensate for middling sound.

**INTEGRATED AMPLIFIERS/COMBOS**

**DELTEC 1987 £1900**

Fast, dry and with excellent transients, this first DPA integrated is the real deal for eighties obsessives. Ridiculously punchy 80VV per channel from a tiny, half-size box. Radical, cool and more than a little strange.

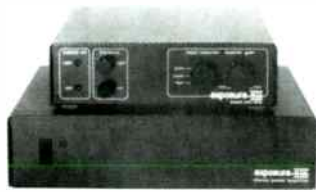


**ROGERS A75 1978 £220**

The prototypical Audiolab 8000a – lots of sensible facilities, a goodly power output and nice sound in one box. The later A7SII and A100 versions offered improved sonics and were seriously sweet and open to listen to.

**EXPOSURE VII/VIII 1985 £625**

Seminal mid-eighties Exposure pre-power, offering most of what rival Naim amps did with just that little bit extra smoothness and sweetness. Still, it's by no means 'sweet' by today's standards, being lean, punchy, musical. It's also possessed of that quintessentially eighties look – frumpy black steel boxes with rough silk screened logos!



**SUGDEN C51/P51 1976 £130**

Soft sounding early Sugden combo with a plethora of facilities and filters, complete with seventies-tastic DIN socketry. A sweet and endearing performer as you'd expect, but lacking in power and poor load driving ability, so partner carefully.

**VTL MINIMAL/50W MONOBLOCK 1985 £1,300**

Vacuum Tube Logic was one of the Europe's biggest tube names in the eighties, and it shows. Rugged, professional build and finish allied to a lively and punchy sound (albeit with limited power) make them an excellent used buy.

**A&R A60 1977 £115**

Sweet and musical feature-packed integrated; the Audiolab 8000A used its blueprint to great effect.



**CREEK CAS4040 1983 £150**

More musical than any budget amp before it; CAS4140 loses tone controls, gains grip.

**AUDIOLAB 8000A 1985 £495**  
Smooth integrated with clean MM/MC phono stage and huge feature count. Extremely reliable, too. Post '93 versions a top used buy.



**MCINTOSH MA6800 1995 £2725**

Effortlessly sweet, strong and powerful with seminal styling to match.

**SUGDEN A21 1969 £ N/A**

Class A transistor integrated with an eminently likeable smoothness and musicality. Limited inputs via DIN sockets.

**MISSION CYRUS 2 1984 £299**

Classic eighties minimalism combines arresting styling with clean, open, lively sound. Further upgradeable with PSX power supply.



**MUSICAL FIDELITY AI 1985 £350**

Beguiling Class A integrated with exquisite styling. Questionable reliability.



**NAIM NAIT 1984 £350**

Superb rhythms and dynamics make it truly musical, but tonally monochromatic. Fine phono stage, very low power.

**NAD 3020 1979 £69**

Brilliantly smooth, sweet and punchy at the price and even has a better phono stage than you'd expect. The archetypal budget super-amp.



**MYST TMA3 1983 £300**

Madcap eighties minimalism, but a strong and tight performer all the same.

**ROGERS CADET III 1965 £34**

Sweet sounding valve integrated, uses ECL86 output valves, even has a half useable phono stage, sweet, warm a good introduction to valves



**ROTEL RA-820BX 1983 £139**

Lively and clean budget integrated that arguably started the move to minimalism.

**PREAMPLIFIERS**

**AUDIOLAB 8000C 1991 £499**

Tonally grey but fine phono input and great facilities make it an excellent general purpose tool.

**AUDIO RESEARCH SP-81982 £1,400**

Beautifully designed and built high end tube preamplifier with deliciously sweet and smooth sound. Not the last word in incision or grip, but that didn't matter to those who aspired to it.

**CONRAD JOHNSON**

**MOTIV MC-8 1986 £2,500**

Minimalist FET-based preamplifier from the Yank valve specialists is brilliantly neutral and smooth with a spry, light balance in the mould of Sugden high end stuff. Something of a curio, but worthwhile nonetheless.

**CROFT MICRO 1986 £150**

Budget valve pre-amp with exceptionally transparent performance.

**LEAK POINT ONE STEREO 1958 £ N/A**

Good for their time, but way off the pace these days. Use of EF86 pentode valve for high gain rules out ultra performance. Not the highest-fi!

**LINN LK-1 1986 £499**

A brave attempt by the Glasgow boys to bring remote controlled user-friendliness to hair-shirt audiophile hi-fi. Didn't quite work, but not half bad for under £100.

**NAIM NAC32.5 1978 £ N/A**

The Salisbury company came of age with this, their classic high end pre. Brilliantly fast and incisive sound that's a joy with vinyl but a tad forward for digital.

**LECSON AC-1 1973 £ N/A**

Amazing styling courtesy of Allan Boothroyd can't disguise its rather cloudy sound, but a design classic nonetheless.



**QUAD 22 1958 £25**

The partner to the much vaunted Quad II monoblocs - cloudy and vague sound means it's for anacrophiles only.

**QUAD 33 1968 £43**

Better than the 22, but Quad's first tranny pre isn't outstanding. Responds well to tweaking/ rebuilding though...

**POWER AMPLIFIERS**

**LEAK STEREO 20 1958 £31**

Excellent workaday classic valve amplifier with decent power and drive. Surprisingly modern sounding if rebuilt sympathetically. Irrepressibly musical and fluid.



**LECSON API 1973 £ N/A**

Madcap cylindrical styling alluded to its 'tower of power' pretensions, but it wasn't. Poor build, but decently clean sounding when working.

**MARANTZ MODEL 9 1997 £8000**

Authentic reproduction monoblocs still more than cut the sonic mustard. Highly expensive and highly sought after.

## CLASSICS

### MICHELL ALECTO 1997 £1989

Crisp, clean and beautifully controlled with gorgeous styling. Partnered with the £1650 Orca this sounds delicious!

### LEAK POINT ONE, TL10, TL12.1 1949 £28

Early classics that are getting expensive. Overhauling is de rigueur before use, using original parts if possible. Surprisingly crisp and musical sound, that's far more modern than Quad IIs. Deeply impressive when in fine fettle.



### MUSICAL FIDELITY XA200 1996 £1000PR

200W of sweet smooth transistor stomp in a grooved tube! Under-rated oddity.



### RADFORD STA25 RENAISSANCE 1986 £977

At the time, very possibly the least cool amplifier on the planet – and we're not talking heat dissipation here. This reworking of Radford's original late sixties design was possessed of a wonderfully rich, old school valve sound with enough power (25W) and lots of subtlety.



### QUAD II 1952 £22

The all-time classic valve amplifier, with a deliciously fluid and lyrical voice. In other respects though, it sounds hopelessly dated. Low power and hard to partner properly.



### QUAD 405 1978 £115

The first of the current dumpers is a capable design with smooth, effortless power and a decently musical sound. 606 and 707 continue the theme with greater detail and incision.

### QUAD 303 1968 £55

Bullet proof build, but woolly sound. Off the pace, but endearing nonetheless. Some pipe smoking slipper wearers swear by them!

### KRELL KMA100 II 1987 £5,750

Ludicrous monoblock version of the giant KSA-100 is one of the seminal eighties transistor power amplifiers. Massive wall/rop allied to a very clean and open Class A sound makes this one of the best amplifiers of its type, ever.

### PIONEER M-73 1988 £1,200

Monster stomp from this seminal Japanese power amplifier, complete with switchable Class A and Class B operation. Clean, open and assured sounding, albeit a tad behind the pace on high speed dance music. Rosewood side cheeks and black brushed aluminium completes the eighties-tastic experience.



## PHONO STAGES

### CREEK OBH-8 SE 1996 £180

Punchy, rhythmic character with oodles of detail makes this a great budget audiophile classic. Partner with a Goldring G1042 for an unbeatable budget combination.



### LINN LINNK 1984 £149

Naim-designed MC phono stage built to partner the original Naim NAIT - yes, really! Fine sound, although off the pace these days.

### MICHELL ISO 1988 £ N/A

This Tom Evans-designed black box started the trend for high performance offboard phono stages. Charismatic, musical and punchy - if lacking in finesse.

## TUNERS

### MARANTZ ST-8 1978 £353

Marantz's finest radio moment. Warm, organic sound plus an oscilloscope for checking the signal strength and multipath.



### CREEK CAS3140 1985 £199

Excellent detail, separation and dynamics - brilliantly musical at the price. T40 continued the theme...

### NAD 4040 1979 £79

Tremendously smooth and natural sound allied to low prices and good availability make this budget analogue esoterica. Needs a good antenna to work properly, however.

### NAIM NAT03 1993 £595

The warm, atmospheric sound is further proof of Naims proficiency with tuners.

### PIONEER TX-9500 1976 £295

Another of the serious classic solid-staters. Boasts the usual high end Jap package of fine sound, brilliant sensitivity and superb build.

### LEAK TROUGHLINE 1956 £25

Series I an interesting ornament but limited to 88-100MHz only. II and III are arguably the best-sounding tuners ever. Adaptation for stereo easy via phono multiplex socket. Fed by a modern outboard decoder they're deliciously lucid with true dimensionality.



### YAMAHA CT7000 1977 £444

Reputedly the best of the classic Jap analogues, this combines sleek ergonomics, high sensitivity and an explicit, detailed sound.

### QUAD FM4 1983 £240

Supreme ergonomics and styling allied to a pleasingly lyrical sound with plenty of sweetness and detail made this one of the best tuners around upon its launch.



### REVOX B760 1975 £520

More of a semi-pro machine than a domestic bit of kit, the Revox offers superlative measured performance although the sound isn't quite as staggering as the numbers. Fine nonetheless, and surely the most durable tuner here?

### NAD 4140 1995 £199

Brilliant affordable digital tuner has a smooth, detailed musical sound plus sensible real-world facilities.

### ROGERST75 1977 £125

Superb mid-price British audiophile design, complete with understated black fascia. Fine sound in the true Rogers mould – smooth and sweet with fine dimensionality.

### SANSUITU-9900 1976 £300

A flagship Japanese tuner designed to steal sales from the likes of Accuphase and Revox, it boasts superlative RF performance and an extremely smooth and lucid sound, along with very fine build and finish.

### SONY ST-5950 1977 £222

One of the first Dolby FM-equipped tuners, a format that came to nought. Still, it was Sony's most expensive tuner to date, and boasted a very good sound quality allied to brilliant ergonomics.



### TECHNICS ST-8080 1976 £180

National Panasonic's specialist hi-fi brand was a big hitter back then, and this is no exception. Superb FM stage makes for a very clean and smooth listen with lots of detail and depth.



**ANALOGUE RECORDERS**

**YAMAHA TC-800GL** 1977 £179  
Early classic with ski-slope styling courtesy of Mario Bellini. Middling sonics by modern standards, but cool nonetheless!



**AIWA XD-009** 1989 £600

Aiwa's Nak beater didn't, but it wasn't half bad nonetheless. Massive spec even included a 16x4 DAC!

**NAKAMICHI CR-7E** 1987 £800

The very best sounding Nakamichi ever - but lacks the visual drama of a Dragon.



**PIONEER CTF-950** 1978 £400

Not up to modern standards sonically, but a great symbol of the cassette deck art nonetheless.



**REVOX A77** 1968 £145

The first domestic open reel that the pros used at home. Superbly made, but sonically off the pace these days. B77 better, but couldn't match the Japanese.



**SONY WM-D6C** 1985 £290

Single capstan transport on a par with a Swiss watch, single rec/replay head better than most Naks. Result: sublime.



**DIGITAL RECORDERS**

**SONY MDS-JE555ES** 2000 £900

The best sounding MD deck ever, thanks to awesome build and heroic ATRAC-DSP Type R coding.



**PIONEER PDR-555RW** 1999 £480

For a moment, this was the CD recorder to have. Clean and detailed.

**MARANTZ DR-17** 1999 £1100

Probably the best sounding CD recorder made; built like a brick outhouse with a true audiophile sound and HDCD compatibility.



**KENWOOD DM-9090** 1997 £500

Serious and sophisticated sound thanks to well implemented ATRAC 4.5; surprisingly musical MD recorder.

**SONY TCD-8 DATMAN** 1996 £599

Super clean sound makes this an amazing portable, but fragile.

**LOUDSPEAKERS**

**ACOUSTIC RESEARCH**

**AR18S** 1978 £125

Yank designed, British built loudspeaker became a budget staple for many rock fans, thanks to the great speed from the paper drivers, although finesse was most definitely not their forte...

**BBC LS3/5A** 1972 £88

Extremely low colouration design is amazing in some respects - articulation, stage depth, clarity - and useless in others (both frequency extremes). Came in wide variety of guises from various manufacturers building it under licence. Partner with Rogers AB1 subwoofers for an extra two octaves of bass!



**LOWTHER PM6A** 1957 £18

**EACH**

This seminal full-range driver is still manufactured. High sensitivity, as fitted to many classic horn designs.

**TANNOY WESTMINSTER** 1985 £4500

Folded horn monsters which certainly sound good if you have the space. Not the last word in tautness but can drive large rooms and image like few others.



**JR 149** 1977 £120

Infamous cylindrical speaker that was ignored for decades but now back in fashion! Based on classic KEF T27 / B110 combo as seen in the BBC LS3/5a. Doesn't play loud, needs a powerful transistor amplifier, but rewards with fine clarity in imaging.



**SPENDOR BCI** 1976 £240

Celestion HF1300 tweeter meets bespoke Spendor Bextrene mid-bass unit - and the result is a beautifully warm yet well focussed sound. A little bass bloom necessitates careful low-stand mounting, but these prove that the seventies did have some fine designs after all!

**QUAD ESL57** 1956 £45

**EACH**

Wonderfully open and neutral sound puts box loudspeakers to shame. Properly serviced they give superb midband performance, although frequency extremes less impressive. Ideally, use in stacked pairs or with subwoofers and supertweeters.



**KEF R105** 1977 £785

Three way Bextrene-based floorstander (complete with castors!) gave a truly wideband listen and massive (500W) power handling. A very neutral, spacious and polite sounding design, but rhythmically well off the pace. The quintessential nineteen seventies loudspeaker

**IMFTLS80** 1976 £550

Warm and powerful nineteen seventies behemoth with transmission loading and a mixture of KEF and Celestion drive units. Impressively physical wideband sound but rhythms aren't its forte.



# Listen Carefully

Calm and intelligent equipment demonstrations for lovers of all types of music

## Well, hello - and welcome to my world

I represent a handful of suppliers in my deliberately small specialist showroom in North London. Through choice I have no staff - and I probably never will.

This means that the ultimate size of my twin businesses (I own simply-STAX) is limited by the care I can offer my customers. If there's a danger that I'm spreading myself too thin, then I'll put the brake on expansion. I may even contract back until it becomes relaxed again. Fine. I'm happy with that possibility.

Every aspect of the demonstration & installation is taken care of by me. I am inescapably accountable for your total satisfaction. I wouldn't have it any other way - and neither would my customers

## I represent the following:

**Ayre** (amplification and digital source). The **Brinkmann** vinyl replay system. **Cassiel** power cords. **Esoteric** (digital source). **Grand Prix** (isolation). **LAT** (XLR interconnect & power distribution). **Mark Levinson** (amplification & digital source). **Lyra** (analogue). **Stereovox** (interconnects). **Sumiko** (analogue). **Thiel** loudspeakers.

## I don't have ...

Anything to do with plasmas, home cinemas, cable bandits, dynamics-crushing mains filters or anything else I'm not passionate about.

## At heart ...

I'm a systems man. This means that while I'm happy to suggest and demonstrate various items that should and probably will make an immediate and worthwhile improvement in your current set-up, my specialisation is getting components to work together - *as a properly integrated system*. The benefits are clear.

## Putting an end to costly and desperate upgrades

It's true that going the system route is a bigger initial investment in the short-term, but you save overall in the long-term by avoiding *unnecessary* upgrades.

## Trade-ins?

I'm happy to discuss this.

## System 1

**Ayre** CX-7e CD & AX-7e integrated. **Thiel** CS1.6 loudspeakers. **LAT** power distribution, XLR connections & speaker leads. **Cassiel** CAS4 power cords. This is by far the most musically satisfying system I've heard up to £10k - yet it costs *far* less. Add the Brinkmann **Oasis** and you have a magnificent vinyl replay facility too.

## System 2

**Ayre** C-5xe digital multi-format. The **Ayre** K-1xe preamp & V-5xe power amp. The **Thiel** CS2.4 loudspeakers. **LAT** power distribution, XLR connections & speaker leads. **Cassiel** CAS4 power cords. And as an option, the incomparable **Brinkmann VRS**

It's very hard to get more musically satisfying than this. Hard, but not impossible - *at a price*. That's system 3.

## System 3

No words of mine can do this justice. Just come and listen. Then you'll understand.

## Substitutions

Depending on taste and budget, Esoteric digital can be substituted for Ayre. Mark Levinson digital & amplification can be substituted for either Ayre or Esoteric.

There are no intelligent substitutions here for

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## THE BRINKMANN VRS (Vinyl replay system)

Quite simply the most musically satisfying vinyl system I have ever heard anywhere *at any price*.

Probably because I have the world's first **Brinkmann** 10.5 tone arm which is both electrically balanced and with XLR outputs. The reduction in background noise and increase in dynamics over the standard 10.5 is mouth-watering. Of course, bearing in mind that few preamps have XLR-equipped phono stages, you'll need a state-of-the-art phono stage. That's the **Ayre** P-5xe. Incidentally, the 10.5 is in effect a **Breuer** 8 Dynamic, but 10.5" in length. Naturally, it sits on the magnificent **LaGrange** turntable.

For *Listen Carefully*, Mr. Brinkmann *personally* sets up the 10.5, his **EMT Titanium** cartridge and **LaGrange** and fine tunes it through his **Lumen White** loudspeakers. The arm with the cartridge is packed in one heavy duty wooden case while the base and platter sit in another. It arrives in the U.K. *personally tuned by the master*. You're up and running in 7 minutes. Nothing is left to chance. Literally nothing.

The price is not for the squeemish - but it puts an end to upgrading your front end - and it sounds consistently wonderful, day after day, year after year. No gurus required.

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Brinkmann nor Thiel. Currently they stand head and shoulders above *anything* else in their price band!

## Demonstrations in London

You'll be surprised I think by the relaxed atmosphere here. It's a marked contrast to traditional demonstrations in conventional (dull, unimaginative, sales-hungry?) dealers.

That's because I offer just one demonstration slot in the morning, one in the afternoon and occasionally one in the evening. No fuss, no hurry, no interruptions, no other visitors, no parking wardens - and no coercion.

I've been known to conduct a demonstration on a Sunday too! Spend time with me and I guarantee you'll benefit from my years of experience and you will receive *my undivided attention*.

## Home demonstrations

I offer these in London (within the M25), Kent, Essex, Cambridgeshire, Hertfordshire, and Bedfordshire too.

## Human contact ...

If you feel you'd like a bit of human interaction, then feel free to pick up the phone right now. You can get me, if I'm not in a demonstration or installation by phoning me on 0208 447 8485. I'm happy to discuss anything re audio with you. I might not have the answer, but I assure you that your opinion - even if I don't agree with it - is important to me. Really!

## But what about the music?

No problem. Until May 30th - if you buy any new equipment from me you get a unique personal ID number that gives you 20% (yes, twenty percent) off all new recordings from Vivante mail order.

<http://www.vivante.co.uk/>

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## The UK Mark Levinson owners club:

It's free to join - if you are a Mark Levinson owner. Terrific, relevant and interesting benefits. Too much to list here. Just phone 0208 447 8485.

## An unsolicited customer comment:

*"The system I heard, Brinkmann LaGrange + their arm, EMT, Ayre amps, all balanced with appropriate cables into Lumen White Silver Flame speakers was (this is painful), head and shoulders above my Roksan/Naim/Sonus system at around similar or less cost. I'm giving serious thought to having a total clear out and buying that very system lock stock."*

Interested? Fine. I offer you a calm and intelligent demonstration of magnificent audio equipment for of all types of music. Prepare to be amazed.

Howard Popeck

[www.listencarefully.co.uk](http://www.listencarefully.co.uk)

020 8447 8485



**MAGNEPLANAR SMGA198X** £800

Technological loudspeaker with genuinely musical abilities: fast, smooth, open, dry.

**MISSION 770** 1980 £375

Back in its day, it was an innovative product and one of the first of the polypropylene designs. Warm, smooth, clean and powerful sound.

**MISSION 752** 1995 £495

Cracking Henry Azima-designed floorstanders combined HDA drive units and metal dome tweeters with surprisingly warm results. Benign load characteristics makes them great for valves.

**HEYBROOK HBI** 1982 £130

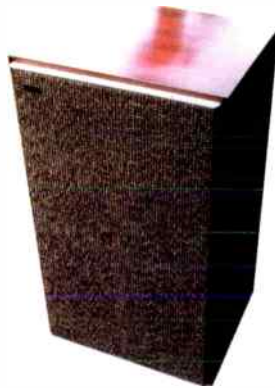
Peter Comeau-designed standmounters with an amazingly lyrical yet decently refined sound. Good enough to partner with very high end ancillaries, yet great with budget kit too. A classic.

**CELESTION SL6** 1984 £350

Smallish two way design complete with aluminium dome tweeter and plastic mid-bass unit set the blueprint for nineteen eighties loudspeakers. Very open and clean sounding, albeit course at high frequencies and limp in the bass. Speakers would never be the same again...

**LEAK SANDWICH** 1961 £39 EACH

Warm sounding infinite baffle that, with a reasonably powerful amplifier can sound quite satisfying.

**QUAD ESL63** 1980 £1200

An update of the ESL57, with stiffer cabinets. Until the 989, the best of the Quad electrostatics.

**YAMAHA NS1000** 1977 £532

High tech Beryllium midband and tweeter domes and brutish 12" woofers in massive sealed mirror image cabs equals stunning transients, speed and wallop allied to superb transparency and ultra low distortion. Partner carefully!

**MISSION X-SPACE** 1999 £499

The first mass production sub and sat system using NXT panels is a sure-fire future classic - not flawless, but a tantalisingly unboxy sound nevertheless!



For all your advertising requirements  
please call **020 7372 6018**

or email:

**advertising@hi-fiworld.co.uk**

# kit & component suppliers

## COMPONENT SUPPLIERS

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## Letter of the Month

### GOLDEN YEARS

Things are beginning to get weird. Your excursions into older equipment have inspired me to enter the time warp. First with a glorious Meridian MCD player. In mint condition and sounding warm and natural in a way the latest, expensive, CD players cannot match. Then I chanced upon a 1980 Luxman integrated amp and matching tuner, both mint, at an Audiojumble, for £100. Again, the sound is disturbingly good. More disturbing than that, it actually sounded better than the latest Luxman, as reviewed in your April edition...I know, I have compared them.

Next up, those giant Tannoy's; sitting in my hall are a pair of the big Tannoy Prestige models, in this case Canterburys. Your reviews seem spot on (sorry!). Especially in pointing-out that at normal listening distances, the big Tannoys sound a bit coarse and unrefined. These beasts are not a good idea for the normal British sitting room...a pair of old Quad 63s with a Rel subwoofer sound a lot more subtle. No doubt in a much bigger room (much bigger!) the results would be different.

There is a painful lesson in all this. It is not just classic old valve stuff from the 50s and 60s which deserves a new lease of life. There are beautiful bits of kit from the 70s and 80s out there, and they sometimes raise serious questions about newer stuff.

Finally, and again weirdly, your comments on the mysteries of CD transports hit right home. Not only does my old Meridian MCD (all metal transport) sound nicer than a lot of new stuff, but I tried a big CEC transport with a modern DAC....The CEC provided an astonishing jump in quality, and that in comparison with the transport from a new £2,000 Marantz unit. What is going on here? Maybe a really serious transport could make CD sound half-decent. No, that really would be too weird, after twenty years of ghastly processed digital sound (oops! the pills are wearing off..)! Keep it up guys, you are really hitting the targets, big time.

Keep it up guys, you are really hitting the targets, big time.  
**Peter Skinner,**  
**St Leonards on Sea,**



A disc spinner from the Golden Years, Meridian's MCD.

Thanks for that - and your interesting comparisons of modern against old. It's all a bit worrying at times, because if everyone who listens to old kit prefers it, then we are by definition progressing backwards!

And anyway, how much did those Canterburys cost you? I am busy counting the contents of my piggy bank before making Tannoy an offer for a pair of used Yorkys. **NK**

### TOTAL IMPACT

I was very interested in your article in the November issue about tweaking the Sonic Impact amp and your continued championing of the nitty gritty of hi-fi and not just the expensive and fashionable (no creeping intended).

Having recently discovered your publication after feeling somewhat dismayed by the march of AV and lack of proper hi-fi coverage (if I see one more article on Plasma screens and how to set up a sub/sat system I will scream). I'm a Hi-Fi World convert. Reading the article and seeing the very websites mentioned that I visit on a regular basis I get a sense that your writers are part of the real world and not just regurgitating the publicity blurb from a particular manufacturer.

I have had an amp based on the

Tripath chipset TA2022 in my system for about six months now and I've found it a revelation. I purchased the kit from 41Hz Audio and although based on surface mounted components, it was easy to build. As soon as it fired up I knew I was hearing something special. It shows up many a traditional amplifier costing many more times the 54 euros it cost, and just confirms to me "the emperor's new clothes" state of the industry.



Tannoy Canterbury - good at a distance, the loudspeaker for 'bigger homes'.

Which brings me to the point of my letter. What exactly are we paying for nowadays when we buy an amplifier? A fancy case and shiny buttons... if it looks expensive it must sound good. I feel most other hi-fi mags

adhere to this, towing the party line, shall we say...

*My amp is still sitting on a plank of wood and looks like a mess but fed by a cheap tube preamp it really sings and never fails to amaze me (I will put it in a cheap plastic case some day).*

*So congratulations on breaking the mould. I look forward to later articles maybe comparing different D-Class kits available now.*

**Tim Collins.**

I believe solid-state amplifiers, on aggregate, are improving slowly. Trouble is, most amps follow a strict pattern that is both economically sensible and reasonably safe. Much of what goes into them is there to avoid self-destruction, loudspeaker destruction - or both. On the matter of sound quality, because a good modern design can measure perfectly there is general bafflement about what could be affecting the sound, and indeed some engineers believe there is nothing wrong with today's amplifiers.

In your case Tim, I suspect your "simple" valve preamp stage is contributing much to the sound. When simple means elegant, as it can with valves, the outcome is often a good one. **NK**

I've been very impressed by the T-Amp - it's pure hands on tweakiness, and not everyone's cup of tea, but given a decent power simply it's surprisingly good at the price. I feel that it's main problem is, in fact, its price - if you put the chipset in a chrome box the size of a Musical Fidelity kW500 and charged £2,000, a lot of people would buy it on sonics alone - but they don't take it seriously because it's less than the price of a DVD box set... **DP**

### GET A GRIP

*Following David Price's recommendation of the SDS Isoplatmat I purchased one from Origin Live.*

*I agree it is a great improvement on the thick rubber Sony mat that has lived on the platter of my Garrard 401 for the last twenty five years. I was surprised how much space and life this gave to my records; I'm still finding old favourites from my collection to play. Sadly, my musical taste froze in late sixties/ early seventies on Progressive Rock, the background shunting in Supertramp's 'Rudy' is clarity personified.*

*As George Pelecanos would say: "only vinyl has that bass". I just wish I had a Marantz tube amp to back it up. However with the small cork pads that Origin Live suggest as a further improvement, and to my ear it is, my trusty Michell record clamp no longer*



### Garrard 401 - sounds better with an SDS Isoplatmat

*clamps to the centre spindle.*

*Could you suggest a suitable, hopefully not too expensive replacement for the otherwise excellent Michell.*

**David Bond**

Hi David - don't go for a heavyweight clamp - you'll upset the Gyro's suspension. This leaves you with just one option, the Orbe centre spindle/clamp upgrade. It's modestly priced (ask Michell Engineering) and works much better than the Gyro clamp.

**DP**

### DAB = RADIO GAGA

*Hi-fi magazines regularly comment somewhat helplessly on the eventual demise of FM radio. Dealers and manufacturers seem to anticipate that the population will suddenly, like Paul, see the light and rebel. Is it not time that the magazine editors get together, maybe utilise the many Shows and alert the public and mount a campaign? Is there any reason why the government cannot be persuaded to have BBC radio side by side with a better quality digital*

and, quite frankly, broadcasters feign to pay little or no attention. The BBC in particular pays lip service only to outside opinion about its policies; it is a quasi-governmental body after all, only notionally answerable to the listening public. I have personally found their Press office to be deliberately rude and unhelpful, as well as ignorant of quality issues, so much so that I stopped contacting them some time ago. As far as they are concerned digital radio is CD quality and why are we complaining? Mention lousy MP2 encoders and they go silent, then get defensive.

In the meantime, because of the bitter criticism of DAB quality they have quietly replaced these antiquated contraptions, so there is tacit acknowledgement that DAB needs improving.

You have to understand that the BBC has invested large sums of public money into DAB so they are not going to admit to being wrong in adopting it so early and so eagerly. I suspect, however, they do



### Sonic T Amp - an acknowledged bargain.

*service. Nowhere in the world, in spite of commercial and political pressures, is there a better quality service than BBC 2, 3, 4 and the World Service. As the saying goes, put your money where your mouth is and work together to arouse the public before it is too late.*

**Graham**

There has been much criticism from people like us already about DAB

now realise that without a serious upgrade to better compression, like AAC for example, and higher data rates, it is doomed to be a 'just acceptable' lo-fi medium for portable radios (assuming its inadequate signal strength is increased by 14dB as ntl suggest).

As no one is quite sure what the future holds, neither the BBC nor critics like us, it is difficult to adopt a



position on what we should be doing. At present DAB is here, whether we like it or not, and so is VHF/FM. If you want quality, invest in the latter. On the future I am personally of the view it is best to hold fire, until broadband radio, satellite, DVB-H and even cell phone technologies settle down. For the next decade or so perhaps we should refine what we have rather than pitch into another inadequate, dated and dead-end transmission system like DAB. **NK**

### THREE'S COMPANY...

I've been reading the unfolding discussion on the Denon 103 with some dismay. Before the debate gets closed down, I think it's time someone actually tried properly to explain what's going on with this cartridge, with a bit of technical advice to shed some light. So far it seems we have the 'This cartridge is a useless anachronism' camp and the 'I've not used it but it's fantastic' camp, which is helping nobody as far as I can see.

I could start by having a rant at DP and NK, but since you're doing such a fine job with the magazine and its content nowadays, I'll skip that bit and get straight into what is required to get the magic out of this unit. Please note that I'm not just an enthusiastic beginner here - my current system is a Nottingham Hyperspace IOL Illustrious followed by home-built phono, a power amp using Vaic AV32 valves in SE with pentode drivers and amorphous-core output trannies, and a pair of the Lynn Olson 'Ariel' 6c speakers as featured in your mag recently. As comparison to the Denon in recent weeks, I've been using a reworked Dynavector XX-1L, plus a Len Gregory sapphire cantilever rework of the Koetsu Rosewood. While both of these (expensive) units will beat the Denon in the treble, in the bass and midrange it's a different story.

For most of this advice, I'm indebted mainly to Thorsten Loesch, noted hi-fi guru and designer; his advice below has been posted recently on DIY Audio forum and Romy the Cat's 'GoodSoundClub' amongst others.

The 103 has various disadvantages arising from its old design, most of which can be solved. It also has at least one major advantage not shared by more than a handful of other units - Alnico magnets. It is not a 'plug and play' solution like a Goldring 1042 - on the other hand, it can do things that the Goldring and any other budget cartridge cannot do.

The first disadvantages and the one where most users and reviewers fail, is the low compliance. Unless the cartridge is loaded with at least 6g of mass at the headshell (and balanced-up, of course!) then dynamics and bass will suffer

enormously. The recurring comments that the 103 is bass-light or 'boring' are just plain wrong - currently my XX-1L in the Illustrious has less bass than the 103 loaded with 6g at the headshell. The low compliance also puts a lot of treble energy into the arm, and down into the arm/plinth interface. This energy can cause a loss of refinement and tone with many arms and decks. In fact, the Denon is often happier with older, less rigid arms, where the HF energy can be lost or dissipated - the SME 3009 and 3012 arms are well-known as a good match to the 103. Rumour has it that the top Schroeder and Morsiani hardwood arms are extremely successful with the 103.

If you use the wrong arm and no mass loading, the typical beginner will then tend to load the cartridge down with 100 ohms or less to kill the apparently rough and aggressive top-end, further dulling-down the potential of the unit. With the correct arm and usage, the 103 can be loaded somewhere from 200 ohms to 1K, with vastly improved tonal colour, life and dynamics.

The remaining problem which is more difficult to solve is the rather basic cantilever and the conical diamond profile. The diamond profile has pros

following people are also fans of the Denon 103: Thom Mackris of Galibier Design in Colorado (high-end turntable designer); Frank Schroeder (his tonearm is considered one of the best in the world and has a 10 month waiting list) various of the European dealers and reviewers such as Hartmut Quaschik of TNT audio, plus (dare I mention him) Ken Kessler, who recently gave a well-considered assessment of the 103's properties in HFN.

For those who wish to try, bear in mind that the 103R with high-purity coils is significantly better than the plain 103. There is also the mysterious 103 'Pro', available from Japan, for which very few reviews exist.

Hope this is of interest,

**Mark Jeffs**

This correspondence is beginning to sound like the sort of rants we once got over the Decca London. I'm sure, like the Decca, the 103 has some attractive properties, but when you are trying to seriously suggest loading a conical stylus with 6gms I suddenly find I have more pressing things to attend to. And as for the sound being good because the magnet is Alnico, perhaps this suggestion needs explanation to have credibility.



**Denon's new TU-1500AE VHF/FM tuner, for those who want quality radio.**

and cons - the plus side is that it plays vinyl from a broad time-span with equal success, and it is very tolerant of surface scratches. The downside is the limited treble extension which loses some refinement and air. The cantilever also takes its toll on this end of the music spectrum; anyone who says the Denon has great treble is inexperienced or misguided. How it would sound with a sapphire cantilever and modern diamond is an interesting question, and one I intend to answer fairly soon, with help from Expert Stylus Co.

If you get the set-up right with the 103, for starters you get exceptional dynamics and tonal colour. I'm also pretty sure the Alnico magnets play a big part in the superb 'liquid' smoothness of vocals, and the very rare rendition of reverb decay and soundstage depth, which so far I have been unable to match with another cartridge. Mr. Keyword ought to appreciate this detail, since the large Tannoy dual-concentrics continue to use Alnico magnets.

You don't have to take me seriously, but please consider that the

All the same, I am sure, with your obviously deep experience of the DL103, it truly does have real strengths, but I feel readers will also understand they are for the dedicated few rather than the many. Generally Hi-Fi World tries to keep its feet on the ground when it comes to product recommendation, so although we understand and appreciate the DL103 may appeal to some, modern cartridges are, in our collective view, a better bet for the average person who wants to enjoy vinyl without getting too involved in the religion. **NK**

Well okay, I was a little flippant in my earlier missives on the DL103, but I never thought we'd offend so many (at least three, at last count) Denon MC lovers. I stand by what I said, and applaud Noel for just putting what I said in more serious and scientific terms - namely that it's dragging an incorrectly profiled diamond through a delicate record groove at higher tracking weights than are ideal. With

the greatest respect to the 'followers of the three', what I'm at a loss to understand is why you'd invest time and money in it, when there are far, far superior solutions off the shelf for not much money, that won't recut your records! A Dynavector DV10X4 is dramatically superior at under £250 (and has an elliptical stylus - whoopee doo!), whereas a £500



Get a Dynavector DV10X4 says David Price

Ortofon Rondo Bronze with a Fine Line point kills the Denon dead like a bug on a windscreen. Is it so wrong to point this out? DP

**REACHING THE ZONE**

I'm about to dig deep into my hard-earned for an amp in the £1,500 price range. The AudioZone AMP-1 has caught my attention, but I can't find anyone this side of the Atlantic who has an unbiased opinion (i.e. who isn't Shadow Audio, etc).

I understand that you are presently reviewing the above - opinion to be published in the June edition. I appreciate the subjective (and perhaps rather cheeky?) nature of my question, but based on your experience of it, does it represent at least fair value in the price range? I can't easily get to Glenrothes to listen to it (I'm in Clitheroe, Lancashire) and am tempted

to take a risk and buy it based on the SixMoons review. My other choice would be the AVI LabSeries Integrated.

Present system: Arcam Alpha 8, Straightthru Interconnects, upgraded Meixing MC34A (Bypassed preamp, silver wiring, Blackgate and Auricap, Mullard NOS & Platinum Series EL34s), Chord Carnival Silver Plus Cables, ProAc Studio 140s. Atacama Equinox stand.

The CD player is soon to be replaced by ESOUND CD-E5. I don't know if you are in a position to reply - but would truly appreciate any morsel you could toss in my direction!

Steve Woods

Our review of the AMP-1 amplifier is in this issue. It's an interesting design, that's for sure, but I have slight reservations about an all direct coupled design lacking an output servo. There will be no problems with preamps or CD players, or phono preamps if it comes to that, that are a.c. coupled - as most are.

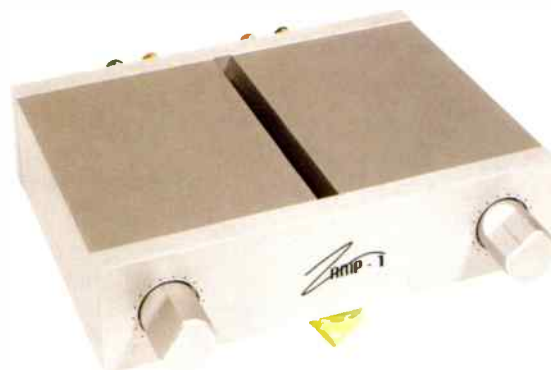
Should a source with d.c. on its output be connected up though, then the loudspeakers will receive a d.c. offset - not a good idea. I presume there is no servo, or a.c. input coupling (i.e. a capacitor) to augment sound

quality, but it's important to be aware of what this means in practice. NK

**HO HUM**

When I opened the cupboard door and saw all my old vinyl LPs sitting there I thought that it must be time for me to resurrect them again, as I know that most of you at World are of the vinyl persuasion. So, I dusted off my Pro-ject Classic turntable and hooked up my valve phono stage and was all set to be knocked out - but I was greeted with a loud mains hum, which increased as I increased the volume. Well, I know how to cure that, I thought, and hooked up an earth wire from my turntable to my preamp. Cured? Hell no! Better, yes but the hum is still there and on quiet passages I tend to get paranoid and listen for the hum. I don't remember hearing this hum, or certainly not as loud, when I previously had my turntable in my system. I have changed the valves, to no avail. I have disconnected the earthing wire and still I have the hum. I don't know what I should do next, other than to put the dust cover back on to the turntable and close the cupboard door on the vinyl and go back to my CD only situation. Can you save me from a life in Damnation?

John Clark



Audiozone AMP-1 - is it worth £1500?

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	Audio Tekni Cartridge with step up (EX review)	£2250
	Blue Pearl (the prototype) Turntable with Graham Phantom arm	£9995
	Zyx airey Cryogenic copper cables	£995
	Project 6.9 Turntable (without cartridge)	£425
	Audio Tekne Cartridge with step-up transformer	£2995
	My Sonic Eminent cartridge (new)	£2750
	Project 9c S carbon fibre silver wired arm	£375

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Hi John. It is impossible for us to diagnose a problem like this with any certainty, at a distance. It may just be that a smoothing cap in your valve phono stage has failed, or similar. It may be that you still have a hum loop somewhere, or it may be that your phono stage mains transformer is too close to the cartridge, or that you have placed the (sensitive) phono stage in a rack over your amplifier's mains transformer, whereas it was at a distance before.

Alternatively, if you can't cure the hum or get anyone to diagnose the problem for you, try a budget phono stage perhaps, like the Cambridge Azur 640P. I hope this helps. **NK**

### CABLE TALKING

After following your recent features on self assembling a pair of World Designs WD25A speakers and the cable reviews published in April's issue, this provoked me to consider the speaker cable fitted internally in most loudspeakers as standard and if it would it be a worthwhile (and relatively cheap) DIY upgrade to replace this. I suppose I am thinking of speakers priced at the lower end of the market, which will have the poorest quality internal cabling.

More so, would it be beneficial to replace the internal cabling with the same speaker cable used externally in a given system, so the signal is transmitted through a more consistent signal path, so minimising variations in the properties of the conducting material?

My system is mostly early 1990s and consists of an Arcam Delta 90.2 integrated amplifier, Pink Triangle LPT turntable (with RB300 and Grado Green), Cambridge Audio CD5se CD player and Rega EL8 speakers. I recently purchased some Black Rhodium cable from their stand at the Bristol show, hence my question. The Rega speakers have a very simple crossover with single terminals. Should I fit the Black Rhodium internally between the crossover and drive units?

My last question refers to solder: I am sure many of your readers also solder their own cable terminations and I wondered if you could recommend a good quality solder and supplier that won't degrade the signal quality?

**Andrew Simpson**

Hi Andrew. Generally, yes you should ensure that all loudspeaker internal cabling is of good quality and that any push-fit connectors are replaced with soldered joints. No harm in removing the crossover and mounting it externally too, if you can manage it.

Maplin sell a silver solder where silver is alloyed with Tin and Copper (Ag/Sn/Cu). It has a higher melting point than traditional Lead (Pb)



**Cambridge Audio Azur 640P phono stage - a budget bargain, complete with warp filter.**

alloys, but these days you are advised to avoid solders containing Lead, or especially, Cadmium (Cd), both of which are toxic. I use a temperature controlled iron with temperature wound up a little. **NK**



**Maplins have a good selection of temperature controlled soldering irons and silver solder.**

### BIRTH OF THE COOL

Danny Kaye, Bert Weedon, Sydney Torch, Nellie Lutcher - I could go on. What an eclectic mix of records to illustrate the 'Birth Of The Cool' article in the March issue!

Last year I visited the WAD demo



**The Elberg MD12 rack mount phono stage - do they get any bigger than this?**

room in Writtle to audition a KiT6550 amplifier. One of the records I took with me was HMV C3572, 'Lullaby from Gayaneh', which heads your article. My jaw dropped when I saw it in the magazine; I played my copy through the system there. Those with a long memory may remember I banged on about 78s a couple of years ago, to redress the balance you should know that my KiT6550 is fed from and feeds to a PC hard disc via a Midiman Flying Cow 24bit AD/DA convertor as well as shellac, vinyl, CD and Minidisc.

What I would like to mention is my newish phono preamp, which I took to

Writtle with the Garrard 401. It's an Elberg MD12 (mark 2 for the pedantic); two disc inputs, switchable MM/MC with 3 MC loadings, 12 EQ curves, variable low pass filter and caters for anything from Edison's first cylinder to the Artic Monkeys LP I bought the other day. Handmade in Denmark, it'll set you back about the cost of a Whest Audio or Trichord Delphini, it has lots more LEDs, comes in a grey 1U professional rack case and has balanced XLR outputs. I love it, my LPs have come to life and 78s have never sounded better. Check out [www.vadlyd.dk](http://www.vadlyd.dk) to know more.

Moving on to old cartridges, I use Shure M44s with Expert Stylus Company tips for shellac, and an M55E for playing older/worn vinyl. The M44 is back in production for DJs, it's ideal for old records and really gets the best out of them, and it has enough output to keep my mono Leak system happy. The Shure M3D is also useful for shellac, but with the frequency response limited to 16kHz it really is a museum piece. It was all I could afford when I was at school, it now sits in a Lenco L70 arm on a Garrard 201B. Another museum piece for pleasant listening is the Pickering/Stanton Model 380A. You are right though, modern arms and cartridges are light years ahead of the

classics but don't throw them away; enjoy them in the right context.

Finally, my Arcam Alpha CD is waiting to take its place in the Leak mono system, so do I replace it with a Shanling CD-T80 or a Unison Unico CD? Hmmmm...

**Richard Zarywacz**

Ugh! I've used M3D, M44 and 55 and 75s in the past and hope never to back there! And early V15s were somnambulant. Shure's V15 VxMR was altogether another ball game though - but they've stopped making it! Shame. **NK**

Hope this month's Group Test helps you with your last question, Richard. We've found the Eastern Electric MiniMax CD to be obviously superior to the Shanling (although it is more expensive, to be fair) - so you'd probably do well to look in this direction - although as Patrick Cleasby said to me, the forthcoming Marantz SA7001KI Sig should put the cat amongst the pigeons... **DP**

### NEW PHONO

*I've been reading your magazine after getting back into vinyl after a 10 years of CD. I've got a Systemdek IIX900, Rega RB250 arm and I've just replaced the old Ortofon cartridge with a Goldring 1042 moving magnet. I'm using my old Arcam Alpha 6 amp lifier and KEF Q30 'speakers.*

*I've read that the phono stage on most amplifiers is not up to the job so I'm wondering if I should get a separate phono stage or replace my amp - or both. If so, I would like some advice on what to spend my money on. I will probably change the speakers soon as*

the lines of the new Revolver R45i floorstanders, and you've a brilliant affordable audiophile system. Won't take a minute! **DP**

### RADIO RADIO

*At last, recognition in a hi-fi magazine that good quality - nay very good quality - music is available to UK for a relatively low cost. I have been listening to the continental stations for many years, at first via a very heavily modified Uniden analogue Satellite receiver and then when they went digital I bought a secondhand Dig Sat receiver. Have been planning to "sort" it for some while now but your suggestion of outboard DAC makes better sense. Now to point of this missive, ARD, as you say, use up to 320kbps but your suggestion implies that 24/96 DACs that are around will do the job. My DAC uses CS8416 digital receiver and TDA1541A which allows up to 192kHz data but I cannot seem to get my head around the kHz-kbps tie-up which is annoying me as I find not understanding a "part" of something very frustrating.*

stripped out, reducing data rate. These days compression ratios of around 10:1 are common, giving a rate one-tenth that of the original digital signal, or 140kbps. Basically, any data rate is possible once you decide to 'compress' a digital signal; there is no link between original and compressed. How much data is thrown away depends solely upon the amount of quality degradation that is deemed acceptable by whoever is doing the compressing, often a broadcaster. Higher resolution digital codes, such as 24bit at 192kHz give much higher data rates than CD of course. **NK**

### TAKING THE TUBE

*After a year of enjoying the rewards having added a valve phono stage (Project Tube Box SE) to my set-up, I find myself tempted to switch my Musical Fidelity A300 to a valve integrated. The A300 drives my speakers well enough, but given the difference the Tube Box made over the A300's stock phono stage I can't help thinking tubes are likely to make all the music sources that much more enjoyable. Louspeakers are Martin Logan Aeon Is, sitting approx. 6ft from the back wall firing down the remaining 18ft of the front room.*

*Sources: Project RPM6/Sumiko Blackbird and sometimes a Goldring 1042, relocked Sony CDP-508ESD with external DAC (what a difference the reclock made; like the ugly duckling turned into a swan). Both sources have benefited enormously from Base SP01 and home-made isolation platforms (consisting of squash ball halves under a wooden shelf). I rarely feel the need for high volume levels, but I would like something powerful enough to drive my speakers effectively without running out of juice too soon. Ideally, I'd like a valve integrated or pre/power which also offers a remote. Budget is \$1,500.*

**Bernard Gibbes**  
Southern California



**Marantz PM7001KI Signature amplifier - a great choice if you want a good on-board phono stage**

*well as they are a bit knocked about and "er in doors" wants something new to polish*

**Martin**

Hi Martin - I'd go for the new Marantz PM7001KI Signature - it's an excellent mid-price integrated amp with - and here's the rub - a proper phono stage, which Ken Ishiwata tells me he is very proud of. I can hear why - it's not a cynical afterthought, but a brilliant boost an already excellent mid-price integrated. This should work a dream with your G1042, and I'd suggest you followed it up with an Origin Live Silver 250 tonearm, and then ultimately a Michell GyroDec SE. The Q30s can then be swapped for something along

*Many thanks for your articles "pushing" digital radio in all forms, even if I have a very large "black stuff" collection I can still enjoy good Digits.*

**Ken Betts**

Hi Ken. The TDA-1541 is an early Philips 16bit/44.1kHz convertor, but the CS8416 is a 192kHz receiver, so I am not quite sure what is going on there!

The data rate of a 16bit stereo signal (i.e. x2) at 44.1kHz sample rate is  $16 \times 44.1 \times 2 = 1.4\text{MHz}$ , or more accurately 'mega bits per second', abbreviated to mbps. If you put this data through a data reduction (aka compression) system, like mp3 or aac, a lot of so called redundant (i.e. inaudible) data (i.e. bits) is

No shortage of tube amps in the States methinks, Bernard. I have been impressed by Audio Research models like the sensible VS155; it has very good transformers, which are key to quality. Unfortunately, Audio Research believe totally in the 6550, which is rugged and reliable, but not so sweet. They are also prepared to scatter solid-state devices around, willy nilly, a practice I have reservations about. This includes bridge rectifiers.

A purer choice is the Quad QC twenty four preamplifier and II-forty power amplifiers. Here you get KT88s, which sound clean and fast, fed from a 5U4G rectifier tube. The preamp uses just a single twin triode. It's all very pure, yet practical and





**Audio Research VS155 tube amplifier - a mixture of old and new.**

very domesticated.

Neither of these will come in at \$1500 dollars though, unless you can buy second hand. You will have to consider a Chinese amp at this price and most, except Shanlings, have decidedly dodgy output transformers, so audition first.

Or - my final flourish of a suggestion! - World Design are about to bring out a new kit amplifier, based on KT88s, of course. If either you or a friend can wield a soldering iron I suggest you check this out first, as it is an Andy Grove design, including transformers of his design manufactured by the UK's best supplier. The first part of this feature will appear in our next issue. It should come in within your budget.

**NK**

### COME BUY WITH ME...

*I was lucky to acquire a good condition pair of NS1000Ms last year and am really pleased with the results after replacing internal wiring and crossover components.*

*However, I would also like to replace the terminals - they really are awful and do not encourage good connection. I've managed to connect my Nordost Red Dawn cables after some bodging but feel that proper terminals capable of taking banana plugs must be the answer - do you have any suggestions on this?*

*I currently play mainly CDs on a Sonic Frontiers 3 deck running through a TacT Millennium digital amplifier (also Nordost cables). Occasional source is LP with an old Rega 3/original S shaped arm (Acos derived?)/ Ortofon MM cartridge/Meridian phono stage with A to D conversion. On CD I feel that the music seems a bit flat and constrained at times (but a lot better with the Yams than my previous Dynaudio Contour 3.3s). Do you have any suggestions? What sort of amplification would you recommend/use with the Yams to get the best from them?*

*The CD player is quite old now and occasionally has problems reading discs - do you think a change would help? I am quite prepared to spend a reasonable amount of money to achieve a worthwhile improvement.*

*I would also like to upgrade my LP playing facilities or do you think the Rega 3 (with perhaps a new cartridge) is okay? It does concern me that my current set up means converting analogue (LP and FM) to digital for the TacT - surely this extra level of processing is inherently undesirable?*

**Henry**

What sort of amps to get the best from NS1000Ms, huh? As far as I'm concerned, that's a bit like asking what the answer to "life, the universe, and everything", is! I can honestly tell you that I don't know. Nothing, but nothing, I've tried does a complete job. I can recommend amps that have wonderful bass grip and fearless high volume driving capability (Musical Fidelity kW500), ones with brilliant midband sweetness and lyricism (World Audio Design 300B), ones that do an amazing all round job for not much money (Jungson JA88D), and so on! The trouble is that the Yams' unique drive units are the most

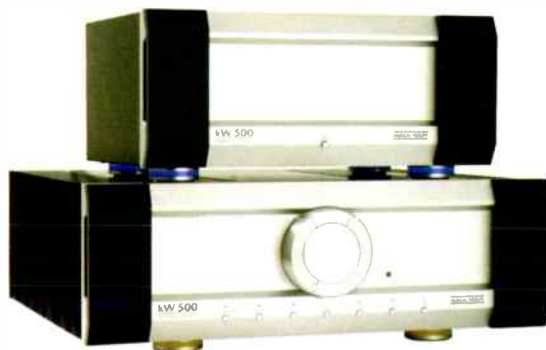
to have to come back at me with your music tastes and subjective sonic preferences for a truly accurate answer. Still, I would say that the TacT isn't up to the job, but nor are any of your ancillaries. You have - in some respects, and in my humble opinion - an exceptional pair of speakers, and they'll sound plain awful until you get your ancillaries sorted.

Okay, here goes then: Are you CD or vinyl centred? If vinyl gets any kind of a look in, I'd go back to an 'analogue' amp - one that doesn't convert all analogue ins (i.e. vinyl) to the digital domain. Start with a high quality vinyl source (GyroDec, SpaceDeck, Aurora, etc.), a decent arm (Michell TecnoArm, etc.), high performance entry level MC (Ortofon Rondo Bronze), and then you need a decent preamp; I'd recommend the Croft Vita, as it has an excellent MM tube phono stage, add a Graham Slee Elevator (to give MC input), then try a very clean powerful power amp like NuForce's Reference 9SE. Cables should be of the calibre of Townshend's Isolda DCT. This will give you a serious source; one that's much better than any CD front end (do you want the Yams to give of their best or not?). For CD, you're looking at Chord's DAC64 DAC and a serious transport, such as a classic TEAC VRDS. **DP**

### OVER SAMPLING

*I am very confused about a particular aspect of modern mainstream recordings on CD. Why are a number of artists making recordings with vinyl surface noise recorded onto the CD track? (for a very recent example, listen to Corinne Bailey Rae's debut album).*

*Also, a number of recordings I have heard start with the thud of stylus into groove, on a CD! Why? Is this practice some kind of "lets make the recording a bit retro and trendy sounding?" Or is it a case of "we accept that vinyl is better, so let's make this sound like it is being*



**Musical Fidelity kW500 - one way to drive Yamaha NS1000s.**

transparent I've ever heard, and they give you the A-Z of what the amp that's driving them is doing wrong, within seconds. In truth, you're going

played on a high-end turntable".

*As if that'll fool anyone! What's next to be overdubbed onto CD tracks? Tape hiss? The spit of an EL34 about to die?*



**Chord DAC64 - a great way to hear CD.**

The surface noise of a 78 played using a pickaxe? Perhaps a piece of digital grit making the track stick for a while (for hours on end on a dance track, who'd notice)? Maybe mono will make a return, or the ends of CDs will slow down as the gramophone spring unwinds?

I use vinyl and am well aware of all the quality/convenience/cost arguments between the black and the silver discs, I happen to be convinced that at its best vinyl sounds better, but like most people I also use CD, but I don't want these noises deliberately added to a modern, essentially well recorded CD. Can you shed any light on why this is happening? I just think it is daft, pointless and annoying.

**Pete Turnock**

What you've identified here Peter is a new-fangled music production practice called sampling; lots of young people do it, and it involves the transcription of their father's records onto computer hard drive, and then playing them back in all manner of pitches, tempos, loops and breaks! Given that many samples come from rosey, dog-eared old soul/jazz/disco records - often campaigned on the

Reading and Bracknell student party circuit 1972-74 - there's often a lot of surface noise and general grunge evident. Furthermore, certain young twentysomething recording artists (rightly) regard vinyl as totally cool (although they never grew up having to live with ever deteriorating LP surfaces and the risks of their manic younger brother snaffling them without consent). So to them, that snap, crackle and pop is kind of, well, romantic and charming. Ahh, the folly of youth! **DP**

**SPECIALIST REVIEWING**

Following your review in December's issue on the Net Audio Sonance DAC,

I purchased one, which I am extremely happy with. I would have to agree with your advice to a reader in January's edition, which compares the DAC's performance to be equal to a £3,000 CD player, therefore a bargain at £750.

I suppose what I am trying to say is, without your magazine I would never have discovered this little gem, and as a pleased customer will continue to buy your magazine on the basis of your inclusion of specialist item reviews.

**Steve McLaren.**

p.s. a few more valve amps please!

Thanks Steve. We try our best to review stuff - and often it turns out to be very 'specialist', because it blows up on the testbench, therefore restricting its charms to the select few (or none) who heard it before its output transistors (or suchlike) spontaneously decided to arc-weld their insides together. We get a puzzlingly large amount of kit like that, therefore we must be one of the world's leading specialist hi-fi titles? **DP**

**TWELVE INCHING**

Hi David

I'm the friend of February's "Letter of the Month" writer. I replaced the dome midranges of my Yamaha NS1200s with cone drivers, which evoked a "ho hum" from you.



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I don't know if you are familiar with the NS1200s. They were Yamaha's flagship model and addressed many of the NS1000's compromises, notably in the bass, but are also smoother and even more accurate than the NS1000s, which are certainly very accurate, as you'd expect from a speaker that was designed as a studio monitor.

Before I go on about the Yamaha's, let me tell you about my three main speaker systems, in order to establish my credentials. I have a custom made active three-way using the famous Axiom 80 in it's ideal frequency range of 150Hz - 8kHz with a Yamaha 15" bass driver and a Yamaha compression tweeter, both from the 1980s Yamaha pro audio line. Just as many are (re)discovering the excellent engineering of Japanese analogue equipment of the last 20 years, I'm sure that the Yamaha



### **Spendor BC1 loudspeakers - big for the computer!**

pro audio gear will soon be recognised as some of the most superlative speaker designs of the last 30 years.

I also have a pair of Spendor BC3s - good speakers but fantastic bi-amped with a pair of high damping factor, high power power amps.

Next up is a pair of \*\*\*\*\* electrostatics with a custom bass speaker crossed at 350Hz. These cost as much as a good car back in the 70s and I don't really want to say much about them as I'm looking for another pair to see out my days. Oh, and I have a pair of BC1s on my computer, with a Lynx One soundcard and a set of vintage Williamson amps driving the BC1s, just for fun. And there's another two or three "classic" speakers around the place.

All of these systems are driven by a very good tube preamp with either solid state or tube power amps in a very

large room. I've been a hi-fi nut for 35 years and I like to think I know a bit about it. However I'm more of a music lover than an audiophile. I feel sorry for those who get into the audiophile rut and suffer from the horrible affliction of not really hearing their system as it really is, but are heavily influenced by reading too many reviews, lusting after high priced mediocrity, and putting others opinions ahead of what their own auditory nerves are telling them. This is very sad; music is a joyful, wonderful experience that should not be sullied or degraded by the ulterior motives of those imposing their will on others. I'm sure you agree.

Back to the dome midrange equipped NS1000s and NS1200s. As you know, these were built to be studio monitors, and a more accurate speaker would be hard to find. The 1200s have the same gold script logo on them as the Yamaha grand pianos, and I wouldn't be surprised if the Yamaha piano team wasn't conscripted into the design of the 1200s- I've never heard piano so faithfully reproduced as through the 1200s. No doubt this is due in part to the mid range dome - it's a big, soft silk design that has all the detail and vividness of the 1000s beryllium driver but without the slight hardness the 1000 can suffer from.

The carbon fibre bass driver of the 1200 compliments the sound. Awesome bass, but only when it's on the recording. But these speakers don't image well! I know you passionately disagree, so let's determine exactly what imaging is. To me it's the perception of width, depth and height of the musical presentation, so the old term "3D" suits as a good description. The soundstage should be evenly spread across the vertical plane with no emphasis towards or from either speaker, i.e. the speakers should completely disappear. If it is a group of say four musicians with a vocalist centre, then the vocalist should not be heard coming from either speaker. This is the Yamaha's only failing - the speakers do not disappear- you cannot help but notice that the speakers are the obvious source of the music. There is still a good sense of a soundstage and the vocalist is obviously meant to be centred but it's not a satisfying illusion.

Replace the Yammies with a pair of BC3s, with these "difficult" speakers driven by four good amps. Now these speakers really disappear. All that is left is a glorious soundstage that is seamless in every plane - width, depth and height. To really illustrate this get hold of an early recording which used a 3 track tape deck. The vocalist was usually given the centre microphone and these recordings make for a "you are there" soundstaging. But played through the Yamahas it reverts back to simple stereo

with no real sense of the centre track. Damn accurate and lots of detail- just what you want for a studio monitor, but in the home the Yamahas are ultimately boring. They're very capable but there's no magic - no illusion. And in my 35 years of playing with speakers I've found every dome midrange to do the same thing.

Any good speaker designer will tell you it's a phase related thing and overwhelm you with science. The Yammies spread the sound, but they don't do it in a phase coherent fashion that recreates a realistic soundstage. I replaced the midrange domes in my 1200s with Fostex cone drivers and the result was quite different - great imaging and soundstaging with seamless response. Now the speakers disappear as they should do.

No they're not perfect- the paper Fostex cones are a little too forward, and I'm looking to find an even better alternative, maybe a ceramic or carbon fibre midrange. It's quite a difficult search as the driver has to match the response, sensitivity and impedance of the midrange dome. And I do have another pair of NS1200s left as original- that unerring accuracy is quite special and I use them occasionally when I want the nth degree of resolution (without the illusion of imaging). It's interesting that the British audio press are re-discovering the great equipment of the 70s and 80s that they so eagerly dismissed back then. Witness the numerous articles on Japanese analogue gear in Hi-Fi World over the last few years. I urge you to maintain the same open mind in the assessment of how and why we listen to each type of loudspeaker.

**Michael Malaney**

Therein lies the rub Michael. Much exotica never got washed up on UK shores and, in conjunction with the undoubtedly closed minds of many traditional Brit scribes (most of whom are now out to pasture) is the reason it was never appreciated here. Even now the UK market isn't big or valuable enough for many Japanese companies to bother with when it comes to real high-end. The U.S.A. and Germany are higher priorities.

**NK**

Well, let's agree to differ, shall we Michael? The NS1200s were a smoother and more couth sounding speaker (I'd say more 'Radio 2', in the perjorative sense), and less fussy in 'real world' conditions. But the 1000s can be very, very couth indeed - it's just you have to have an amplifier able to do the job right in the first place. I also disagree - I've got the NS1000Ms disappearing into the recorded acoustic - just use a serious

valve amp and vinyl, and there's suddenly invisible, and sweet and smooth too. The valve amp I've had great success with, in these respects, is a modded World Audio K5881 - but don't expect kick-arse bass transients; I've not heard any valve amps do this. **DP**

### SAND BLASTING

Could I hasten to offer Steve (May issue, Letters, page 105, "sand and deliver") some reassurance about his Mission M73 loudspeakers? I've used M73s



**TDK's S80 NXT loudspeakers - great for computers.**

in three systems now, one for a friend, one for my son, and my own. All have been filled with dry sand nearly up to the filling hole (about 9kg) whereas NK used about 12kg when he reviewed the M73 so favourably for the June 2001 issue. Friend and son say everyone who has heard their systems has been highly impressed, as have I - and we're talking discriminating folks here.

Attention to the following points is essential IMHO: Make sure the sand is dry. If it isn't completely free-flowing it's too wet for your expensive boxes.

The speakers' spikes must be used and must be adjusted so that there's not the slightest rock ability (pennies or, better, spike pads (see eBay) are excellent on stiff wooden floors - I haven't tried paving slabs.

Don't use the metal plates supplied to link the treble and bass inputs - two banana (4mm) plugs per speaker cable conductor, spaced 20-25mm apart, sound much better.

My impression is that the above measures make bass notes appear from a silent background (apart from any recorded acoustic), which could just be that of which Steve's complaining. Hope this helps. BTW, how on earth does one remove the blessed drive units?

There must be a quiet majority of readers whose taste outstrips their wallet, as mine does mine, and I hope we all appreciate your attention to our end of the wonderful world of audio. Are the Creative Cambridge Soundworks Digital and the TDK S-80 still the greatest affordable stereo computer speakers and which would work best with my "awesome" Yamaha WF192XC

soundcard?

Could I also put in a plea for any UK retailer of Dale RN60 resistors to make him/herself known? They're a cost-effective substitute for Vishay-Dale bulk foils where the quantity required precludes use of the latter. Mouser.com in the U.S. is the only source I know, but they have a high minimum order value. Cheers for the ever-fascinating mag. I didn't like the SP25 either!

**Keith**

Thanks for that Keith - I didn't like

the SP25 either too- but I'm sure there are three readers out there who've modded it and it now betters a Nakamichi Dragon turntable by a mile, and I'm even more sure they're going to be writing in about it until the very end of printed media itself... A quickie on your computer speakers - the TDK S80s are still around (just), having been superseded in Japan at least, and still a massive bargain in the mould of the Sonic Impact T-Amp. Buy now while stocks last! **DP**

### BUDGET BLOCKBUSTERS

Congratulations on an excellent magazine this month (May)! The Group Test just goes to show what can be done with limited funds - I was particularly intrigued by the Rega based system you assembled. However, you made no mention of cabling in your article. As this, presumably, is important for the synergy of the system, I would be interested to know what speaker cable you used. Also, I think you gave the price of the complete system at just over £1000. What about decent stands for the M.A. Radius 90s? And, of course, the speaker cable. I imagine £1,200 is nearer the mark...

**Rob**

Well, alright Rob - you've got me there. Actually, I didn't mention the stands because I blu-tacked the MA Radius 90s atop my Yamaha NS1000s. I've also used them blu-tacked to a window ledge, where they worked brilliantly too. In truth, if you really don't have anything big and solid to hand to blu-tack them to, you'd be

looking at a very heavy, mass loaded stand, about 24" high - Partington Dreadnoughts would fit the bill nicely, although I suspect that virtually anything would get nice noises with them. One of the joys about speakers the size of a postage stamp is that there's very little of them to resonate and wobble around - and the result is that they're quite inert in the room.

As for the loudspeaker cables used, well I just happened to use Townshend Isolda DCT - which is stupidly expensive in the context of the system - I'd go for Chord Company Odyssey 2, which is still pricey but you won't need many metres of it and it's not quite in the 'lottery winner' price bracket. **DP**

### THE MOD SQUAD

The Shanling CD-T80 sounds even better if the op-amps are replaced - it is possible to use very high quality precision OPA627 op-amps - plug in replacement boards are available, each with two surface-mount OPA627s (as the OPA627s are single devices and the standard op-amps in the CD-T80 are dual devices). I had to order mine from the 'States and three modules plus carriage cost about £100. They were worth every penny, having much greater effect than changing the valves. I honestly couldn't hear a difference when changing valves to NOS RCA 5670s and I couldn't hear much difference immediately when I changed the op-amps, but by the second evening all my CDs just started to sound so much better!

**Fergus Casey**

Thanks for that, Fergus - this month's CD modding feature done in conjunction with Audiocom has been a real ear-opener for yours truly. It's interesting that vinyl junkies obsess over the minutiae of everything in their decks (to wit: LPI2 suspension grommets), but CD-ers have very little real control of what's inside their machines and what isn't. Companies such as Audiocom are changing all that - all power to their soldering irons, so to speak! **DP**



**Replacing the output valves in Shanling's CD-T80 can alter the sound, but let them run in.**



# MOST VITAL COMPONENT

Back in the 70's, when LP12's were king, there was this theory put about by Linn that the front end was the most important part of the hi-fi chain, and providing that was right, the system would sound great. While accepting that there is some truth in this, I have never full agreed and from experience know that speakers are the most critical component. Invariably, when visiting customers to sort out their problems, it is invariably the speakers which are the problem, though they generally blame the amplification. There are not many great speakers out there, which is why, visiting Hi-fi Shows, I only really concentrate on speaker manufacturers demo's, in the hope of finding something special. There was no doubt that at the Las Vegas Show in January the best sound came from the Nola Pegasus and Viper IIA demos, and at the recent Bristol Show was glad to accept a 'Product of the Year' Award from Hi-Fi+ Magazine for the Pegasus (see [www.nolaspeakers.com](http://www.nolaspeakers.com)).

I don't have those on demo yet as they are a bit pricey and large for the average British home, but the smaller Viper's are on demo. Another great range is that from AV1 (Neutron IV, Pro-Nine +.Duo.Trio.Brio). ([www.av1hifi.com](http://www.av1hifi.com)) of which the first three will generally be on demo. So if you want something out of the ordinary, do give a ring, or send an e-mail

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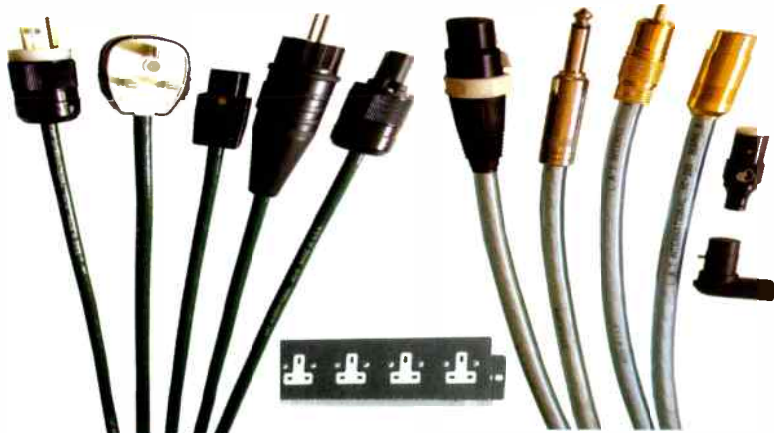
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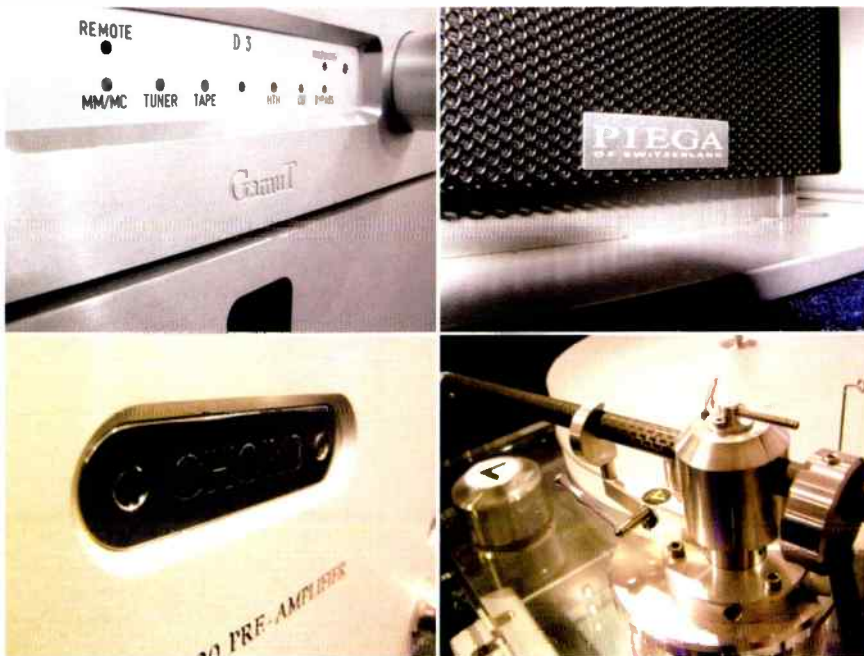
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Audio Synthesis DAX Decade 22 Bit Balanced S/H	3500	1799	JM Lab Sib XL x5 Grey S/H	1000	650
Audio Synthesis DAX Decade 22 Bit Single ended S/H	2999	1499	Martin Logan Aeon I Oak BNIB	3189	2500
Mark Levinson 37 CD Transport S/H	5495	2299	Martin Logan Clarity Cherry 4 months old S/H	2498	1999
Meridian 206 CD Player S/H	N/A	379	Pen Audio Rebel 2 x-demo	995	699
Musical Fidelity Nu Vista CR 3D Player S/H	2999	1699	Rega ELA Cherry X-demo	749	499
Musical Fidelity X10D v3 S/H	300	199	Sonus faber Electro Amator II S/H	2995	1499
Orpheus labs One DAC with anagram x-demo	3150	1799	Sonus faber Ironwood Stands S/H	498	279
Primare V10 CD/DVD Player x-demo	795	499	Sonus Faber Leather Stands, fixed height, x-dcmo	310	199
Rega Jupiter CD Player x-demo	998	749			
Rega planet CD player x-demo	498	379			
Sony CDP X940 SACD Player S/H	549	299			
Theta Generation V Balanced S/H	6290	1799			
Theta Pro Basic II DAC with Oscom/Balanced S/H	2990	895			
Unison Research Unico Valve CD Player x-demo	1295	749			
Wadia 861B x-demo	6500	5299			
<b>Analogue</b>					
Audio Research PH3 Phono Stage x-demo	1699	999			
Crown Jewel Ltd Edition MC Cartridge 100hrs	2650	1499			
Benz Micro LP MC 300hrs S/H	1850	995			
EAR-Yoshino MC3 Step up Transformer S/H	825	499			
Lehmann Audio Silver Cube Phono stage S/H	2250	995			
Kuzma Stabi/Stogi S Turntable New& Boxed	N/A	1399			
Rega RB300 Tonearm x-demo	188	119			
Roksan Xerxes Alphason Xenon XPSII S/H	N/A	599			
Shun Mook Small record Clamp x-demo	600	375			
Triplanar VI Tonearm IC box x-demo	3500	1999			
<b>Preamplifiers</b>					
Audio Analogue Bellini Remote Preamplifier X-demo	625	449			
Audio research LS1 Hybrid Preamplifier S/H	1798	649			
Conrad Johnson PV10bL valve Preamplifier x-demo	1299	799			
Conrad Johnson PV14L Remote controlled valve x-demo	2399	1750			
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Mark Levinson No380 Preamplifier S/H	4999	2499			
Roksan DS4 Black PSU S/H	449	199			
Roksan L1 Line Preamplifier Silver S/H	2250	799			
Spectral DMC 30s Reference Preamplifier S/H	7600	4999			
<b>Amplifiers</b>					
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Audio Research CL60 Re Built S/H	N/A	1399			
Audio Research VM220 Valve mono Amplifiers x-demo	9000	7499			
Audio Research VT60 Re Valved S/H	1999	995			
Conrad Johnson MV60 SE Valve Amplifier S/H	2500	1895			
Densen DM10 Power Amplifier S/H	1300	495			
EAR-Yoshino 859 Integrated Amplifier (serviced) S/H	2440	1395			
ECS EA1 Mono Amplifiers (pair) S/H	6500	2999			
Electrocompaniet AW120 Dmb Stereo Power Amplifier S/H	2499	1399			
Electrocompaniet AW220 Stereo Power Amplifier S/H	1499	749			
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OCM 500 Soloist stereo power amp, awesome S/H	2700	899			
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Audio Pro Blue Diamonds Active S/H	995	549			
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Nordost Valhalla 1m Balanced Digital AES. EBU S/H	1680	899			
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Siltech HF10 G5 1m AES/FBU Balanced Digital BINB	340	199			
Siltech HF9 G3 1m AES/EBU Balanced Digital BINB	250	169			
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Siltech SPX20 0.5m IEC-Shuko Mains cable x-demo	199	95			
Siltech Octopus 8 Way Shuko 2.5M SPO 18M x-demo	499	279			
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Spectral MI330 2m RCA BINB	580	349			
Spectral MI330 MK1 4m S/H	800	395			
Spectral MI330 MK11m S/H	575	275			
Spectral MI-350 20ft Interconnect RCA-RCA x-demo	1400	799			
Spectral Z Chord III 2m mains cable x-demo	999	499			
Townshend Audio 2x 5m Isolda Bi wired S/H	1200	699			
Transparent Music Wave Bi Wire 2x8ft S/H	499	249			
Transparent Music Wave Super 2x 4.62m x-demo	2479	1499			
VDH CS-122 HYBRID 2x3m pair Speaker cable ex-demo	172	85			
VDH Goldwater 2x3m pair Speaker cable ex-demo	48	25			
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Rega radio 3 Silver X-demo	398	279			
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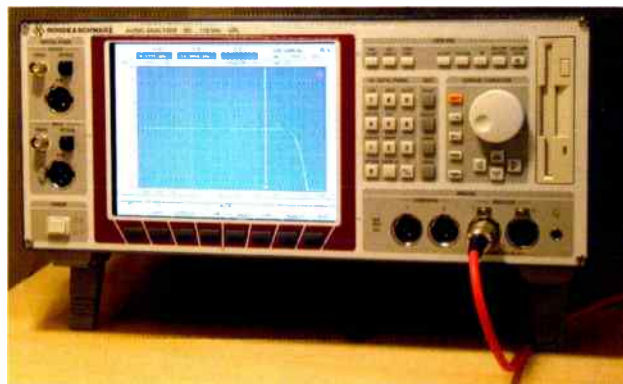
Hi-Fi World measures all incoming products before sending them out to reviewers and is unique in having such a rigorous vetting system. It reflects our dedicated approach to assessing audio equipment. Nothing gets by before thorough scrutiny.

In-house measurement is costly and time consuming, yet it has always been central to our belief that both readers and manufacturers deserve it, because there is no alternative if complex technologies are to properly assessed.

Measurement achieves many things. It ensures a product is working properly before it is subjectively auditioned. We pick up problems like loudspeaker drive units wired out-of-phase by accident, digital filters that roll-off in a bizarre fashion due to design error, a transmission line loudspeaker with no bass (!), amplifiers with excessive d.c. offsets, excessive jitter and all manner of other funnies.

Manufacturers published data is then checked against our measurements. There is usually little problem here.

The reviewer is then given the results. This gives useful guidance on what to watch out for in listening tests. For example, if three CD players use the same chip set they may well sound much alike in their basic attributes, if not identical. This is useful information for a reviewer.



Hi-Fi World uses a range of test equipment from around the world, including a Rohde & Schwarz UPL for testing CD and DVD players. Amplifiers are tested with 8903B Audio Analysers from Hewlett Packard. Loudspeakers are measured with a Bruel & Kjaer measuring microphone and Hewlett Packard 3561A spectrum analysers. We use three of these for basic test work and to ensure our listening room and conditions are balanced. Tuners are measured with a Leader 30125 Lab generator and Marconi 2015 RF generator, plus external MPX filters and equalisation.

We continue to upgrade our testing to keep up with the latest standards, to ensure that both readers and manufacturers receive the most accurate information possible about the items we review. No one does it better than Hi-Fi World.

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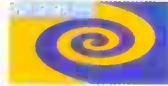
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Website: [www.progressiveaudio.co.uk](http://www.progressiveaudio.co.uk) E-mail: [dave@progressiveaudio.co.uk](mailto:dave@progressiveaudio.co.uk)

Established 1988

I have the following items for sale. This is an assortment of ex demonstration (ED) or secondhand (SH) equipment. Most of the ex dem pieces will carry a warranty and are generally in pretty much as new condition. Secondhand items too are generally in as new condition. Please call to ascertain exact details. Unless otherwise stated items will be in original manufacturers packaging. If an item needs to be sent then the carriage costs will be borne by the buyer.

1. SME Model 20 Mk 1 V/Transfiguration SH. One owner from new. £2950. No box.
2. SME Model 10. Brand new. Still in sealed box. Cancelled order. Special Price £2495.
3. Tannoy Dimension 12 loudspeakers. Cherry. ED. Virtually unused. £4500.
4. Innersound Eros 111 semi-active hybrid Electrostatic speakers. Maple side cheeks. Complete with 600 watt bass amp. Brilliant, Brilliant speakers. ED. (New price £7500) £5000.
5. Sugden Masterclass AA mono blocks. 150 watts Class A. Black. ED. £4500.
6. Sugden Masterclass pre amp. Black. ED. £1595.
7. Sugden Masterclass phono stage. Silver. ED. £950.
8. Tom Evans Vibe line pre amp. ED. £2700.
9. Unison Research SR1 hybrid valve amp. ED. £975.
10. Complete Chord Choral system including rack. Comprises Blu cd transport, DAC 64, Prima pre amp and Mezzo 50 power amp. Silver. ED. (Price new £11935) £9500.
11. Chapter Audio Verse 11 (NOT Plus) power amp. ED. £2250.
12. Roksan Kandy KA-1 Mk 11 Integrated amp. ED. £225.
13. Roksan Caspian CD player. SH. Some minor marks. £450.
14. Densen Beat B-400 Plus (DAC upgrade) cd player. ED but never used! Black. £950.
15. Densen Beat B-200 pre amp. ED but never used. Black. £725.
16. Densen Beat B-340. Power amp. New. Albino. £1500.
17. Densen Gizmo. I have two of these - both brand new in boxes. £150 each.
18. Moon i5 integrated amp. Black. No remote. Remotes are available separately from importer or me. ED. £2495.
19. LFD L51 lineage pre amp. Black. SH. No box. £1375.
20. Plinius SA102 power amp. Black. ED. £2995.
21. Plinius M8 pre amp. Black. ED. £1600.
22. Red Rose Spirit amp. ED. £695.
23. Red Rose Rosette amp. ED. Brilliant - especially partnered with R3 speakers. £1250.
24. Red Rose R3 speakers. Maple. SH. £1750.
25. Red Rose R3 speakers. Maple. ED. £1995.
26. Red Rose Rosebud 11 speakers. Piano Rosewood. ED. £2250.
27. Red Rose Spirit speakers. Rosewood. ED. £650.
28. Red Rose Spirit speakers. French Aframosia. SH. £700.
29. Proac Tablette 2000 speakers. Walnut. ED. £425.
30. Acoustic Energy Reference AE1 speakers. Gloss Black. With stands. ED. Very little use. £1850
31. Musical Fidelity A3CR pre amp. Silver/Gold. ED. £650
32. Musical Fidelity A300CR power amp. All Silver. ED. (unused) £1500.
33. Musical Fidelity A3.2 Integrated amp (last model) Unused. £650.
34. Consonance J5000 Plus 300B integrated valve amp. ED. £1095.
35. Consonance M100 Plus 300B integrated valve amp. ED. £1150.
36. Wadia 301 Mk 1 cd player. Variable output. Silver. ED. £2250.
37. Audio Synthesis Transcend Decade cd transport. Still up there with the best. ED. £2000.
38. Audio Synthesis Desire Decade power amp with Black Gate capacitor upgrade. ED. £2250.
39. Avid Diva turntable. No arm. ED. £975.
40. Audio Analogue Maestro. An absolute monster of an integrated amp. ED. £1995.
41. Audinote Meishu Line 300B valve amp. New 300Bs. One of my all time favourite amps!! ED. £1800.
42. DNM 3B Twin 2 box pre amp. SH (Cost new £3000) £1350.
43. Exposure XX111 pre amp. New. £995.
44. Exposure XXV111 power amp. New. £995.
45. Exposure XX11 CD player. New. £995.
46. Exposure 2010S CD player. New. £350.
47. Exposure 2010 (Not "S") power amp. New. £275.
48. Exposure 2010 (Not "S") integrated amp. New. £325.
49. Consonance Cyber 50 valve line pre amp. Mahogany top. ED. £725.
50. Consonance Cyber 40 valve phono stage for m/m and m/c. Cherry top. ED. £650.
51. Living Voice Auditorium speakers. Cherry. Black plinths. ED. £1250.
52. Audio Synthesis Passion phono m/c phono stage. £795.
53. Audia CD One cd player. Black/Silver. ED. £2750.
54. Audia Flight pre amp. Black/Silver. ED. £2750.
55. Audia Flight 50 power amp. Black/Silver. ED. £3000.
56. Vienna Acoustics Haydn speakers. Rosewood. ED. £400.
57. Vienna Acoustics Mozart speakers. Beech (one grille is broken) ED. £850.
58. Vienna Acoustics. Beethoven speakers. Black Ash. ED. £1500.
59. Anthony Gallo Reference 3 speakers. Black/Silver. ED. £1800.
60. Harbeth HL-Compact 7ES speakers. Birds Eye Maple. ED. £950.
61. Harbeth HL P3ES 11 speakers. Cherry. ED. £550.
62. Michell Technodek/RB250 turntable. New. £475.
63. Talk Electronics Thunder 3. 1B cd player. Fixed output. Silver. ED. £1450.
64. Talk Electronics Hurricane 3. 1B pre amp. Black. ED. £1350.
65. Talk Electronics Tornado 3. 1B monoblock 200 watt power amps. Black. ED. £2150.
66. Veritas "20" speakers with matching stands. Piano Black. ED. £995.
67. Veritas H3 Floorstanding folded horn speakers. 102db sensitivity Gloss Black. ED. Paul Messenger rated these as one of his products of the year when he reviewed them (cost new £5995) £3500. No boxes. £750.
68. Totem Model 1 speakers (not Signature version) Cherry. SH. £3000.
69. Chord Co Signature interconnect cable (RCA) 1m. ED. £350.
70. Chord Co Signature interconnect cable (RCA) 1m. New. £650.
71. Alon 1 speakers. Light Oak (cost new £1695) ED. £600.
72. Alon Petite loudspeakers. Walnut (cost new £1295) ED. £650.
73. Origin Live Encounter tonearm. Little use. ED. £350.
74. Proac CC1 Centre channel speaker. Mahogany. Slightly marked. ED. £1995.
75. PS Audio P600 Multiwave mains regenerator. ED. £350.
76. Audionote ANE/SpX speakers. Light Oak. ED. With dedicated MAF stands. £1500 Incl stands.
77. Audionote ANK/SpX speakers. Walnut. SH. £550.
78. Audionote P Zero 8 watt push-pull valve mono block power amps. Never used!! £400.
79. Audionote AZOne speakers (the original design) Never used. £250.
80. Proac Response 1.5 speakers. Black Ash. ED. No boxes. £750.
81. Meadowlark Swift speakers. Light Oak. ED. £550.
82. Philosophy Audio Gold Series speaker cable. 5m Bi Wire terminated with banana plugs. This cable is one of the very very best. ED (Cost new £1875) £1200.
83. Audionote AN-Vx Interconnect terminated with AN-P Silver phono plugs. 2m set. ED (cost new £1024) £650.
84. Musical Fidelity X-80. New. £275.
85. Musical Fidelity X-150. New. £495.
86. Musical Fidelity X-PreV3. New. £495.
87. Musical Fidelity X-150. ED. Never used - displayed only. £450.
88. Musical Fidelity X-80. ED. Never used - displayed only. £250.
89. Wheaton Triplanar MkV11 tonearm. With fly lead terminated with RCA phono plugs. Brand new and unused. Complete with manual and gauges. £2750.
90. Pathos Logos hybrid valve amp. ED. £2150.
91. Shanling CD1100 valve cd player. ED. £1250.
92. Isol-8 Powerstation 200 mains regenerator. 2 mains outlets. Perfect for cd players, phono stages and pre amps. Not for big power amps. ED. £995.
93. Quad ESL 63 electrostatics. Still a world class speaker. This pair are in Walnut, 25 years old but serviced by Quad within the last two years and in perfect working order. No boxes. SH. £750.

Lehmann LFD LivingVoice Lyr McIntosh Merit Michell Monopulse Musical Fidelity Music Maker



# private ads

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**T+A INTEGRATED amp**  
£1800. Audion Quattro Triode  
845 single ended monoblocks  
30 watts £1500 pair. Linn LP12,  
Ittok LVII arm, Karma car-  
tridge, £550. NHT sub-woofer  
system, active crossover, 250  
watts mono amp £600. NHT  
amplifiers 250w monoblocks  
£400. Tel: 020 8531 5979 (Jul)

WANTED: "RUARK Templar  
Mk2" loudspeakers. Fully veneered  
natural cherry, yew or oak. Must  
be in excellent condition. For  
Sale: Rega Alya loudspeakers, mint,  
boxed £175 Tel: 01943 463 510 (W.  
Yorks) (Jun)

TANNOY III LZs Monitor Golds  
£375. Ruark Sabres £150. Quad  
33, 303, FM3 £275. Sansui AU217  
II amplifier £70. Sansui TU200 FM  
tuner £30. Yamaha CA710 amplifier  
£50. Naim SBLs £600. All mint. Tel:  
01722 334 694 (Jul)

NAIM 3.5 CD Player £390. Naim  
42.5 pre-amp £95. Naim HiCap  
£245. NAP 90 power amp £190.  
Rotel RMB 1095 THX 5 channel  
power amp £700. All vgc. Tel: 0116  
241 5435 (Jun)

PAIR AVI Pro Nine Plus loudspeakers.  
Cherry. Boxed. Excellent. Cost  
£799, accept £470. Denon 260L  
tuner Mk1 £30. Tel: 01502 518 938  
(Jun)

WANTED: PIONEER PDR 609 CD  
Recorder. Must be unmarked and  
working perfectly. Tel: Dolgellau  
01341 422 111 (Gwynedd) (Jun)

QUAD ELS 57 speakers. Black  
grills. Breathtaking sound.  
Complete rebuild by 'One Thing'.  
Superb condition. £835 ono. Tel:  
01745 331 681 (evenings) or  
07714 530 889 (day) (Rhyl, North  
Wales) (Jun)

CHORD SIGNATURE intercon-  
nects. 1 metre £210. 1.75 metre  
£280. Russ Andrews Hi-Current  
Powerkord with Wattgate 350 IEC,  
6 feet, £80. Tel: 01752 773 369 (Jun)

FOR SALE: Rose RV23S valve pre-  
amp, new valves and tube rings.  
Mint, box and manual. £290 plus  
carriage. Rose RP190 power amp,  
70 watt, mint, box and manual.  
£200 plus carriage. Monarchy SM-  
70 Pro 25Watt Class A, mint, box,  
manual (£900) £420 plus carriage.  
Tel: 01903 247 779 (Sussex) (Jul)

AUDIO INNOVATIONS I000  
silver circuit monoblocks, spare  
valves. Audio Alchemy transport,  
V3 Dac, Power Station 4, Michell  
Iso phonostage, Hera Chord  
Chorus balanced 1 metre. Tel: Alan  
01395 275 698 evenings. (Exmouth,  
Devon) (Jun)

NAIM CDX2, 6 months old, plus  
XPS2 power supply, £2600. Naim  
Stageline MM with iSupply, 7  
months old, £150. Tel: 07714 216  
755 or 020 8647 7419 (Jun)

WANTED: NON-Working Quad  
33, 34, 44, FM3 or FM4. 303 or  
405. Also 405-2 boards etc. Don't  
throw them out. Contact Mike  
on 01758 613 790 with price. No  
dealers! (Jun)

QUAD ESL63 electrostatic speak-  
ers (with stands) also 'REL' 'Storm'  
sub-woofer. All in good condi-  
tion. £1000. Tel: 01502 563 175  
(Lowestoft) (Jun)

ORACLE PARIS £425. Audionote  
ANV £135. Kelvin Labs Class A  
integrated £285. Audionote/Snell  
K Huygen stands £150. Rata turn-  
table support £155. Valve amplifier  
(1950's) £195. Rehoeko RK125's  
part exchange RK115A Audio  
Exchange SP8 £850. VAC PA35/35  
£1695. Edison Twelve £200. Tel:  
0113 255 9475/257 0637 (Jun)

YAMAHA NS1000M, vgc, required  
internally. Fine example of this  
hugely capable speaker. £950 ono.  
Sugden A21a MM/MC, good condi-  
tion, £450 ono. Tel: 020 7609 5030  
anytime (Jun)

SUPERB JADIS JPL line level  
pre-amp. Recently checked and  
revalved. Boxed. Cost £4300. Ac-  
cept £1200. Pristine Meridian 101  
pre-amp, £100. Pioneer TX9500  
tuner, £125. REL Strata, £175. Tel:  
07729 620 621 (Jun)

WANTED: SHARP GF-777  
Ghettoblaster 4 band stereo radio  
cassette recorder double cassette  
player from the 1980's. Must be in  
mint condition, 100% unmarked, no  
signs of wear and no broken dam-  
aged parts, also fully operational.  
Offering £1400. Tel: 01865 378  
578 evenings 5pm-9pm or Email:  
fiskallen@aol.com (Aug)

EXPOSURE XVIII regulated mono-  
block power amplifiers. Exposure  
XVII stereo pre-amplifier £1200.  
Exposure X integrated £200. Tel:  
David 0114 268 5753 (Jun)

SIM 2 HY200 projector with iScan  
line doubler and ceiling mount.  
Sealed optics with three quarters  
lamp life left. All vgc with boxes,  
£1200 (£7200). Tel: 0116 241 5435  
(Jun)

MICHELL DECK Vista preamp  
Decca cartridge radio tuner Rotel  
speakers Swallow 200 watt power  
each Trichord Dino plus cables  
preamp remote control Russ An-  
drews mains cables interconnect  
cables. Tel: 01933 678 251 (Jun)

AUDIONOTE ANJ loudspeakers,  
oak, excellent condition, original  
packaging, £550. Tannoy 605, black  
ash, good condition. Offers. Tel:  
01256 763 981, Email:  
peter.larwood@virgin.net (Jun)

FOR SALE: Castle Stirling 3 speak-  
ers. Natural oak, excellent condi-  
tion, boxed, £330. Tel: 01248 853  
157 (Anglesey, North Wales) (Jun)

YAMAHA REFERENCE CD Player  
CD-5050 weight approx. 14kgs.  
Normal price £1,600, will accept  
£650. Technics Studio Version CD  
Player SL-PI200 (as used by the  
BBC) Normal price, £2,000 will  
accept £950. Can email pictures.  
Email:  
kykyriacou@yahoo.co.uk  
Tel: 020 83743958 (Jun)

NEW, BOXED, unused hi-fi for sale.  
Black Lumley Lapmros 100 MK  
II and T+A V10, white. Cost new  
£6600. For sale £5000-selling due  
to relationship/house problems.  
Jonqpr@hotmail.com or 07841  
114628 (Jun)

MICHELL ORBE with Iso  
phono stage. SME V. Cost over  
£4000. Accept £1750. Theta  
Chroma DAC. Cost £800.  
Accept £295. All excellent  
condition. Tel: 020 7722 3748  
or 07932 674 810 (London  
NW3) (Jun)

MICHELL GYRODEC with RB300  
arm, QC PSU and Shure V15VX  
£600. Hart Phonostage and PSU  
£100. Tel: 01202 884 148 (Jun)

LOTH-X BARD 'A' ultimate  
Lowther speakers. Mint condition.  
2 years old. Freq. 25Hz-22KHz. The  
only real full range Lowther. £4750.  
Very rare.. Tel: 07768 777 112  
(Northampton) (Jun)

ONE PAIR of Quad 989 speakers,  
Vintage finish. Bought 16 months  
ago and in pristine condition. They  
have had approximately 20hours  
use, and are absolutely awesome.  
Includes original boxes and litera-  
ture. Tel 07810 485137 or 01202  
694974 for more information. (Jun)



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# trade ads

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**M25 AUDIOJUMBLE.** Ashtead Peace Memorial Hall, Ashtead, Surrey, KT21 2BE. M25 Junction 9. Sunday 11th June, 11.00am. Tel: 07730 134 973 (Jul)

**VINTAGEWIRELESS COMPANY LONDON**

Website: [www.vintagewirelesslondon.co.uk](http://www.vintagewirelesslondon.co.uk)

Buy-Sell-Exchange.

Vintage Hi-Fi. Repairs,

Spares, Restoration. All valve equipment Wanted for cash: Tannoy, Quads, Garrard and audio valves. Please call us at 17 Bell Street, London, NW1 5BY.

Tel: 020 7258 3448

Fax 020 7258 3449 Email: [vwirelesslondon@aol.com](mailto:vwirelesslondon@aol.com)

(Jun06)

**AUDIOPHILE OBJECTIVE** for New, X-Display and Preowned Hi-Fi. Regular brands and some not so known. We're 5 miles south of Stansted airport in Sawbridgeworth. Free Parking. Tel: 01 279 724 024. Hi-Fi Purchased. (Jun)

**AUDIOPUBLIC.** 78 Otley Road, Headingley, Leeds, 0113 217 7294. Yorkshire's newest Hi-Fi retailer, stockists of Naim Audio, Rega Research, Conrad Johnson, Sugden, Dynavector. (cartridges and amplifiers) and many more. Please call for advice. (Jun)

**AMAZING CABLES** Solid silver interconnects from £110, with air / teflon insulation and WBT plugs. Silver speaker and mains cables from £250. Fantastic performance, refund guarantee. Tel: 0115.982.5772 after 7pm, Email: [bob@skydivers.co.uk](mailto:bob@skydivers.co.uk) (Jul)

**VINYL LP's Wanted:** Folk, Blues, Jazz, Reggae, Soul, Rock, Classical. Good prices paid. Must be in excellent condition. Phone: 07941 220 296 Send lists to: [vwrecords@bigfoot.com](mailto:vwrecords@bigfoot.com) Website: <http://www.vwrecords.co.uk/> (Jun)

**AUDIO SHED.** Top quality hi-fi for sale. Beauhorn, Croft, Voodoo, Headlund Horns, Experience Filtration, H-Cap, Cut Loose Audio, Canary Audio, Omega speakers etc. Blackgates and Audio Valves also available. Please call 01923 828 765 or 07900 918 882 (Jun)

**BRILLIANCE SYNERGY** interconnects. Hi-Fi Choice - 'We like these cables alot'. HFW - Sound/£ ratio is superb' Digital, XLR, Video Interconnects and Speaker cables with DCT variants. Demonstration cables available. Contact Mike on 07963 117 341 [www.brilliancehifi.co.uk](http://www.brilliancehifi.co.uk) (Jun)

**CORK TURNTABLE MATS** are recommended by the HiFi press as an effective turntable upgrade Vinyl Alignment offers a high quality Cork Turntable Mat at only £27.49 from [www.vinylalignment.co.uk](http://www.vinylalignment.co.uk) [enq@vinylalignment.co.uk](mailto:enq@vinylalignment.co.uk) 01274 428070 (Jul)

**RARE, DELETED** and new vinyl records for sale. Free monthly 20 page catalogue. 1000s of vinyl LPs. 99% ex to mint condition. 60's & 70's Rock, Jazz, Folk, many "cult" artists & as well as "names". Do not miss out. Write or phone: Sugarbush Records (HFW), 8 Hawkenbury Road, Tunbridge Wells, Kent, TN2 5BJ, UK. 01892 541 746. Or browse website: [www.sugarbushrecords.com](http://www.sugarbushrecords.com) (Jul)

**FOR SERVICE, Repairs, Upgrades and Re-Manufacturing** of all valve audio equipment. Leak Troughline specialists, re-aligned etc. For more info contact E.F.G. (London) Ltd inc. E. Gane and Son Est 1948 on 020 8743 2727 (Jun)

**-WANTED - EARLY HI-FI CLEAR CRYSTAL SYSTEMS**  
John Petrie-Baker  
Tel: 020 7328 9275

## CLASSIC CONTACTS

When a classic goes 'poof' your troubles have just started, but there may be a good ending. Replacing failing parts can improve the sound, so here is a short listing of all those companies who specialise in getting a classic up and running again after its deposited a small ring of soot on your ceiling!

**CLASSIQUE SOUNDS**

(Paul Greenfield, Leicester)  
ESL-57s restored, rebuilt, fully renovated or improved. Leak, Quad valves etc.  
Tel: 0845 123 5137 / Mob: 0116 2835821  
Email: [classique\\_sounds@yahoo.co.uk](mailto:classique_sounds@yahoo.co.uk)  
[www.flashbacksales.co.uk/classique](http://www.flashbacksales.co.uk/classique)

**GT AUDIO**

(Graham Tricker, Bucks)  
Leak Troughline specialists. Also Quad and most classic tuners, radios and amplifiers restored, repaired.  
Tel: 01895 833099 / Mob: 07960 962579  
[www.gtaudio.com](http://www.gtaudio.com)

**AUDIOLAB**

(Phil Pimblott, Leeds)  
Renovation, repair and restoration Specialist in valve hi-fi, radio transmitters, cinema amps, kit building.  
Tel: 0113 244 0378  
[www.audiolabs.co.uk](http://www.audiolabs.co.uk)

**QUAD ELECTROACOUSTICS** (Cams)

Quad's service department. able to repair almost all Quad products, from the very first.  
Tel: 0845 4580011  
[www.quad-hifi.co.uk](http://www.quad-hifi.co.uk)

**Dr MARTIN BASTIN**

(Shropshire)  
Garrard 301/401 restoration, renovation and service. Special plinths; rumble cures, etc.  
Tel: 01584 823446

**LORICRAFT AUDIO**

(Terry O'Sullivan, Bucks)  
Garrard 301/401 and their own 501 repair, spares and service.  
Tel: 01488 72267  
[www.garrard501.com](http://www.garrard501.com)

**LOCKWOOD AUDIO**

(London)  
Tannoy loudspeaker parts, restoration and repair. Also Epos and TDL loudspeakers.  
Tel: 020 8 864 8008  
[www.lockwoodaudio.co.uk](http://www.lockwoodaudio.co.uk)

**CARTRIDGE MAN**

(Len Gregory, London)  
Specialist cartridge re-tipping service and repairs. High quality special cartridges  
Tel: 020 8 688 6565  
[www.listen.to/thecartridgeman](http://www.listen.to/thecartridgeman)

**TECHNICAL AND GENERAL**

(East Sussex)  
Turntable parts - wide range of spares and accessories, plus arms and cartridges  
Tel: 01892 654534

**REVOX**

(Brian Reeves, Cheshire)  
Revox tape recorder spares, service and repair. Accessories also available.  
Tel: 0161 499 2349  
Email: [brian@revoxservice.co.uk](mailto:brian@revoxservice.co.uk)  
[www.revofreeuk.com](http://www.revofreeuk.com)

**SOWTER TRANSFORMERS**

(Brian Sowter, Ipswich)  
Large range of audio transformers for valve amps, cartridges, line drive, interstage plus all associated services.  
Tel: 01473 252794  
[www.sowter.co.uk](http://www.sowter.co.uk)

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# NEXT MONTH: PORTABLE ISSUE



July's Hi-Fi World is suitably summery. Hard to believe now, but come the hot(!) weather, we'll be wanting to listen to our music out and about, so we're doing a special on portable audio. We're rounding up a range of digital audio portables (yes, including the iPod!), plus a whole host of cool accessories for music on the move. For those who enjoy staying at home (always sensible if it's raining), we've also a great range of very high performance, small-sized hi-fi separates - which is proof positive that less is more. Here's just a selection of what we hope to bring you...

- Rio Carbon 6GB, iPod G5, Sony NWA-3000B & Creative Labs Zen MicroPhoto portables
- iPod Hi-Fi, Intempo iDS-01, Onkyo DS-A1 portable accessories
- Koss The Plug & Sennheiser MX-550 in-ear headphones
- Nu Force Reference 9SE monobloc power amplifiers
- olde worlde: Sony WM-D6C Walkman Professional
- Onkyo A-977 midi Class D integrated amplifier
- Philips WACS700 wireless music centre
- Linn 110 Komponent loudspeakers

plus:

- Monitor Audio GS60 Gold Signature loudspeakers
- Creek Destiny integrated amplifier
- Revolver RW45i loudspeakers
- Clearaudio Ambient turntable
- AAD C550 loudspeakers

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# TOMMY

## THE WHO

### 1969



**T**he first 'Rock Opera' - that is the tag attached to 'Tommy', The Who's magnum opus. After 'I Can See For Miles' flopped as a single in 1967 - a track Who vocal/guitarist and songwriter, Pete Townshend believed was the best single The Who had ever made - Townshend felt the next release was going to have to be special, both for the success of the band and because of the immense amount of debt the band found themselves in, the guitar smashing antics never helped the bank balance.

"We kind of recognised his talent," stated lead singer, Roger Daltrey, about Townshend, "as young as we were and as stupid as we were, we recognised that he was incredibly talented at writing his brilliant songs - and we left him alone to do it."

Looking around him, Townshend saw success being generated by The Beatles, Cream, Hendrix and the like and he thought, "what do I do with this bunch of reprobates? Keith Moon who thinks everything is a joke, John Entwistle who just wants to rub his nose and turn up his amp and Roger who was still pretty much a wide boy."

Townshend himself admits to being no intellectual at the time but he knew he had to come up with something so he decided to have a last effort. 'Tommy' was, therefore, a last ditch attempt to save The Who.

Townshend had been dabbling in concept song writing for fun and to learn about song writing. In fact, the first experiment was concluded

on the album, 'A Quick One'. 'A Quick One While He's Away' was Townshend's mini-opera and was about an engine driver who abuses a child in his care; although the theme is not an obvious one, the link to 'Tommy' was clear.

'Tommy' was created during 1968, a year of great cultural excitement and a ferment of ideas. Townshend felt primed for 'Tommy', especially as manager Kit Lambert's father was the music director of the Royal Ballet Orchestra and was able to teach Townshend about operatic form, cantatas and the like. As for the band, well they were always up for anything!

The original theme was about a boy who is thrown into a sort of autistic deaf, dumb and blindness and becomes a big spiritual leader in his community. However, friend of Townshend, rock journalist and pinball enthusiast, Nick Cohn, felt that the "God stuff" was passé. "In the previous months he and I had been out playing pinball all the time. I decided to tease him a bit and said, instead of 'Tommy' being a pseudo-rock star thing what about if he was a pinball champion? And Nick said, 'Now that would be interesting'."

The album itself is efficient, crisp and well mixed. This is illustrated well by the album's hit single, 'Pinball Wizard', with the acoustic guitar - showing Townshend's wonderfully loose, almost flamenco strumming style - mixed low, so when Entwistle's dramatic Wagnerian bass chord hits, it leaps out of the record (structured to compensate for the large amounts

of compression used in radio at the time).

The boundaries were certainly pushed when the album was released, but it hit the headlines before that. When 'Pinball Wizard' was released in March 1969. Without context, people believed that Townshend was, "writing a nasty song about deaf, dumb and blind kids. That attracted a lot of negative comment, which fell away when the album was released." Even so, Tony Blackburn banned it, which helped sales...

Recommended listening copies include the 2004 issue, two disc Hybrid SACD set featuring a 25 track CD remastered in 5.1 Surround Sound plus a 17-track bonus disk featuring previously unreleased outtakes and alternate versions with five additional stereo only recordings. Most CD versions are pretty poor. However, the single CD release on MCA is a decent master.

On vinyl, there was a 180gm release via Simply Vinyl, but this is not the best of masters. In fact, the original release on Decca USA is the best vinyl recording. Check out Esprit (eil.com) for possible stock. Finding an original in good condition is difficult, though. Next down the ladder is the original German version, then the UK and then the Japanese release. One note for despairing vinyl lovers, Classic Records ([www.classicrecords.com](http://www.classicrecords.com)), which has a good relationship with Pete Townshend, appears to be in the midst of releasing many Who albums. 'Tommy' has yet to be released but this label should be monitored, just in case. **PR**



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